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Dear Debra:

Faro Mine Complex: 2009 Groundwater Investigations

Please find attached the FINAL version of the Faro Mine Complex 2009 Groundwater Investigations report.

It was noted in the DRAFT report that water quality data sections would be updated and reviewed by Robertson GeoConsultants (RGC) following completion of their 2009 groundwater quality review. However, the RGC review was not completed in time for the inclusion of those results in the FINAL version of the SRK 2009 groundwater report. Therefore, water quality for 2009 drill holes in certain areas, such as the Cross Valley Dam and ETA, have not been integrated with larger water quality data sets and broader hydrogeologic conceptual models.

The integration of these data sets and hydrogeologic conceptual models may improve the understanding of the groundwater flow regimes in some of these key areas. SRK recommends this task be undertaken in the 2010/2011 fiscal year.

Yours truly,

SRK Consulting (Canada) Inc.

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Senior Hydrogeologist

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FMC160

Faro Mine Closure
Fermeture de la mine Faro

Faro Mine Complex
2009 Groundwater Investigations

Prepared for:

Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

and

Yukon Government

Prepared by:

SRK Consulting
Engineers and Scientists

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February 2010

Faro Mine Complex

2009 Groundwater Investigations

Yukon Government

Assessment and Abandoned Mines
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SRK Project Number 1CY001.034

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Executive Summary

A field program was conducted by SRK during the late summer of 2009 to provide groundwater information for eight locations at the Faro and Vangorda/Grum mine areas and to install a groundwater well to supply non-potable water to the Guardhouse for personnel involved with site care and maintenance. Reporting of the Guardhouse water well installation and testing is provided under separate cover. The other locations, which are described within this document, were identified during discussions with various parties (ie. YG, the TAT, the IPRP and SRK) as having gaps in groundwater or geologic information that, if filled, could improve closure planning and engineering or provide valuable groundwater monitoring information. Objectives, conclusions and recommendations for each of the eight areas are provided below.

Cross Valley and Intermediate Dams (CVD/ID) – The objective of this component was bedrock groundwater characterization. Three inclined drill holes were completed to characterize bedrock below the CVD, which are from north to south, P09-C1, C2 and C3. Monitoring wells were installed in P09-C1 and P09-C2. A monitoring well could not be installed in P09-C3 due to drilling complications. Depth to bedrock was greatest at the southern-most drill hole (56m at P09-C3). Overburden at depth in P09-C3 was dominated by fine sand, possibly with boulders and gravel immediately over bedrock. Bedrock hydraulic conductivity ranged from average lows of about $5x10^{-8}$ m/s to local zones with values greater than $1x10^{-5}$ m/s. A highly permeable zone was identified at depth in P09-C3, with a value of about $2x10^{-4}$ m/s. No significant structural features were identified in the bedrock. Water quality data indicates that bedrock groundwater on the northern side of the valley is impacted by contaminated waters. Water quality at P09-C1 is impacted by contaminated seepage, though not to the same magnitude as overburden waters. Water quality at P09-C2 has low sulphate concentrations but sodium and alkalinity may indicate contributions from process water and, hence upgradient impacted waters, but that the sulphate plume has not yet arrived. Water quality from deep bedrock in P09-C3 has elevated zinc but repeat sampling cannot be completed due to the monitoring well position. Total bedrock sulphate load is significantly less than overburden load, as is bedrock zinc load. Despite multiple attempts, drill holes below the ID did not reach bedrock due to heaving sands. All drill holes attempted below the ID were grouted to surface.

For the CVD/ID area, it is recommended that consideration be given to further bedrock testing if the final SIS alignment is not along the toe of the CVD. SIS closure engineering should consider the depth to bedrock, particularly on the south side of the valley. If the elevated zinc concentrations from deep bedrock at P09-C3 cannot be ruled out as indications of impacts from upgradient waters, additional drilling to delineate these waters is also recommended. Pumping tests using the overburden pumping wells should be completed to assess effectiveness in terms of bedrock hydraulic control. The 2009 monitoring wells should be included for routine groundwater sampling.

ETA – The objective of this component was characterization of hydraulic properties and water quality within bedrock and natural overburden at the mouth of the Faro Creek canyon to assess the bypass of the current ETA interim seepage interception system (SIS). One inclined drill hole was

completed in bedrock (P09-ETA1), one vertical drill hole into natural overburden (P09-ETA2) and a third vertical hole (P09-ETA3) to assess depth to bedrock away from the other two drill holes. Monitoring wells were installed in P09-ETA1 and P09-ETA2. Bedrock hydraulic testing indicated generally very low hydraulic conductivity (mostly less than $1x10^{-8}$ m/s) and no significant geologic structures were identified. Natural overburden is thin, no more than 2m thick but highly permeable, under about 16m of tailings. Bedrock water quality shows low concentrations of sulphate and zinc. Overburden has high sulphate and zinc concentrations, with sulphate load on the order of 300 tonnes/yr and zinc load on the order of 5 tonnes/yr. Load estimates indicate load has or is bypassing the ETA interim SIS within the natural overburden unit, though not in bedrock, at least where tested.

For the ETA, it is recommended that: monitoring wells P09-ETA1 and ETA2 be added to the list of regular groundwater sampling locations; seepage interception in the ETA be improved to provide better capture efficiency; the removal of the tailings from within the bottom of the Faro Creek Canyon should be considered as part of the development of the final detailed closure plan.

S-wells – The specific objectives of this component were completion of a performance assessment of the S-wells SIS and determination of the need for additional monitoring. The performance review of the S-wells SIS indicates that the system is capturing significant load, but modifications to PW3, the primary trench pumping sump, would be required to improve hydraulic control. It was also recognized that additional groundwater monitoring was required down gradient of the SIS to monitor and fully evaluate system effectiveness. As part of the 2009 field program, six monitoring wells were installed below the SIS. Geologic data suggests that the SIS intersects the Shallow Aquifer except at its eastern end. Modifications to the S-wells SIS were undertaken during the 2009/2010 winter season to improve drawdown and extend the interceptor trench to the east. Performance data before and after the SIS modifications indicate that modification activities have improved hydraulic control in the Shallow Aquifer, and that Deep Aquifer interception at PW2 is working but could be improved by replacement of PW2 with a deeper screen and installation of a second pumping well near PW2. Additional water quality data from down gradient monitoring wells and the NFRC will be required to determine if load to the NFRC has been reduced.

For the S-wells area, it is recommended that: monitoring wells SIS1 to SIS6 be added to the list of regular groundwater sampling locations; performance reviews be completed annually to assess system effectiveness over time and provide input to the adaptive management process. Flow monitoring on the NFRC, at least at station X2, should be improved to allow better assessment of NFRC load. The current SIS setup should be monitored for at least one year to allow determination of effectiveness.

Grum Slot – The objective of this component was to determine characteristics of the overburden – bedrock interface for assessment of maximum allowable elevations that the Grum Pit lake should be allowed to reach during closure. Historically, it has been assumed that this interface is permeable and, thus, the pit water level should remain below the interface. Two drill holes were completed in the Grum Slot, one into the overburden and one into bedrock. Hydraulic testing data suggests that

the interface and overlying sediments are permeable, but water levels in both overburden and bedrock are higher than the pit water elevation, similar to the standing water in the Grum Slot. The presence of a groundwater mound under the Grum Slot creates a hydraulic barrier to flow from the Grum Pit. The Grum Pit water level could be allowed to rise above the previous AMP elevation of 1213.4 masl to an elevation less than that of the Grum Slot (~1227 masl).

Water quality in the overburden shows relatively high concentrations of zinc similar to Grum Pit water quality. Bedrock has lower zinc concentrations. Standing water in the Grum Slot shows slightly elevated sulphate concentrations but very low zinc concentrations. Relatively high zinc concentrations in overburden may be derived from fill, much of which was observed to have high pyrite content and may be waste from mineralized zones.

For the Grum Slot, it is recommended that: P09-GS1A and GS1B be sampled again to provide better confidence in water quality numbers, but not more than once per year; consideration should be given to routing a clean water source into this area if necessary, to support the high hydraulic head providing the barrier to flow from the Grum Pit. Consideration may be given to increasing the Grum Pit water level, as long as it is below the elevation of the Grum slot standing water. The possibility of changing the maximum allowable Grum Pit water level will have to be considered in terms of predicted Grum Pit water quality and risk of release to the environment, but could allow significant additional storage capacity within the Grum Pit.

Little Creek Dam – The objective of this component was groundwater characterization below the Little Creek Dam. Seven drill holes with monitoring wells were completed below the toe of the Little Creek Dam (P09-LCD1 to LCD7). The geology is heterogeneous, with zones of high permeability sand and gravel interlayered with lower permeability silty units. Groundwater flow is estimated to be about 5 L/s. Groundwater quality shows relatively low concentrations of sulphate and zinc and groundwater under the dam currently carries minor load.

For the Little Creek Dam area, it is recommended that five monitoring wells (P09-LCD1, 2, 3, 4 and 6) be added to the list of regular groundwater sampling locations.

Vangorda Creek – The objectives of this component were characterization of bedrock and overburden groundwater conditions underneath and around Vangorda Creek, below the mine access road, and survey of flow and water quality in Vangorda Creek. Two drill holes were completed immediately down gradient of the mine access road, one to characterize bedrock (P09-VC1) and one for overburden (P09-VC2). Bedrock drilling identified no geologic structures and only moderate bedrock permeability, ranging from about $2x10^{-7}$ to $7x10^{-7}$ m/s. A permeable sand and gravel unit was identified overlying bedrock. Water quality in both the bedrock and overburden shows low concentrations of sulphate and zinc, though slightly higher in overburden than bedrock. Groundwater zinc and sulphate loads in this area are minimal.

Groundwater elevations indicate a gradient towards the Vangorda Pit, but if the pit water level reached a high enough elevation, flow towards Little Creek Dam, within the basal sand and weathered bedrock unit, would be possible.

The recent Vangorda Creek flow and water quality survey indicates that loading to the creek is occurring, but can mostly be explained by inputs from small surface water drainages below the Grum Pit and seepage from Moose Pond. An increase in zinc load upstream of Moose Pond was identified, but the source is uncertain. A high concentration, low flow source, such as a minor seepage from the Vangorda Dump could cause the observed increase in load, but the presence of such a source has not been identified.

For the Vangorda Creek component, recommendations are: monitoring wells P09-VC1 and VC2 should be added to the list of regular groundwater sampling locations; additional flow and water quality surveys should be completed along Vangorda Creek to determine if the observed zinc load increase is real and, if so, provide spatial guidance for identification of potential sources; consideration should be given to further subsurface characterization of the basal sand and weathered bedrock unit underneath the Vangorda mine access road and closer to the southwestern edge of the pit to determine the elevations and characteristics of this potential pathway for Vangorda Pit water.

Grum Dump West – The objective of this component was groundwater characterization in the vicinity of seep survey location SRK-GD13, immediately down-gradient of the Grum Dump, which in 2009 had sulphate concentrations of about 1,150 mg/L, zinc concentrations of about 0.1 mg/L and flows ranging from about 6 L/min during the later summer dry season to greater than 100 L/min during the spring. Three overburden drill holes were completed (P09-GW1 to GW3). Overburden thickness ranged from less than 1m to about 3.5m, lithologies ranging from sand and gravel to silty or clayey sand. At the time of drilling, significant water was encountered, but by August, when hydraulic testing and sampling occurred, all monitoring wells were dry, suggesting seasonal variation in water levels is greater than the depth of monitoring well screens, on the order of a few metres.

A stream survey was conducted in October 2009 by Laberge to assess surface drainage from this area. Water was not observed until a distance of about 200m below the dumps (station G1). Water quality at two stations showed elevated sulphate concentrations (~900 to 1,000 mg/L) and low zinc concentrations (0.0015 to 0.03 mg/L); the higher concentration being found at a distance of about 400m down-gradient of the dumps (station G2).

While concentrations are relatively low and the catchment size for this area is relatively small, results suggest seepage from the Grum Dump is the likely source of the loadings.

Recommendations for the Grum Dump west area are: monitoring wells P09-GW1 and GW3 should be added to the list of regular groundwater sampling locations for the spring only; consideration should be given to continuing flow and water quality monitoring at least at station G2 to provide better information regarding potential effects of dump seepage on surface water drainages over time.

Upper North Fork of Rose Creek - The purpose of this component was preliminary characterization of geology and groundwater conditions for use in engineering design for the re-alignment of the NFRC into a lined channel. Three drill holes with monitoring well installations were completed within the NFRC valley about 50m downstream of the confluence with the Faro Creek diversion (P09-UN1 to UN3), where the stream valley narrows to a width of about 25m. The NFRC valley alluvial materials have a depth of up to 12m closer to the valley centre, decreasing towards the valley margins and are permeable with hydraulic conductivity as high as $1x10^{-3}$ m/s. Shallow, discontinuous permafrost exists, but extents are uncertain. The NFRC is probably a gaining stream in the area of the drill holes. At the outlet, the sides of the valley are characterized as colluvial apron, heterogeneous colluvial deposits. Groundwater flow within the valley centre is estimated to be on the order of 6 L/s under natural conditions. Groundwater quality showed relatively low concentrations of sulphate and zinc, considered to be representative of background levels for this area. The proposed cutoff wall for the re-alignment of the NFRC seems reasonable.

Recommendations for the upper NFRC area are: one or more of the monitoring wells in this area be included in the regular groundwater sampling program, if additional background water quality is considered necessary and if the wells are not frozen; engineering design for the cutoff wall at the upper end of the NFRC channel re-alignment should take into account appropriate cutoff wall techniques for high permeability materials and consider groundwater management during construction.

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1 Introduction and Scope

This report presents results of the SRK Consulting (Canada) Inc. 2009 groundwater investigations at various locations (Figure 1) on the Faro Mine Complex, near Faro, Yukon. These investigations have been completed for the Yukon Government (YG) to provide groundwater information as part of the overall mine closure planning process.

The scope of work for this program was developed by SRK, the Faro Mine Closure Management Team (FMCM) and the Faro Technical Advisory Team (TAT). The scope included:

- Desktop studies to develop conceptual understandings of groundwater flow at the Grum Slot and Little Creek Dam areas.
- A performance assessment for the S-wells seepage interception system (SIS).
- Completion of a drilling program for bedrock and overburden hydrogeologic understanding at the following areas:
  - Below the Cross Valley and Intermediate Dams (CVD and ID, respectively);
  - Below the Emergency Tailings Area (ETA), near the mouth of the Faro Creek Canyon;
  - Along the toe of the western side of the Grum Dump West;
  - Within the Grum Pit slot;
  - Along Vangorda Creek, immediately downstream of the Haul Road and flume; and
  - Along the toe of Little Creek Dam.
- Drilling and installation of a groundwater supply well for the Guardhouse and laboratory facilities.
- Flow and water quality surveys along Vangorda Creek and surface water below the Grum Dump West area.
- Data analysis, development or updates to hydrogeologic conceptual models and estimates of flow and load for each area, presented in a final report.

During July, an investigation was added for groundwater conditions in the upper North Fork of Rose Creek (NFRC) area, near the confluence with the Faro Creek diversion. This work involved additional drilling and testing to provide information for input to engineering studies related to the overall closure plan, specifically, the NFRC diversion.

The report is organized as follows: a brief background of information and justification for each area, followed by a program description and methods section, summarizing what and how work was completed, followed by results. Results are presented by area.

Results of the water well drilling and installation are presented in a separate report submitted to YG: ***Faro Mine Complex, 2009 Guardhouse Water Supply Well Installation Report, SRK Consulting, November 2009***.

2 Background

While groundwater at the Faro Mine Complex has been the subject of numerous investigations as part of the mine closure planning, uncertainty still exists in certain areas in regards to existing groundwater flows, distribution of hydraulic conductivity and current, or potential, load from dumps and open pits. Each of the areas included in the 2009 groundwater investigation has been identified in terms of such uncertainty and considered of sufficient significance to require further data collection. The following summarizes background and justification for the studies included in this report.

CVD/ID – As part of the overall closure plan, a SIS will eventually be installed in the area of the CVD and ID. This SIS will likely be required to have very high capture efficiencies, thus the potential for bypass through the bedrock system needs to be assessed and potentially included in designs. All of the groundwater investigation that has currently been completed in this area has focused on overburden. The need for an assessment of bedrock hydraulic parameters, water quality and capture potential, has been recognized for the past few years.

A desktop review of bedrock structure and available hydrogeological information was completed by SRK in 2008 (SRK, 2008a). Recommendations for bedrock drill holes were presented. Multiple discussions were completed with the TAT and Faro Independent Peer Review Panel (IPRP) in 2006 to 2008 in regards to bedrock investigations. Bedrock drilling and hydraulic testing were recommended, but were deferred until the location of a SIS was more certain.

For the 2009 program, it was decided that initial bedrock drilling be completed, despite a final location for the SIS not being determined, to provide initial bedrock information for conceptual design purposes and baseline bedrock water quality.

ETA – Groundwater quality review and investigations in 2004 and 2005 concluded that the tailings in the ETA were, or had the potential to, add significant dissolved metal load to the Rose Creek Valley aquifer (SRK, 2006). In 2007, Deloitte &Touche, as Interim Receiver, installed a preliminary SIS below the ETA and mine access road, to intercept water and pump it back to the Faro Pit. This SIS operated during warm months only and, during operation, uncertainty existed in regards to how much water was bypassing the system through bedrock and whether or not it must be included in future interception design.

Additional investigation of bedrock water quality and hydraulic parameters was determined to be necessary. This information would be combined with surface water flow survey data to assess this need.

S-wells – In the winter of 2009, a SIS was installed in the S-wells area to intercept groundwater in the Shallow Aquifer, considered to be a significant percentage of waste dump seepage reporting to the NFRC, leading to a triggering of the Adaptive Management Plan (AMP) (SRK, 2009b; GLL, 2008). While quantitative performance of the SIS was not yet available, during discussions of the

SIS in the summer of 2009, it was concluded that additional monitoring wells were required down-gradient of the SIS to properly assess and track SIS efficiency.

Grum Slot – In 2003, Gartner Lee Limited (GLL) completed a study of management alternatives for the Grum Pit, including development of a filling curve, time to fill and a recommended maximum pit water elevation (GLL, 2003). The maximum elevation that was recommended for the pit assumed that the overburden – bedrock contact would be permeable and, hence, allowing the pit water level to rise above this elevation could lead to leakage from the pit to the environment. The TAT recommended that the permeability of the contact zone be assessed to provide better understanding of the risk of leakage due to a high pit water level.

Little Creek Dam – Little Creek Dam is located immediately up-gradient of Vangorda Creek. Water impounded behind the dam has poor water quality, due, at least in part, to the controlled capture of seepage from the Vangorda Waste Rock Dump. No information has been available to assess seepage from Little Creek Dam and the consequent effects on Vangorda Creek water quality. The TAT recommended that an investigation be completed to assess hydrogeologic conditions and groundwater quality below Little Creek Dam.

Vangorda Pit Bedrock Seepage to Vangorda Creek – The potential for leakage from the Vangorda Pit to Vangorda Creek via bedrock pathways was identified by the TAT as a risk during planning for previous site investigations, but investigations were deferred due to inabilities of drilling equipment on previous years to accomplish the required task. The drilling equipment used for the 2009 investigation was selected to accomplish investigation of bedrock hydraulic conductivity and potential for seepage from Vangorda Pit to Vangorda Creek. As part of this investigation, a flow and water quality survey along Vangorda Creek was also recommended, to provide additional information on the location of potential loading sources.

Grum Dump West – Numerous drainages exist to the northwest of the Grum Dump for which no information exists on surface water or groundwater quantities or quality. Based on the results of a 2009 water quality review, the TAT recommended that a targeted investigation be conducted to assess seepage from the Grum Dump in this area, including a flow and water quality survey of surface water drainages (TAT, 2009).

Upper North Fork of Rose Creek – As part of the closure plan, at least part of the NFRC is to be re-aligned into a raised channel to isolate it from impacted groundwater. Engineering works at the upstream end of this channel will be required to divert both surface water and, at least, shallow groundwater into the channel. No information is currently available for the design of said structure(s). The TAT recommended that an initial field investigation be completed to provide information for design purposes.

Figure 1 shows the areas covered as part of the 2009 groundwater investigation.

3 Program Description and Methodology

3.1 Desktop Studies

As part of the planning process for certain areas, desktop studies were completed by SRK using existing information. The following summarizes the method and objectives of these studies:

Grum Slot – The objective of this study was focused on updating the hydrogeological conceptual model for the area, with a particular emphasis placed on the potential for groundwater flow along the overburden – bedrock contact within the Grum slot itself. The study focused primarily on a review of existing reports and studies, specifically, engineering hydrogeology studies completed by Piteau Associates during mining of the Grum Pit and GLL studies. Results are summarised in Section 4.4.1.

Little Creek Dam – The objective of this study was a review of available geology and hydrogeological data to assess the potential for load emanating from seepage below the Little Creek Dam. Results are summarised in Section 4.5.1.

3.2 Field Program

The 2009 groundwater field program included drilling and monitoring well installation, hydraulic testing, sampling for groundwater quality and two stream surveys. The drilling, testing and sampling component occurred from approximately June 14 to August 28, 2009. Drilling and testing were overseen by multiple SRK staff: John Kurylo, Michelle Murphy, Melissa Pitz and Dan Mackie. Well development, hydraulic testing and initial sampling were completed by SRK, namely Melissa Pitz, Mark Storey and Chris Doughty. Stream surveys were conducted by Laberge on October 1, 2009.

There were two significant variances from the originally proposed work. As previously mentioned, drill holes were added near the confluence of the Faro Creek Diversion and the NFRC to provide information for design of the NRFC diversion. The second variation was the inability to complete the two drill holes planned along the toe of the ID, despite multiple attempts. Details on this work are provided in Section 4.1.1, the CVD/ID component.

3.2.1 Drilling and Monitoring Well Installations

Drilling was conducted by Geotech Drilling of Prince George, BC using a track-mounted Fraste MDXL with air-rotary and diamond drilling capability. Overburden was drilled using 10 cm (4-inch) or 15 cm (6-inch) ODEX air-rotary methods. Bedrock was drilled using HQ diamond drilling with triple tube core recovery. When necessary, diamond drilling used an environmentally safe polymer drilling mud. Air-rotary drilling used no additives; water was occasionally used to assist in clearing cuttings from bit. Two Marooka tracked support vehicles carried equipment and compressors. SRK provided all drilling supervision and logging.

Monitoring wells were installed in two ways:

- Overburden monitoring wells were completed through ODEX casing with flush-threaded, 5 cm (2-inch) solid and 0.010 slot schedule 40 PVC. Filter sand was used around screen zones and bentonite chips, pellets or grout used for surface seals.
- Bedrock monitoring wells were completed in HQ drill holes, also with flush-threaded, 5 cm (2-inch) solid and 0.010 slot schedule 40 PVC. Filter sand was not placed around screen zones. Bentonite packers and foam bridges were installed on the PVC above the screen zone. After waiting at least 2 hours for packers to hydrate, the annular space, in both bedrock and the overburden was grouted to surface using a tremmie line.

At ground surface, steel protective casings were installed and cemented over monitoring well PVC stickups. Well IDs were either written on the top of each protective casing with indelible ink or inscribed on metal tags attached to the monitoring well.

Drill hole logs are included in Appendix A.

3.2.2 Hydraulic Testing Methods and Data Analysis

Hydraulic testing was completed in all drill holes, with the exception of the monitoring wells in the S-wells areas. Testing of the monitoring wells in S-wells area was not considered a high priority as hydraulic properties could be inferred through monitoring during operation of the S-wells SIS.

Multiple methods were used for hydraulic testing, depending on site-specific conditions and when the testing occurred, either during drilling or following monitoring well installation. Testing and data analysis methods are summarized below.

Packer Injection Tests

Packer injection tests were completed in all bedrock diamond drill holes using a pneumatic packer assembly. In general, packer injection tests were completed roughly every five meters in bedrock drill holes. When drilling of a specific interval was completed, clean water was pumped through the drill rods to clean cuttings from the drill hole. Once water became clear, drill rods were pulled back an appropriate length, packers installed and inflated using nitrogen, and pressure injection tests completed. The possibility that drilling mud (i.e. polymer-based drilling additive) remained in fractures during testing cannot be ruled out, thus hydraulic conductivity values may in fact be higher than measured.

Packer testing followed SRK standard operating procedures. Test pressures were estimated prior to initiation based on depth in bedrock. Water was injected at multiple increasing pressure steps, followed by decreasing pressure steps of similar value. Pressure and flow were monitored using a dedicated testing apparatus. Pressure was monitored on liquid-filled gauges and flow measured on a flow meter with increments of 0.1 litre. Pressure was checked by comparison with the drill rig pressure gauge. The flow meter was checked multiple times using the bucket and stopwatch method.

Test data was entered by field staff into a spreadsheet immediately following each test. Data quality was checked and interpretations on data validity or anomalies identified on the spreadsheets. If questions arose about test validity, the test was repeated.

Data was analyzed using the Thiem method (Thiem, 1906).

Airlift Tests

Airlift testing was considered in relatively high hydraulic conductivity zones for both bedrock and selected overburden drill holes. In bedrock drill holes, if packer injection testing indicated a relatively permeable zone, identified by high injection flows, an airlift test was considered. Similarly, in overburden drill holes, if immediate sampling for water quality analyses was desirable, an airlift test was conducted.

In bedrock drill holes, airlift tests occurred over the same packer-isolated zone as used for packer injection testing. With the packers inflated and sealing off the test zone, an educator line (air line) was lowered down through the ODEX casing, an airlifting wellcap installed and water airlifted, or pumped, from the zone using the compressors. Airlifted water was directed to tanks of known volume and the flow rate calculated. If the objective was collection of a water quality sample, the sample was collected from the discharge line after a sufficient volume had been airlifted from the test zone. Following airlifting, recovery of water level was recorded, essentially providing a pumping recovery test.

The same general procedure was used for airlift testing in overburden drill holes, except that the test zone was not isolated using the pneumatic packers. Water was airlifted directly out of the ODEX casing, such that the test zone was essentially the materials at the end of the drill hole.

Airlift test data was analyzed using pumping test recovery methods in the computer package AQTESOLV. Typically, the Theis recovery analytical method (Theis, 1935) was used to determine hydraulic parameters.

Slug Tests

Slug tests were conducted after well development was complete. A static water level reading was first taken, and a Solinst Levelogger with a direct read cable lowered into the well to measure head during testing. A solid slug made of PVC was quickly introduced into the well, causing a sudden rise in head. Levelogger readings were monitored until head had fallen to the static level. The slug was then quickly removed from the well, causing a sudden fall in head, and readings were monitored until the head had risen to the static level, or approximately 95% recovery. This procedure was repeated several times using two different sizes of slug. The number of repetitions depended on the quality of the data collected, and the recovery time of the well.

A direct-read cable was not available for the testing of the ETA and upper NFRC (UN) wells, so the Levelogger was simply started and then lowered down the well, and retrieved at the end of testing. Recovery between each test was assessed using a water level tape.

Isolated variances to these methods are discussed in the results section for each area.

Raw data from the tests was prepared for input into AQTESOLV. Normalised recovery data from each test were superimposed in order to assess the consistency of the tests. Some data sets were adjusted using the translation method (Butler, 1998) in order to remove noise during the test initiation. All wells were assumed to be fully penetrating, and the thickness of the aquifer (b) was assumed to be equal to the vertical length of the screen (L). For those wells not installed vertically, the appropriate corrections were applied to determine the effective vertical height and horizontal diameter of the well and screen. It was assumed that there was no well skin. AQTESOLV applied a correction for the effective well casing radius based on the expected value of H0 (initial displacement) for the slug that was used (Butler, 1998). Expected values of H0 were calculated based on dimensions of the slugs used.

Multiple analytical methods were used for each slug test analysis. All of the analytical models used assume that the well is installed in a confined aquifer. For each slug test, first the Cooper et al. method was applied, and a type curve manually fitted to the data. Secondly, the KGS method was applied, and a type curve again manually fitted to the data. The storativity value was assumed to be $1x10^{-5}$, unless it was possible to achieve a good curve match using a higher value. In all cases, consistent storativity values were used for all tests.

Isolated variances to these methods are discussed in the results section for each area.

Hydraulic testing results are summarized in Appendix B.

3.2.3 Well Development and Sampling for Water Quality

Well development and sampling were completed at least one day after installation of monitoring wells to provide time for annular seals to set. Monitoring wells were developed by pumping at least three well volumes using either a Waterra Hydrolift pump, or by hand. Well development and sampling were completed by Mark Storey and Chris Doughty of SRK.

During well development, field parameters were collected regularly to assess sufficiency of development. Field parameters included electrical conductivity (EC), pH and oxidation-reduction potential (ORP). The ORP values recorded are considered uncertain due to exposure to the atmosphere and should be used with caution. Observations of water clarity were also collected as a general sense of well development. At multiple locations, despite significant development, water did not become clear.

During development, once field parameters stabilized and a minimum of three well volumes had been removed, samples were collected for water quality analyses. Water samples were collected in

dedicated, laboratory-supplied bottles. All bottles were triple rinsed with sample water. Samples for dissolved metals were field-filtered using a 0.45 nm filter and a nitric acid stabilizer added. Bottles were stored in the site lab refrigerator prior to shipping to Maxxam Analytics.

Groundwater quality laboratory results are included in Appendix C.

3.2.4 Stream Survey Methods and Data Analysis

Two surface water surveys were conducted by Laberge Environmental under direction from SRK, along ephemeral streams below the Grum Dump West and along Vangorda Creek. For both, flows were measured at multiple locations using standard flow measurement techniques and samples of surface water collected for water quality analyses. The Laberge report on these surveys is included in Appendix E.

Flows and water quality data were used to calculate load and changes in load along the surveyed reaches.

4 Results

4.1 Cross Valley and Intermediate Dams

4.1.1 Drilll Holes, Completions and Hydraulic Testing

Five bedrock drill holes were planned for the CVD and ID areas, three below the toe of the CVD and two below the toe of the ID. The objective of all drill holes was bedrock hydraulic testing and bedrock water quality sampling, with completion of monitoring wells within competent bedrock below the weathered zone, if identified. Overburden at all drill holes was completed with 4-inch ODEX methods. Bedrock was drilled HQ triple-tube.

Three of the planned five drill holes were completed (P09-C1, C2 and C3), along the toe of the CVD, though only two as initially planned. All holes are inclined, C1 and C2 oriented towards the north and C3 oriented towards the south. A bedrock monitoring well could not be installed in P09-C3. At C3, depth to bedrock was found to be significantly greater than assumed during planning (drilled depth of 58 m vs. initial estimate of 45 m). The ODEX drilling rate through the sandy overburden was very slow and caused rapid wear on the casing shoe and down-hole hammer, extending the time to complete this hole by numerous days. Ultimately, the ODEX casing could not reach bedrock. The drilling method had to be changed to diamond drilling and, subsequently, the hole did reach the planned total depth. The consequence of switching to diamond drilling prior to reaching bedrock was that a monitoring well could not be installed with available materials: materials to construct a monitoring well through the diamond drill rods were not available, which was required as the ODEX casing extended only partially through the overburden. Removing the diamond drill rods would have led to collapse of the borehole above the overburden – bedrock interface. In the end, a monitoring well was installed within the deep overburden, approximately 3 m (10 ft) above the bedrock interface.

Both of the ID locations (P09-ID1 and ID2) were attempted multiple times but drilling was unsuccessful due to flowing sand conditions. Both 4-inch and 6-inch ODEX drilling were attempted, but after more than seven days had been expended at different collar locations, discussions between Geotech and SRK concluded that the likelihood of success were very low with the available equipment. After discussion with YG, drilling in this area was abandoned.

Drill hole locations are shown on Figure 2. Details on drill hole completions and are summarized in Table 1. Hydraulic testing results are summarized in Table 2.

Table 1: CVD and ID Drill Hole and Completion Information

Drill Hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill Hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (m)	Screen Depth (mbgs)	Depth to water (m below TOC)	Date of depth to water
P09-C1	6914314	580170	1017.36	70	60.4	34.0	0.85	32.6 to 34.0	0.36	8-Aug-09
P09-C2	6914228	580119	1016.58	70	74.9	59.3	0.75*	53.5 to 59.3	~ -1.0*	8-Aug-09
P09-C3	6914143	580078	1019.65	70	87.4	48.7	0.77	45.8 to 48.7	1.47	8-Aug-09
P09-ID1**	6914108	580646	n/a	70	40.5	No monitoring well - grouted to surface			N/A	N/A
P09-ID2**	6913888	580476	n/a	70	27.4	No monitoring well - grouted to surface			N/A	N/A

*Artesian conditions; with stick-up extension, estimated at about 1m above ground.
**Drill hole not completed or surveyed. Location information from hand-held GPS only.
Mbgs = metres below ground surface.

Table 2: CVD Drill Hole Hydraulic Testing Results

Drill Hole ID	Test Zone Lithology	Test Type	Test Zone (m.b.g.s – vertical depth)	Test Date	Hydraulic Conductivity (m/s)	Comments
P09-C1	BR	Packer	26 to 30.4	24-Jul-09	5x10-7	
	BR	Packer	30.4 to 34.7	24-Jul-09	2x10-5	
	BR	Packer	34.7 to 39	24-Jul-09	3x10-6	
	BR	Packer	39 to 43.2	25-Jul-09	2x10-7	
	BR	Packer	43.2 to 47.5	25-Jul-09	5x10-7	
	BR	Packer	49.7 to 51.9	25-Jul-09	1x10-6	
	BR	Packer	46.1 to 51.9	25-Jul-09	1x10-6	
	BR	Packer	51.9 to 56.1	26-Jul-09	2x10-6	
	BR	Packer	56.1 to 60.4	26-Jul-09	1x10-6	
	BR	Slug	32.6 to 34.0 (Screen)	8-Aug-09	2x10-4 (BEJ)	BEJ = Best engineering judgement
	Average horizontal K				3x10-6	(packer data only)
P09-C2	BR	Packer	43.2 to 46.2	18-Jul-09	8x10-8	
	BR	Packer	46.2 to 50.6	19-Jul-09	4x10-8	
	BR	Packer	50.6 to 54.9	19-Jul-09	4x10-8	
	BR	Packer	50.6 to 59.1	20-Jul-09	1x10-7	
	BR	Packer	54.9 to 59.1	20-Jul-09	2x10-7	
	BR	Packer	59.1 to 63.4	20-Jul-09	2x10-8	
	BR	Packer	63.4 to 67.8	20-Jul-09	6x10-8	
	BR	Packer	66.2 to 72.1	21-Jul-09	2x10-8	
	BR	Packer	72.1 to 74.9	22-Jul-09	2x10-8	
	BR	Pump-Recovery	53.5 to 59.3 (Screen)	8-Aug-09	6x10-7 (BEJ)	Pumped with Hydrolift
	Average horizontal K				6x10-8	(packer data only)
P09-C3	BR	Packer	59.2 to 67.3	26-Jun-09	2x10-7	
	BR	Packer	67.3 to 71.6	27-Jun-09	6x10-7	
	BR	Packer	74.4 to 80.4	28-Jun-09	9x10-9	
	BR	Packer	80.2 to 87	29-Jun-09	4x10-4	Low confidence – low injection pressure. Qualitative high K.
	BR	Airlift	80.2 to 87.4	29-Jun-09	2x10-6	Moderate confidence. Poor fit to data. Continuously pumping rate of ~ 0.5 L/s (8 US gpm). Drawdown of about 20+ m.
	OB	Slug	45.8 to 48.7 (Screen)	8-Aug-09	3x10-4 (BEJ)	Oscillatory response
	Average horizontal K				7x10-7	(packer and airlift BR data only)

Figure 3 is a cross section for the Cross Valley Dam drill hole locations. A cross-section below the Intermediate Dam is not presented as drilling in this area did not reach bedrock and did not provide any data beyond that previously available. Observations and conclusions from drilling and hydraulic testing for P09-C1, 2 and 3 are summarized below. Information for the Intermediate Dam drill holes follows.

Bedrock Characteristics

- Phyllite or schist was the predominant lithology intersected by the drill holes. Geologic maps (Pigage, 2004) indicate a NW-SE trending lithologic contact extending approximately between the locations of P09-C1 and P09-C2, from gabbro on the south to phyllite on the north, but all rock types essentially looked the same. Rock characterized as gabbro may have been intersected at depth in P09-C3, but the change in lithology was subtle. Unless noted, all rock is considered phyllite.
- Depth to bedrock increases from north to south. At P09-C1, vertical depth to bedrock was about 25metres, about 44.5m at C2 and about 56m at C3.
- All bedrock was highly foliated, with a very significant percentage of core breaks occurring on or parallel to foliation.
- Core recovery from the phyllite was often less than 100% for no apparent reason. The rock was highly friable and weak, suggesting that some percentage of the lost core could have been washed during drilling. Return water was very turbid. This has been observed at drill holes in other areas of the site intersecting similar lithology.
- Rock quality designation (RQD) was typically greater than 75% and often greater than 90%. Low RQD was typically related to rubble zones that could not be considered drilling induced (ie. mechanical breaks) with high certainty. However, considering the highly friable and weak strength nature of the phyllite lithology, many if not most of these rubble zones were likely drilling-induced.
- Weathered bedrock, as characterized by lower than average RQD, presence of oxidation products on fractures, or indications of bedrock decomposition, were not identified in significant thickness in any of the drill holes. In P09-C1, a 1m weathered zone was interpreted below the overburden – bedrock interface. In P09-C2 and C3, the only discernable difference between rock below the interface and deeper bedrock was a tendency for an increasing number of breaks along foliation surfaces. Even this relationship is uncertain.
- At P09-C3, there was no significant change in fracture frequency from the phyllite to the gabbro sections.
- Following monitoring well construction at P09-C2, water flowed from the top of the stick-up. After addition of an additional stick-up, the static water level was about 1 m above ground surface. The monitoring well is screened over an interval approximately 7 to 10 m below the overburden-bedrock interface.

Hydraulic Characteristics

- Packer testing was completed at approximately 5m intervals in all three drill holes (P09-C1, 2 and 3).
- At P09-C1, hydraulic conductivity ranged from $2x10^{-5}$ to $2x10^{-7}$ m/s, with a geometric mean of $1x10^{-6}$ m/s for nine tests. One test was greater than the mean and four tests were less than mean. The highest value ($2x10^{-5}$ m/s) was for a zone approximately 3 to 8 m below the overburden-

bedrock interface. This zone corresponds to rock with high RQD and total core recovery (TCR). No features of specific interest were identified. The depth-weighted average hydraulic conductivity from packer tests is $3x10^{-6}$ m/s.

- Slug testing of the P09-C1 monitoring well, which was screened over the high hydraulic conductivity (K) packer test zone, resulted in a best engineering judgement (BEJ) K value of $2x10^{-4}$ m/s. The screen length is approximately two meters shorter than the packer testing zone and may indicate the highly permeable nature of individual fractures.
- At P09-C2, hydraulic conductivity ranged from $1x10^{-7}$ to $2x10^{-8}$ m/s, with a geometric mean of $5x10^{-8}$ m/s for nine tests. Four tests were greater than the mean and five tests were less than the mean. The highest value ($2x10^{-7}$ m/s) was for a zone approximately 12 to 16 m below the overburden-bedrock interface. This zone included about 0.4m of rubble zone, some of which was interpreted as drilling-induced. Veining was relatively frequent and, on average, two joints were identified per three metre core run. The depth-weighted average hydraulic conductivity from packer tests is $6x10^{-8}$ m/s.
- Development recovery testing of the P09-C2 monitoring well, which was screened over the high K packer test zone, resulted in a BEJ hydraulic conductivity of $6x10^{-7}$ m/s. The screen length is approximately equivalent to the packer testing zone.
- At P09-C3, hydraulic conductivity ranged from $2x10^{-7}$ to $9x10^{-9}$ m/s, with a geometric mean of $9x10^{-8}$ m/s for three successful tests. A fourth test, from 85 to 93 m drilled depth and within the gabbro lithology, had a packer testing result of approximately $4x10^{-4}$ m/s, but is only considered indicative due to low injection pressure combined with sufficiently high flow rates to incur high friction losses. An airlift test was completed over this zone for 210 minutes at an average "pumping rate" of 0.5 L/s. Drawdown at the end of the test was greater than 20m. The hydraulic conductivity from the airlift test was $2x10^{-6}$ m/s. This zone was characterized by foliation fractures but no joints were identified. Core recovery was good with relatively long sections of intact core. The depth-weighted average hydraulic conductivity from packer and airlift tests is $7x10^{-7}$ m/s.
- The monitoring well at P09-C3 was completed in fine sand above the overburden-bedrock interface due to drilling and installation limitations. Slug testing of the monitoring well in a hydraulic conductivity of $3x10^{-4}$ m/s for these materials.
- High hydraulic conductivity zones in P09-C1 appear to be limited in extent but results suggest the presence of discrete high K fractures in, at least, relatively shallow bedrock to depths of approximately 8 m below the overburden-bedrock interface.
- The bulk hydraulic conductivity in P09-C2 appears to be relatively low compared to P09-C1, with the only relatively high permeability zone occurring approximately 12 to 16 m below the overburden-bedrock interface.
- At P09-C3, there is more variation in hydraulic conducitivity than at the other two locations. The highest value occurs at depth within the apparent gabbro lithology, but the hydraulic

conducitivity was greater than $1x10^{-7}$ m/s to depths of approximately 15 m below the overburden-bedrock interface, within phyllite.

Intermediate Dam Drill Holes

Multiple attempts were made to complete drill holes P09-ID1 and ID2. ODEX drilling, using both 4-inch and 6-inch setups, was confounded by flowing sands at relatively shallow depths.

- Two attempts were made for P09-ID1. ODEX drilling reached a maximum depth of 40 m at two different collar locations. The drill holes were grouted to surface upon termination.
- Two attempts were made for P09-ID2. ODEX drilling reached a maximum depth of 27 m at two different collar locations. The drill holes were grouted to surface upon termination.

4.1.2 Water Quality

Samples were collected from each of the three CVD locations for water quality analyses, both during drilling and following installation in August 2009 and, P09-C3 a second time in November 2009. P09-C1 and –C2 could not be sampled in November as they were frozen. For P09-C1 and C2, samples were collected from the monitoring wells screened in bedrock. For P09-C3, samples were collected from the monitoring well completed in overburden, just above the overburden-bedrock interface, but also from deep, permeable bedrock. The deeper bedrock sample was collected at the end of an airlift test conducted during drilling. A summary of water quality results are presented in Table 3.

Table 3: CVD Groundwater Quality

Well ID	Sample Depth (m drilled depth)	Sample From	n	Acid (mg/L)	Alk (total) (mg/L)	Cond (uS/cm)	pH (pH units)	SO4 (mg/L)	Mg (mg/L)	Zn (mg/L)	Ca (mg/L)
P09-C1	32.6 to 34.0	Bedrock MW	2	38	380	2400	7.8	1150	90.8	0.016	425
P09-C2	53.5 to 59.3	Bedrock MW	1	203	1500	2520	7.6	28	87.7	0.008	207
P09-C3	45.8 to 48.7	Overburden MW	2	29	420	901	7.6	97	38.7	0.003	106
P09-C3	85 to 93 - airlift	Bedrock	1	na	2000	3100	7.9	11	149.0	0.176	386

n = number of samples; mw = monitoring well

Groundwater quality varies across the valley and between the bedrock and overburden. All samples show circum-neutral pH but concentrations and bedrock appears to have high electrical conductivity relative to the one overburden location.

P09-C1 has elevated concentrations of sulphate, magnesium and zinc, similar to those reported for overburden at P01-11 and P05-02 in the 2008 groundwater quality review (RGC, 2009), both of which are located on the north side of the valley in close proximity to P09-C1. P09-C1 water quality indicates that groundwater is impacted by contaminated waters at a depth of at least 10m below the overburden – bedrock interface along the north side of the valley.

P09-C2 water has a relatively high electrical conductivity but sulphate and zinc concentrations are much lower than at P09-C1. Concentrations at P09-C2 are of similar or lower value to some overburden monitoring wells located on the southern side of the valley (e.g., P01-02), with the exception of magnesium, which has a concentration more similar to P09-C1. P03-09, a multi-level overburden monitoring well just to the south of P09-C2 has shown increasing sulphate concentrations, with significantly greater concentrations in all monitoring zones than observed at P09-C2. P09-C2 has elevated sodium compared to other wells (305 mg/L at –C2 vs. <100 mg/L at -C1 or –C2) and higher bicarbonate (similar range of values to total alkalinity). P09-C2 waters could represent process water coming from the tailings that is not showing high sulphate, possibly because little oxidation occurred during milling. These observations could indicate that displaced process water, characterized by elevated sodium and bicarbonate concentrations, is reporting to P09-C2 now. Sulphate is low at this time because little oxidation occurred during milling, and so process water would have low sulphate concentration. This may indicate a pathway connecting to the tailings but that the sulphate plume has not yet arrived.

P09-C3 bedrock water from the well screened over a depth of 85 to 93 mbgs shows very low sulphate concentrations but elevated concentrations of zinc and magnesium. In fact, the zinc and magnesium concentration are greater than any of the results presented for this area in the 2008 groundwater quality review. While confidence in water quality for the deeper bedrock is limited due to the inability to complete a monitoring well in the deeper bedrock and collect additional data, comparison with water quality from overburden immediately above bedrock at P09-C3 indicates sufficient difference to rule out the possibility of contamination from the overburden aquifer. Sulphate in the deep overburden is about nine times that of the deep bedrock and zinc concentration in the overburden is about .2.5 orders of magnitude *lower* than deep bedrock. Magnesium concentration is almost four times higher in deep bedrock than overburden. The possibility that these waters represent an upgradient high sulphate, high zinc source affected by varying dilution or solubility controls cannot be ruled out.

4.1.3 Hydrogeologic Conceptual Model

Existing hydrogeologic conceptual models have focused on overburden stratigraphy, with no real detail for bedrock. The only changes to the overburden conceptual model is the increase in depth to the overburden – bedrock contact at P09-C3 and the absence of the till unit overlying bedrock.

Bedrock drilling and hydraulic conductivity data indicates that:

- The weathered bedrock zone is thin or cannot be differentiated from competent bedrock.
- Bedrock hydraulic conductivity does not decrease with increasing depth.
- Air-lift testing at depth in P09-C3 indicates that relatively high hydraulic conductivity bedrock can be present at significant depths below the overburden – bedrock contact.
- Hydraulic conductivities could not be correlated with specific features in drill core.

- Hydraulic conductivity is generally higher on the northern and southern sides of the valley than in the middle.

Available water level data for autumn 2009 indicate that a small upwards gradient from bedrock to overburden is present, at least at the north side of the valley. This may be a function of the high hydraulic head within the Cross Valley and Intermediate ponds.

Data suggests that bedrock should be considered as a separate hydrogeologic unit. Hydraulic testing data suggest that the bedrock could be subdivided into three hydrogeologic units, the separations assumed to be halfway between each of the drill holes and extending approximately to the valley sides. Each unit can be assumed to have a thickness of 30m.

Two hydrostratigraphic units can be assumed for the CVD area, with bedrock including the three sub-units:

1. Overburden: ~240m wide, 25 to 50m thick. Average transmissivity from 2005 pumping tests = 1,495 m^2/d (RGC, 2006). The overburden unit incorporates all lithologies. Increase in thickness at P09-C3 is not considered to represent a significant change to flows.

2. Bedrock:

   a. North Bedrock – 170m wide x 30m deep with K = $3x10^{-6}$ m/s

   b. Central Bedrock - 95m wide x 30m deep with K = $6x10^{-8}$ m/s

   c. South Bedrock - 140m wide x 30m deep with K = $7x10^{-7}$ m/s

4.1.4 Flow and Load Estimates

Table 4 presents flow and load estimates for the hydrostratigraphic units at the CVD. Overburden is assumed the same as reported in RGC, 2006. Flow is assumed to be horizontal, in a down valley direction. The gradient is assumed to be the same as that used for the RGC estimates.

Table 4: CVD Groundwater Flow and Load Estimates

Unit or Location	Area (m^2)	K (m/s)	Gradient	Flux (l/s)	SO4 Conc. (mg/L)	Zn Conc. (mg/L)	SO4 Load (tonne/yr)	Zn Load (tonne/yr)
Overburden	240m wide with T=1,495 m^2/d			96.0	Assumed from RGC		1840	0.03
North Bedrock	5100	3.00E-06	0.016	0.24	1150	0.016	9	0.0001
Central Bedrock	2850	6.00E-08	0.016	0.003	28	0.008	0.002	0.000001
South Bedrock	4200	7.00E-07	0.016	0.05	11	0.176	0.02	0.0003

The flow and load estimates in Table 4 are considered conservative for the upper 30m of bedrock. Hydraulic gradients may be upwards from bedrock to overburden, thus actual horizontal flows less than presented here.

In general, bedrock and sulphate and zinc loads are minimal when compared to overburden. The lowest loads are within the central area and highest in the south. Zinc load in the southern bedrock area is about three times that in the north area. It is currently unclear if the measured zinc concentration in the deeper south bedrock is evenly distributed through this area or indicative of impacts from contaminated waters. There have been no other observations of concentrations at this magnitude anywhere near or below the CVD.

RGC is currently completing a review of 2009 water quality data, including stable isotopes for certain areas. Interpretation of the source or cause of the observed concentrations within the deep bedrock at P09-C3 should be reviewed once the water quality study is completed.

4.1.5 Considerations for Closure Engineering

Results of the 2009 groundwater program indicate the following considerations for closure engineering:

- Bedrock data is only available for the toe of the CVD. Additional information will be required if the planned Rose Creek Valley SIS is not located in this area.
- Depth to bedrock is variable and can be significant. Methods for cutoff wall construction will have to take this into account, if that option is required.
- Load is travelling within bedrock, could be significant, and must be considered for final closure.
- Relatively high zinc concentrations within deep bedrock at P09-C3 require further interpretation. Bedrock water quality and the hydrogeologic conceptual model should be re-visited upon completion of the 2009 groundwater quality review. If the high zinc concentrations cannot be considered to represent high background levels, further investigation in this area will be required.
- Additional pumping tests should be completed below the CVD to determine if bedrock groundwater can be captured or controlled by pumping from the overburden unit. The bedrock monitoring wells should be used as part of these tests.

4.2 ETA

4.2.1 Drill Holes, Completions and Hydraulic Testing

Three drill holes were completed in the ETA area, at the mouth of Faro Creek canyon. Original planning called for two drill holes, one to characterize bedrock (P09-ETA1) and one for the overburden – bedrock contact (P09-ETA2). A third drill hole was completed on the southwest side of the canyon for further information regarding depth to bedrock (P09-ETA3). The overall objective of these drill holes was to improve characterization of the potential for bypass of the ETA interim seepage interception system.

Drill hole locations are shown on Figure 4. Drill hole location and completion details are summarized in Table 5. Hydraulic testing is summarized in Table 6.

Table 5: ETA Drill Hole and Completion Information

Drill Hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill Hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (mags)	Screen Depth (mbgs)	Depth to water (m from TOC)	Date of depth to water
P09-ETA1	6913635	582807	1074.66	70	40.4	29.8	0.93	29.8 to 26.9	6.99	24-Aug-09
P09-ETA2	6913633	582807	1074.46	90	19.8	17.7	0.71	16.15 to 17.7	10.22	28-Aug-09
P09-ETA3	6913615*	582832*	1073.74*	90	4.6	N/A	N/A	N/A	N/A	N/A

* Ground elevation estimated from handheld GPS as hole was not surveyed.

Table 6: ETA Hydraulic Testing Results

Drill Hole ID	Test Zone Lithology	Test Type	Test Zone (m drilled depth)	Test Date	Hydraulic Conductivity (m/s)	Comments
P09-ETA1	BR	Packer	23.6 to 24.8	14-Aug-09	<1x10-8	Little flow at all pressures
	BR	Packer	23.6 to 27.8	14-Aug-09	<1x10-8	Little flow at all pressures
	BR	Packer	27.8 to 32.4	14-Aug-09	7x10-8	
	BR	Packer	32.4 to 37.0	15-Aug-09	<1x10-8	Little flow at all pressures
	BR	Packer	37.0 to 43.1	15-Aug-09	<1x10-8	Little flow at all pressures
	BR	Slug	28.65 to 31.7 (Screen)	28-Aug-09	N/A	Test abandoned due to slow recovery from removal of Waterra tubing
P09-ETA2	OB	Slug	16.15 to 17.7 (Screen)	28-Aug-09	2x10-3 (BEJ)	Oscillatory
P09-ETA3	N/A	N/A	N/A	N/A	N/A	No well installed

Figures 5a and 5b are cross sections through the ETA drill holes. Observations and conclusions from drilling and hydraulic testing for P09-ETA1, 2 and 3 include:

Tailings Thickness

- P09-ETA1 and 2 drilled through tailings to their respective targets, bedrock and overburden.
- Tailings were encountered to vertical depths of approximately 16 to 18 m.

Overburden Characteristics

- P09-ETA2 was drilled vertically with air-rotary methods to install a monitoring well in permeable materials at the overburden – bedrock interface.
- Tailings were identified to a depth of 16 m and bedrock was intersected at 16.8 m.
- Overburden materials were silty to clayey sand and gravel. Thickness was about 1m.
- The monitoring well was installed within the overburden materials and underlying shallow bedrock.

Bedrock Characteristics

- P09-ETA1 was drilled to a total drilled depth of 43 m (~40 m vertical depth) for bedrock characterization.

- Bedrock was intersected at a drilled depth of 19.3 m (18 m vertical depth).
- Highly foliated phyllite lithology with zones of quartz-calcite veining was encountered for the entire bedrock drill length.
- Bedrock RQD was greater than 95% for the entire drilled length. The majority of core breaks occurred along foliation planes and were interpreted as drilling-induced breaks.
- There was no clear weathered zone below the overburden – bedrock contact.
- The drill hole extends approximately 15m horizontally from the collar location, a distance roughly equivalent to the centerline of the canyon.
- No significant structural features were identified. A 10cm zone was tentatively interpreted as a potential healed fault, recovered as competent core with high RQD, similar to other runs.

Hydraulic Characteristics

- At P09-ETA1, hydraulic conductivity ranged from $7x10^{-8}$ to less than $1x10^{-8}$ m/s for five tests. A hydraulic conductivity value of $1x10^{-8}$ m/s is considered by SRK to be the lower limit of sensitivity for the packer testing equipment being used. The one relatively high K value of $7x10^{-8}$ m/s was for a zone covering the potential fault, at a vertical depth of 26 to 31 m below ground surface, and approximately 8 to 13 m below the overburden-bedrock interface. The bulk hydraulic conductivity for bedrock is assumed to be $1x10^{-8}$ m/s.
- Slug testing of the P09-ETA1 monitoring well, which was screened between 27 and 30 m below ground surface, within the high hydraulic conductivity packer test zone, was inconclusive. Water level recovery from introduction of the slug was extremely slow and the hydraulic conductivity value qualitatively interpreted as $<1x10^{-8}$ m/s.
- At P09-ETA2 the monitoring well was installed within the overburden materials and underlying shallow bedrock.
- Slug testing of the P09-ETA2 monitoring well was $2x10^{-3}$ m/s. The water level response to slug emplacement was oscillatory, supporting the interpretation of high hydraulic conductivity.
- P09-ETA3 was drilled approximately 15 m southeast of ETA 1& ETA2 on top of the berm to the southeast of the Faro Creek canyon, along the trend of the east bedrock wall of the canyon. Bedrock was intersected at a depth of 4.6 m.

4.2.2 Water Quality

Samples were collected from monitoring wells P09-ETA1 and 2 for water quality analyses. A summary of water quality results is presented in Table 7. Water quality results for Faro Creek, at the approximate location of the drill holes, are included from a survey of Faro Creek surface water completed in mid-August 2009, approximately one week before groundwater samples were collected.

Table 7: ETA Groundwater Quality

Well ID	Sample Depth	Sample From	n	Acid (pH 8.3)	Alk (total)	Cond	pH	SO4	Mg	Zn	Ca
	(m drilled depth)			(mg/L)	(mg/L)	(uS/cm)	(pH units)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
PO9-ETA1	29.8 to 26.9	Bedrock MW	2	0.8	195	431	8.1	32	10.0	0.003	61
PO9-ETA2	16.15 to 17.7	Overburden MW	2	540	165	5175	6.7	4400	540	82.6	528
FCS-4 weir at end of Faro Canyon	Faro Creek	Surface Water	1	1040	2.6	5930	5.6	5200	679	148	504

n = number of samples; mw = monitoring well

Groundwater quality is significantly different between the bedrock and overburden monitoring wells. While both have circum-neutral pH, water within the overburden unit is about 1 pH unit lower than bedrock. Electrical conductivity is significantly higher in the overburden unit, as are sulphate and zinc concentrations: sulphate concentration is about two orders of magnitude higher in the overburden unit and zinc concentration is more than four orders of magnitude higher.

4.2.3 Hydrogeologic Conceptual Model

Bedrock in the Faro Creek canyon is calcareous phyllite of the Vangorda Formation (Pigage, 2004). Foliation dips to the south at about 15 degrees. The regional geologic map shows no geologic structures in the vicinity of the canyon. Bedrock on the sides of the canyon is highly fractured and weathered.

At the mouth of the canyon, the canyon is a relatively narrow, deep feature with minimal overburden fill. Tailings constitute a significant percentage of the unconsolidated material within the canyon; the overburden and weathered bedrock unit is thin, no more than a couple of meters.

Bedrock underneath the canyon appears to be low permeability. Foliations may impart an anisotropy on bedrock hydraulic conductivity, which would have lower hydraulic conductivity in the direction of Faro Creek drainage, as suggested by foliation orientation. The only other bedrock hydrogeologic data for the area is from SRK05-ETA-BR2, which was drilled northwest of the mine access road, collared on top of the ETA tailings. This drill hole was drilled vertically, to a depth of about 23 m, about 13.5 m of which were in bedrock of similar lithology to the P09-ETA1. Hydraulic conductivity was typically about $1x10^{-8}$ m/s with one test zone at $1x10^{-7}$ m/s. While bedrock data is still relatively minimal, the data do suggest that bedrock has a low bulk hydraulic conductivity.

Three hydrostratigraphic units are defined for this area:

1. Tailings unit - Hydraulic conductivity is unknown, but assumed to be low.
2. Overburden and weathered bedrock unit – Considered to have a maximum thickness of about 1 to 2m. Characterized by sand and gravel. Hydraulic conductivity = $2x10^{-3}$ m/s.
3. Competent bedrock unit - Hydraulic conductivity = $1x10^{-8}$ m/s.

- Prior to April and after about mid July, PW2 water levels decline relative to the rest of the record. Only the data in mid July corresponds to a significant change in PW2 pumping rate. Increased PW2 drawdown after mid August without a corresponding change in monitoring well drawdown could be a result of well inefficiency.

Data for PW2 suggest that pumping in the Deep Aquifer can be effective for hydraulic control and additional pumping wells would likely improve this situation. PW2 has limited available drawdown due to its construction. Additional pumping wells in the vicinity of PW2 could provide improved aquifer drawdown. PW2 itself is not an ideal pumping well and performance could potentially be improved by replacing it with a deeper screen.

PW1, while installed in an area of elevated sulphate and zinc concentrations, could be removed from current operation and hook-ups used for an additional pumping well near PW2.

4.3.2 Drill Holes and Completions

Six monitoring wells were installed down-gradient of the S-wells interceptor trench. Drill hole locations are shown on Figure 6. Drill hole location and completion details are summarized in Table 11. Hydraulic testing was not completed for these drill holes as they will be included in on-going SIS performance monitoring. Hydraulic parameters can be determined from performance data, if necessary.

Table 11: S-wells Drill Hole Completion Information

Drill Hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill Hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (mags)	Screen Depth (mbgs)	Depth to water (m from TOC)	Date of depth to water
SIS1	6912954	584585	1087.59	90	6.1	6.3	0.97	4.8 to 6.3	4.34	25-Aug-09
SIS2	6912950	584594	1087.39	90	6.3	5.5	0.98	4.6 to 5.5	3.34	25-Aug-09
SIS3	6912944	584602	1087.36	90	6.1	3.7	1.03	2.2 to 3.7	2.70	25-Aug-09
SIS4	6912936	584617	1087.55	90	4.6	3.7	1.03	2.8 to 3.7	2.99	25-Aug-09
SIS5	6912935	584622	1087.49	90	4.6	3.7	0.98	2.8 to 3.7	2.73	26-Aug-09
SIS6	6912934	584625	1087.39	90	4.6	4.6	0.90	4.6 to 5.5	2.99	27-Aug-09

Mbgs = metres below ground surface.
TOC = top of casing.

All six of the SIS monitoring well drill holes were drilled ODEX method in unconsolidated sediments, with total target depths equivalent to be below the interpreted base of the Shallow Aquifer, as determined from previous drilling information. Monitoring wells were completed in permeable zones identified in each drill hole. Figure 7 shows two cross sections, one showing stratigraphy based on test pits and drilling completed prior to the 2009 program. The second cross section shows stratigraphy including information from the 2009 drill holes. Both sections include the approximate outline of the permeable trench and the central pumping sump (i.e., PW3).

SIS 1, 2, 3 and 4 were drilled at approximate 10m spacing, with SRK05-SP4b included within the spacing, between SIS3 and 4. SIS5 and 6 were drilled at roughly 5m spacing to the southeast of SIS4, to provide additional stratigraphic information beyond the approximate southeast end of the primary interceptor trench.

Lithologic information from the SIS locations indicates that the interceptor trench has cross-cut the majority of sand and gravel materials interpreted as the Shallow Aquifer. Lithologic information from the SIS wells provides the following additional information:

- Permeable materials screened in SIS2 may extend past the northwest end of the interceptor trench.
- Permeable materials screened in SIS5 and 6 exist outside of the southeast end of the interceptor trench (prior to November, 2009).

4.3.3 Water Quality

Samples have been collected from monitoring wells SIS1 to 6 for water quality analyses. A summary of water quality results is presented in Table 12. Water quality results are included from the interceptor trench pumping well (PW3). Monitoring well SRK05-SP4b was not sampled this autumn. The PW3 sample was collected mid-August, 2009, approximately one week before groundwater samples were collected.

Table 12: S-wells SIS Wells Groundwater Quality

Well ID	Sample Depth (m drilled depth)	Sample From	n	Acid (pH 8.3) (mg/L)	Alk (total) (mg/L)	Cond (uS/cm)	pH (pH units)	SO4 (mg/L)	Mg (mg/L)	Zn (mg/L)	Ca (mg/L)
SIS1	4.8 to 6.3	Overburden MW	1	337	250	7280	7.0	6800	1140	150	642
SIS2	4.6 to 5.5	Overburden MW	2	1140	175	2285	6.2	7800	1310	491	535
SIS3	2.2 to 3.7	Overburden MW	2	780	175	7340	7.0	6800	1135	453	465
SIS4	2.8 to 3.7	Overburden MW	2	607	230	6545	6.9	6000	996	296	484
SIS5	2.8 to 3.7	Overburden MW	1	28.7	300	5150	8.0	4000	621	7.39	507
SIS6	4.6 to 5.5	Overburden MW	1	42.8	520	4910	7.7	3700	635	14.2	559
PW3	Sump	Pumping Well	1	815	150	8210	7.2	7500	1270	486	467

Water quality data indicate that, while groundwater at all monitoring well locations shows impact from dump seepage, the level of impact is not the same at all locations. SIS2, 3 and 4, which are screened within the main body of the Shallow Aquifer, show higher concentrations of dissolved zinc than wells closer to the ends of the trench. Concentrations in these wells are also more similar to water pumped from PW3.

4.4.2 Drill Holes, Completions and Hydraulic Testing

Two drill holes with monitoring wells were completed in the Grum Slot area, one in deep bedrock (P09-GS1A) and a second to the overburden-bedrock contact (P09-GS1B). Drill hole locations are shown on Figure 8. Drill hole location and completion details are summarized in Table 13. Hydraulic testing results are summarized in Table 14. Drill logs are located in Appendix A.

Table 13: Grum Slot Drill Hole and Completion Information

Drill Hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill Hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (mags)	Screen Depth (mbgs)	Depth to water (m from TOC)	Date of depth to water
P09-GS1A	6904658	592593	1230.00	90	29.6	29.6	0.86	23.5 to 29.6	2.52	6-Aug-09
P09-GS1B	6904657	592601	1229.98	90	6.6	6.6	0.92	5.1 to 6.6	2.39	6-Aug-09

Mbgs = metres below ground surface
TOC = top of casing

Table 14: Grum Slot Hydraulic Testing Results

Drill Hole ID	Test Zone Lithology	Test Type	Test Zone (m)	Test Date	Hydraulic Conductivity (m/s)
P09-GS1A	BR	Packer-isolated Falling Head	11.0 to 14.0	14-Jul-09	3x10-6
	BR	Packer	14.3 to 18.9	14-Jul-09	1x10-7
	BR	Packer	18.9 to 23.5	15-Jul-09	1x10-9
	BR	Packer	23.5 to 29.6	15-Jul-09	4x10-8
	BR	Slug	23.5 to 29.6 (Screen)	6-Aug-09	1x10-7 (BEJ)
P09-GS1B	OB	Slug	5.1 to 6.6 (Screen)	5-Aug-09	5x10-4 (BEJ)

Figure 9 is a cross section extending through the Grum Slot drill holes to the Grum Pit lake. Observations and conclusions from drilling and hydraulic testing for P09-GS1A and GS1B include:

Overburden Characteristics

- Unconsolidated material was encountered to a depth of 5.5 m below ground surface. At P09-GS1B, fill materials were encountered to a depth of 4m, underlain by about 0.6m of black, pyritic-rich material interpreted to be ore or waste rock, then approximately 1m of clayey, silty sand with gravel overlying bedrock.
- The P09-GS1B monitoring well was screened within the sandy unit and shallow bedrock, from 5.1 to 6.6m below ground surface.
- Static water level on the August 6, 2009 was about 1.5m below ground surface (1227.6 masl).
- Slug testing of the monitoring well indicates a hydraulic conductivity of $5x10^{-4}$ m/s.

Bedrock Characteristics

- P09-GS1B was drilled to a total depth of 29.6 m below ground surface, approximately 24m of which were in bedrock.
- Phyllite was the only lithology intersected, with zones of quartz-calcite veining and high sulphide content.
- Bedrock was highly foliated, with a significant percentage of core breaks occurring on or parallel to foliation. Foliations breaks ranged from 12/m to 29/m. Joint frequency was lower, typically less than 2/m.
- There were no indications of a significant bedrock weathered zone though core recovery was low in the first meter.
- At P09-GS1a, bedrock hydraulic conductivity ranged from $3x10^{-6}$ to less than $<1x10^{-8}$ m/s for four tests conducted during drilling. Three tests were $1x10^{-7}$ m/s or lower. The one relatively high hydraulic conductivity value of $3x10^{-6}$ m/s, derived from a packer-isolated falling head test, was for a zone between 11 to 14 m below ground surface, and approximately 6 m below the overburden-bedrock interface. This zone included a 10cm mechanical rubble zone. RQD ranged from 73% to 89% with four joints identified over the entire zone length.
- A monitoring well was completed with a screen extending from 23.5 to 29.6 meters below ground. Slug testing results from the monitoring well indicate a hydraulic conductivity of $1x10^{7}$ m/s, or roughly two times the packer test-derived hydraulic conductivity value for the same zone.
- Static water level in the monitoring well on August 6, 2009 was approximately 1.66 m below ground surface (1227.5 masl), slightly lower than the water level in P09-GS1B.

4.4.3 Water Quality

Samples have been collected from both monitoring wells as well as the Grum Slot standing water for water quality analyses. A summary of water quality results is presented in Table 15.

Table 15: Grum Slot Groundwater Quality

Well ID	Sample Depth (m drilled depth)	Sample From	n	Acid (pH 8.3)	Alk (total)	Cond	pH	SO4	Mg	Zn	Ca
				(mg/L)	(mg/L)	(uS/cm)	(pH units)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
P09-GS1A	23.5 to 29.6	bedrock	2	9.8	210	1350	7.8	545	69.2	0.054	200
P09-GS1B	5.1 to 6.6	overburden	3	14.8	213	1180	7.7	437	60.6	4.42	165
Slot Standing water	Surface	Surface	1	n/a	79	738	7.9	310	40.4	0.010	90

Overburden and bedrock waters are circum-neutral with somewhat elevated sulphate and zinc concentrations. Sulphate concentrations are similar, but zinc is about two orders of magnitude higher in the overburden than bedrock. The standing water in the Grum Slot has slightly lower sulphate than groundwater, and considerably lower zinc concentration.

For comparison, zinc concentrations in the Grum Pit on July 14, 2009 were about 5 mg/L at depth and sulphate concentrations about 425 mg/L.

4.4.4 Hydrogeologic Conceptual Model

Bedrock underlying the immediate Grum Slot area is primarily calcareous phyllite of the Vangorda Formation. The phyllite may be anisotropic in terms of hydraulic conductivity. Sulphide-bearing ore may exist on the western edge, at the pit edge, or underneath the slot. Overburden thickens to the north and northwest of the slot, incorporating the basal "thalweg" aquifer described previously. This aquifer may daylight in the Grum Slot. Within the slot, overburden is generally thin, typically characterized as "till" but heterogeneity is likely.

Bedrock underneath the canyon appears to be relatively low hydraulic conductivity; overburden has a relatively high hydraulic conductivity.

Two hydrostratigraphic units are defined for the Grum Slot:

1. Overburden and shallow permeable bedrock – extends to a depth of approximately 10m below the overburden-bedrock interface; hydraulic conductivity of $5x10^{-4}$ m/s.

2. Competent bedrock – extends from roughly 10 to at least 30m below the overburden-bedrock interface; hydraulic conductivity of $2x10^{-8}$ m/s (geometric mean of deep bedrock hydraulic conductivity values).

Water levels in P09-GS1A and B are elevated above that of Grum Pit lake, similar to that of the standing water in the Grum slot. The hydraulic gradient in Grum slot is towards the pit lake from the slot standing water. There is no indication from drilling or hydraulic testing for the presence of a confining unit below the overburden-bedrock contact, thus the similarity of water levels in the two monitoring wells is suggested to indicate that bedrock and overburden in this area are hydraulically connected.

Piteau (1991 and 1995) report that the Thalweg Aquifer, located underneath the thick overburden on east and northeast sides of the Grum Pit, was artesian, thus the need for active dewatering during operations for pit slope stability. These reports indicate that water from the Thalweg Aquifer came to surface within the approximate area of the current Grum Slot, leading to the presence of standing water, similar to what is currently seen. Hence, it is possible that the current Grum Slot standing water is fed, at least in part, by groundwater from the Thalweg Aquifer, as well as direct precipitation and snowmelt runoff. As long as the standing water in the Grum Slot is higher than the pit lake, the hydraulic gradient will be towards the pit lake.

4.4.5 Considerations for Closure Planning

For closure planning, the primary concern is that the water level in the Grum Pit reaches an elevation allowing discharge to the environment through the Grum Slot. If the hydrogeologic conceptual model presented here is valid, it may be feasible to allow the Grum Pit water level to reach elevations higher than previously believed (1213.4 masl at pit spill point), as long as it is below that of standing water in the Grum Slot (approximately 1227 masl), which essentially provides hydraulic control. The possibility of changing the maximum allowable Grum Pit water level will have to be considered in terms of predicted Grum Pit water quality and risk of release to the environment, but recently acquired data indicates the allowable water level could be raised, which could provide significant additional storage capacity within the Grum Pit.

While the Grum Slot represents the "spill point" for Grum Pit, a hydraulic gradient will exist from the Grum Pit to the environment in a west to southwesterly direction, through bedrock. While no information exists on bedrock hydraulic conductivity to the west or southwest of the Grum Pit, available data suggests that the flux in these directions would be low.

Sampling P09-GS1A and B again would increase confidence in the water quality results.

Consideration should be given to the feasibility of identifying a source of clean water that could be diverted into the Grum Slot to support the presence of the hydraulic barrier, if ever necessary.

4.5 Little Creek Dam

4.5.1 Desktop Study

Prior to initiation of drilling in the Little Creek Dam area, a review of available geology information was completed to assist in development of the drilling program. Little information was identified, the only available information being from field investigation and construction reports for the dam itself, which focused on geotechnical stability issues rather than hydrogeology. Personal communication with Peter Healey, P.Eng. of SRK, who was involved in the design and construction of the dam, provided useful observational information. The following points summarize information available prior to drilling:

- Discontinuous permafrost was identified in dam foundation soils, primarily in the left abutment area (viewed looking downstream).
- Sand and gravel was encountered occasionally, most lithologies being identified as silty till.
- Significant groundwater was never identified.
- Quality of water impounded behind the dam is poor and there is a hydraulic gradient from this water towards Vangorda Creek.

Considering the information available for planning, it was concluded that the appropriate approach was to complete drill holes along the toe of the dam at regular spacing, completing additional infilling drilling if information collected deemed it appropriate. Monitoring wells would be installed in permeable, water bearing materials for hydraulic testing and sampling for water quality.

4.5.2 Drill Holes, Completions and Hydraulic Testing

Seven drill holes were completed in overburden (P09-LCD1 to LCD7). Monitoring wells were installed in all drill holes except P09-LCD5, which was terminated in frozen silty sand and gravel. Drill hole locations are shown on Figure 10. Drill hole location and completion details are summarized in Table 16. Hydraulic testing results are summarized in Table 17. Drill logs are located in Appendix A.

Table 16: Little Creek Dam Drill Hole Completion Information

Drill Hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill Hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (mags)	Screen Depth (mbgs)	Depth to water (m from TOC)	Date of depth to water
P09-LCD1	6903138	593468	1097.53	90	19.8	6.5	0.91	5.97 to 6.47	3.87	7-Aug-09
P09-LCD2	6903136	593465	1097.69	90	7.6	4.8	0.90	3.6 to 4.8	4.42	7-Aug-09
P09-LCD3	6903104	593443	1093.71	90	9.1	6	0.86	5.5 to 6	1.69	7-Aug-09
P09-LCD4	6903097	593436	1093.68	90	12.2	11.78	0.84	10.88 to 11.78	11.96	6-Aug-09
P09-LCD5	6903056	593418	1096.37*	90	19.8	N/A	N/A	N/A	N/A	N/A
P09-LCD6	6903073	593421	1096.21	90	9.1	7.31	0.84	6.41 to 7.31	5.61	6-Aug-09
P09-LCD7	6903009	593423	1101.68	90	10.4	10.4	0.60	7.4 to 10.4	Dry	5-Aug-09

* Ground elevation estimated from handheld GPS as hole was not surveyed.
Mbgs = metres below ground surface
TOC = top of casing

Table 17: Little Creek Dam Hydraulic Testing Results

Drill hole ID	Test Zone Lithology	Test Type	Test Zone (m)	Test Date	Hydraulic Conductivity (m/s)	Comments
P09-LCD1	OB	Slug	5.97 to 6.47 (Screen)	7-Aug-09	4x10-4 (BEJ)	
P09-LCD2	OB	Pump-Recovery	3.6 to 4.8 (Screen)	7-Aug-09	4x10-6 (BEJ)	Hand pumped
P09-LCD3	OB	Slug	5.5 to 6 (Screen)	7-Aug-09	2x10-5 (BEJ)	
P09-LCD4	OB	Slug-Recovery	10.88 to 11.78 (Screen)	6-Aug-09	N/A	Hole was probably frozen and affected by test method. No data presented.
P09-LCD5	N/A	N/A	N/A	N/A	N/A	Borehole only
P09-LCD6	OB	Slug	6.41 to 7.31 (Screen)	6-Aug-09	6x10-4 (BEJ)	
P09-LCD7	N/A	N/A	7.4 to 10.4 (Screen)	N/A	N/A	Dry well

Figure 11 is a cross section through the Little Creek Dam drill holes. Observations and conclusions from drilling and hydraulic testing of the Little Creek Dam locations include:

Overburden Characteristics

- Unconsolidated material was encountered to depths of over 20 m below ground surface. Only one of the drill holes intersected bedrock (P09-LCD1 at a depth of about 20m); all other drill holes were terminated prior to intersecting bedrock.
- Lithology is variable both spatially and with depth. Lithology ranges from silt to sand and gravel dominant layers. Thicknesses of individual layers vary between drill holes and may or may not be laterally continuous. Lithology and variability is generally supportive of a glaciofluvial depositional environment.
- There is no indication of a primary channel or flow path; permeable materials (typically sand and gravel with or without silt) were intersected to varying degrees in all drill holes.
- There is no indication of a permeable sand/gravel horizon overlying bedrock in P09-LCD1.
- Ice was observed in cuttings from numerous holes, but delineation of a permafrost boundary is uncertain.
- Hydraulic conductivity from tests in five monitoring wells ranged from $4x10^{-6}$ to $6x10^{-4}$ m/s. The distribution of hydraulic conductivity values does not show any obvious pattern.
- LCD2 did not have sufficient water column to submerge any of the available slugs. The Levelogger was lowered to the bottom of the well, which was then pumped by hand using Waterra tubing. The water level was then allowed to recover before being pumped a second time.
- LCD4 did not have sufficient water to submerge any of the available slugs. Previous observations suggested that the well had a very slow recharge rate and would require monitoring over a longer period of time, so the Levelogger was installed overnight with a lower sampling rate (2 seconds). The well proved difficult to pump, so instead the Waterra tubing was removed, acting as a "slug removal" and causing a fall in the water level. The Levelogger was retrieved the following day.
- LCD2 tests were pump-recovery tests, and were analyzed using the Theis Recovery method, assuming that they were fully penetrating wells. A straight line was fit to the early-time data.

4.5.3 Water Quality

Samples have been collected from all monitoring wells for water quality analyses. A summary of water quality results is presented in Table 18.

Table 18: Little Creek Dam Groundwater Quality

Well ID	Sample Depth (m drilled depth)	Sample From	n	Acid (pH 8.3)	Alk (total)	Cond	pH	SO4	Mg	Zn	Ca
				(mg/L)	(mg/L)	(uS/cm)	(pH units)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
P09-LCD1	5.97 to 6.47	Overburden MW	2	7.8	280	813	7.9	165	32.2	0.004	120
P09-LCD2	3.6 to 4.8	Overburden MW	2	9.7	280	848	8.0	175	34.7	0.010	132
P09-LCD3	5.5 to 6	Overburden MW	2	13.0	285	789	8.0	150	34.4	0.004	128
P09-LCD4	10.88 to 11.78	Overburden MW	1	1.3	330	1210	7.8	270	32.2	0.004	127
P09-LCD6	6.41 to 7.31	Overburden MW	2	10.3	290	803	7.9	140	33.5	0.013	127

n = number of samples; mw = monitoring well

In general, groundwater in this area has a circum-neutral pH with slightly elevated electrical conductivity. The highest conductivity value (1210 uS/cm from LCD4) is from a monitoring well that may be frozen; results may just indicate quality of stagnant water within the standpipe. Sulphate concentrations are elevated compared to overall background levels for the Faro Mine Complex (<50mg/L) but within the range of concentrations observed at monitoring wells P2001-02 and P2001-03, which are located down gradient of the Vangorda Dump collector ditch. Zinc concentrations at LCD1, 3 and 4 also compare similarly with these Vangorda Dump monitoring wells. Zinc concentrations at LCD2 and LCD6 are elevated compared to these monitoring wells.

For comparison, water quality for standing water behind the Little Creek Dam, collected twice in 2008, shows sulphate concentrations from about 1,100 to 3,100 mg/L and zinc concentrations from about 95 to 179 mg/L. These data suggest that groundwater down gradient of the dam are not, at present, significantly impacted by seepage through the dam, though zinc may be being attenuated along a flowpath from Little Creek Pond.

4.5.4 Hydrogeologic Conceptual Model

Overburden sediments of the Vangorda Plateau area are typically compact silty and sandy glacial till. A basal sand and gravel unit typically overlies bedrock. Bedrock in the vicinity of the Little Creek Dam is calcareous phyllite of the Vangorda Formation (ICAP, 1996). Within the immediate area of the Little Creek Dam, a relatively permeable channel of sandy materials has been observed (P.Healey, pers. comm.).

Overburden units underlying the Little Creek Dam are heterogeneous, perhaps reflecting a glaciofluvial depositional setting, though variation within a "till" unit is not uncommon.

Three overburden hydrostratigraphic units are defined for the Little Creek Dam area:

1. Permeable sand and gravel unit – Considered vertically and laterally heterogeneous. May be present at depths of up to 15m in certain areas with composite thickness ranging to a maximum of about 5m. Average hydraulic conductivity of $7x10^{-5}$ m/s.

2. Low permeability silt-dominant unit – Considered vertically and laterally heterogeneous. May be present at depths of up to 20m with composite thickness ranging to a maximum of about 15m. Average hydraulic conductivity assumed to be $<1x10^{-7}$ m/s (reasonable for a silty till).

3. Frozen ground – Considered to be present at a depth of about 10 to 15m down gradient of the dam in all but the northern-most areas. Base unknown. Hydraulic conductivity assumed to be less than $1x10^{-8}$ m/s.

Inclusion of units 1 and 2 is considered justified as, if loading in this area ever does become an issue, it will likely be focused within the higher permeability materials. Hence, lumping of these units could over-simplify the hydrogeological conditions.

4.5.5 Flow and Load Estimates

Flow and load estimates were determined for both the permeable sand and gravel and lower permeability silt units. Cross sectional areas were estimated based on Figure 11. A cross-sectional area of 675 m^2 was assumed for the sand and gravel unit (135m wide by 5m thick) and a cross-sectional area of 1,350 m^2 (135m wide by 10m thick) for lower permeability silt unit. A hydraulic gradient of 0.1 was assumed, based on the water level difference and distance for Little Creek Pond and Vangorda Creek down-gradient of the dam. Table 19 presents flow and load estimates for groundwater under the Little Creek Dam. As water quality data are not available for the silt unit, values are assumed to the same as for the sand and gravel unit.

Table 19: Little Creek Dam Flow and Load Estimates

Unit	Area (m^2)	K (m/s)	Gradient	Flux (l/s)	SO_4 Conc. (mg/L)	Zn Conc. (mg/L)	SO_4 Load (tonne/yr)	Zn Load (tonne/yr)
Permeable Sand & Gravel	135	$7x10^{-5}$	0.1	0.9	175	0.01	5	0.0003
Low Permeability Silt	1,350	$1x10^{-7}$	0.1	0.014	175	0.01	0.07	0.00004

Loading from this area is currently relatively low with the exception of sulphate within permeable sand and gravel. Zinc within the permeable sand and gravel may be attenuated along the flowpath.

4.5.6 Considerations for Closure Planning

At this time, there appears to be no need to assess groundwater interception below the Little Creek Dam. Routine, long-term monitoring of groundwater quality from at least three of the monitoring wells (ie. LCD1, LCD3 and LCD6) should be continued as part of the overall site monitoring program.

4.6 Vangorda Creek

4.6.1 Drill Holes, Completions and Hydraulic Testing

Two drill holes were completed below the mine access alongside Vangorda Creek, P09-VC1 and VC2. P09-VC1 was completed in bedrock. P09-VC2 was completed in overburden. Monitoring wells were installed in both drill holes. Drill hole locations are shown on Figure 10. Drill hole location and completion details are summarized in Table 20. Hydraulic testing results are summarized in Table 21. Drill logs are located in Appendix A.

Table 20: Vangorda Creek Drill Hole, Completion and Testing Information

Drill Hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill Hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (mags)	Screen Depth (mbgs)	Depth to water (m from TOC)	Date of most recent depth to water
P09-VC1	6903244	593627	1113.28	60	58.1	57.9	0.89	52.6 to 57.9	4.00	5-Aug-09
P09-VC2	6903259*	593623*	1110.90*	90	21.3	21.3	0.9	18.25 to 21.3	1.63	5-Aug-09

* Coordinates and ground elevation estimated from handheld GPS as hole was not surveyed.

Table 21: Vangorda Creek Hydraulic Testing Results

Drill hole ID	Test Zone Lithology	Test Type	Test Zone (m)	Test Date	Hydraulic Conductivity (m/s)	Comments
P09-VC1	BR	Packer	32.0 to 35.6	11-Jul-09	$1x10^{-6}$	
	BR	Packer	38.5 to 44.9	11-Jul-09	$4x10^{-7}$	
	BR	Packer	46.4 to 52.8	12-Jul-09	$2x10^{-7}$	
	BR	Packer	53.1 to 58.1	12-Jul-09	$7x10^{-7}$	
	BR	Slug	60.7 to 66.8 (Screen)	5-Aug-09	$5x10^{-5}$ (BEJ)	Problematic Test Results
P09-VC2	OB	Slug	18.25 to 21.3 (Screen)	5-Aug-09	$2x10^{-5}$ (BEJ)	

Figures 12a &b are cross sections through the Vangorda Creek drill holes. Cross section locations are shown on Figure 10. Observations and conclusions from drilling and hydraulic testing of the Vangorda Creek locations include:

Overburden Characteristics

- Overburden thickness at P09-VC2 was approximately 21m. The collar for P09-VC2 is approximately 5m above Vangorda Creek.
- The upper 18m are sandy silt and clay.
- Sand and gravel was encountered for 2.4m above bedrock, from about 18 to 21 below ground.
- The screen for the monitoring well at P09-VC2 is 3m long, covering the sand and gravel unit and marginally into bedrock.
- Slug testing of the overburden monitoring well indicates a hydraulic conductivity of $5x10^{-4}$ m/s.

Bedrock Characteristics

- P09-VC1 was drilled at an inclination of 60 degrees from vertical to a total drilled depth of 67m. The drill hole was oriented towards, and roughly perpendicular to, Vangorda Creek to assess bedrock conditions underneath the creek, specifically, to determine if the creek is structurally controlled. The orientation and drilled length resulted in the drill hole reaching final depth at approximately the opposite side of Vangorda Creek, at a depth of approximately 52m below the Creek.
- Lithology was calcareous phyllite, with marble zones up to 0.6m in length.
- RQD was less than 80% for 37% of the recovered core. Average RQD was 85%. The lowest RQD (37%) occurred approximately 2 to 3.5m below the overburden-bedrock interface.
- Total core recovery (TCR) was typically lower than core run length, attributed to the friable, weak nature of the phyllite. Return water was typically black and very turbid, suggesting rock was pulverized and "washed" during drilling.
- Mulitple rubble zones were encountered, most interpreted as drilling-induced in nature.
- Joint density ranged from a low of 0/m to a high of 4.6/m, with an average of 2.4/m. The highest joint density occurs at a drilled depth of 58 to 59.5m.
- No structural features were identified.
- Bedrock hydraulic conductivity ranged from $2x10^{-7}$ to $1x10^{-6}$ m/s for four tests conducted during drilling. Three tests were $1x10^{-7}$ m/s or lower. The highest hydraulic conductivity value of $1x10^{-6}$ m/s was for a zone between 32 to 35.6 m below ground surface, and approximately 5 m below the overburden-bedrock interface. RQD ranged from 70% to 98% with 11 joints identified over the entire zone length.
- The monitoring well in P09-VC1 is screened across a vertical depth of about 61 to 67m, corresponding to the bottom of the drill hole. Slug testing at this location indicates a hydraulic conductivity of $5x10^{-4}$ m/s, significantly higher than packer injection testing. Slug test water level data was non-ideal, variations with slug direction suggesting a directional bias. The slug test value is considered of only moderate confidence.

4.6.2 Water Quality

Samples were collected from both monitoring wells for water quality analyses. A summary of water quality results is presented in Table 22.

Table 22: Vangorda Creek Groundwater Quality

Well ID	Sample Depth (m drilled depth)	Sample From	n	Acid (pH 8.3)	Alk (total)	Cond	pH	SO4	Mg	Zn	Ca
				(mg/L)	(mg/L)	(uS/cm)	(pH units)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
P09-VC1	52.6 to 57.9	Bedrock MW	2	0.6	140	427	8.1	71	10.1	0.006	52
P09-VC2	18.25 to 21.3	Overburden MW	2	3.4	165	367	8.0	26	10.7	0.043	60
P09-VC2	18.3 to 21.3 – airlift	Overburden	1	0.7	150	370	8.2	44	10.7	0.016	52

n = number of samples; mw = monitoring well

Water quality results indicate that water has circum-neutral pH and slightly elevated electrical conductivity, compared to Vangorda Creek. Sulphate concentrations are low, similar to many background water concentrations. Sulphate is higher in bedrock than overburden. This could be a factor of rock vs. overburden mineralogy.

Conversely, zinc concentrations are higher in overburden than bedrock. Bedrock zinc concentration is low, approximately three times lower than Vangorda Creek in this area. Overburden zinc concentration (as measured in the monitoring well) is approximately seven times higher than bedrock concentration and roughly 2.5 times the concentration of Vangorda Creek in this area (Vangorda Creek data are presented below in Section 4.6.5).

4.6.3 Hydrogeologic Conceptual Model

Bedrock underlying Vangorda Creek, in the vicinity of P09-VC1and 2, is calcareous phyllite of the Vangorda Formation. The phyllite may be anisotropic in terms of hydraulic conductivity. Overburden is typically compact silty to sandy glacial till, overlying a relatively high hydraulic conductivity sand-dominant unit, which overlies bedrock. Overburden thickens is about 30m, with the majority comprised of till. Vangorda Creek is incised into this unit. No geologic structures have been mapped along the alignment of Vangorda Creek, below the mine access road (Figure 5-4, ICAP, 1996)

Three hydrostratigraphic units are defined:

1. Low permeability silt-dominant unit (till) - Considered vertically and laterally heterogeneous. May be present to depths of 20m. Hydraulic conductivity is uncertain, but assumed to be lower than $1x10^{-7}$ m/s.
2. High permeability basal sand and weathered bedrock unit – typically sand and/or gravel, with some silt. Considered to be laterally extensive. Thickness ranges from about 5 to 10m. Hydraulic conductivity = $2x10^{-5}$ m/s.
3. Bedrock unit – may be anisotropic due to foliations. Hydraulic conductivity = $5x10^{-7}$ m/s to a depth of at least 30m below the overburden – bedrock interface (geometric mean of all bedrock test data).

Water level data collected for both wells on August 5, 2009, indicate hydraulic heads greater than the elevation of Vangorda Creek. Depth to water was 1.6m for VC2 (the overburden well) and 4m for VC1 (the bedrock well). Correction to elevation suggests very similar hydraulic head values. Water levels for VC2 indicate that gradients in both the overburden and bedrock units are towards Vangorda Creek.

Comparison of water levels for the monitoring wells and the Vangorda Pit (as measured on July 13, 2009) indicate a hydraulic gradient towards the pit. As shown on Figure 12b, the pit water level is below the overburden – bedrock interface, though the exact elevation and configuration of the interface in that area of the pit is uncertain. Considering this and water quality, the source of water within the basal sand and weathered bedrock unit is probably limited in terms of catchment area, perhaps with contributions from Vangorda Creek above the mine road.

4.6.4 Flow and Load Estimates

Flow and load estimates were determined for the basal sand/weathered bedrock and bedrock units based on the cross-sectional area illustrated in Figure 12a. A cross-sectional area of 500 m^2 (50m wide by 10m thick) was assumed for the basal sand/weathered bedrock and a cross-sectional area of 1,500 m^2 (50m wide by 30m thick) for the bedrock unit. For the purpose of the flow estimates, the flow direction is assumed to be roughly horizontal. Hydraulic gradients are uncertain. A gradient of 0.1 was assumed. Results are summarized in Table 23.

Table 23: Vangorda Creek Groundwater Flow and Load Estimates

Unit	Area (m^2)	K (m/s)	Gradient	Flux (l/s)	SO4 Conc. (mg/L)	Zn Conc. (mg/L)	SO4 Load (tonne/yr)	Zn Load (tonne/yr)
Basal Sand and Weathered BR	500	$2x10^{-5}$	0.1	1.0	26	0.043	1	0.001
Bedrock	1500	$5x10^{-7}$	0.1	0.08	44	0.006	0.1	0.00001

There is a gradient from groundwater towards the creek, but considering the thick silty materials between the basal sand and the creek, groundwater flux is probably very low and not considered significant.

4.6.5 Vangorda Creek Stream Survey

Laberge Environmental Services conducted a stream survey along Vangorda Creek on October 1, 2009. The survey included flow measurements and sampling for water quality at six stations, located from immediately below the mine access road to downstream of Sweet Creek. Survey locations are shown on Figure 10. The Laberge survey report is included as Appendix E.

Table 24 presents flow, zinc and sulphate concentrations and calculated loads for each station.

Table 24: Vangorda Creek Flows and Surface Water Quality

Station	Discharge (m3/s)	Alk (total)	Cond	pH	SO4	Zn	SO4 Load	Zn Load	
		mg/L	uS/cm	pH units	mg/L	mg/L	mg/s	mg/s	Comments
A	n/a	26	114	7.6	26	0.017	n/a	n/a	Not possible near outlet of CMP
B	0.398	26	119	7.6	28	0.018	11144	7.2	
C	0.403	28	127	7.6	31	0.023	12493	9.3	
D	0.399	35	197	7.7	55	0.023	21945	9.2	
E	n/a (same as D)	37	209	7.8	59	0.022	23541	8.8	Station close to D and flow measurement considered redundant. Change in flow less than 2 L/s from D.
F	0.443	41	271	7.8	67	0.021	29681	9.3	

Flow measurements indicate that Vangorda Creek discharge does not increase significantly along the surveyed reach. Discharge measurements are typically considered ±10%, so the reported flows, even the apparent increase between station D and F (no measurement at station E), could be about the same.

Zinc and sulphate concentrations and load show different increases in a downstream direction. Zinc concentration increases between stations B and C by about 25%. Suphate shows about a 10% increase between these stations, but almost doubles between station C and D and shows another increase of about 15% between stations E and F. Assuming that discharge remains about the same at all stations, load shows a similar increase to concentration. If the increase in discharge between stations D and F is real, sulphate load increases by an additional 14% while zinc load shows a only a marginal increase.

Comparison of Vangorda Creek water quality data with groundwater quality data and seep survey results provides insight into sources for the increasing downstream load. Areas of loading to Vangorda Creek have historically been constrained primarily to surface seepage from the Grum Dump, specifically, seepage from Moose Pond (station V2A), Trib A (V2) and, to a lesser degree, the smaller creeks draining from the southwest portion of the dumps (ie. No Fork Creek and Sweet Creek). Groundwater quality data from the majority of monitoring wells located below both the Grum and Vangorda dumps have historically shown low metal and sulphate concentrations. Notable exceptions, showing effects of seepage from the Grum Dump, are P96-9A, a 20m deep overburden well approximately 225m above Vangorda Creek and close to Grum Creek, and Moose well, located at the toe of the Moose Pond embankment. Increases in sulphate load between Vangorda Creek stations C and F can be explained by known contributions from these areas.

The increase in sulphate and zinc load between Vangorda Creek stations B and C cannot be reasonably explained by those same contributions as stations B and C are sufficiently far upstream of these contributing areas that they can be reasonably ruled out. There are at least two possibilities for this additional load: upwelling groundwater from the overburden unit identified at P09-VC2 or seepage from the north/northeastern portion of the Vangorda Dump.

Sulphate concentration from groundwater at P09-VC2 is about 30 mg/L and zinc concentration about 0.04 mg/L. At these concentrations, the flows required to obtain the observed increase in load between stations B and C (2 mg/s for zinc and 1,200 mg/s for SO4) are:

Sulphate: 1,200 mg/s ÷ 30 mg/L = 40 L/s

Zinc: 2 mg/s ÷ 0.04 mg/L = 50 L/s

Flows of 40 to 50 L/s are about 10% of the flow of Vangorda Creek measured at stations B and C. The increase in flow between the two stations was only about 5 L/s, so while the required groundwater contribution would be higher than observed, these measurements are close to or within flow measurement error. Considering the groundwater flow estimated for the basal sand unit (about 1 L/s as shown in Table 23) it seems unlikely that such flows are the contributing source, assuming that Vangorda Creek has incised into the basal sand/weathered bedrock unit such that direct hydraulic connection is possible.

Stations V32 and V33 are water quality monitoring stations on Vangorda Dump toe drains No. 5 and No. 6, respectively, both of which are generally aligned to flow into Little Creek Pond, behind Little Creek Dam. SRK seep survey stations SRK-VD04 and SRK-VD05 also cover these locations. SRK-VD10 is located on drain No. 4, which is to the west of drain No. 5 and No. 6. Average 2007 to 2008 sulphate concentrations for the SRK seep survey stations range from 13,000 to 59,000 mg/L and zinc average concentrations from 2,000 to about 12,000 mg/L.

Assuming a sulphate concentration of 35,000 mg/L, the observed increase in sulphate load between stations B and C, about 1,350 mg/s, requires a flow of:

1,200 mg/s ÷ 35,000 mg/L = ~0.03 L/s.

At a flow of 0.04 L/s and assuming a zinc concentration of 6,000 mg/L, zinc load would be:

6,000 mg/L x 0.03 L/s = 180 mg/s.

This is about two orders of magnitude greater than the observed increase in zinc load of 2 mg/s. Working backwards, the necessary zinc concentration to achieve a zinc load increase of 2 mg/s at a flow of 0.04 L/s is:

2 mg/s ÷ 0.03 L/s = ~65 mg/L.

This zinc concentration is significantly lower than concentrations observed at the seeps, but attenuation along a flow path could account for the lower zinc concentration. Such attenuation has been observed at other locations. Considering that heterogeneity in the geologic materials underlying the Vangorda Dump is present, a small amount of seepage bypassing diversion structures couldn't be ruled out, but has not ever been observed.

While the scenarios presented here are considered plausible, even considering the relatively low flow estimated for the basal sand/weathered bedrock unit in Section 4.6.4, it is recognized that only one survey has been completed along Vangorda Creek, thus it is difficult to make any firm conclusions.

4.6.6 Considerations for Closure Planning

Based on findings from the Vangorda Creek area, three items are presented for consideration during closure planning:

1. P09-VC1 and VC2 should be added to the groundwater sampling locations.

2. While data suggests that flow within bedrock underlying Vangorda Creek is likely not great, the basal sand and weathered bedrock unit does represent a potential groundwater pathway for water from Vangorda Pit, if the water level reaches sufficient elevation and can enter the unit. This potential should be considered as part of determining the final pit water level.

3. There is potentially a source of load to Vangorda Creek in the general vicinity of Little Creek Dam. Additional flow and water quality surveys along Vangorda Creek should be considered. Monthly measurements for one year would likely provide sufficient data to better constrain whether this is real or what potential sources area.

4.7 Grum Dump West

4.7.1 Drill Holes, Completions and Hydraulic Testing

Three drill holes were completed below the Grum Dump West area, P09-GW1, 2 and 3. All three drill holes were terminated in shallow bedrock. Monitoring wells were installed in saturated unconsolidated materials in P09-GW1 and GW3. No monitoring well was installed in P09-GW2. Drill hole locations are shown on Figure 13. Drill hole location and completion details are summarized in Table 25. Drill logs are located in Appendix A.

On August 3, 2009, the Grum Dump west drill holes were visited for sampling and hydraulic testing. Both wells were found to be dry, thus sampling and testing could not occur.

Table 25: Grum Dump West Drill Hole and Completion Information

Drill hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (mags)	Screen Depth (mbgs)	Depth to water (m from TOC)	Date of depth to water
P09-GW1	6904214	591114	1280.01	90	5.2	3.7	0.74	1.56 to 3.66	Dry	27-Aug-09
P09-GW2	6904207	591113	1279*	90	1.2	N/A	N/A	N/A	N/A	N/A
P09-GW3	6904214	591107	1279.80	90	9.0	2.4	0.83	1.4 to 2.4	Dry	27-Aug-09

Note: Coordinates estimated from handheld GPS as hole was not surveyed.
*Ground elevation as no monitoring well.
Mbgs = metres below ground surface.
TOC = top of casing.

Figures 14a and 14b are cross sections through the Grum Dump west drill holes. Observations and conclusions from drilling include:

Overburden Characteristics

- Overburden thickness ranges from less than 1m at GW1, the drill hole furthest from the dumps, to about 3.5m at GW3, closest to the dumps. The area of relatively deep overburden may correspond to the ephemeral surface drainage, but variation is probable across the area.
- Overburden materials range from sand and gravel to silty or clayey sand, the silty or clayey sand lithology being generally predominant.
- During drilling, water was encountered in both GW1 and GW3. In GW1, water was encountered close to the overburden – bedrock interface. In GW3, the drill hole closest to the dump toe with greatest overburden thickness, water was encountered above bedrock.
- At GW3, weathered bedrock was encountered from about 3 to 3.5 m to about 7.5m depth. Cuttings were wet and showed significant weathering, as identified by orange, rusty staining. Drilling through this section was "quick".
- The screen for the monitoring well at GW1 was installed at the overburden – bedrock contact, within shallow weathered bedrock and overlying sand and gravel materials.
- The screen for the monitoring well at GW3 was installed at shallow depth (about 1.5 to 2.5m below ground) in a permeable zone identified during drilling, just above the overburden-bedrock interface.
- A monitoring well was not installed at GW2.
- Hydraulic testing could not be completed as water levels had dropped below the screen levels by the time of testing, but the presence of water at shallow depths during drilling suggests that water levels can be this high and likely vary seasonally.

4.7.2 Water Quality

Due to the monitoring wells being dry on all visits following initial completion, groundwater quality cannot be assessed. During drilling, observations of "orange" colored water were made during the drilling of GW3, both in overburden and weathered bedrock. Similar observations at other areas of the Faro Mine complex have shown such waters to be impacted.

For comparison, the dump toe seep at this location, SRK-GD13, which was sampled on September 24, 2009, had a sulphate concentration of 1,100 mg/L and a zinc concentration of 0.108 mg/L. Conductivity was 2,650 uS/cm and pH 8.0. Flow was estimated at 6 L/min. During the spring 2009 survey, general parameters and metals were similar (SO4 – 1,200 mg/L; Zn – 0.113 mg/L) but flow was much higher, estimated at about 120 L/min.

4.7.3 Hydrogeologic Conceptual Model

Within this area, overburden is assumed to the be the same silty to sandy glacial till as observed in other areas of the Vangorda Platuea. Bedrock is calcareous phyllite of the Vangorda Formation.

Without additional hydrogeologic data, it is difficult to define an appropriate conceptual model for this area. Based on drilling data alone, three hydrostratigraphic units can be suggested:

1. Silty sand to sand and gravel unit – Considered to be laterally heterogeneous. Silty materials generally overly sand and gravel unit. Thickness varies laterally. Maximum observed thickness of about 3.5m. Hydraulic conductivity currently unknown but should be assumed reasonably high.
2. Weathered bedrock unit – Assumed to be present in topographic lows but lateral extent unknown. Can reach thickness of about 4m. Hydraulic conductivity currently unknown but should be assumed reasonably high.
3. Bedrock unit – Competent bedrock can be encountered at depths of less than 1m, probably associated with topographic highs. Little information available, but assumed lower hydraulic conductivity than overlying units.

4.7.4 Flow and Load Estimates

Groundwater flow and load cannot be properly estimated without further hydrogeologic information. Considering the seasonal variability in water levels, shallow flows may be seasonal. Deeper flow is inferred to be continuous based on surface water information from surface water survey location GW1. The basis for this is presented in the following section.

4.7.5 Grum Dump West Surface Water Survey

Laberge Environmental Services conducted a stream survey along ephemeral drainages below the Grum Dump West on October 1, 2009. The survey was planned to collect flow and water quality data at numerous locations down potential drainages, but at the time of the survey, water could only be located at some distance from the dump toe. Survey locations are shown on Figure 10. The Laberge survey report is included as Appendix E.

The survey included flow measurements and sampling for water quality at two stations, located approximately 200 and 400 m down gradient of the dump. Station G1 was the highest elevation location where water was observed. Table 26 presents flow, zinc and sulphate concentrations and calculated loads for each station.

Table 26: Grum Dump Surface Water Quality

Station	Discharge (m^3/s)	Alk (total)	Cond	pH	SO_4	Zn	SO_4 Load	Zn Load
		mg/L	uS/cm	pH units	mg/L	mg/L	(mg/s)	(mg/s)
G1	0.0015	330	1760	8.0	680	0.001	1020	0.0015
G2	0.002	270	1290	8.1	460	0.015	920	0.03

Flow measurements indicate that stream discharge did not increase significantly between the surveyed stations. Attempts to locate flowing water higher up on these drainages was unsuccessful. Discharge measurements are typically considered ±10%, so the reported flows are considered to be the same.

Sulphate concentrations suggest that these surface waters are impacted by dump seepage. Zinc concentration at station G1 was low, but surprisingly high at G2. Both sulphate and zinc concentrations suggest dilution when compared to the toe seep data from SRK-GD13. Zinc and sulphate load show different increases in the downstream direction. Zinc concentration increases between the two stations increase by more than one order of magnitude. Suphate load decreases slightly.

The measured concentrations suggest that seepage from the dump is reaching the creek at the measurement stations. The depth and pathway is uncertain, but at greater depth than monitored by P09-GW1 and GW2. Weathered bedrock is a likely candidate.

4.7.6 Considerations for Closure Planning

At this time, this area is not considered to require additional work, besides continued monitoring of existing stations (P09-GW1 and GW3). The load from this area is relatively low and the catchment is small. The groundwater wells should be visited as part of the routine monitoring, particularly in early spring. Consideration should be given to continued monitoring of surface water quality.

4.8 Upper North Fork of Rose Creek

4.8.1 Drill Holes, Completions and Hydraulic Testing

Three drill holes were completed Upper North Fork Rose Creek area, P09-UN1, 2 and 3. All three drill holes were terminated in shallow bedrock. Monitoring wells were installed in saturated unconsolidated materials. The three drill holes were completed roughly perpendicularly to the NFRC, with UN1 being closest to the NFRC stream valley side and UN3 being closest to the NFRC and the center of the valley. Drill hole locations are shown on Figure 15. Drill hole location and completion details are summarized in Table 27. Hydraulic testing results are summarized in Table 28. Drill logs are located in Appendix A.

Table 27: Upper NFRC Drill Hole and Completion Information

Drill Hole ID	Northing	Easting	Stick-Up Elevation (masl)	Inclination (degrees)	Drill Hole Depth (mbgs)	MW Depth to Bottom (mbgs)	Stick-Up (mags)	Screen Depth (mbgs)	Depth to water (m from TOC)	Date of most recent depth to water
P09-UN1	6914228	586409	1114.21	90	9.1	5.2	1.01	3.7 to 5.2	1.33	25-Aug-09
P09-UN2	6914226	586436	1114.72	90	9.4	6.7	0.90	5.2 to 6.7	1.64	25-Aug-09
P09-UN3	6914243	586400	1115.26	90	13.7	8.8	0.90	7.3 to 8.8	1.9	25-Aug-09

Mbgs = metres below ground surface.
TOC = top of casing.

Table 28: Upper North Fork Rose Creek Hydraulic Testing Results

Drill Hole ID	Test Zone Lithology	Test Type	Test Zone (m)	Test Date	Hydraulic Conductivity (m/s)
P09-UN1	OB	Slug	3.7 to 5.2 (Screen)	26-Aug-09	1x10-3 (BEJ)
P09-UN2	OB	Slug	5.2 to 6.7 (Screen)	26-Aug-09	6x10-4 (BEJ)
P09-UN3	OB	Slug	7.3 to 8.8 (Screen)	26-Aug-09	3x10-4 (BEJ)

Figure 16 is a cross section through the UN drill holes, oriented perpendicular to the NFRC. Observations and conclusions from drilling and hydraulic testing of the Upper North Fork locations include:

Overburden Characteristics

- Depth to bedrock increases towards the center of the stream valley ranging from about 7.5 to 12 m below ground surface. Depth to bedrock was greatest at the northern-most drill hole (UN3), which is located along the northern valley margin, not within the valley centre.
- Lithology is vertically and laterally heterogeneous, characterized by varying percentages of silt, sand and gravel, with clay-rich zones.
- Sand and gravel with silt is the most common material.
- Sand and gravel, or cobbles with sand and gravel are present over bedrock. At UN3, this cobble zone is 3.4m thick.
- The upper two to three meters of UN3 were frozen, indicating the presence of shallow, discontinuous permafrost. This is supported by observations of isolated frozen monitoring wells at the Zone II area, downstream from the Upper North Fork area.
- Slug testing data from all three holes indicates high hydraulic conductivity, ranging from $3x10^{-4}$ m/s to $1x10^{-3}$ m/s with an average of $6x10^{-4}$ m/s. Overall, the valley bottom sediments can be considered to be highly permeable.

4.8.2 Water Quality

Samples were collected from all three monitoring wells for water quality analyses. A summary of water quality results is presented in Table 29.

Table 29: Upper NFRC Groundwater Quality

Well ID	Sample Depth (m drilled depth)	Sample From	n	Acid (pH 8.3) (mg/L)	Alk (total) (mg/L)	Cond (uS/cm)	pH (pH units)	SO_4 (mg/L)	Mg (mg/L)	Zn (mg/L)	Ca (mg/L)
PO9-UN1	3.7 to 5.2	Overburden MW	1	6.8	120	233	7.8	8.7	7.27	0.005	34
PO9-UN2	5.2 to 6.7	Overburden MW	1	6.9	210	415	7.8	16	15.3	0.031	62
PO9-UN3	7.3 to 8.8	Overburden MW	1	12.5	110	215	7.5	8.2	5.55	0.011	31

n = number of samples; mw = monitoring well

Concentrations of sulphate and zinc are relatively low, and conductivity in range with other interpreted background levels. Zinc concentration in UN2 is about one order of magnitude greater than UN1, but may indicate background variability. Sulphate levels are very low in all three monitoring wells.

4.8.3 Hydrogeologic Conceptual Model

The area of the upper NFRC drill holes can generally be characterized as a relatively broad, flat area of alluvial stream deposits, surrounded by variable thickness' of glacial deposits. Surficial geology maps from Bond (1999) shows alluvial plain materials within or overlying a colluvial apron.

- Alluvial deposits are defined as: silt, sand and pebbles with reworked cobbles and boulders occurring as bars or overbank floodplain deposits, 0 - 10 m thick; floodplain subject to periodic floods.
- Colluvial apron is defined as: coalescing colluvial fans at the base of a slope, >1 m thick.

The drill holes are located at the downstream end of a flat, approximately 25 to 100m wide and about 100m long, area of alluvial deposits. The confluence of the Faro Creek diversion is located about 50m upstream of the drill hole locations. The drill hole locations are located in a narrow portion of the area, where the NFRC becomes constrained in a relatively narrow valley bounded on the northwest by hills leading up to the Faro waste rock dumps and on the southeast by materials mapped as colluvial apron.

Two hydrostratigraphic units are defined for this area:

1. Alluvial deposits – 7 to at least 12 m thick. Typically silty sand and gravel. Relatively high permeability cobble-dominant zone on bedrock is typical. K = $5x10^{-4}$ m/s to $1x10^{-3}$ m/s.

2. Bedrock – carbonaceous phyllite or similar lithology. Typically lower hydraulic conductivity than overburden based on data from other areas (likely by at least two orders of magnitude).

The alluvial deposits hydrostratigraphic unit does not appear to be confined to the valley center in the vicinity of the NFRC, though lateral extents are uncertain. At surface, the valley appears bounded to the sides by relatively low permeability colluvial apron materials, into which the NFRC appears to have incised. The alluvial deposits unit can be assumed, at least at this area, to be a single, highly permeable, zone.

Water levels within the UN monitoring wells are all relatively close to ground surface, probably close to the elevation of the NFRC. It is assumed that the NFRC is a gaining stream in this area as the valley narrows at the southwestern end, though there is insufficient water level data, particularly for bedrock and the NFRC itself, to confirm this. Water within the overburden unit is assumed to flow in the same direction as the NFRC and to have a horizontal gradient similar to the NFRC.

4.8.4 Flow and Load Estimates

Flow and load estimates were determined for the valley centre alluvial unit based on the cross-section illustrated in Figure 16. A cross-sectional area of 500 m^2 was assumed (50m wide by 10m thick). For the purpose of the flow estimates, the flow direction is assumed to be roughly horizontal in the direction of flow of the NFRC. A gradient of 0.02 was assumed, about that of the NFRC. Results are presented in Table 30.

Table 30: Upper NFRC Groundwater Flow and Load Estimates

Unit	Area (m^2)	K (m/s)	Gradient	Flux (l/s)	SO_4 Conc. (mg/L)	Zn Conc. (mg/L)	SO4 Load (tonne/yr)	Zn Load (tonne/yr)
Alluvial Deposits	500	$6x10^{-4}$	0.02	6.0	26	0.043	5	0.0083

4.8.5 Considerations for Closure Engineering

One or more of the new wells should be added to the groundwater monitoring system, if more background water quality data is needed and the wells are not frozen.

The location of the drill holes described here is the approximate upstream end of the re-aligned NFRC channel described in the closure project description. A cutoff wall has been presented as part of this project description to divert clean groundwater within the alluvial materials up into the re-aligned NFRC channel. Based on drilling and hydraulic testing results, construction of said cutoff seems reasonable, with proper planning for water management during construction and selection of a cutoff method appropriate for reasonably high permeability materials.

5 Conclusions and Recommendations

A field program was conducted during the late summer of 2009 to provide groundwater information for eight locations at the Faro and Vangorda/Grum mine areas and to install a groundwater well for the Guardhouse. Reporting of the Guardhouse water well installation and testing is provided under separate cover. For the other eight locations, interpretations of subsurface conditions were made or updated. Considerations for closure planning were included for most of the areas. Conclusions and recommendations for each of the eight areas are:

5.1 Cross Valley and Intermediate Dams (CVD/ID)

Three inclined drill holes were completed to characterize bedrock below the CVD. Monitoring wells were installed in two (P09-C1 and P09-C2). A monitoring well could not be installed in P09-C3 due to an inability to get surface casing seated in bedrock. Depth to bedrock increases from north to south, from about 25m to 56m. The depth to bedrock at the southern-most drill hole (56m at P09-C3) was greater than anticipated from previous drilling. Hydraulic conductivity is variable, from average lows around $5x10^{-8}$ m/s to local zones of values greater than $1x10^{-5}$ m/s. A highly permeable zone was identified at depth in P09-C3, with a value of about $2x10^{-4}$ m/s. No significant structural features were identified in the bedrock. Hydraulic conductivity is generally higher at the northern side of the valley and lowest in the center. Bedrock water quality is variable. Elevated sulphate at P09-C1, the northern most drill hole, and zinc are similar to impacted overburden in this area. Zinc is relatively elevated at depth in P09-C3 compared to other monitoring wells below the CVD. P09-C1 water quality suggests that bedrock underlying the northern portion of the valley is impacted like overburden. The deep bedrock sample for P09-C3, which was collected during an airlift test cannot be repeated but needs to be further interpreted as part of the 2009 groundwater quality study. Contaminant load within bedrock exists and must be considered as part of closure engineering.

Drill holes below the ID did not reach bedrock due to heaving sand conditions. All drill hole attempts were grouted to surface.

CVD/ID Recommendations

- Additional bedrock investigation should be considered as part of on-going closure engineering, particularly if the Rose Creek Valley SIS is not going to be located along the toe of the CVD.
- Pumping tests should be completed using the existing overburden pumping wells and monitoring in bedrock. The objective being to assess whether or not pumping from overburden can provide bedrock hydraulic control.
- SIS engineering and method assessment should include consideration of the depth to bedrock across the valley.
- Water quality from the CVD bedrock drillholes should be included in the 2009 groundwater quality review and, if the deep bedrock groundwater sampled during drilling of P09-C3 cannot

be identified as anomalous background data, additional drilling will be required to better delineate contaminant distribution in this area.

- Monitoring wells in P09-C1 and C2 should be added to the list of regular groundwater sampling locations.

5.2 ETA

Two drill holes were completed at the mouth of the Faro Creek canyon to characterize hydraulic properties and water quality within bedrock and natural overburden. Bedrock has low hydraulic conductivity and drilling did not identify any significant geologic structures. Overburden is thin, no more than 2m thick, but highly permeable, under about 16m of tailings. Bedrock water quality shows low concentrations of sulphate and zinc. Overburden has high sulphate and zinc concentrations, and sulphate load on the order of 300 tonnes/yr and zinc load on the order of 5 tonnes/yr. Bedrock loads are orders of magnitude lower. The reasonably high load within the overburden unit indicates load has or is bypassing the ETA interim SIS. Bedrock seepage is relatively minor.

ETA Recommendations

- Monitoring wells P09-ETA1 and ETA2 should be added to the list of regular groundwater sampling locations.
- Seepage interception in the ETA should be improved to provide better capture efficiency.
- Consideration should be given to removing tailings from within the bottom of the Faro Creek Canyon as part of closure.

5.3 S-wells

Performance review of the S-wells SIS indicates that the system is capturing significant load, but was not achieving the required drawdown within the Shallow Aquifer to fully intercept groundwater. It was also recognized that additional groundwater monitoring was required down-gradient of the SIS to monitor system effectiveness. As part of the 2009 field program, six monitoring wells were installed below the SIS. Geologic data suggests that the SIS intersects the Shallow Aquifer except at the eastern end. Modifications to the S-wells SIS were undertaken during the 2009/2010 winter season to improve drawdown and extend the interceptor trench to the east. Performance data following the SIS modification work indicate that hydraulic control has been significantly improved. Deep Aquifer interception at PW2 is working but could be improved by replacement of PW2 and installation of a second pumping well near PW2. PW1 is operating effectively but contributing a small percentage of the overall intercepted load.

S-wells Recommendations

- Monitoring wells P09-SIS1 to SIS6 should be added to the list of regular groundwater sampling locations.

- Performance reviews should be completed annually to assess system effectiveness.
- Flow monitoring on the NFRC needs to be conducted with water quality sampling and procedures should be improved to provide more accurate values.
- Consideration should be given to replacing PW2 with a well of similar diameter and deeper screened interval and installing a second pumping well near PW2.
- The current setup should be monitored for at least one year to provide better data for assessing SIS effectiveness.

5.4 Grum Slot

An elevation of 1213.4 masl was determined by Gartner Lee as the maximum level to which the Grum Pit water level should be allowed to reach to prevent discharge to the environment. This elevation was based on the assumption that the overburden – bedrock interface is permeable.

Two drill holes were completed in the Grum Slot to assess hydraulic properties of the overburden – bedrock interface and deeper bedrock. Testing data suggests that the interface and overlying sediments are permeable, but water levels in both overburden and bedrock are higher than the pit water elevation, similar to the standing water in the Grum Slot. The presence of a groundwater mound under the Grum Slot creates a hydraulic barrier to flow from the Grum Pit, hence, consideration may be given to increasing the maximum allowable Grum Pit water level, as long as it remains lower than the standing water in the Grum Slot (~1227 masl). The possibility of changing the maximum allowable Grum Pit water level will have to be considered in terms of predicted Grum Pit water quality and risk of release to the environment, but could allow significant additional storage capacity within the Grum Pit.

Water quality in the overburden shows relatively high concentrations of zinc similar to Grum Pit water quality. Bedrock has lower zinc concentrations. Standing water in the Grum Slot has higher zinc concentrations than groundwater or the Grum Pit water.

Grum Slot Recommendations

- P09-GS1A and GS1B should be sampled again to provide better confidence in water quality numbers, but shouldn't be monitored more than once per year. Sampling of the Grum Slot standing water should also be repeated.
- If the load to the Grum Slot standing water cannot be identified and cut off, consideration should be given to routing clean water into this area, to provide a source of dilution to this water and to support the high hydraulic head providing the barrier to flow from the Grum Pit.

5.5 Little Creek Dam

Seven drill holes with monitoring wells were completed below the toe of the Little Creek Dam to provide groundwater quality and hydraulic conductivity information. The geology is heterogeneous,

with zones of high permeability sand and gravel interlayered with lower permeability silty units. Groundwater flow is estimated to be about 5 L/s. Groundwater quality shows relatively little influence of impacts from contaminated seepage. Sulphate is elevated but not to levels observed in Little Creek Pond. Zinc concentrations are low and may indicate attenuation.

Little Creek Dam Recommendations

- Monitoring wells P09-LCD1, 2, 3, 4 and 6 should be added to the list of regular groundwater sampling locations.

5.6 Vangorda Creek

Investigations in the Vangorda Creek area included the installation of two drill holes immediately down gradient of the mine access road to characterize bedrock under Vangorda Creek and overburden, as well as a flow and water quality survey of Vangorda Creek itself. Bedrock drilling identified no geologic structures and bedrock permeability ranging from about $2x10^{-7}$ to $7x10^{-7}$ m/s. A permeable sand and gravel unit was identified overlying bedrock. Water quality in both the bedrock and overburden shows low concentrations of sulphate and zinc, though slightly higher in overburden than bedrock. Groundwater zinc and sulphate loads in this area are minimal.

Groundwater elevations indicate a gradient towards the Vangorda Pit, but if the pit water level reached a high enough elevation, flow towards Little Creek Dam, within the basal sand and weathered bedrock unit, would be possible.

The Vangorda Creek flow and water quality survey indicates that loading to the creek is occurring, but can mostly be explained by inputs from small surface water drainages below the Grum Pit and seepage from Moose Pond. An increase in zinc load upstream of Moose Pond was identified, but the source is uncertain. A high concentration, low flow source, such as a minor seepage from the Vangorda Dump could cause the observed increase in load, but the presence of such a source has not been identified.

Vangorda Creek Recommendations

- Monitoring wells P09-VC1 and VC2 2 should be added to the list of regular groundwater sampling locations.
- Additional flow and water quality surveys should be completed along Vangorda Creek to determine if the observed zinc load increase is real and, if so, provide spatial guidance for identification of potential sources.
- Consideration should be given to further subsurface characterization of the basal sand and weathered bedrock unit underneath the Vangorda mine access road and closer to the southwestern edge of the pit to determine the elevations and characteristics of this potential pathway for Vangorda Pit water.

5.7 Grum Dump West

Three drill holes were completed in June 2009 west of the Grum Dump, in the vicinity of seep monitoring station SRK-GD13, immediately down-gradient of the Grum Dump. 2009 sulphate concentrations at SRK-GD13 were about 1,150 mg/L and zinc concentrations about 0.1 mg/L. Seep flows range from about 6 L/min during the later summer dry season to greater than 100 L/min during the spring. Overburden thickness ranges from less than 1m to about 3.5m, lithologies ranging from sand and gravel to silty or clayey sand. At the time of drilling, significant water was encountered, but by August, when hydraulic testing and sampling occurred, all monitoring wells were dry, suggesting seasonal variation in water levels is greater than the depth of monitoring well screens, on the order of a few metres.

A stream survey was conducted in October 2009 by Laberge to assess surface drainage from this area. Water was not observed until a distance of about 200m below the dumps. Water quality at two stations showed elevated sulphate concentrations (~900 to 1,000 mg/L) and low zinc concentrations (0.0015 to 0.03 mg/L); the higher concentration being found at a distance of about 400m down-gradient of the dumps.

While concentrations are relatively low and the catchment size for this area is relatively small, results suggest seepage from the Grum Dump is the likely source of the loadings.

Grum Dump west Recommendations

- Monitoring wells P09-GW1 and GW3 should be added to the list of regular groundwater sampling locations for the spring only.
- Consideration should be given to continuing flow and water quality monitoring at least at station G2 to provide better information regarding potential effects of dump seepage on surface water drainages over time.

5.8 Upper North Fork of Rose Creek

Three drill holes with monitoring well installations were completed within the NFRC valley about 50m downstream of the confluence with the Faro Creek diversion. The purpose of these drill holes was preliminary characterization of geology and groundwater conditions for use in engineering design for the re-alignment of the NFRC into a lined channel.

Drilling results indicate that valley alluvial materials have a depth of up to 12m closer to the valley centre, decreasing towards the valley margins. Shallow, discontinuous permafrost exists, but extents are uncertain. The alluvial plain characterizing this overall area narrows to about 25m or so at the southwestern edge, where the NFRC flows out of the valley. The NFRC is probably a gaining stream at the outlet of the alluvial plain. At the outlet, the sides of the valley are characterized as colluvial apron, heterogeneous colluvial deposits. Alluvial materials within the valley centre are quite permeable with hydraulic conductivity as high as $1x10^{-3}$ m/s. Groundwater flow within the valley centre is estimated to be on the order of 6 L/s under natural conditions. Groundwater quality

showed relatively low concentrations of sulphate and zinc, considered to be representative of background levels for this area.

Upper NFRC Recommendations

- If further background water quality is considered necessary for the NFRC stream channel, one or more of the monitoring wells in this area could be included in the regular groundwater sampling program, if the wells are not frozen.
- Engineering design for the cutoff wall at the upper end of the NFRC channel re-alignment should consider water management during construction and appropriate cutoff wall techniques for high permeability materials.

This report, "**Faro Mine Complex – 2009 Groundwater Investigations - FINAL**," was prepared by SRK Consulting (Canada) Inc.

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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Figures

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VANCOUVER

Faro Mine Closure
Fermeture de la mine Faro

2009 Groundwater Investigations

2009 Groundwater Program Locations

Job No: 1CY003.034

Filename: Figure 1_Vicinity_20100106.ppt

Faro Mine Complex

Date:	Approved:	Figure:
February 2010	DM	1

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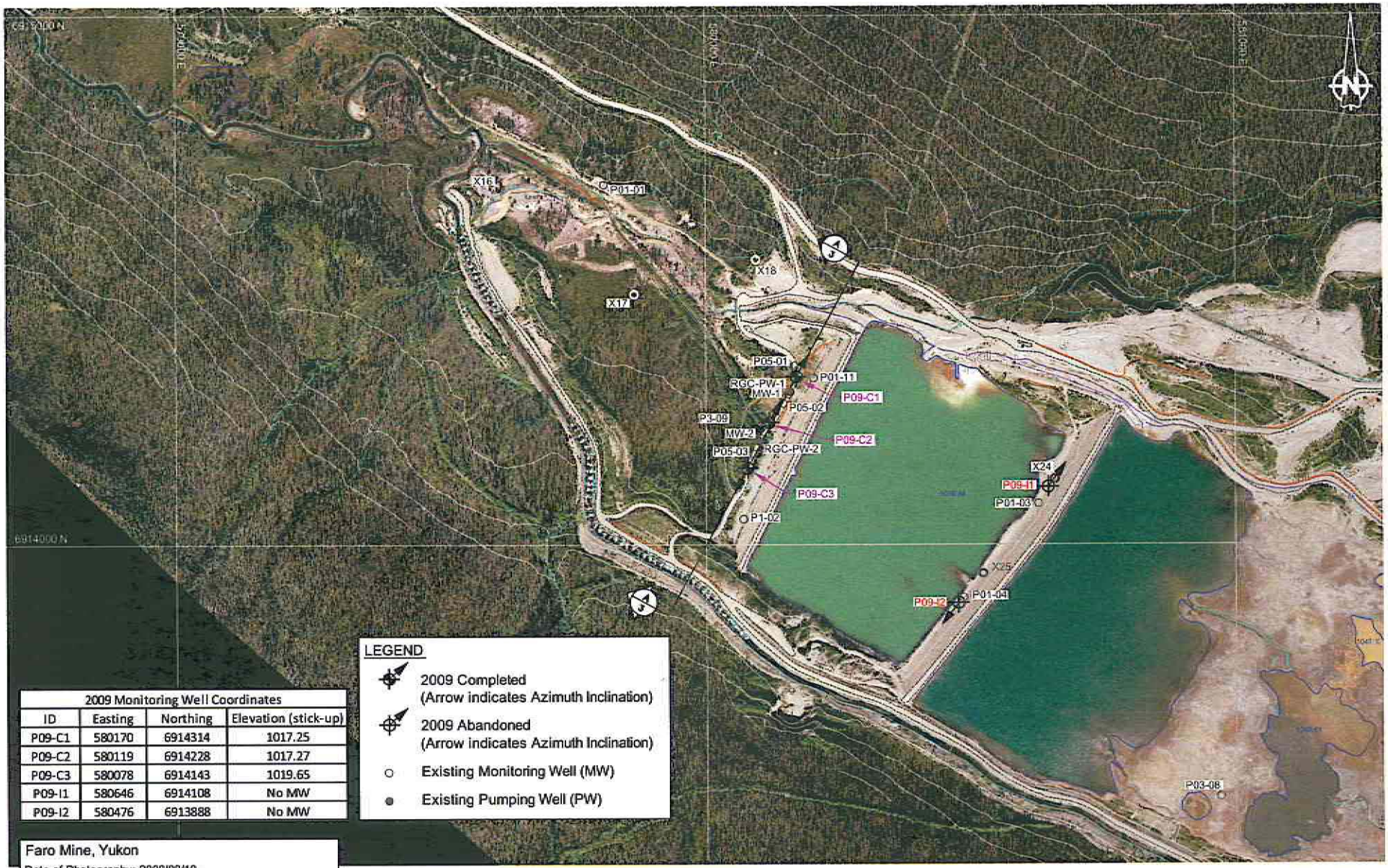

LEGEND

- 2009 Completed (Arrow indicates Azimuth Inclination)
- 2009 Abandoned (Arrow indicates Azimuth Inclination)
- Existing Monitoring Well (MW)
- Existing Pumping Well (PW)

2009 Monitoring Well Coordinates			
ID	Easting	Northing	Elevation (stick-up)
P09-C1	580170	6914314	1017.25
P09-C2	580119	6914228	1017.27
P09-C3	580078	6914143	1019.65
P09-I1	580646	6914108	No MW
P09-I2	580476	6913888	No MW

Faro Mine, Yukon

Date of Photography: 2008/08/10
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

0 100 200 300 400 500
Scale in Metres

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Vancouver B.C.

SRK JOB NO.: 1CY001.034
FILE NAME: Guardhouse Water Well Map.dwg

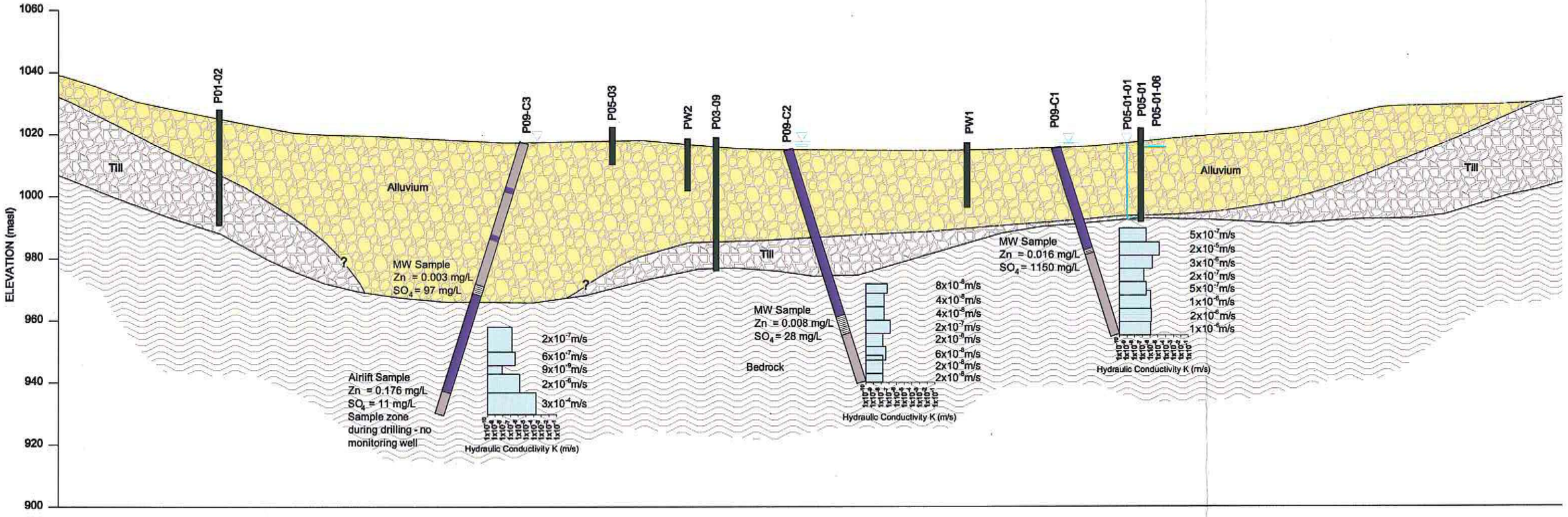
Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

CVD / ID Drill Hole Location Map

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	2



SECTION A-2

No Vertical Exaggeration

LEGEND:

- Till
- Alluvium
- Bedrock (Phyllite)
- Water Level

Monitoring Well

- Screen
- Bentonite Grout
- Backfilled Drill Hole

WATER LEVEL ELEVATIONS			
Drill Hole	Water level (masl)	Measurement Date	Note
P09-C1	1017	Aug. 8, 2009	Frozen Nov. 09 (Frozen Nov. 09, Bedrock)
P09-C2	>1017.5 (Artesian)	Aug. 8, 2009	Frozen Nov. 09 (Frozen Nov. 09, Bedrock)
P09-C3	1017.8	Nov. 4, 2009	Overburden (OB)
P05-01-01	1016.2	Nov. 2, 2009	Deepest Sampling Port (OB)
P05-01-06	1015.7	Nov. 2, 2009	Shallowest Sampling Port (OB)

Note:

Section does not include all drill holes in vicinity, only drill holes close to section. Overburden stratigraphy is simplified.

0 10 20 30 40 50
Scale in Metres

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SRK JOB NO.: 1CY001.034
FILE NAME: FARO CVD-ID Sections.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

CVD Cross Section

DATE: Feb. 2010 | APPROVED: DM | FIGURE: 3

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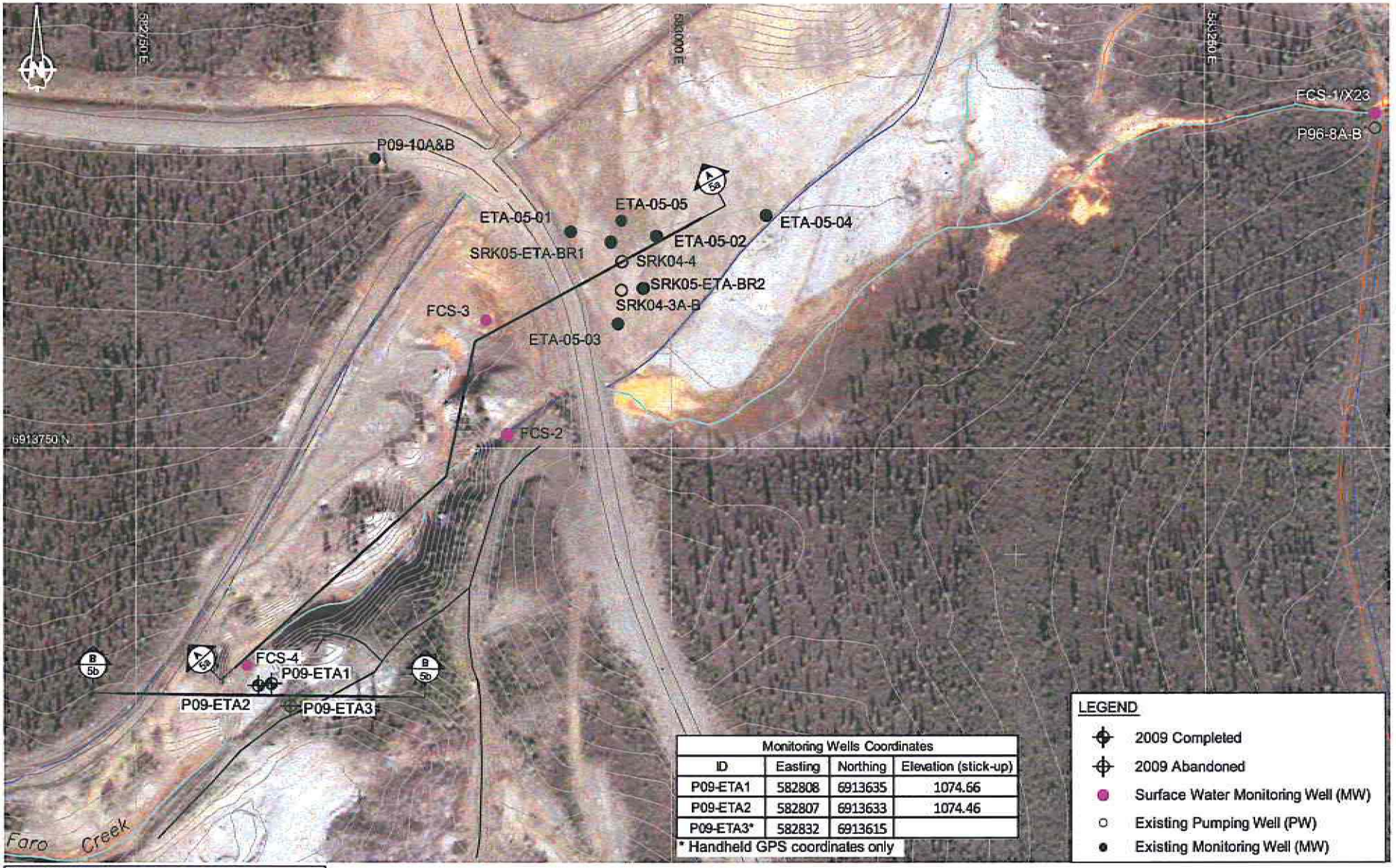


Monitoring Wells Coordinates			
ID	Easting	Northing	Elevation (stick-up)
P09-ETA1	582808	6913635	1074.66
P09-ETA2	582807	6913633	1074.46
P09-ETA3*	582832	6913615	

* Handheld GPS coordinates only

LEGEND

- 2009 Completed
- 2009 Abandoned
- Surface Water Monitoring Well (MW)
- Existing Pumping Well (PW)
- Existing Monitoring Well (MW)

Faro Mine, Yukon

Date of Photography: 2008/08/10
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

0 25 50 75 100
Scale in Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CY001.034
FILE NAME: FARO SITE Area.dwg

Faro Mine Closure
Fermeture de la mine Faro

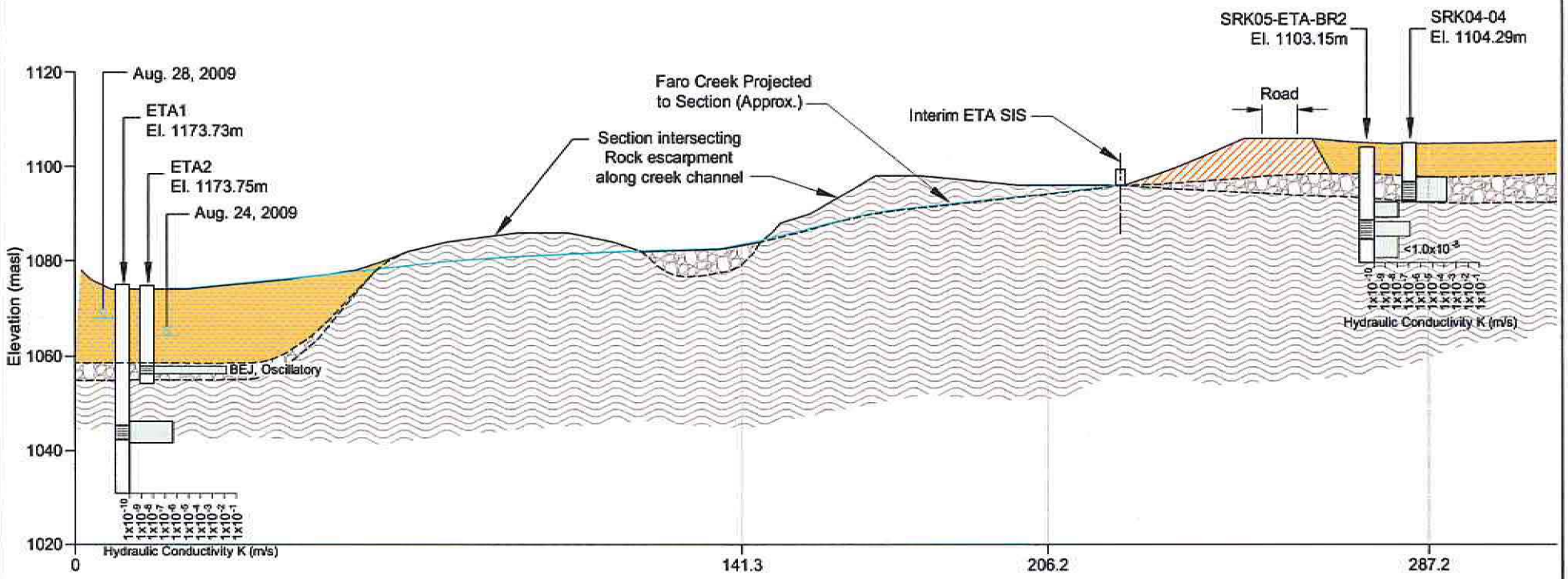
FARO MINE COMPLEX

2009 Groundwater Investigation

ETA Drill Hole Location Map

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	4

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2009 Acad Dwgs\FARO SITE Area.dwg



SECTION A/4
1:1250
No Vertical Exaggeration

LEGEND

- Screen Section
- Tailings
- Alluvium
- Bedrock (Phyllite)
- Water Level

*ETA1 drilled at 70° dip, azimuth perpendicular to section

0 10 20 30 40 50
Scale in Metres

SRK Consulting
Engineers and Scientists

SRK JOB NO.: 1CY001.034
FILE NAME: FARO SITE Area.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

ETA Cross Section A

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	5a

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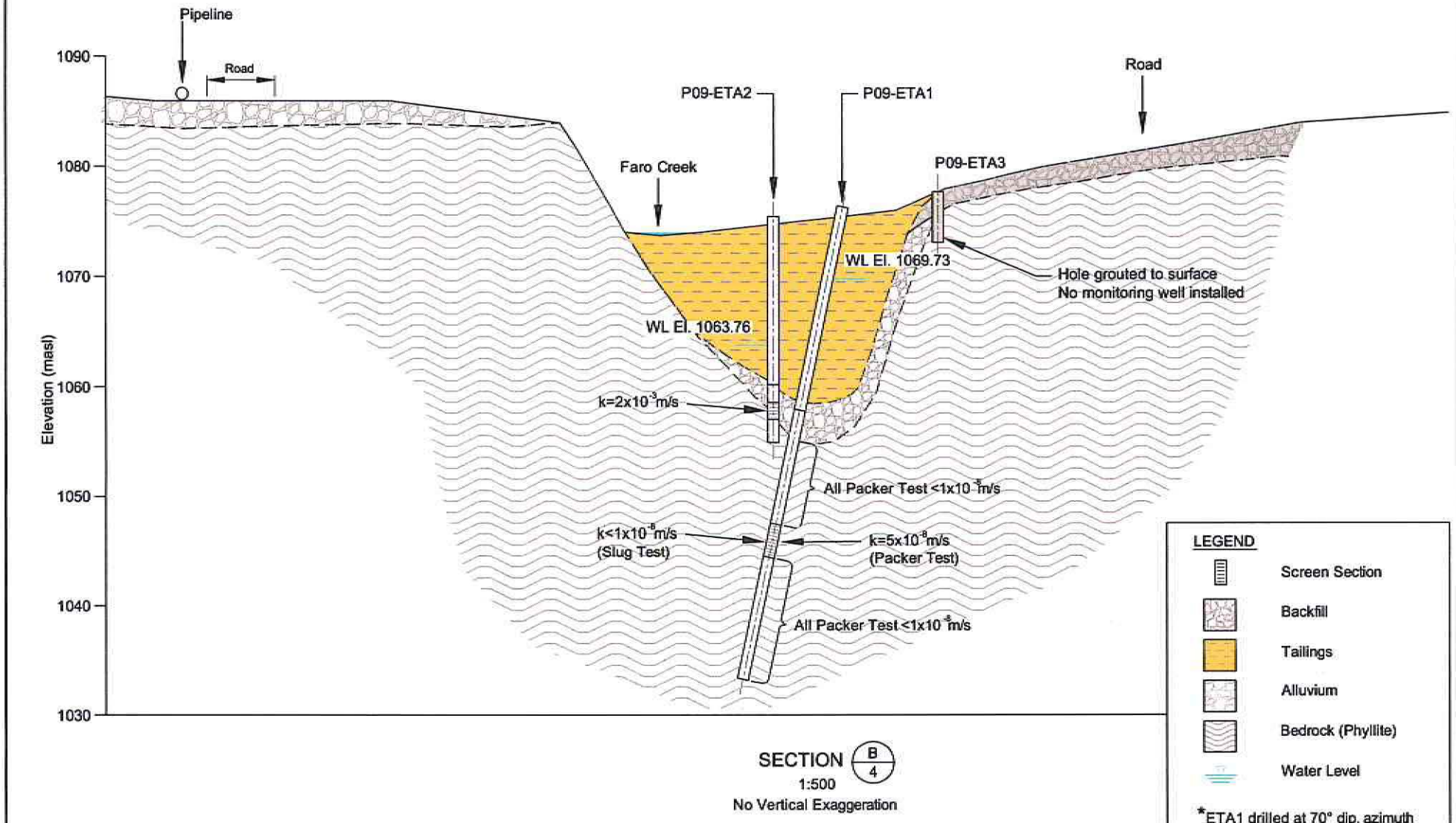

SECTION B/4
1:500
No Vertical Exaggeration

0 5 10 15 20 25
Scale in Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CY001.034
FILE NAME: FARO SITE Area.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

ETA Cross Section B

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	5b

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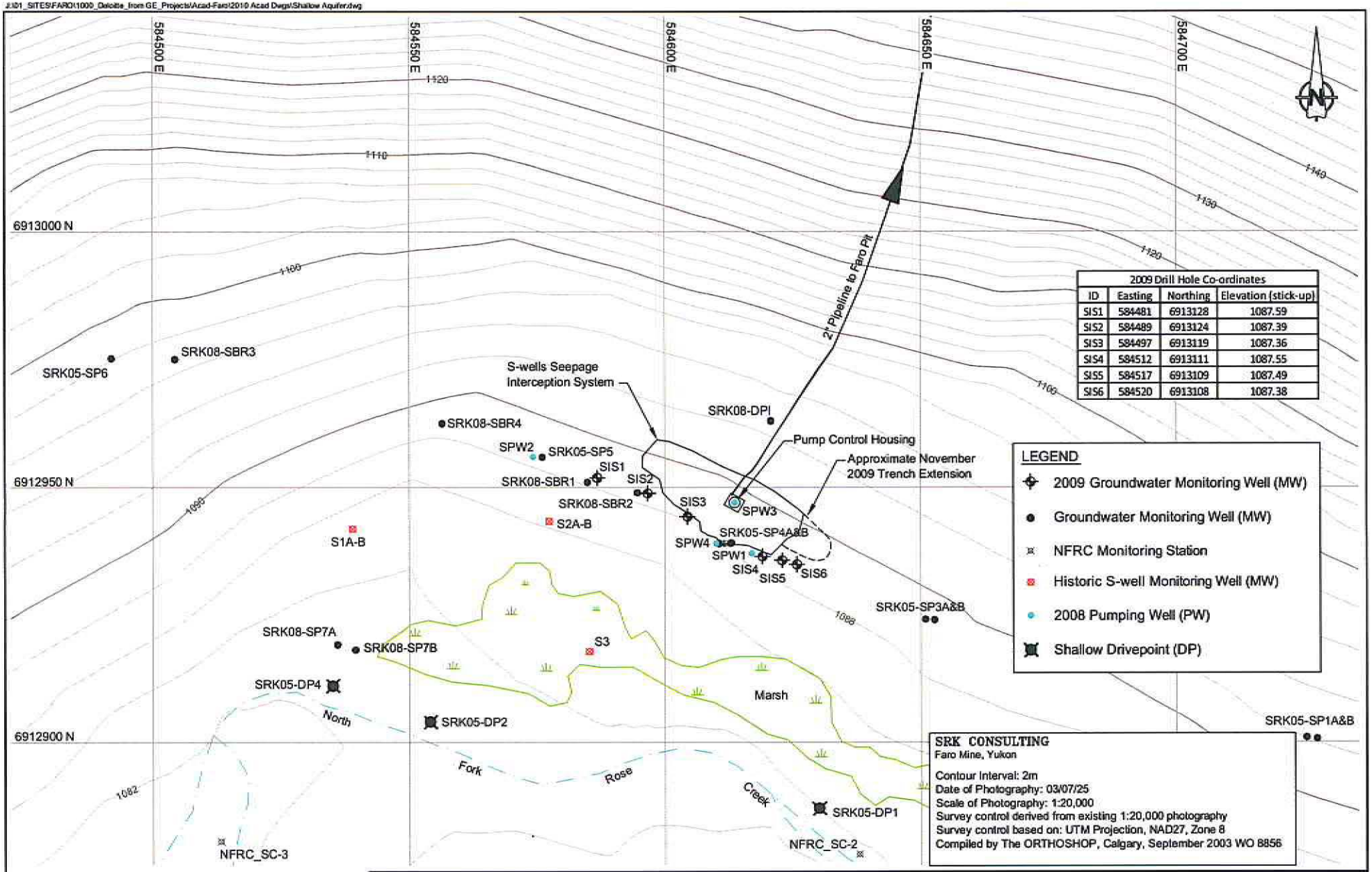

2009 Drill Hole Co-ordinates			
ID	Easting	Northing	Elevation (stick-up)
SIS1	584481	6913128	1087.59
SIS2	584489	6913124	1087.39
SIS3	584497	6913119	1087.36
SIS4	584512	6913111	1087.55
SIS5	584517	6913109	1087.49
SIS6	584520	6913108	1087.38

LEGEND

- 2009 Groundwater Monitoring Well (MW)
- Groundwater Monitoring Well (MW)
- NFRC Monitoring Station
- Historic S-well Monitoring Well (MW)
- 2008 Pumping Well (PW)
- Shallow Drivepoint (DP)

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003 WO 8856

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Vancouver B.C.

SRK JOB NO.: 1CY001.034
FILE NAME: Shallow Aquifer.dwg

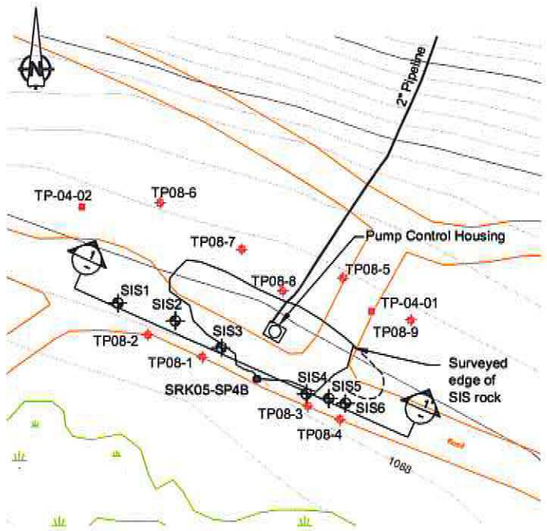
Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

S-wells Drill Hole Location Map

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	6



Plan and Cross Section Location

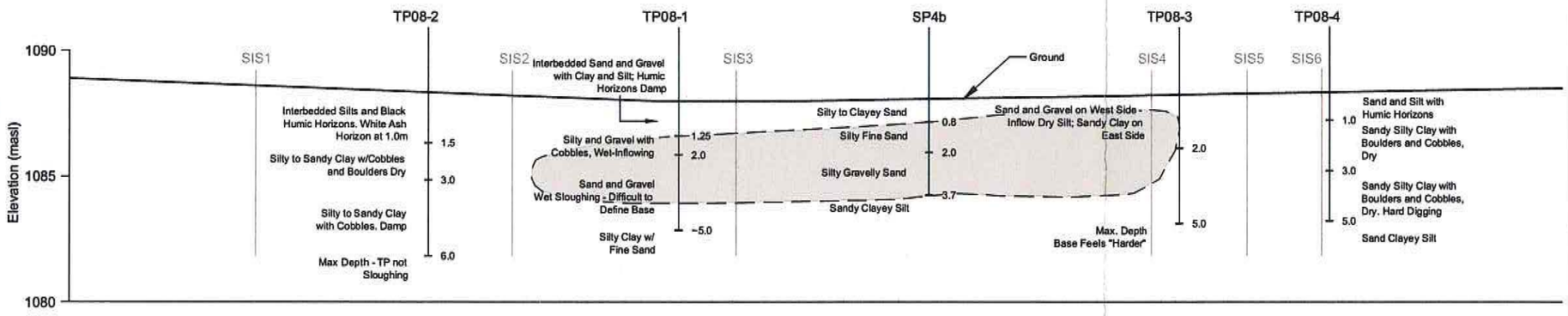
Scale A

LEGEND

- 2009 Completed
- Test Pit
- 2005 Monitoring Well

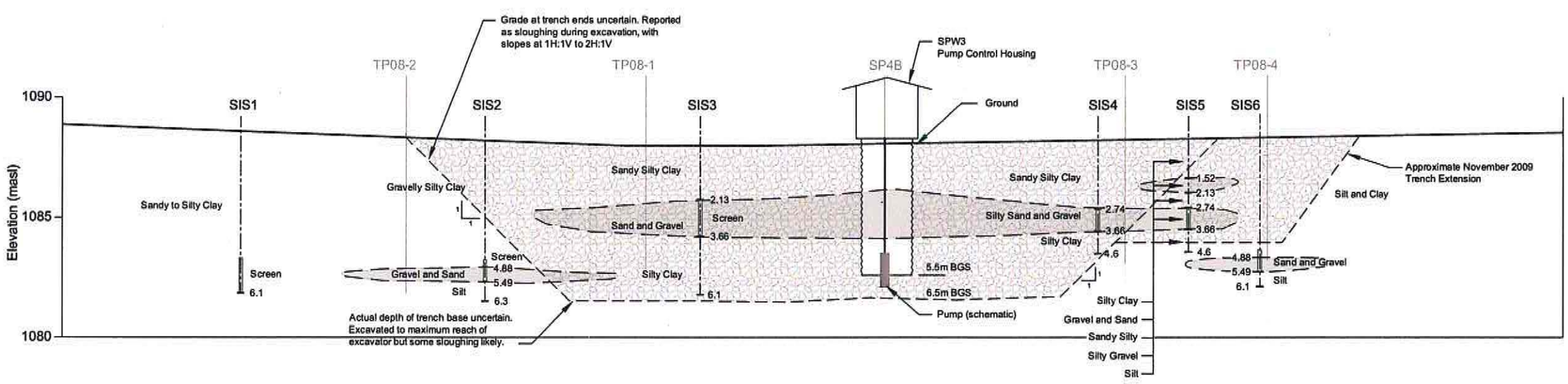
Note:

Only holes in cross sections are shown on plan.



Section 1 - Test Pit Version

Scale B



Section 1 - SIS Monitoring Well Version

Scale B

SIS WELL WATER QUALITY - AUG. 2009		
ID	Zn(mg/l)	SO_4 (mg/l)
SIS 1	No sample	Bailed dry with slow recovery
SIS 2	396	6900
SIS 3	360	6000
SIS 4	307	6000
SIS 5	No sample	Bailed dry with slow recovery
SIS 6	No sample	Bailed dry with slow recovery

Scale B: 0 2 4 6 8 10 Metres

Scale A: 0 10 20 30 40 50 Metres

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SRK JOB NO.: 1CY001.034

FILE NAME: Shallow Aquifer.dwg

Faro Mine Closure Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

S-wells Cross Sections

DATE: Feb. 2010 | APPROVED: DM | FIGURE: 7

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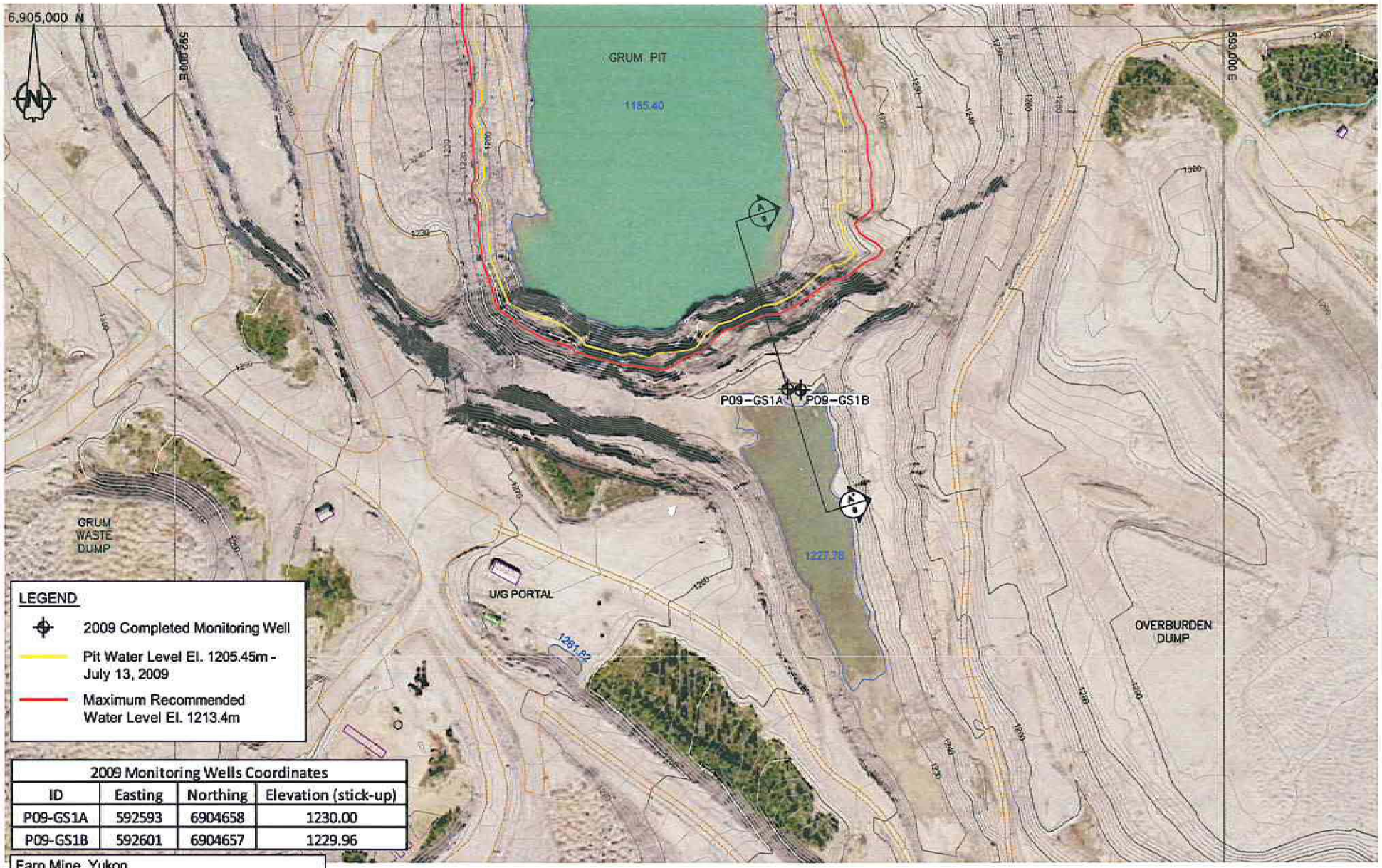
J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Vangorda-Grum\2009 Drawings\VG_Area.dwg



2009 Monitoring Wells Coordinates			
ID	Easting	Northing	Elevation (stick-up)
P09-GS1A	592593	6904658	1230.00
P09-GS1B	592601	6904657	1229.96

Faro Mine, Yukon
Date of Photography: 2008/08/10
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

0 50 100 150 200 250
Scale in Metres

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Vancouver B.C.

SRK JOB NO.: 1CY001.034
FILE NAME: VG_Area.dwg

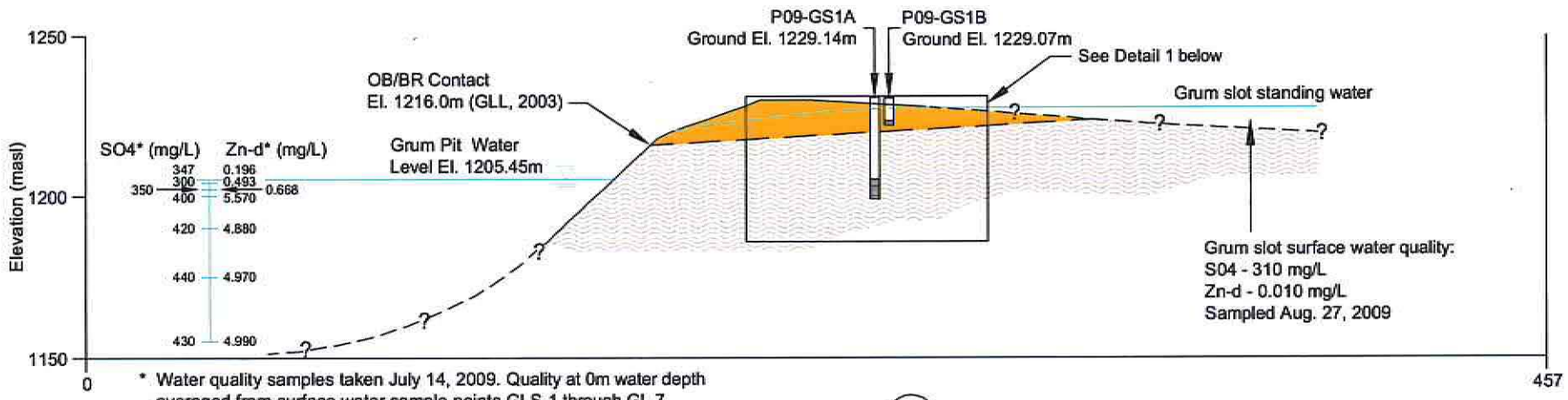
Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Grum Slot
Drill Hole Location Map

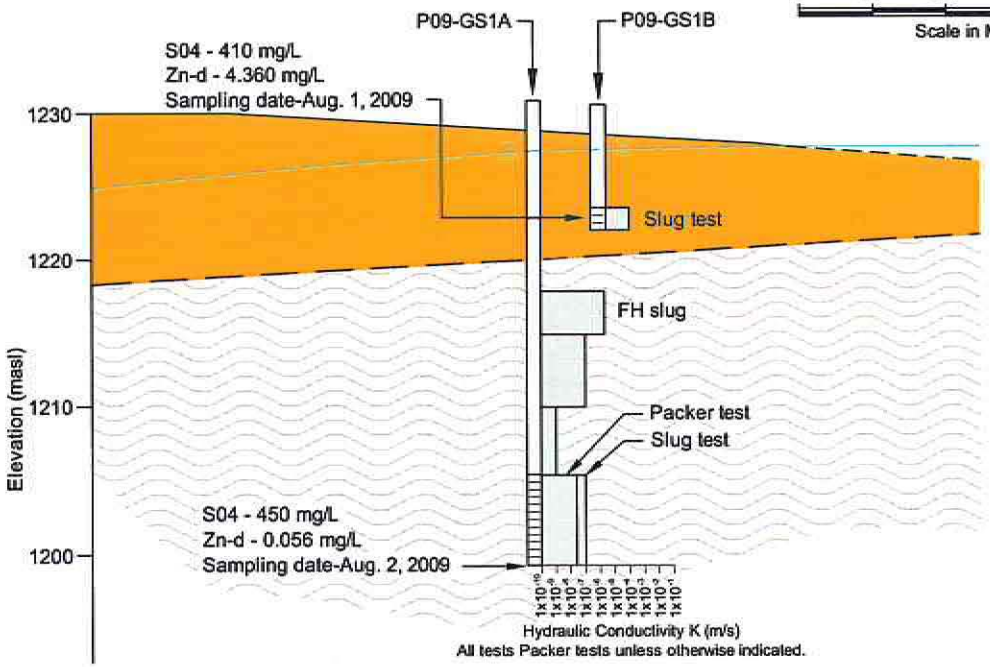
DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	8



* Water quality samples taken July 14, 2009. Quality at 0m water depth averaged from surface water sample points GLS-1 through GL-7.

SECTION A / B

0 20 40 60 80 100
Scale in Metres



All tests Packer tests unless otherwise indicated.

LEGEND

- Screen Section
- Overburden
- Bedrock (Phyllite)
- Water Level (Data taken July 13, 2009)

*GS1B - Projected to section
Packer test taken near OB/BR contact.

DETAIL 1

0 5 10 15 20 25
Scale in Metres

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SRK JOB NO.: 1CY001.034
FILE NAME: VG_Area.dwg

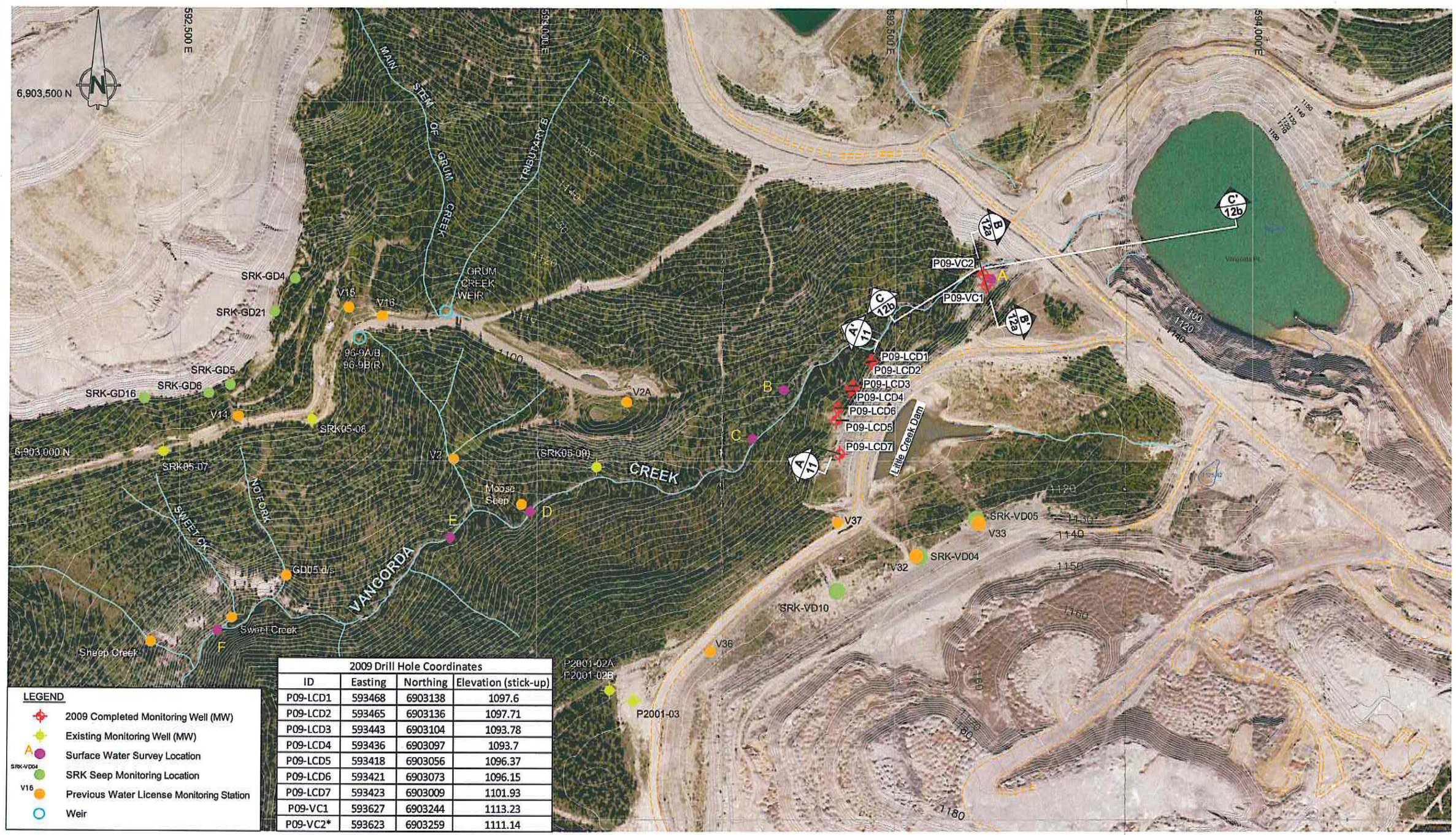
Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Grum Slot
Cross Section

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	9



LEGEND

- 2009 Completed Monitoring Well (MW)
- Existing Monitoring Well (MW)
- A — Surface Water Survey Location
- SRK-VD04 — SRK Seep Monitoring Location
- V16 — Previous Water License Monitoring Station
- Weir

2009 Drill Hole Coordinates			
ID	Easting	Northing	Elevation (stick-up)
P09-LCD1	593468	6903138	1097.6
P09-LCD2	593465	6903136	1097.71
P09-LCD3	593443	6903104	1093.78
P09-LCD4	593436	6903097	1093.7
P09-LCD5	593418	6903056	1096.37
P09-LCD6	593421	6903073	1096.15
P09-LCD7	593423	6903009	1101.93
P09-VC1	593627	6903244	1113.23
P09-VC2*	593623	6903259	1111.14

Note: * Location of BH P09-VC2 is approximate

Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27
Compiled by The ORTHOSHOP, Calgary, September 2003

0 50 100 150 200 250
Scale in Metres

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SRK JOB NO.: 1CY001.034
FILE NAME: SectionP09-VC1.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation
Little Creek Dam and Vangorda Creek Drill Hole and Stream Survey Location Map

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	10

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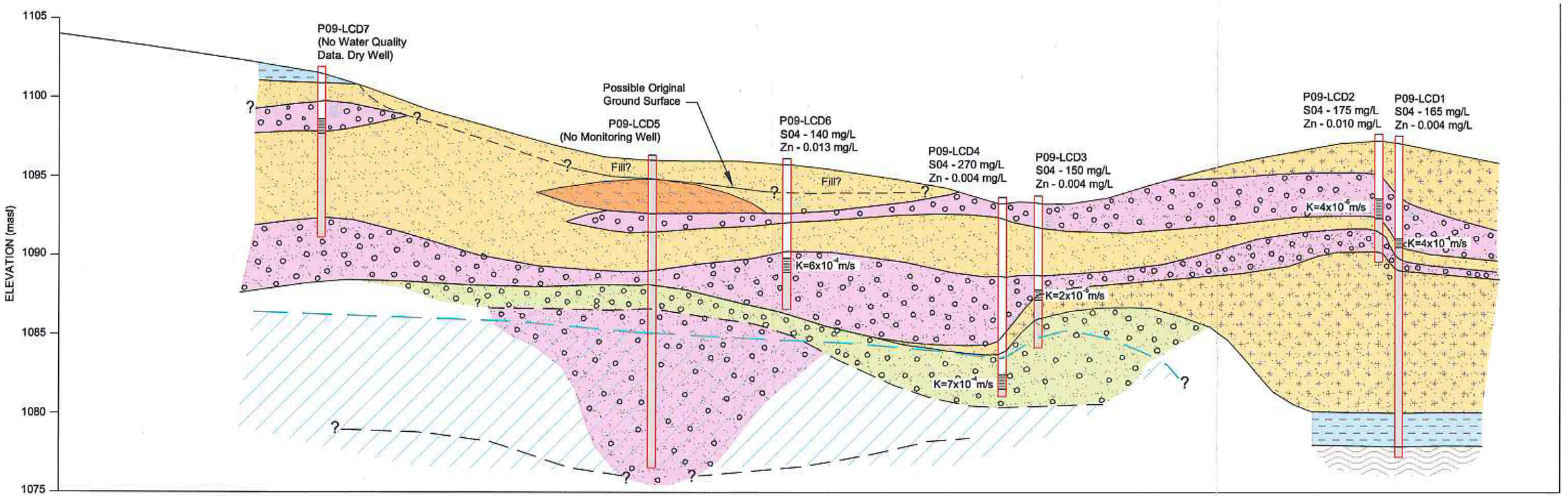

SECTION A/10

2X Vertical Exaggeration

LEGEND:

- Permafrost Horizon
- Silts, Sands (Gravels may be present)
- Sands, Gravels (Silts may be present)
- Sands, Gravels (Greenish Black)
- Organic Rich Soils
- Clays
- Bedrock (Phyllite)

All water level measurements taken between Aug. 5-7, 2009.
Water quality results from August 2009.

Monitoring Well
Screen
Backfilled Drill Hole

0 5 10 15 20 25
Scale in Metres

DRILL HOLE COORDINATES			
Hole ID	Easting	Northing	Elevation (stick-up)
P09-LCD1	593467.652	6903138.018	1097.60
P09-LCD2	593465.033	6903136.480	1097.71
P09-LCD3	593443.025	6903103.880	1093.79
P09-LCD4	593435.751	6903096.675	1093.70
P09-LCD75	593417.974	6903055.890	1096.37
P09-LCD6	593421.144	6903073.076	1096.16
P09-LCD7	593423.009	6903008.629	1101.93

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SRK JOB NO.: 1CY001.034
FILE NAME: SectionP09-VC1.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Little Creek Dam
Cross Section A

DATE: Feb. 2010 | APPROVED: DM | FIGURE: 11

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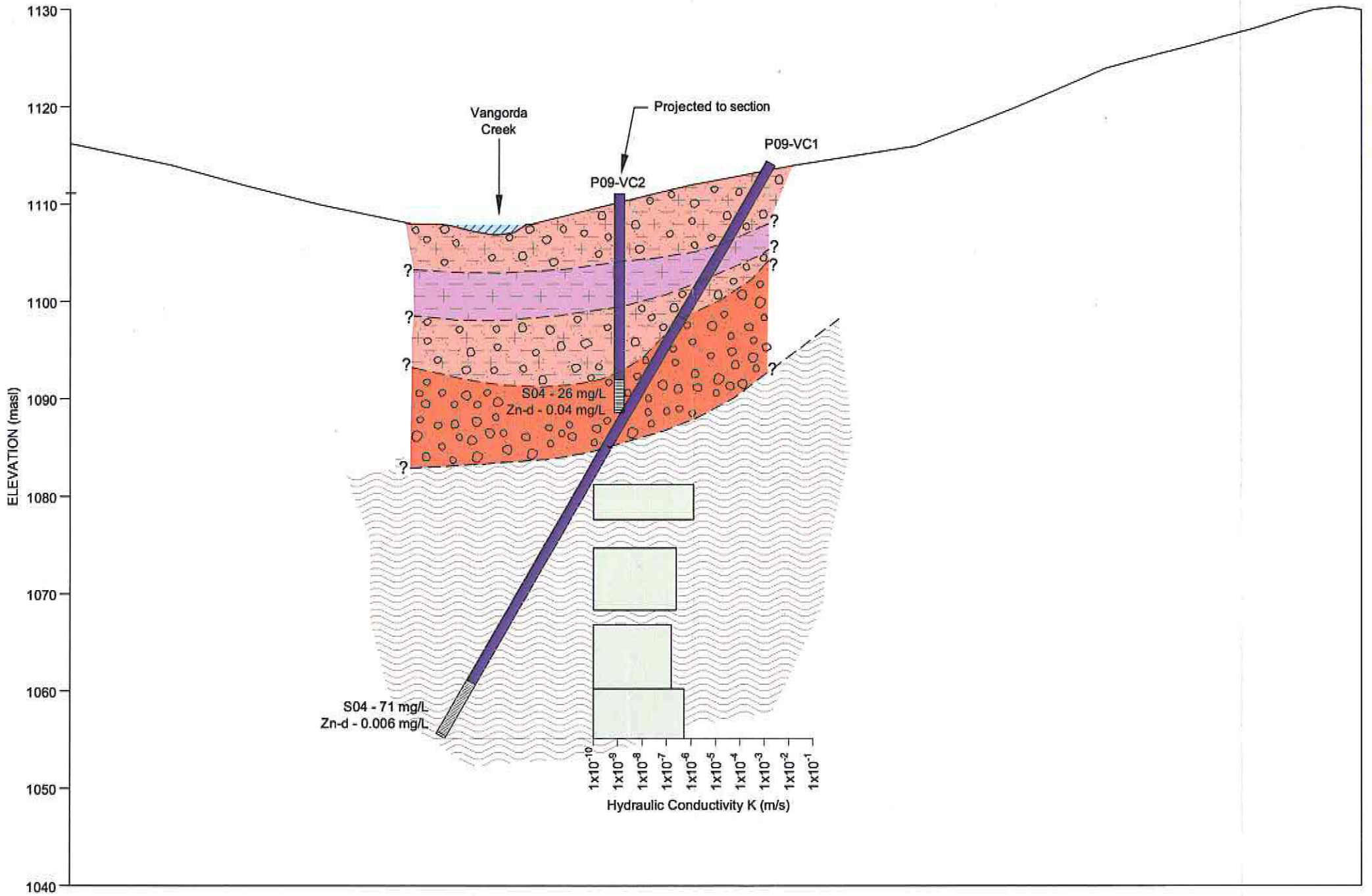

LEGEND:

- Silt and Clay
- Silt and Clay with some Sand/Gravel
- Sand and Gravel
- Bedrock (Phyllite)
- Creek Deposit
- All water level measurements taken on Aug. 5, 2009

Monitoring Well

- Screen
- Bentonite Grout
- Backfilled Drill Hole

SECTION B 10

No Vertical Exaggeration

0 5 10 15 20 25

Scale in Metres

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Vancouver B.C.

SRK JOB NO.: 1CY001.034

FILE NAME: SectionP09-VC1.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Vangorda Creek
Cross Section B

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	12a

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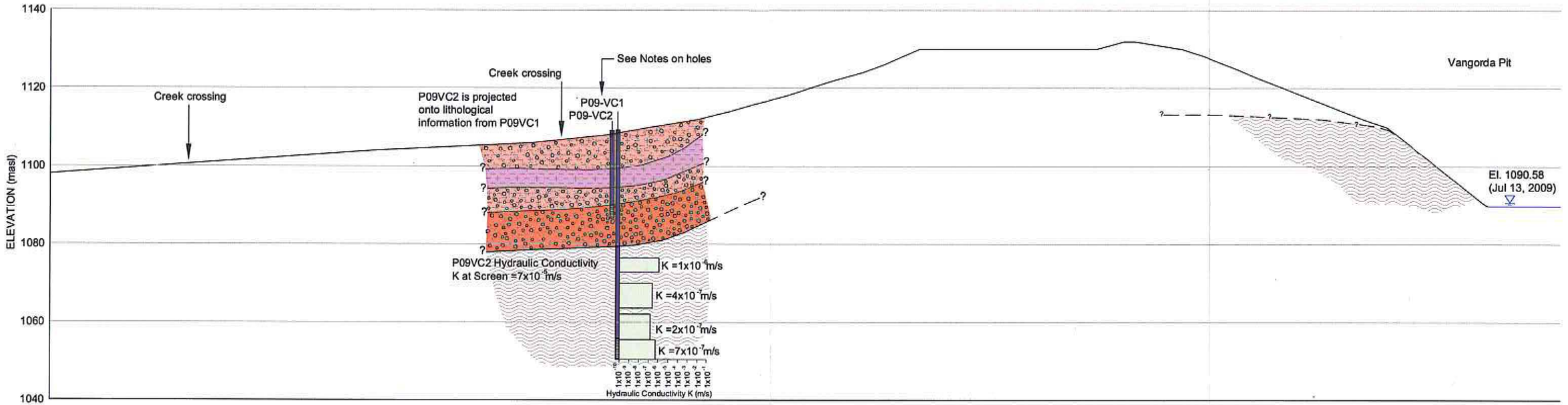

SECTION C/10

No Vertical Exaggeration

Notes:

1. Both holes are projected onto section. Elevations to be determined in final draft.
2. * P09-VC1 drilled at 60° perpendicular to and away from section.

LEGEND:

- Silt and Clay
- Silt and Clay with some Sand/Gravel
- Sands, Gravels (Silts may be present)
- Bedrock (Phyllite)
- All water level measurements taken on Aug. 5, 2009

Monitoring Well

- Screen
- Bentonite Grout
- Backfilled Drill Hole

0 10 20 30 40 50

Scale in Metres

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Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CY001.034

FILE NAME: SectionP09-VC1.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Vangorda Creek
Cross Section C

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	12b

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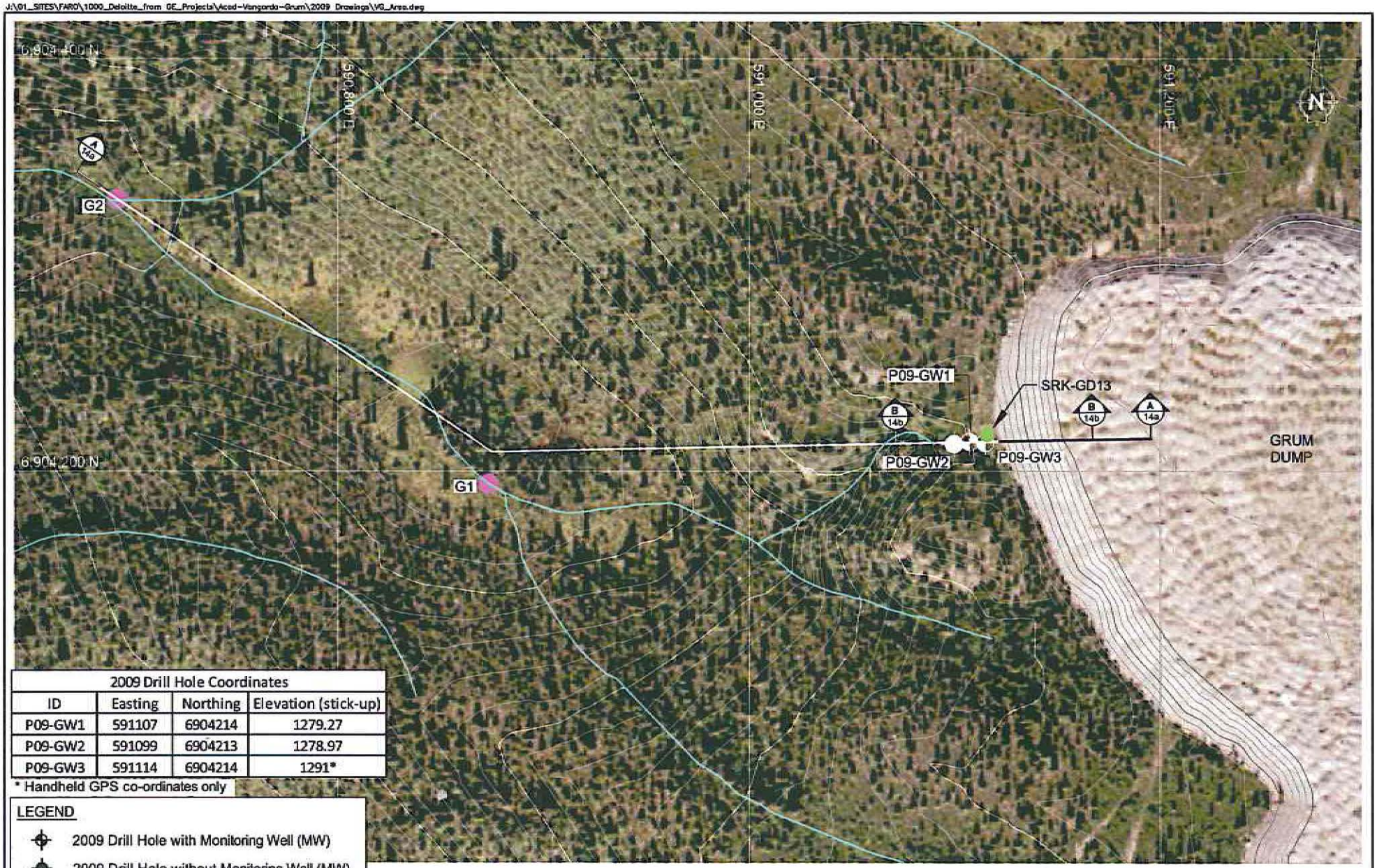

2009 Drill Hole Coordinates			
ID	Easting	Northing	Elevation (stick-up)
P09-GW1	591107	6904214	1279.27
P09-GW2	591099	6904213	1278.97
P09-GW3	591114	6904214	1291*

* Handheld GPS co-ordinates only

LEGEND

- 2009 Drill Hole with Monitoring Well (MW)
- 2009 Drill Hole without Monitoring Well (MW)
- G1 — Surface Water Survey Location
- SRK-GD13 — SRK Seep Survey Location

0 20 40 60 80 100
Scale in Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CY001.034
FILE NAME: VG_Area.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation
Grum Dump West
Drill Hole and Stream Survey
Location Map

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	13

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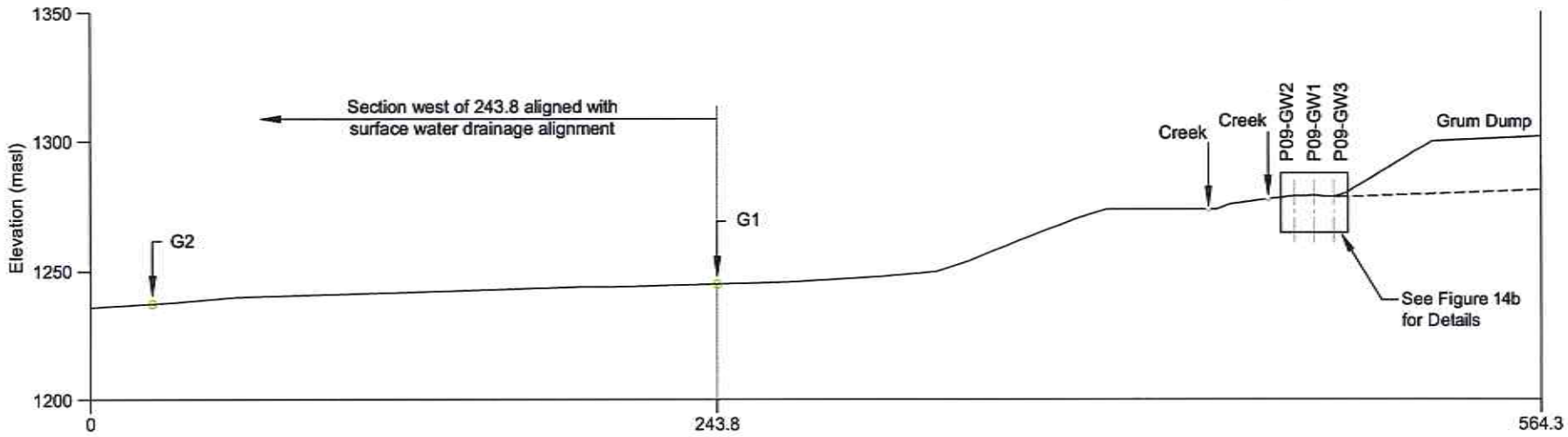

SECTION A/13
1:2500

LEGEND

—·—	Creek crossing
P09-GW1	Drill Hole/ Monitoring Well
G1 ○	Surface Water Survey Location

0 20 40 60 80 100
Scale in Metres

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Vancouver B.C.

Faro Mine Closure
Fermeture de la mine Faro

2009 Groundwater Investigation

Grum Dump West
Cross Section A

SRK JOB NO.: 1CY001.034
FILE NAME: VG_Area.dwg

FARO MINE COMPLEX

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	14a

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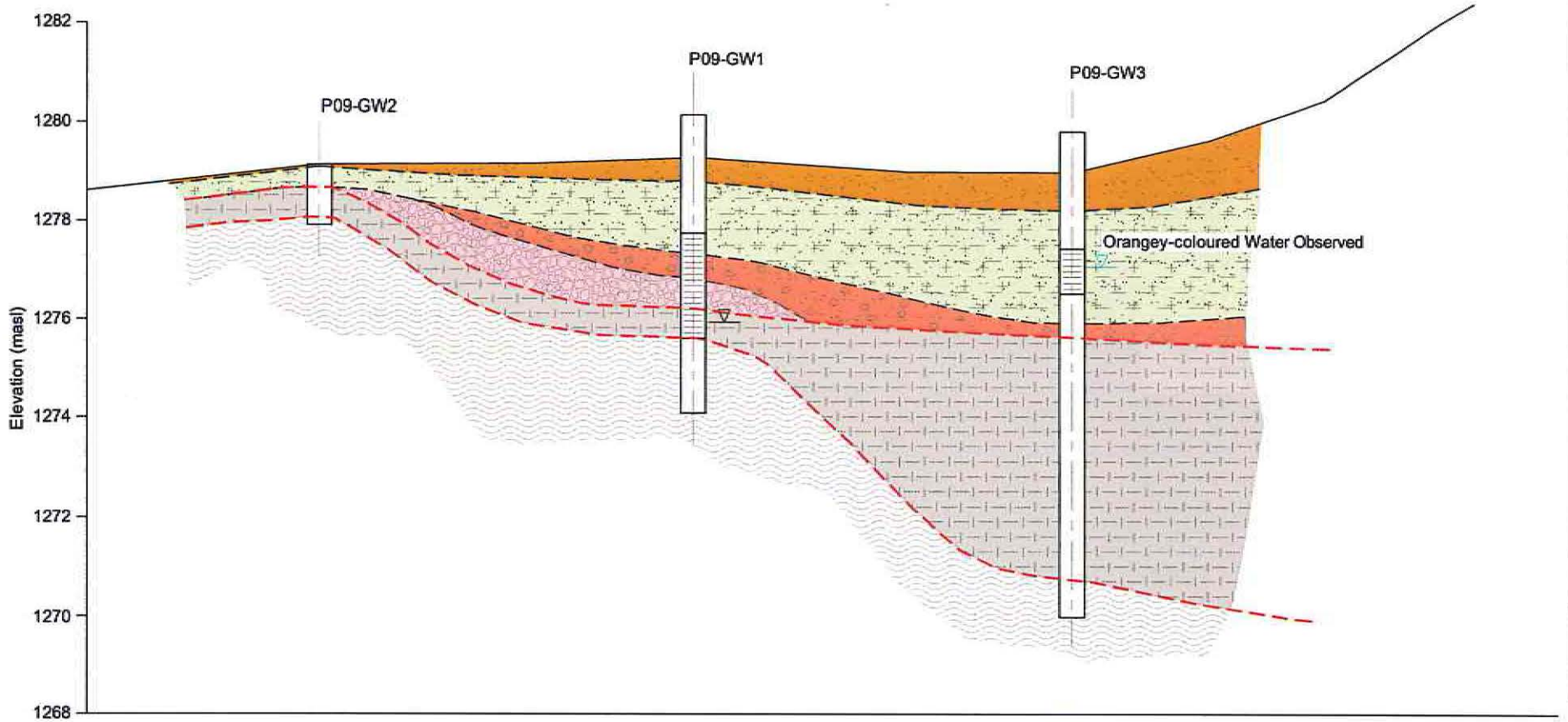

SECTION B/13

No Vertical Exaggeration

LEGEND

- Screen Section
- Topsoil
- Silty/Clayey Sand
- Weathered Bedrock
- Sand and Gravel
- Gravel
- Bedrock (Solid)
- Water Level Post-Drilling (June 2009)
  NOTE: All Wells Dry August to September 2009

0 1 2 3 4 5
Scale in Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CY001.034
FILE NAME: VG_Area.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Grum Dump West
Cross Section B

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	14b

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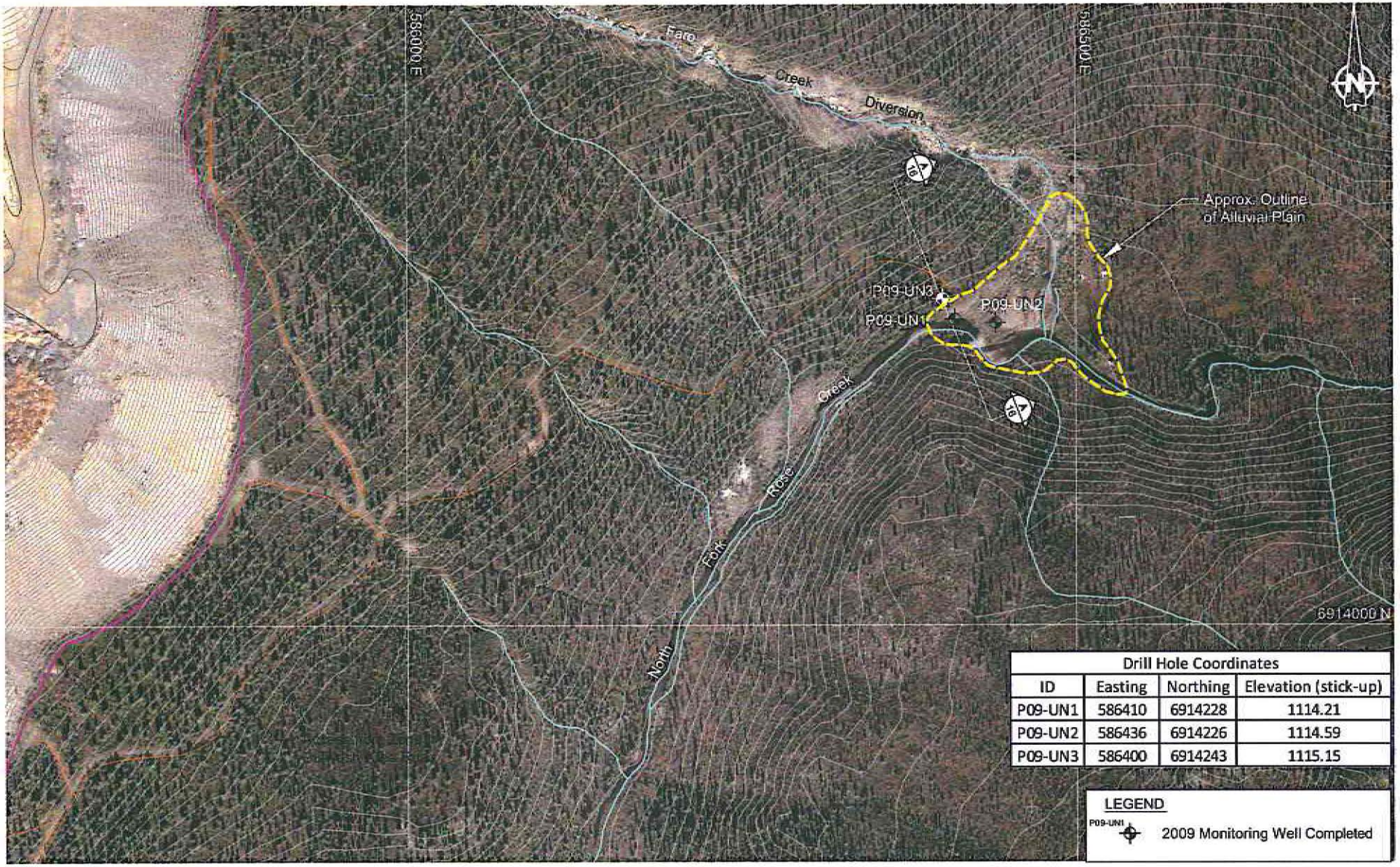

Drill Hole Coordinates			
ID	Easting	Northing	Elevation (stick-up)
P09-UN1	586410	6914228	1114.21
P09-UN2	586436	6914226	1114.59
P09-UN3	586400	6914243	1115.15

LEGEND

P09-UN1 — 2009 Monitoring Well Completed

0 25 50 75 100

Scale in Metres

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Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CY001.034

FILE NAME: FARO SITE Area.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Upper NFRC Drill Hole Locations

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	15

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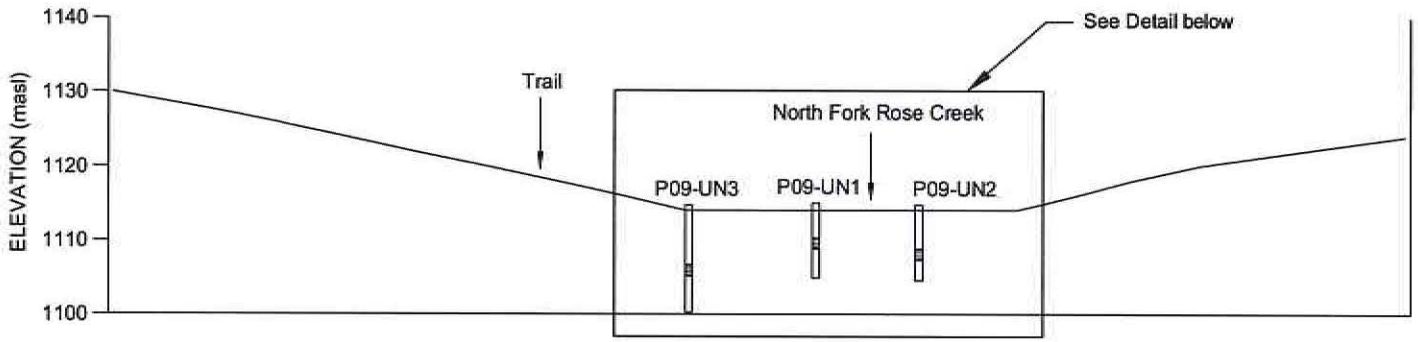


SECTION A-15

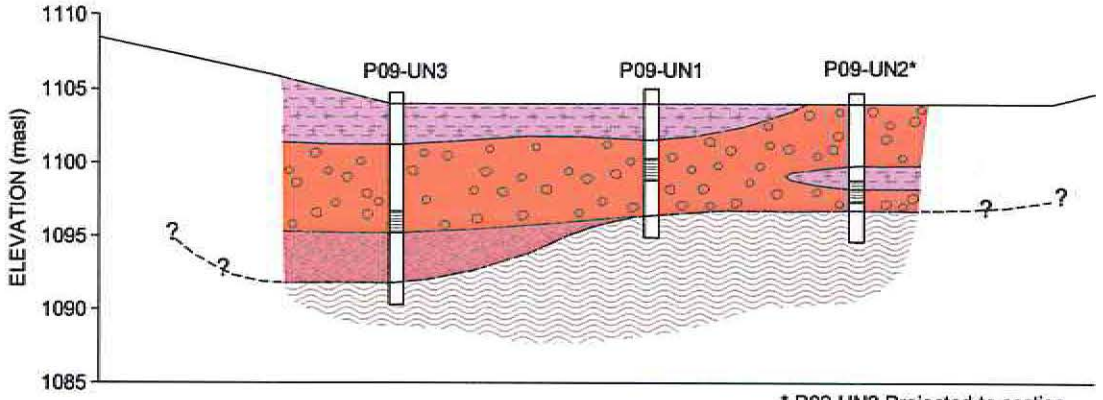
LOOKING UPSTREAM

0 10 20 30 40 50

Scale in Metres

LEGEND:

- Silt and Clay
- Sand and Gravel
- Cobbles
- Bedrock (Phyllite)



* P09-UN2 Projected to section

DETAIL

0 5 10 15 20 25

Scale in Metres

Survey control derived from existing 1:20000 photography Survey control based on: UTM Projection, NAD27 Compiled by The ORTHOSHOP, Calgary, September 2003

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Vancouver B.C.

SRK JOB NO.: 1CY001.034

FILE NAME: FARO SITE Area.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

2009 Groundwater Investigation

Upper NFRC
Cross Section

DATE:	APPROVED:	FIGURE:
Feb. 2010	DM	16

Appendices

Appendix A
Drill Hole Logs

P09 – C1

0 to 3 feet	Infill - Road materials (Clay, little silt, sand, and gravel) brown
3 to 10 feet	Organic swamp material (peat?) that smelled – black in color, decaying vegetation
10 to 15 feet	Gravel with cobbles, trace sand and clay.
15 to 40 feet	Silty clay, grey wet
40 to 70 feet	Gravel and cobbles little sand (30 to 50 mm)
70 to 80 feet	Silty clay some sand
80 to 85 feet	Sand and gravel
85 to 91 feet	Weathered bedrock, phyllite.

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C1
LOCATION:	Cross Valley Dam	**PAGE:**	1 OF 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-22 TO 2009-07-27	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 30	**CASING:**	None
COORDINATES:	6914313.85 N 580169.97 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Azimuth approximate.
Water level Aug 8, 2009: 0.378m from TOC

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	# Joints / # Foliations (10 20 30); TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵)	COMMENTS
			1016.51					
			0.00	Infill - Road materials (Clay, little silt, sand, and gravel), brown				
			1015.66					
			0.90	Organic swamp material (peat?) that smelled – black in color, decaying vegetation				
			1013.69					
			3.00	Gravel with cobbles, trace sand and clay.				
			1012.19					
5			4.60	Silty clay, grey, wet				
10			1005.05					
			12.20	Gravel and cobbles, little sand (30 to 50 mm)				
15								
20			996.49					
			21.30	Silty clay, some sand				
			993.58					

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C1
LOCATION:	Cross Valley Dam	**PAGE:**	2 **OF** 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-22 **TO** 2009-07-27	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 30	**CASING:**	None
COORDINATES:	6914313.85 N 580169.97 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Azimuth approximate.
Water level Aug 8, 2009: 0.378m from TOC

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	# Joints / # Foliations (10 20 30) TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵)	COMMENTS
			992.17 / 25.90	Sand and gravel				
			991.17 / 26.97	Weathered bedrock, phyllite				
				Bedrock - phyllite				
30								Phyllite, 3 foln fracs, qtz veins, broken and weathered Phyllite layering, 8 foln fracs, qtz veins with xtls, cemented joints, sulphides 8 foln fracs, qtz veins with xtls, layered 5 foln fracs, veining, long pieces of core recovered
35								4 foln fracs, white & grey layers, sulphide xtls 8 foln fracs, long runs of core 2 foln fracs, sulphides, and qtz veins, vuggy, qtz xtls - pic in daily report 6 foln fracs, qtz xtls, sulphides, qtz xtls, throughout
40								5 foln fracs, crumbly fractured, phyllite, vuggy, qtz veins 3 foln fracs, qtz xtls, veins & pieces of phyllite 3 foln fracs, phyllite very broken up and crumbly
45								11 foln fracs, crumbly, clay, lots of fractures & crumbly 3 foln fracs, clay, same as above 7 foln fracs, layered phyllite, qtz blebs & veins, sulphides 6 foln fracs, layered phyllite, vuggy with qtz veins 5 foln fracs, 3 lareg qtz veins, 20 to 100 mm in length

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C1
LOCATION:	Cross Valley Dam	**PAGE:**	3 **OF** 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-22 **TO** 2009-07-27	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 30	**CASING:**	None
COORDINATES:	6914313.85 N 580169.97 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Azimuth approximate.
Water level Aug 8, 2009: 0.378m from TOC

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	# Joints / # Foliations (10 20 30); TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵)	COMMENTS
55								Bottom is layered purple/brown. 8 foln fracs, 4 to 5 qtz veins, 10 to 20 mm upto 150 to 200 mm.
								7 foln fracs, qtz veins, cemented joints, green fine grained bedded
								Green speckled. 10 foln fracs, easier to drill though, longer runs, qtz veins
								Schist? 5 foln fracs, green, shiny mica like, easy to drill through
60								Schist? 6 foln fracs, same as above, some qtz veins, vuggy areas
								litho change. 1 foln fracs, similar looking to the 10-5 m/sec core
								3 foln fracs, same as above
								1 foln fracs, same as above
			956.09					1 foln fracs, competent, hard run to drill
65			64.31	END OF BOREHOLE				
70								

P09 – C2

0 to 50 feet/15m	"Till" clay, some silt sand and gravel brown, then grey
50 to 125 feet/38m	Gravel, some sand, trace silt and clay, grey
125 to 145 feet/44m	Gravel with more sand
145 feet	Coarse sand, trace gravel, silt and clay.

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C2
LOCATION:	Cross Valley Dam	**PAGE:**	1 OF 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-17 TO 2009-07-22	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 30	**CASING:**	None
COORDINATES:	6914227.57 N 580118.99 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Azimuth approximate.
Water level Aug. 8, 2009 - Artesian.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	# Joints / # Foliations (10 20 30) / TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁶ 1x10⁻⁷)	COMMENTS
0			1015.83 / 0.00	"Till" clay, some silt, sand and gravel, brown, then grey				
5								
10								
15			1001.73 / 15.00	Gravel, some sand, trace silt and clay, grey				
20								
25								
30								

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C2
LOCATION:	Cross Valley Dam	**PAGE:**	2 **OF** 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-17 **TO** 2009-07-22	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 30	**CASING:**	None
COORDINATES:	6914227.57 N 580118.99 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Azimuth approximate.
Water level Aug. 8, 2009 - Artesian.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	# Joints / # Foliations (10 20 30) / TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷)	COMMENTS
40			980.12 / 38.00	Gravel with more sand				
45			974.59 / 43.89	Coarse sand, trace gravel, silt and clay.				
50			973.87 / 44.65	Bedrock - phyllite. Possible gabbro occurring at depth - see comments.				Phyllite & sulphides. 7 foln fracs 11 foln fracs, small qtz vein 12 foln fracs, very layered/bedded, crumbly 17 foln fracs, cemented joints, vuggy 8 foln fracs, rubbly, crumbly top more competent than bottom 14 foln fracs, some small qtz veins, large cemented joint 17 foln fracs, qtz veins 12 foln fracs, qtz veins 10 foln fracs, washed out area in run 7 foln fracs, qtz last 41 cm of run
55								

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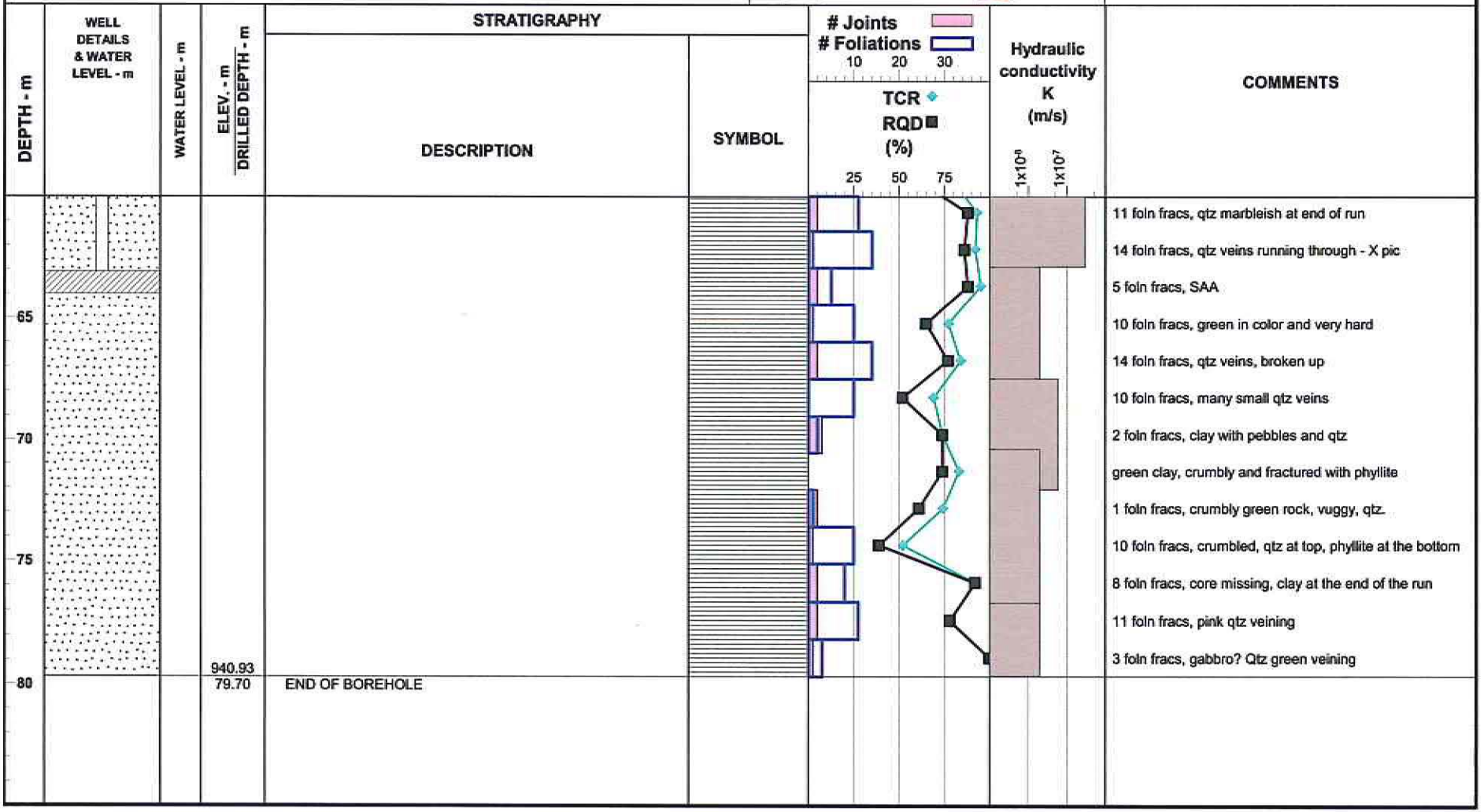
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C2
LOCATION:	Cross Valley Dam	**PAGE:**	3 **OF** 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-17 **TO** 2009-07-22	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 30	**CASING:**	None
COORDINATES:	6914227.57 N 580118.99 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Azimuth approximate.
Water level Aug. 8, 2009 - Artesian.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement



PHOTOS OF C3

Depth		Description	Photo
From	To		
0.0	2.5	Silty SAND with light brown gravel. Dry.	
2.5	5.0	Silty SAND with gravel, dark brown moist	
5.0	10	Silty CLAY, dark grey, moist, very plastic	
10.0	12.5	Coarse silty SAND with clay, moist	

12.5	13.5	Light gray rock (boulder). Water struck at 13.5'.	
13.5	16	Silty GRAVEL with sand, dark grey, moist	
16	18	Silty GRAVEL, sub-rounded, sub-angular, light brown, wet	See above
18	75	Same as above	Same as above
75	140	Gravel/sand	
140	142	Well sorted beach sand, dark grey	

142	145	GRAVEL with silty sand, coarse sand, small gravel, mostly dark colour, subangular		
145	146	sandy GRAVEL, dark grey, some subangular ¾" pieces, mostly <1.5" sub angular and subround		
146	149	Very uniform, well sorted, black SAND, fine grain		

149	150	Sandy GRAVEL	
150	153	Sandy GRAVEL, phyllite/quartz , larger pieces of angular rock, possibly boulders	
153	160	Sandy GRAVEL, some larger pieces	

160	170	GRAVEL	
170	189'9"	(began coring to get through boulders and cobbles) COBBLES	
189'9"	219'9"	Phyllite core	

219'9"	264'4"	Phyllite and quartz, feldspar	
264'4"	305'1"	Phyllite, and possibly Gabbro after 270 feet?	

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C3
LOCATION:	Cross Valley Dam	**PAGE:**	1 OF 4
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4" & 6"/Diamond
BORING DATE:	2009-06-22 TO 2009-06-30	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 210	**CASING:**	None
COORDINATES:	6914143.01 N 580078.40 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
OB MW. Azimuth approximate.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	# Joints / # Foliations (10 20 30); TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s)	COMMENTS
			1018.88					
	Water level at elev. 1018.14m on 2009-08-01	▼	0.00 / 1018.13	Silty SAND with light brown gravel. Dry.				
			0.80 / 1017.47	Silty SAND with gravel, dark brown, moist				
			1.50 / 1016.06	Silty CLAY, dark grey, moist, very plastic				
			3.00 / 1015.31	Coarse silty SAND with clay, moist				
5			3.80 / 1015.03	Light gray rock (boulder). Water struck at 13.5'.				
			4.10 / 1014.28	Silty GRAVEL with sand, dark grey, moist				
			4.90 / 1013.71	Silty GRAVEL, sub-rounded, sub-angular, light brown, wet				
10			5.50	Silty GRAVEL, sub-rounded, sub-angular, light brown, wet				
15								
20			997.36 / 22.90	Gravel/sand				

Hydraulic conductivity K (m/s): 1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵ 1x10⁻⁴

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C3
LOCATION:	Cross Valley Dam	**PAGE:**	2 OF 4
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4" & 6"/Diamond
BORING DATE:	2009-06-22 TO 2009-06-30	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 210	**CASING:**	None
COORDINATES:	6914143.01 N 580078.40 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
OB MW. Azimuth approximate.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	# Joints / # Foliations (10 20 30); TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵ 1x10⁻⁴)	COMMENTS
30								
35								
40								
45			978.76 / 42.70	Well sorted beach sand, dark grey				
			978.19 / 43.30	GRAVEL with silty sand, coarse sand, small gravel, mostly dark colour, subangular				
			977.35 / 44.20	sandy GRAVEL, dark grey, some subangular ¾" pieces, mostly <1.5" sub angular and subround				
			977.06 / 44.50	Very uniform, well sorted, black SAND, fine grain				
			976.22 / 45.40	Sandy GRAVEL				
			975.94 / 45.70	Sandy GRAVEL, phyllite/quartz, larger pieces of angular rock, possibly boulders				

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C3
LOCATION:	Cross Valley Dam	**PAGE:**	3 **OF** 4
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4" & 6"/Diamond
BORING DATE:	2009-06-22 **TO** 2009-06-30	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 210	**CASING:**	None
COORDINATES:	6914143.01 N 580078.40 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
OB MW. Azimuth approximate.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	# Joints / # Foliations (10 20 30); TCR / RQD (%) (25 50 75); Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵ 1x10⁻⁴)	COMMENTS
			46.60 973.02				
			48.80 970.20	(began coring to get through boulders and cobbles) COBBLES			
55			51.80 965.97				
			56.31	Bedrock - phyllite. Possible gabbro at depth - see comments.			phyllite. short run. Very foliated, breaks along foliated lines
							phyllite. very weak foliated rock
60							phyllite. breaks easily to the touch
							phyllite. rock is getting slightly more competent, some areas have mud between folds, but could be from drill process
							phyllite. rock getting stronger, not breaking along foliated lines as much
65							phyllite. weaker, more foliated
							phyllite. weaker, more foliated
							phyllite with feldspar and quartz
70							phyllite. short run, core was lost in barrel
							phyllite. weaker than previous runs, breaks up easily
							phyllite with feldspar and quartz. weaker than previous runs, breaks up easily
							phyllite with feldspar and quartz. stronger rock

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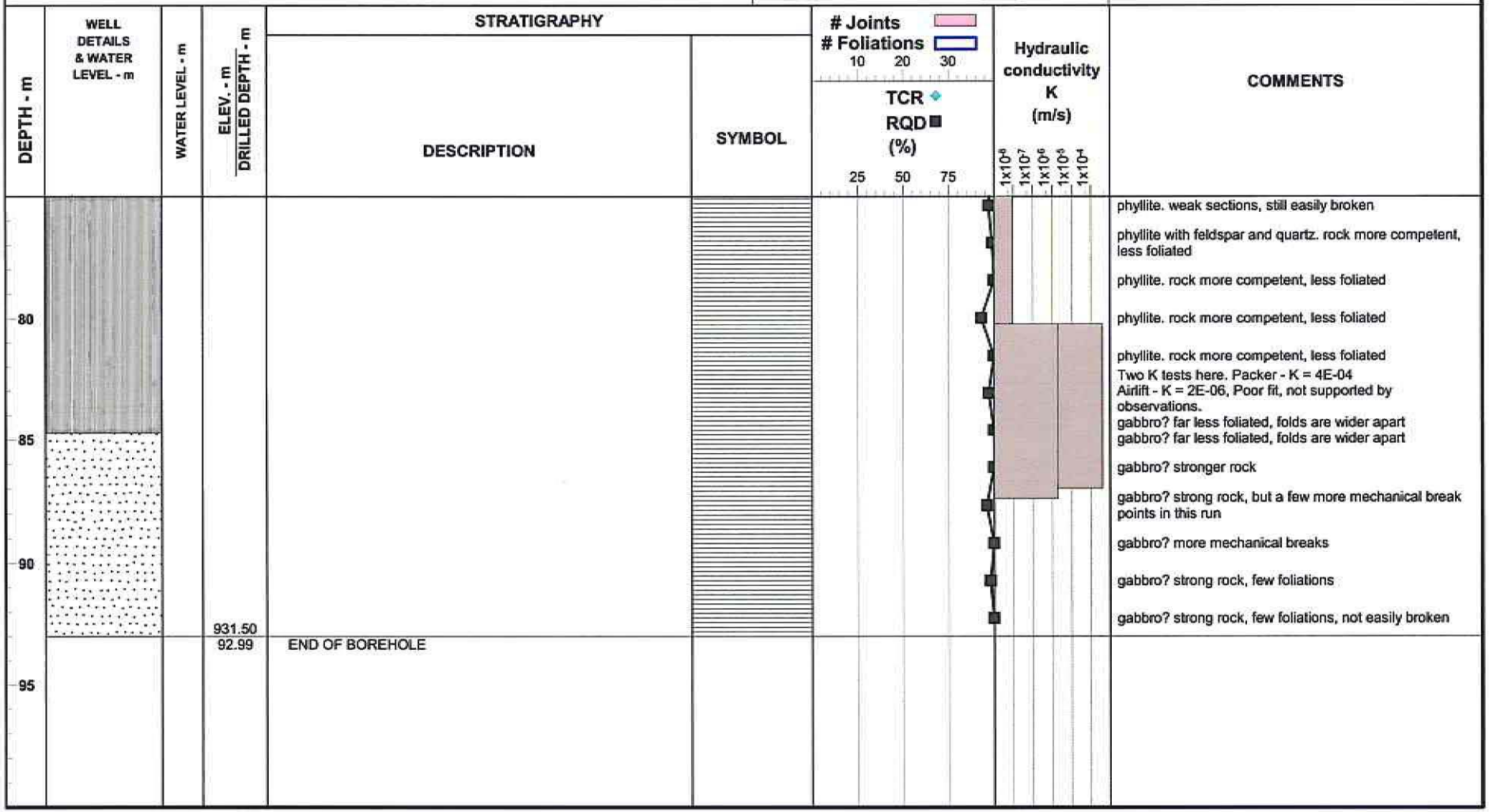
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-C3
LOCATION:	Cross Valley Dam	**PAGE:**	4 OF 4
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4" & 6"/Diamond
BORING DATE:	2009-06-22 TO 2009-06-30	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 210	**CASING:**	None
COORDINATES:	6914143.01 N 580078.40 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
OB MW. Azimuth approximate.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement



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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-I1
LOCATION:	Intermediate Dam	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4" & 6"/Diamond
BORING DATE:	2009-08-20 TO	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 40	**CASING:**	None
COORDINATES:	6914108.00 N 580646.00 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Hole aborted at 133'. NO MONITORING WELL - grouted to surface.
Azimuth approximate.
Elevation data unavailable.

SOIL LEGEND
Topsoil/Organics
Tailings
Road materials
Overburden
Clay
Silt
Sand
Gravel
Cobbles

WELL PLUG MATERIAL LEGEND
Backfill
Bentonite
Sand
Bentonite Grout
Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			0.00			
0			0.00	Sandy (coarse), Gravelly(well graded), trace cobbles (cobbles increasing with depth)		
5						
10						
15						
20						
25						
30						
35			-35.80			
40			38.10 -38.10	Silty, sandy , gravelly		
			40.54	END OF BOREHOLE		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-I2
LOCATION:	Intermediate Dam	**PAGE:**	1 **OF** 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-08-07 **TO** 2009-08-12	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 220	**CASING:**	None
COORDINATES:	6913888.00 N 580476.00 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Hole aborted. NO MONITORING WELL - grouted to surface with 400 gallons of grout.
Azimuth approximate.
Elevation data unavailable.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			0.00			
1			0.00	Compacted fill for road way – sand, gravel, clays and silt compacted boulders		
2						
3			-2.87			
4			3.05	Layers of sands and gravels, with boulders		
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27			-25.78			
28			27.43	END OF BOREHOLE		
29						

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-ETA1
LOCATION:	Emergency Tailings Area	**PAGE:**	1 OF 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-08-13 TO 2009-08-15	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 300	**CASING:**	None
COORDINATES:	6913634.86 N 582807.41 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Hole drilled under creek - azimuth approximate.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	# Joints / # Foliations (10 20 30) / TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵)	COMMENTS
			1073.73 / 0.00	Tailings				
5	Water level at elev. 1068.03m on 2009-08-24	▼						
10								
15								

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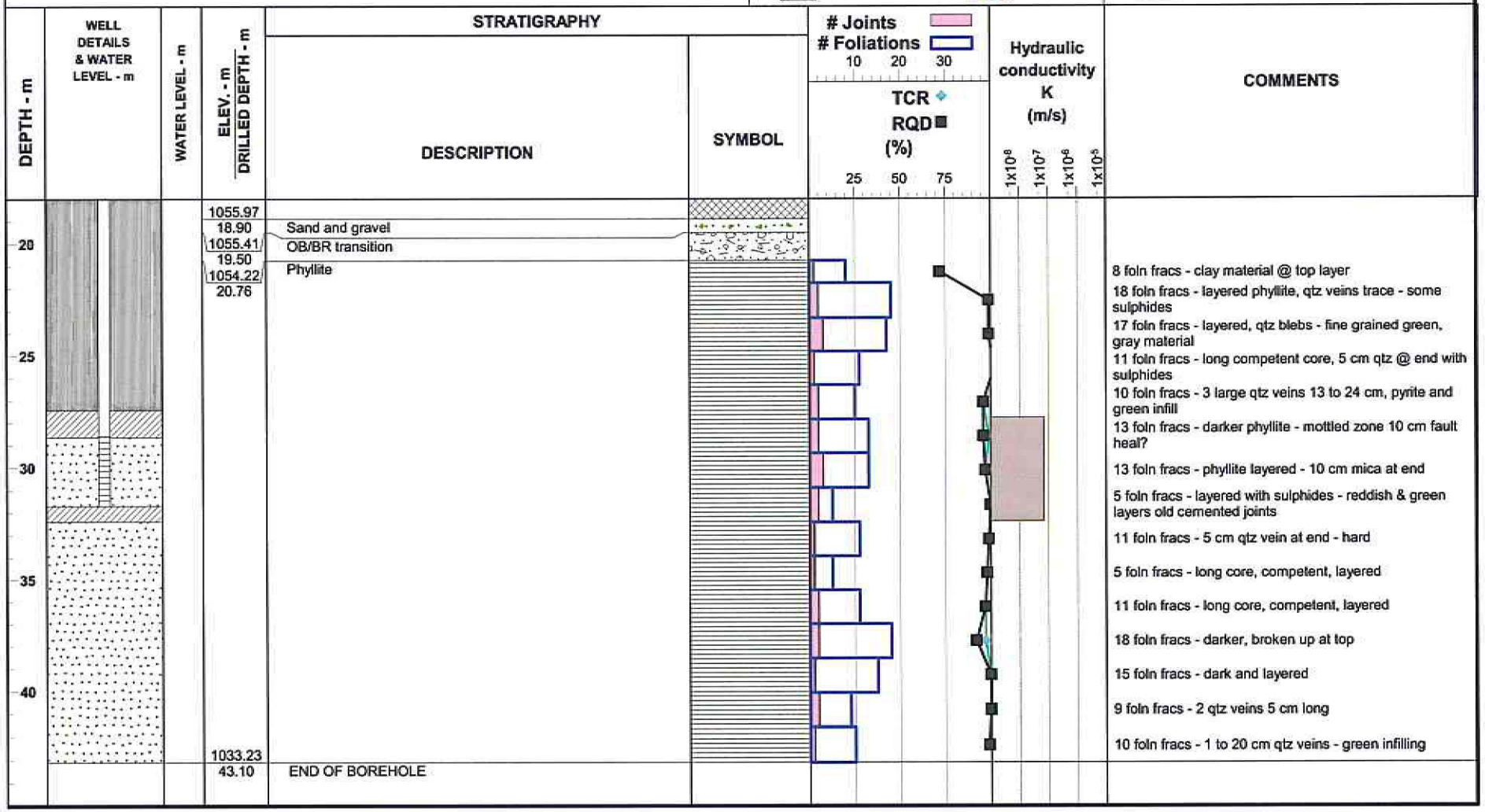
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-ETA1
LOCATION:	Emergency Tailings Area	**PAGE:**	2 **OF** 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-08-13 **TO** 2009-08-15	**DRILL:**	Fraste MDXL
DIP:	70.00 **AZIMUTH:** 300	**CASING:**	None
COORDINATES:	6913634.86 N 582807.41 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Hole drilled under creek - azimuth approximate.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement



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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-ETA2
LOCATION:	Emergency Tailings Area	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-08-13 TO 2009-08-15	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6913632.81 N 582807.18 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	Hydraulic conductivity K (m/s) 1x10⁻⁵ 1x10⁻⁴ 1x10⁻³	COMMENTS
			1073.75				
1–14	Water level at elev. 1064.24m on 2009-08-28	▼	0.00	Tailings			
15			1058.51 / 15.24	Sand - fine with silt and clay, wet			
16			1057.75 / 16.00	Gravel - with sand, pieces of phyllite with a bit of quartz			
17–18			1056.95 / 16.80	Phyllite			
19			1053.95				
20			19.80	END OF BOREHOLE			
21							

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-ETA3
LOCATION:	Emergency Tailings Area	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-08-15 TO 2009-08-15	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6913615.00 N 582832.00 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
NO WELL INSTALLED. Bentonite grout to surface. Handheld GPS co-ordinates only.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	STRATIGRAPHY SYMBOL	COMMENTS
			1082.00			
1			0.00	Silty clay, with sand and gravel		
2						
3			1079.00			
			3.00	Weathered bedrock - phyllite		
4						
			1077.40			
			4.60	END OF BOREHOLE		

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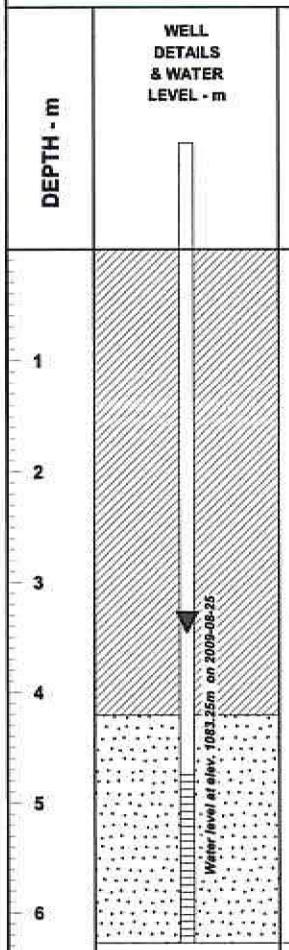
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	SIS1
LOCATION:	S-wells	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Air Rotary
BORING DATE:	2009-08-16 TO 2009-08-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6912953.80 N 584585.44 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
S-wells SIS Monitoring Well. Overburden hole. No slug testing completed.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement



ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	COMMENTS
1086.62			
0.00 / 1085.86	silty clay		Stick-up length 0.97m.
0.76 / 1085.10	silty clay		
1.52 / 1084.33	sandy silty clay		
2.29 / 1082.66	sandy silty clay		
3.96 / 1082.05	silty clay - black/brown		
4.57 / 1081.44	silty clay - black/brown		
5.18 / 1080.83	silty clay - black/brown		
5.79 / 1080.34	sandy clay		
6.28	END OF BOREHOLE		

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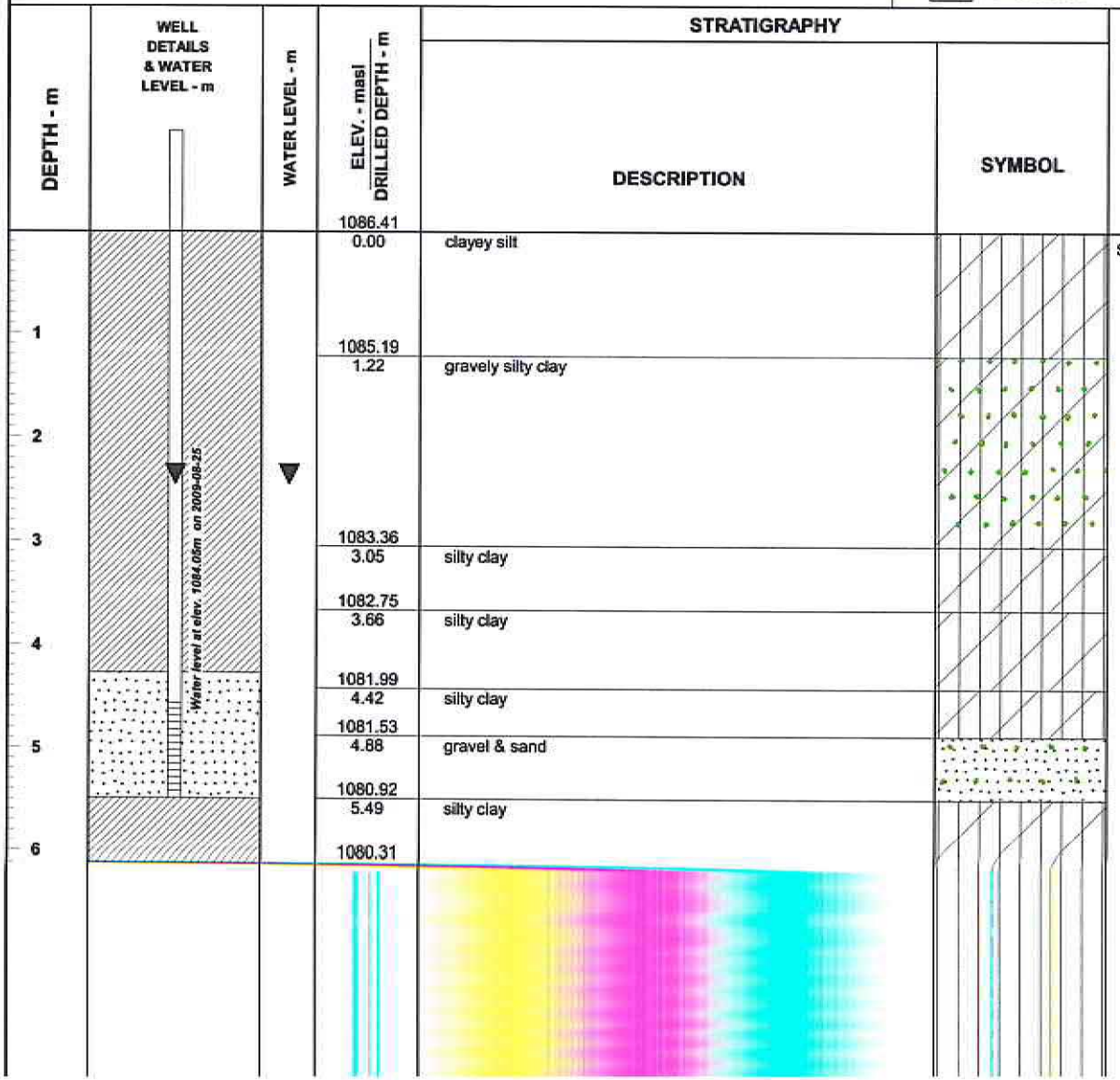
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	SIS2
LOCATION:	S-wells	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Air Rotary
BORING DATE:	2009-08-16 TO 2009-08-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6912949.76 N 584593.63 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
S-wells SIS Monitoring Well. Overburden hole. No slug testing completed.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement



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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	SIS3
LOCATION:	S-wells	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Air Rotary
BORING DATE:	2009-08-16 TO 2009-08-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6912943.97 N 584601.78 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
S-wells SIS Monitoring Well. Overburden hole. No slug testing completed.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1086.33			
1			0.00	sandy silty clay		Stick-up length 1.03m.
			1085.11			
			1.22	gravelly silty clay		
2	Water level at elev. 1084.66m on 2009-08-25		1084.20			
			2.13	gravel		
			1083.59			
3			2.74	gravel with sand		
			1082.67			
			3.66	silty clay		
4			1081.76			
			4.57	END OF BOREHOLE		
5						

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	SIS4
LOCATION:	S-wells	**PAGE:**	1 **OF** 1
FILE No:	1CY001.034	**DRILL TYPE:**	Air Rotary
BORING DATE:	2009-08-16 **TO** 2009-08-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6912936.17 N 584616.71 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
S-wells SIS Monitoring Well. Overburden hole. No slug testing completed.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1086.52			
1			0.00	silty clay		Stick-up length 1.03m.
			1085.30			
2			1.22	sandy, silty clay		
			1083.78			
3	Water level at elev. 1084.56m on 2009-08-25		2.74	clayey, silty gravel & sand		
			1082.86			
4			3.66	silty clay		
			1082.25			
			4.27	END OF BOREHOLE		
5						

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	SIS5
LOCATION:	S-wells	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Air Rotary
BORING DATE:	2009-08-16 TO 2009-08-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6912934.75 N 584621.64 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
S-wells SIS Monitoring Well. Overburden hole. No slug testing completed.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1086.51			
1			0.00	silty clay		Stick-up length 0.98m.
			1084.99			
2	Water level at elev. 1084.76m on 2009-08-26	▼	1.52	gravel & sand		
			1084.38			
			2.13	clayey, sandy silt		
3			1083.77			
			2.74	silty, clayey gravel		
			1082.85			
4			3.66	silty, clayey till		
			1081.94			
5			4.57	END OF BOREHOLE		

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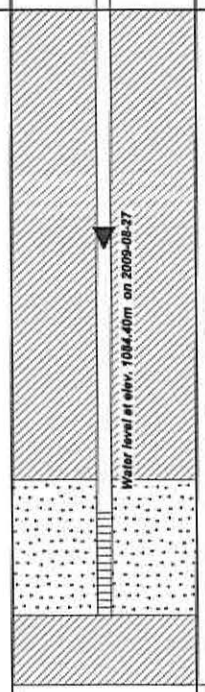
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	SIS6
LOCATION:	S-wells	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Air Rotary
BORING DATE:	2009-08-16 TO 2009-08-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6912933.75 N 584624.55 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
S-wells SIS Monitoring Well. Overburden hole. No slug testing completed.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement



DEPTH - m	ELEV. - masl / DRILLED DEPTH - m	DESCRIPTION	SYMBOL	COMMENTS
	1086.48			
	0.00	clayey silt		Stick-up length 0.90m.
1	1085.26			
	1.22	gravelly, silty clay		
2	1084.04			
	2.44	silty, sandy clay		
3	1083.43			
	3.05	silty clay		
4				
	1081.60			
5	4.88	sandy gravel		
	1080.99			
	5.49	clayey silt		
6	1080.38			
	6.10	END OF BOREHOLE		

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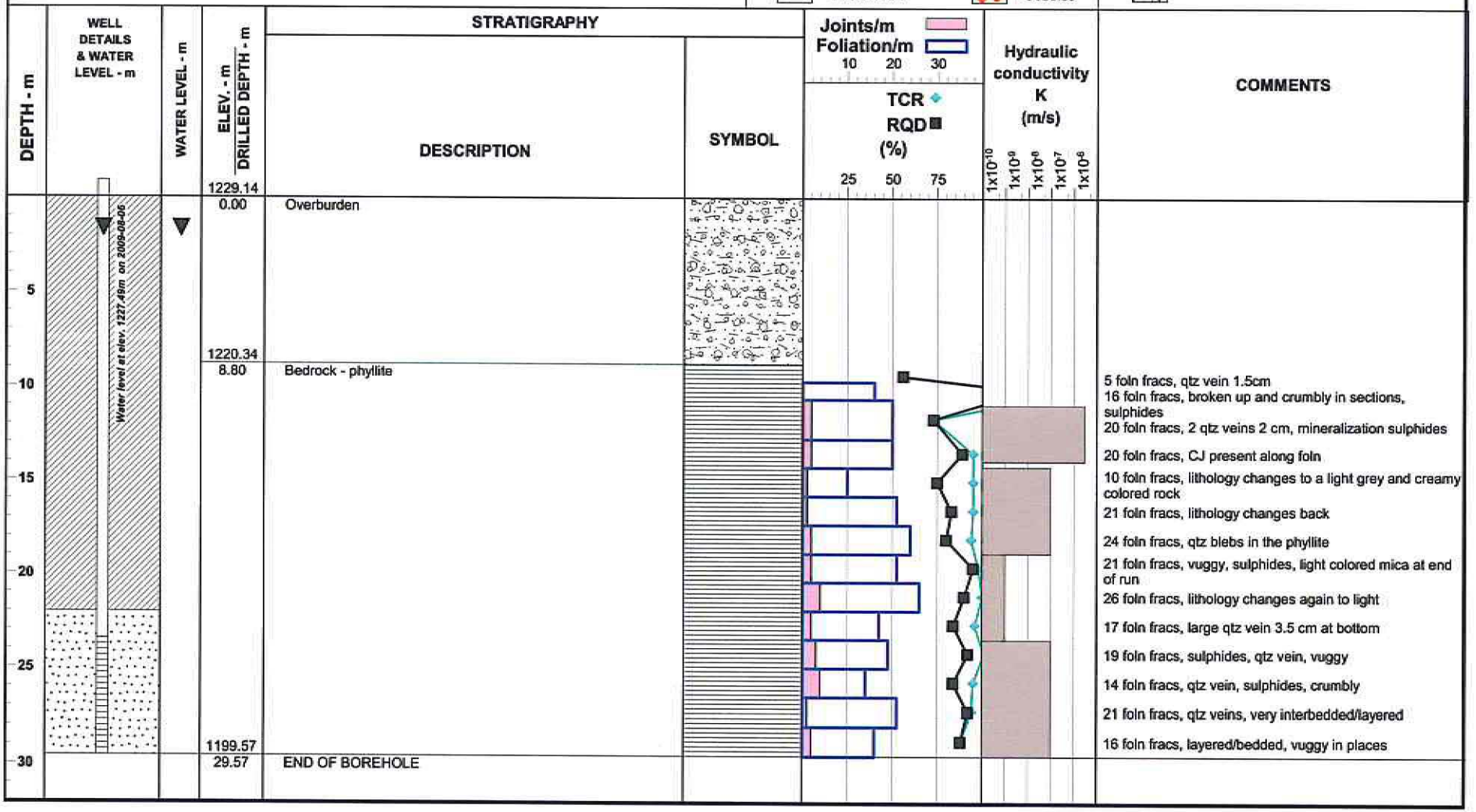
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-GS1A
LOCATION:	Grum Slot Cut	**PAGE:**	1 **OF** 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-13 **TO** 2009-07-15	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6904657.96 N 592593.02 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement



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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-GS1B
LOCATION:	Grum Slot Cut	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-14 TO 2009-07-14	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6904657.22 N 592600.77 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Overburden hole.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	Hydraulic conductivity K (m/s) 1x10⁻⁵ 1x10⁻⁴ 1x10⁻³	COMMENTS
			1229.06				
0			0.00	Clay, with sand and silt, trace gravel. Poorly sorted. Wet. Brown.			
1							
2	Water level at elev. 1227.57m on 2009-08-06						
3			1225.98				
			3.10	SAA – Dry. Grey.			
			1225.36				
			3.70	Pyrite ore material. Wet. Black.			
4			1225.05				
			4.00	Sand, medium grained with clay and silt, trace gravel (2 - 20mm clasts). Pepper white, grey, black.			
			1224.43				
			4.60	Gravel with sand, some clay, trace silt. Dark grey.			
5			1223.82				
			5.24	Bedrock, phyllite, gravel size pieces.			
6							
			1222.46				
			6.60	END OF BOREHOLE			

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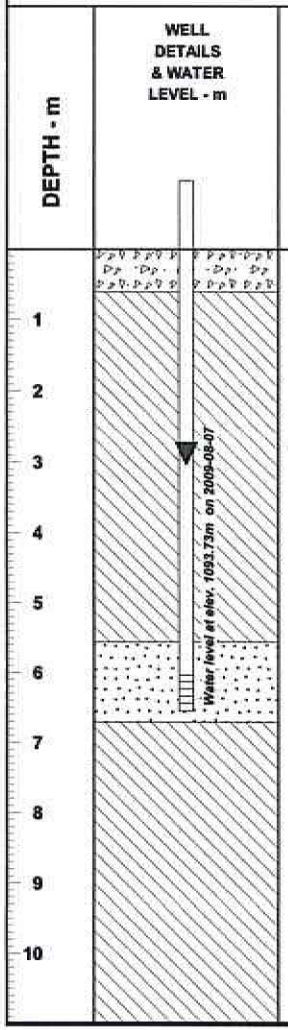
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD1
LOCATION:	Little Creek Dam	**PAGE:**	1 OF 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-16 TO 2009-06-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903138.17 N 593467.61 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:
Bit of mud in well water

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement



DEPTH - m	ELEV. - masl / DRILLED DEPTH - m	WATER LEVEL - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
	1096.62				
	0.00		Thin layer of black TOPSOIL		
	1096.52		Medium brown clayey silty SAND some gravel; medium plasticity		
	0.10				
1	1095.86		Light ot medium brown with a grey tinge, silt SAND, some gravel and some to trace clay		
	0.76				
	1095.10		Brown silty clayey SAND some gravel; med to low plasticity		
2	1.52				
	1094.49		Medium brown to grey brown clayey SAND, some silt and gravel		
	2.13				
	1094.03	▼	Medium brown grey silty SAND some gravel and clay		
3	2.59				
	1093.27		Medium orangish brown SAND and GRAVEL some to trace silt		
	3.35				
	1092.96		Wet brown SAND and GRAVEL some silt		
4	3.66				
	1092.35		Brownish grey silty SAND and GRAVEL		
	4.27				
5	1091.74		Grey GRAVEL some sand, trace to no silt		
	4.88				
	1090.83				
6	5.79		Grey clayey SAND and GRAVEL some silt		
	1090.07				
7	6.55		Grey silty SAND some gravel, some to trace clay; low plasticity		
	1089.30				
8	7.32		Grey SAND and GRAVEL, some silt trace clay		
	1088.54				
	8.08		Grey silty SAND with gravel		
	1087.78				
9	8.84		Grey SILT some sand, some to trace gravel and clay; low plasticity SPT done at 8.99m depth. Sample: Dense grey SILT some clay, gravel and sand, medium plasticity (frozen?)		
	1086.71				
10	9.91		Blows: 1st 6"- 27, 2nd 6" - 53, 3rd 6" - 70 Grey sandy SILT some gravel and trace clay		
	1085.80				

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD1
LOCATION:	Little Creek Dam	**PAGE:**	2 OF 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-16 TO 2009-06-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903138.17 N 593467.61 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:
Bit of mud in well water

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
12			1085.19 11.43 1084.43 12.19 1083.67	Grey sandy SILT some gravel and trace clay Grey gravely SILT, some sand, trace clay; low to no plasticity Grey sandy SILT, some gravel		
13			12.95 1082.75	Grey sandy SILT, some gravel		
14			13.87	Grey clayey SILT, trace sand and trace to no gravel; medium to high plasticity		
15			1081.23			
16			15.39 1080.47	Grey clayey SILT, trace sand and trace to no gravel; medium to high plasticity		
17			16.15 1079.55	Grey clayey SILT, trace sand and trace to no gravel; medium to high plasticity Drill cuttings sampled clogged with silt		
18			17.07 1078.94 17.68 1078.33	Grey silty CLAY, trace gravel; high plasticity Grey silty CLAY, trace gravel; medium to high plasticity		
19			18.29 1077.27	Cuttings: Grey to brownish black SAND and GRAVEL some to trace rock fines		
20			19.35 1076.81 19.81 1076.76 19.81	Hit BEDROCK at ~19.2m depth from ground surface. Appears to be the carbonaceous phyllite unit. Cuttings: Grey to brownish black GRAVEL, some sand Note: While drilling SRK09-LCD-02 the ground was pressurized at one point to help pull the rods and the j-plug off the top of the piezo on LCD-01 was blown off. It appears as the pressurized air traveled through the gravel layer previously targeted. END OF BOREHOLE		
21						
22						

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD2
LOCATION:	Little Creek Dam	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-17 TO 2009-06-17	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903136.47 N 593464.98 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:

SOIL LEGEND

- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND

- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1096.79			
			0.00	Medium brown moist/wet silty SAND some gravel, some to trace clay		
			1095.88			
1			0.91	Medium grey moist/wet brown silty SAND some gravel and clay		
			1094.66			
2			2.13	Grey brown SAND and GRAVEL to sandy GRAVEL some silt		
			1093.44			
3		▼	3.35	Brown to grey sandy GRAVEL, some silt, trace clay; note that some of the silt may have been from the drill rods		
			1092.52			
4			4.27	Brown to grey saturated sandy GRAVEL some silt		
			1091.91	Water observed in cuttings around 4.72m depth		
			4.88	Light grey saturated to moist gravely SILT some sand and some to trace clay		
5			1091.00			
			5.79	Grey saturated silty GRAVEL some sand to silty GRAVEL and SAND; trace clay		
			1090.39			
6			6.40	Grey silty SAND, some gravel		
			1089.78	Soil appears to be getting progressively siltier after ~6.71m		
			7.01	Grey sandy SILT, some to trace gravel, trace to no clay		
			1089.32			
7			7.47	Grey sandy SILT, some to trace gravel		
			1089.17	END OF BOREHOLE		
			7.62			
8						

Water level at elev. 1093.29m on 2009-08-07

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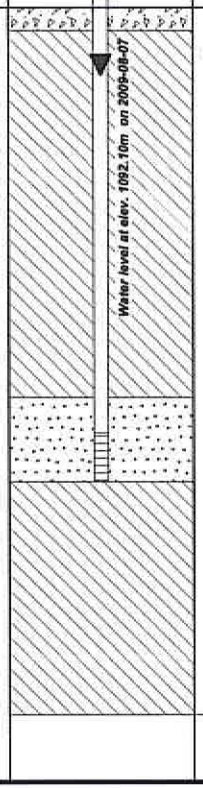
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD3
LOCATION:	Little Creek Dam	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-17 TO 2009-06-17	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903103.88 N 593443.03 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Murky water in well observed

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement



DEPTH - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	COMMENTS
	1092.85			
	0.00	Brown SAND and GRAVEL some silt		
	1092.24			
1	0.61	Grey brown silty SAND and GRAVEL Water level observed near surface. PVC origionally wanted to be buoyant		
	1091.33	but after it stabilized the head was slightly below the ground surface.		
	1.52	Rods flushed with water to clear		
2	1090.72	Grey sandy SILT trace clay and gravel; low plasticity		
	2.13	Grey sandy SILT some gravel and clay; low to medium plasticity		
	1090.11			
3	2.74	Grey coarse sandy SILT, some gravel trace clay; low plasticity		
	1089.34			
	3.51	Grey saturated sandy SILT some gravel and clay; low to medium plasticity		
4	1088.28			
	4.57	Grey gravely SAND some silt		
5	1087.67			
	5.18	Grey gravely SAND some silt, less silt than at 5.180m		
	1087.06			
6	5.79	Grey silty SAND some gravel SPT done at 6.10m depth. Sample: Grey silty SAND some gravel trace clay		
	1086.14	(sample was not as sand rich as expected).		
	6.71	Blows: 1st 6" - 26 2nd 6" - 38 3rd 6" - 36		
7	1085.53	Grey silty SAND some gravel		
	7.32	Green grey to brown SAND and GRAVEL, trace to no silt, also saw some		
	1084.93	pyrite in cuttings		
8	7.92	After ~7.62m lots of water was observed. ~1/2 L/s flow through cuttings		
	1084.32	spout		
	8.53	Drill progressed much slower in gravel unit		
9	1083.71	Grey to greenish black SAND and GRAVEL, some silt; weathered bedrock?		
	9.14	Silty ice observed in cuttings at ~8.53m depth		
		Grey to greenish black SAND and GRAVEL, to gravely SAND, some to		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD4
LOCATION:	Little Creek Dam	**PAGE:**	1 **OF** 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-17 **TO** 2009-06-17	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903096.67 N 593435.75 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:

SOIL LEGEND

- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND

- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1092.84			
			0.00	Deep brown silty SAND some gravel trace clay and organics; not quite a topsoil		
			1091.93			
1			0.91	Grey sandy SILT some gravel and some to trace clay; low plasticity		
			1091.32			
			1.52	Grey sandy SILT some gravel and clay; low to medium plasticity		
2						
			1090.10			
			2.74	Grey silty SAND some gravel to silty SAND and GRAVEL trace clay		
3						
			1088.88			
4			3.96	Grey sandy SILT, some gravel and clay; low to medium plasticity		
			1088.27			
			4.57	Reamed out rods/cleared with water at ~4.57m Grey silty GRAVEL some sand, trace to no clay		
5						
			1087.35			
			5.49	Grey silty GRAVEL some sand		
6			1086.74	Drill was progressing at a very quick rate untill ~6.10m depth.		
			6.10	Grey sandy GRAVEL, some silt; this cuttings sample was washed with water		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD4
LOCATION:	Little Creek Dam	**PAGE:**	2 **OF** 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-17 **TO** 2009-06-17	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903096.67 N 593435.75 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:

SOIL LEGEND

- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND

- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	COMMENTS
7			6.55 1085.83	Grey GRAVEL some silt and sand		
			7.01 1085.37	Grey sandy GRAVEL some silt		
			7.47 1085.07	Grey coarse sandy GRAVEl some silt Hard drilling at ~7.62m		
8			7.77	Grey silty SAND some gravel Hit boulder at ~7.62 to 8.08m		
			1084.31			
			8.53	Grey silty SAND some gravel; more sand than at 8.53m depth below ground surface		
9			1083.39			
			9.45	Just after 9.45m water was observed to be dripping from the cuttings spout.		
			1083.09	Grey silty GRAVEL some sand		
			9.75	Grey to greenish black saturated sandy GRAVEL some silt; starting to get into frozen ground. Weathered bedrock?		
10			1082.48	Hit a hard possible frozen grey to green-black sandy GRAVEL some silt		
			10.36 1082.17	Grey to greenish black saturated sandy GRAVEL some silt; into frozen ground.		
			10.67	Switched to open hole drilling at 10.67m depth.		
11		▼	1081.56	Grey to greenish black saturated sandy GRAVEL some silt; frozen ground.		
			11.28	This unit appeared to be fairly permeable based on cutting and water observed during drilling.		
				Grey to greenish black saturated sandy GRAVEL some silt; frozen ground.		
12			1080.65			
	Water level at elev. 1081.74m on 2009-06-06		12.19	END OF BOREHOLE		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD5
LOCATION:	Little Creek Dam	**PAGE:**	1 OF 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-17 TO 2009-06-18	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903052.00 N 593430.00 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:
No piezo installed at this location. Note the remarks about the frozen ground conditions in the 'Description' column.
Handheld GPS co-ordinates only.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1106.00			
			0.00	Grey brown silty SAND some gravel, trace clay and organics Hard drilling at the start of this hole.		
			1105.09			
1			0.91	Deep grey brown silty sand, some organics and gravel, trace clay		
			1104.48			
			1.52	Dark brownish black TOPSOIL, organic rich, some sand, silt and gravel		
2			1103.87			
			2.13	Medium black to dark brownish black TOPSOIL, organic rich, some silt and clay, some to trace sand and gravel		
3						
			1102.34			
			3.66	Deep/dark reddish brown slity SAND and GRAVEL		
4				Utilized water to assist with drilling at ~4.27m		
			1101.12			
5			4.88	Med grey to grey brown silty SAND to sandy SILT some gravel trace clay		
6			1099.90			
			6.10	Grey sandy SILT some gravel, low plasticity		
			1099.29	Appear to be in groundwater now after 6.40m depth		
7			6.71	Grey sandy SILT some gravel		
			1098.68			
			7.32	Grey gravelly coarse SAND, some to trace silt (fairly clean)		
			1098.08			
8			7.92	Clean coarse SAND and GRAVEL unit.		
			1097.77	Grey gravelly coarse SAND some silt		
			8.23	Grey to green black saturated gravely SAND, some silt		
9			1096.86			
			9.14	Water being produced through cuttings spout just after 9.14m		
			1096.25	Grey to green-black sandy GRAVEL, some silt		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD5
LOCATION:	Little Creek Dam	**PAGE:**	2 OF 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-17 TO 2009-06-18	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903052.00 N 593430.00 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:
No piezo installed at this location. Note the remarks about the frozen ground conditions in the 'Description' column.
Handheld GPS co-ordinates only.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1095.33	Grey silty GRAVEL some sand		
11			10.67	Stopped drilling on June 17th at 10.67m depth		
			1094.87	Grey gravelly SAND some silt		
			11.13	Grey silty GRAVEL some sand		
			1094.11	Into FROZEN GROUND at ~11.28m depth. Icy Gravel.		
12			11.89	Less liquid water observed and more silty frozen ice chunks observed in cuttings.		
13				Grey silty GRAVEL some sand		
			1092.59			
			13.41	Grey silty SAND some gravel		
14			1091.67			
			14.33	Grey silty GRAVEL some sand		
			1091.37	Grey sandy GRAVEL some silt		
15			14.63	Grey sandy GRAVEL some silt		
			1091.06			
			14.94			
16			1089.69			
			16.31	Grey silty GRAVEL some sand		
17						
18				Extremely hard drilling		
			1087.41			
			18.59	Grey silty GRAVEL some sand		
19						
			1086.19	Drill rods flushed with water. Hard to get sample of cutting at ~19.51m		
20			19.81	END OF BOREHOLE		

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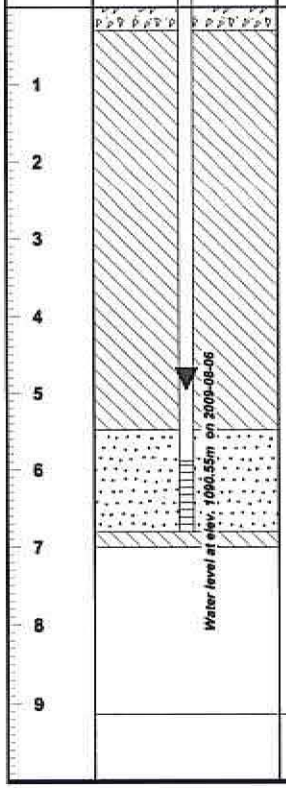
BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD6
LOCATION:	Little Creek Dam	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-17 TO 2009-06-18	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903073.14 N 593421.04 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement



DEPTH - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	COMMENTS
	1095.37			
	0.00	medium brown sandy SILT some gravel. Very wet		
1	1094.15			
	1.22	dark brown sandy SILT with trace of gravel and organics. Very wet		
	1093.54	Brown mud		
2	1.83	Dark brown sandy SILT trace of gravel and organics. Wet		
	1092.93			
	2.44	Med brown silty SAND sub rounded gravel < 1/2" trace of organics. Moist		
3	1092.32			
	3.05	Drill case stuck with mud		
	1091.71	Light brown/grey sandy silty GRAVEL. Angular < 1/4"; moist		
	3.66	Sandy		
4	1091.10	Medium brown silty SAND with Gravel; small subrounded with trace of moist		
	4.27	Medium brown silty SAND with small angular gravel; trace moist		
	1090.49			
5	4.88	Medium brown, sandy SILT with some gravel; small and angular with trace		
	1089.88	moist (silt forms when hand pressed)		
	5.49	Rock/boulder		
6	1089.27	light brown silty GRAVEL with sand; Small angular,wet		
	6.10	water		
		light brown silty GRAVEL with some sand;Small angular and subrounded,		
	1088.36	wet		
7	7.01	light grey silty GRAVEL with some sand;Small angular and wet		
		Asked for SPT		
8		Flushed casing		
	1086.84			
	8.53			
9	1086.23			
	9.14	EOH		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-LCD7
LOCATION:	Little Creek Dam	**PAGE:**	1 **OF** 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-18 **TO** 2009-06-18	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903008.74 N 593423.04 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:
Well dry on Aug 5, 2009

SOIL LEGEND
Topsoil/Organics; Tailings; Road materials; Overburden; Clay; Silt; Sand; Gravel; Cobbles

WELL PLUG MATERIAL LEGEND
Backfill; Bentonite; Sand; Bentonite Grout; Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	COMMENTS
			1113.00			
			0.00 1112.39	Dark grey silty CLAY with some sand and trace of organics; highly plastic		
1			0.61 1111.78	Dark grey clayey SILT with some sand; medium plasticity		
			1.22 1111.17	Dark brown sandy SILT with coarse sand and gravel;low plasticity		
2			1.83 1110.56	Medium brown silty SAND with gravel;moist		
			2.44 1109.95	Brown/grey silty SAND with some gravel; subrounded, small		
3			3.05 1109.34	Brown sandy GRAVEL with some silt; subrounded 1/2", moist		
	Water level at elev. 1108.39m on 2009-06-18		3.66 1108.73	Brown/grey sandy SILT with clay (very plastic) and trace of gravel Water not flowing, making mud, jammed up drill		
4			4.27 1108.12	Dark grey sandy SILT with clay; very plastic		
			4.88 1107.51	Grey sandy SILT with clay; very plastic		
5			5.49 1106.90	Grey sandy SILT with clay; very plastic		
			6.10 1106.29	Grey sandy SILT with clay (very plastic) and trace of gravel Clayey SILT. Difficult to drill through. Added water to flush		
6			6.71 1105.68	Grey sandy SILT with clay (very plastic) and trace of gravel(small)		
			7.32 1105.08	Grey sandy SILT; very plastic		
7			7.92 1103.86	Dark grey sandy SILT; dry in situ, very plastic		
			9.14 1103.25	Grey silty GRAVEL; 1/4" gravel angular/subrounded		
8			9.75 1102.64	Dark grey silty GRAVEL; small gravel, plastic		
			10.36	EOH		
9						
10						

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-VC1
LOCATION:	Vangorda Creek	**PAGE:**	1 OF 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-10 TO 2009-07-13	**DRILL:**	Fraste MDXL
DIP:	60.00 **AZIMUTH:** 340	**CASING:**	None
COORDINATES:	6903244.43 N 593626.92 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Original borehole diameter: 4"
Azimuth approximate.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	DESCRIPTION	SYMBOL	# Joints / # Foliations / TCR / RQD (%)	Hydraulic conductivity K (m/s)	COMMENTS
			1112.39					
			0.00					
			1109.75					
			3.05	Soil (brown)				
			1108.69					
			4.27	Sands and clays				
5			1107.90					
			5.18	Silty sand and gravel - probably till				
			1106.58					
			6.71	Overburden				
10			1101.83					
			12.19	Clays, sandy brown silt				
15			1099.19					
			15.24	Overburden				
			1096.55					
			18.29	Med-course sand, angular to sub-rounded, dark grey				
			1096.02					
20			18.90	Sub-angular to angular course sand and gravel. Assorted litho, many unweathered chips				
			1094.18					
			21.03	Sub-angular to sub-rounded course sand w/ gravel - Assorted litho - igneous + phyllite				
			1093.12					
			22.25	Phyllite chips, all angular				
			1092.06					

Water level at elev. 1109.88m on 2009-08-05

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-VC1
LOCATION:	Vangorda Creek	**PAGE:**	2 OF 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-10 TO 2009-07-13	**DRILL:**	Fraste MDXL
DIP:	60.00 **AZIMUTH:** 340	**CASING:**	None
COORDINATES:	6903244.43 N 593626.92 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Original borehole diameter: 4"
Azimuth approximate.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY DESCRIPTION	SYMBOL	# Joints / # Foliations (10 20 30); TCR / RQD (%) (25 50 75)	Hydraulic conductivity K (m/s) (1x10⁻⁴ 1x10⁻⁷ 1x10⁻⁸ 1x10⁻⁵)	COMMENTS
25			1090.75	Boulders				
			24.99 / 1090.48	Course sand + gravel - Varied litho - Large # of angular grey phyllite chips				
			25.30	Brown/Grey Medium/course sand + fine gravel. Angular to sub-angular. Unweathered mica chips present.				
			1087.58					
			28.65	Brown fine to course sand, waterbearing				
30			1087.31	Brown medium to course sand w/ fine gravel, waterbearing				
			28.96	Black course sand - fine gravel. Black phyllite dominates other lithos present.				
			1086.78					
			29.57	Same as above, w/ some qtz or other veining				
			1085.47					
			31.09					
			1083.35					
35			33.53	Bedrock - phyllite				w/ quartz. All broken. Breaking parallel to foliation, weak foliations, can't distinguish joints
								w/quartz. Breaking parallel to foliation, weak foliations, can't distinguish joints. Washing out? Open hloe
								w/ quartz. " " recovery increasing, stronger, difficult to distinguish joints
								w/ quartz. All broken. Breaking parallel to foliation, weak foliations, can't distinguish joints
40								w/ quartz. Breaking parallel to foliation, weak foliations, can't distinguish joints. Washing out? Open hloe
								w/ quartz. " " recovery increasing, stronger, difficult to distinguish joints
								10 foln breaks, joints possibly break on foliation - weathered
45								Lost core. All redrilled.
								flt>46.5m . 46.5 - 46.8m small flt (healed), no litho

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-VC1
LOCATION:	Vangorda Creek	**PAGE:**	3 **OF** 3
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-07-10 **TO** 2009-07-13	**DRILL:**	Fraste MDXL
DIP:	60.00 **AZIMUTH:** 340	**CASING:**	None
COORDINATES:	6903244.43 N 593626.92 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Original borehole diameter: 4"
Azimuth approximate.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	# Joints / # Foliations (10 20 30); TCR / RQD (%) (25 50 75); Hydraulic conductivity K (m/s) (1x10⁻⁸ 1x10⁻⁷ 1x10⁻⁶ 1x10⁻⁵)	COMMENTS
50							change, more vng between fit fltzn. 3 foln breaks, rock deformed vn'd & sulphides, multiple shears fltzn <49.8m. 7 foln breaks, same as above, deformed to 163.4, vn'd & sulphides 11 foln breaks, out of fit, same lito as above
55							16 foln breaks, rock becoming more competent, fewer foln breaks change in the last 2.5 feet. 14 foln breaks, marble interbedding last 2.5 feet 17 foln breaks, no marble bedding
60							9 foln breaks, losing water in upper 2.3 feet 20 foln breaks, interbedded with marble, sulphides in run 18 foln breaks, sulphide mineralization in foln breaks
65			1054.31				16 foln breaks, sulphides, top is piece from last run 16 foln breaks 13 foln breaks, sulphides 17 foln breaks, rubbly zone at last 2.5 feet
			67.06	END OF BOREHOLE			

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-VC2
LOCATION:	Vangorda Creek	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	
BORING DATE:	2009-07-16 TO 2009-07-16	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6903254.00 N 593636.00 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:
Overburden hole.
Hole unsurveyed; handheld GPS co-ordinates and elevation only.

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	Hydraulic conductivity K (m/s)	COMMENTS
			1110.00			1×10^{-5} 1×10^{-4} 1×10^{-3}	
1–6	Water level at elev. 1109.21m on 2009-09-03	▼	0.00 / 1103.90	Sandy silt and clay, trace gravel. Brown.			
7–10			6.10 / 1099.30	Sandy silt and clay. Wet. Brown.			
11–13			10.70 / 1096.30	Clay with silt, some sand and gravel. Grey.			
14–18			13.70 / 1091.70	Clay with silt, trace fine to medium sand. Grey.			
19			18.30 / 1090.20	Gravel, cobbles, and sand.			
20			19.80	Sand fine to medium grained, trace silt and clay. Well sorted.			
21			1088.70	Phyllite			
22			20.73 / 1088.70 / 21.59	END OF BOREHOLE			
23							

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-GW1
LOCATION:	Grum Dump West (GD13)	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-15 TO 2009-06-15	**DRILL:**	Froste, Track Mounted
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6904214.01 N 591106.56 E	**DATUM:**	UTM NAD 27, 8 V

GENERAL COMMENTS:
Dry well on 27 Aug 2009
Height to top of casing/pvc = 0.804m

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	COMMENTS
			1279.27			
			0.00	Topsoil above from 0-0.46m Can observe some ground deflection as the drill progresses		
			1278.81			
			0.46	Medium brown silty SAND some gravel and clay. Mainly low plasticity.		
			1278.36			
1			0.91	Medium to light brown SILT and SAND some gravel and trace to some clay. Low to medium plasticity.		
			1277.75			
			1.52	Medium brown SILT and SAND some gravel and clay. Medium to high plasticity.		
			1277.29			
2			1.98	Grey brown GRAVEL and SAND some silt trace clay.		
			1276.98	Small boulder, lots of dust from drill		
			2.29	Grey brown GRAVEL and SAND some silt trace clay.		
			1276.83			
			2.44	Cuttings: Grey GRAVEL some to trace sand and silt. Observed water in cuttings/watertable? after ~3.05m.		
3			1276.22			
			3.05	Cuttings:Grey GRAVEL some to trace sand and silt.		
			1275.92	Switched to 3.5" button open hole bit at 3.05m to confirm bedrock		
			3.35	Weathered Bedrock		
			1275.61			
			3.66	Competent Bedrock		
4						
5			1274.09			
			5.18	END OF BOREHOLE		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-GW2
LOCATION:	Grum Dump West (GD13)	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-15 TO 2009-06-15	**DRILL:**	Froste, Track Mounted
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6904213.00 N 591099.00 E	**DATUM:**	UTM NAD 27, 8 V

GENERAL COMMENTS:
No piezo installed at this location.

SOIL LEGEND
Topsoil/Organics, Tailings, Road materials, Overburden, Clay, Silt, Sand, Gravel, Cobbles

WELL PLUG MATERIAL LEGEND
Backfill, Bentonite, Sand, Bentonite Grout, Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - masl / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	COMMENTS
			1278.97			
			0.00	Very thin layer of TOPSOIL		
			1278.92	Deep brown silty SAND, some gravel, some to trace clay		
			0.05			
			1278.51			
			0.46	Possible weathered bedrock zone BEDROCK encountered after 0.46m, closer to 0.61m depth (diorite)		
			1278.36			
			0.61	Bedrock becoming competent after 0.61m		
1			1277.75			
			1.22	END OF BOREHOLE		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-GW3
LOCATION:	Grum Dump West (GD13)	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"
BORING DATE:	2009-06-15 TO 2009-06-15	**DRILL:**	Froste, Track Mounted
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6904213.70 N 591114.26 E	**DATUM:**	UTM NAD 27, 08 V

GENERAL COMMENTS:
Dry well on 27 Aug 2009
-Height to top of casing/pvc= 0.884m

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	ELEV. - masl / DRILLED DEPTH - m	DESCRIPTION	SYMBOL	COMMENTS
	1291.00	**STRATIGRAPHY**		
	0.00	Wet black grey TOPSOIL, organics, silty sand, some gravel and clay		
		Water was observed shortly after drilling started. Brown to orangy brown in colour coming up around odex bit		
	1290.24 / 0.76	Grey brown wet silty SAND, some clay and gravel		
1	1289.48 / 1.52	Medium orange brown clayey SAND, some silt and gravel; medium plasticity		
2	1288.87 / 2.13	Moist, medium brown silty SAND with gravel, some to trace clay		
	1288.41 / 2.59	Standpipe piezometer installed close to the weathered and overburden interface		
3	1287.95 / 3.05	Light brown silty SAND some gravel		
	1287.65 / 3.35	Orangy colour typical of seeps observed around this area; pH estimated to be closer to 5 based on colour		
4		Orangy brown silty SAND and GRAVEL		
		Weathered Bedrock		
5		Orangy brown		
		Red-brown		
6		Orangy brown to medium brown		
7		Water flowing from cuttings tube estimated to be ~0.33L/s at 6.86m depth		
		Orangy brown to medium brown		
		Orangy brown to medium brown		
8		Grey to orange brown		
	1282.77 / 8.23	Grey to orange brown		
		Solid/sound BEDROCK (appeared to be diorite) hit at ~8.23m, weathered bedrock above.		
9	1282.01 / 8.99	END OF BOREHOLE		

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-UN1
LOCATION:	North Fork Rose Creek	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-08-18 TO 2009-08-18	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6914228.29 N 586409.49 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	Hydraulic conductivity K (m/s)	COMMENTS
			1113.20			1x10⁻⁵ 1x10⁻⁴ 1x10⁻³	
1	Water level at elev. 1112.88m on 2009-08-25	▼	0.00 / 1112.90	Gravel - and sand (fine to coarse - sub angular to sub rounded), with silt and clay, brown, moist			
			0.30 / 1111.98	Silt - Clayey, with sand (fine), organics (roots) gray/brown, moist - hard to roll into a thread (breaks)			Split spoon blow count at 6 inch intervals over 2 feet: 2, 1, 2, 3 = 8 total
2			1.22 / 1110.76	Same as above - Trace gravel (sub angular), dark grayish/brown, wet			
3			2.44 / 1109.54	Sand - (fine to coarse grained), with gravel, trace silt, sand, and cobbles (30 mm), brown, wet			Split spoon blow count at 6 inch intervals over 2 feet: 26, 12, 10, 6 = 54 total
4			3.66 / 1108.93	Gravel - sand (fine to coarse - subangular to subrounded), trace silt and clay, brownish/gray, wet			Split spoon blow count at 6 inch intervals over 2 feet: 48, 54, refusal, refusal
			4.27 / 1108.32	Sand - (fine to coarse grained - sub angular to subrounded), with silt and sand, trace gravel, orange/brown, wet - in SS finer at the top with depth it			Slug test. BEJ.
5			4.88 / 1108.02	gets coarser, first 1 foot medium to fine sand			
			5.18 / 1107.71	Gravel - with sand (fine to medium - sub angular to subrounded), trace silt and clay, orange/brown, wet			Split spoon blow counts: 50+, refusal
6			5.49 / 1107.41	Sand - fine to medium grained (subangular), trace gravel, brown, wet			
			5.79 / 1106.49	Gravel - with sand (fine to coarse - subangular), trace silt and clay, brownish/grey, wet, black boulder like material			
7			6.71 / 1105.58	Gravel - some coarse sand, little fine to medium sand, iron staining, black, wet - possibly a boulder?			
			7.62	Gravel & Sand - coarse sand, little silt and sand, iron staining, black, wet - bedrock????			
8				bedrock core - black/purple grey, fractures, iron staining			
9			1104.10 / 9.10	END OF BOREHOLE			

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-UN2
LOCATION:	North Fork Rose Creek	**PAGE:**	1 OF 1
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-08-19 TO 2009-08-19	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6914225.67 N 586435.98 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:

SOIL LEGEND

- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND

- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	SYMBOL	Hydraulic conductivity K (m/s)	COMMENTS
			1113.82			1x10⁻⁵ 1x10⁻⁴ 1x10⁻³	
0	Water level at elev. 1112.85m on 2009-08-25	▼	0.00	Sand - (fine to medium - sub angular), trace silt and clay, brown, moist			
			1112.91				
1			0.91	Gravel - with sand (fine to coarse - sub angluar to subrounded), little silt and clay, brown, wet, little recovery			Split spoon blow count: 2, 1, 1
2			1111.69				Split spoon: 8 blows
			2.13	Sand - (fine to coarse - subangular to subrounded) silty, clayey, trace gravel (10mm), brown, wet, layered in picture with layers of finer and coarser material.			Split spoon blow count at 6 inch intervals over 2 feet: 3,4,4,8 = 19 Total
3			1110.77				
			3.05	Sand - (fine to coarse) with gravel, little silt and clay, brown (light and dark materials), wet			
4			1109.55				Split spoon blow count at 6 inch intervals over 2 feet: 1, 8, 8, 7 = 24 total
			4.27	Mainly silt, with a lesser degree of clay			
5			1108.03				
			5.79	Sand - (medium to coarse - subangular to subrounded) with gravel, little silt and clay, orange/brown, wet			Split spoon blow count at 6 inch intervals over 2 feet: 5, 7, 11, 11 = 34 total
6			1107.72				Slug test. BEJ.
			6.10	SAA - sand a bit coarse, more gravel, brown, wet			
			1107.11				
7			6.71	Sand & Gravel - (fine to coarse grained), rusty clay material, water is dirty in this run, gravel pieces are dark black as in P09-UN1 - weathered bedrock???, rusty, wet			Split spoon blow count: 50+, refusal
			1106.81				
			7.01	Cobbles - with gravel, little sand, silt and clay, gray, rusty areas, moist - bedrock, - drillers noted it was a strange run			
8			1106.50				
			7.32	Core - Bedrock - blackish/purple, sulphides, joints infilled with light clay materials			
9			1104.42				
			9.40	END OF BOREHOLE			

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-UN3
LOCATION:	North Fork Rose Creek	**PAGE:**	1 OF 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-08-19 TO 2009-08-20	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6914243.28 N 586400.40 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	DESCRIPTION	SYMBOL	Hydraulic conductivity K (m/s)	COMMENTS
			1114.36				
			0.00	Organic Soil - peat, roots, spongy material, black, moist - water			
			1113.75				
			0.61	Silt - with clay, trace sand (fine to medium), organics, dark brown, wet, frozen			
1			1113.45				Split spoon blow count at 6 inch intervals over 2 feet: 10, 11, 10, 12 = 43 total
			0.91	Silt - clayey, trace sand (fine to medium), organics (wood), dark brown, frozen			
2			1112.23				
			2.13	SAA - trace coarse sand and gravel			
			1111.92				
			2.44	Gravel and sand -(angular to subangular) with silt and clay, dark brown, moist			
3			1111.62				Split spoon blow count at 6 inch intervals over 2 feet: 6, 1, 0, 0 = 7 total
			2.74	(Split spoon) Silt - clayey, little fine sand, grayish/brown, frozen, ice crystals			
			1111.31	Drilled in 30 seconds, sand and gravel and wood chips			
			3.05				
4			1110.09				Split spoon blow count at 6 inch intervals over 2 feet: 2, 24, 31, 11 = 68 total
			4.27	Gravel - with sand (coarse angular), trace fine grained sand, rusty, black rock (bedrock?)			
5			1108.72				
			5.64	Silt - clayey, cobbles (subangular) at end of run (10 to 20 mm), grey, wet			Split spoon blow count at 6 inch intervals over 2 feet: 6, 33, 21, 6 = 66 total
6			1108.41				
			5.95	Sand - (medium to coarse), silty, clayey, trace gravel, gray, wet			

Water level at elev. 1113.24m on 2009-08-25

Hydraulic conductivity K (m/s): 1×10^{-5}, 1×10^{-4}, 1×10^{-3}

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BOREHOLE LOG

PROJECT:	2009 Groundwater Investigation	**BOREHOLE:**	P09-UN3
LOCATION:	North Fork Rose Creek	**PAGE:**	2 OF 2
FILE No:	1CY001.034	**DRILL TYPE:**	Odex 4"/Diamond
BORING DATE:	2009-08-19 TO 2009-08-20	**DRILL:**	Fraste MDXL
DIP:	90.00 **AZIMUTH:** 0	**CASING:**	None
COORDINATES:	6914243.28 N 586400.40 E	**DATUM:**	UTM NAD 27, 08V

GENERAL COMMENTS:

SOIL LEGEND
- Topsoil/Organics
- Tailings
- Road materials
- Overburden
- Clay
- Silt
- Sand
- Gravel
- Cobbles

WELL PLUG MATERIAL LEGEND
- Backfill
- Bentonite
- Sand
- Bentonite Grout
- Cement

DEPTH - m	WELL DETAILS & WATER LEVEL - m	WATER LEVEL - m	ELEV. - m / DRILLED DEPTH - m	STRATIGRAPHY: DESCRIPTION	STRATIGRAPHY: SYMBOL	Hydraulic conductivity K (m/s)	COMMENTS
			1107.04				Split spoon blow count at 6 inch intervals over 2 feet: 6, 14, 9, 11 = 40 total
8			7.32 / 1105.52	Sand - gets coarser with depth, little silt and clay, trace gravel, orange/gray, wet			Slug test. BEJ.
9			8.84 / 1105.22	Cobble/rock - 1 foot piece, white with biotite, rust at end			
			9.14 / 1103.84	Cobbles (20 to 50 mm), with sand (fine to medium grained), trace silt and clay			
10			10.52 / 1103.53	(Split spoon) - Gravel & sand - with silt and clay, 1 cobble (10 mm), orange, wet			Split spoon blow count: 12, 20, refusal
11			10.83 / 1102.17	Cobbles (30 mm), a piece of white granite looking material that is fractured/jointed, then what looks to be black bedrock material			
12			12.19 / 1100.66	Bedrock			
13							
14			13.70	END OF BOREHOLE			

Appendix B
Hydraulic Testing Datasheets

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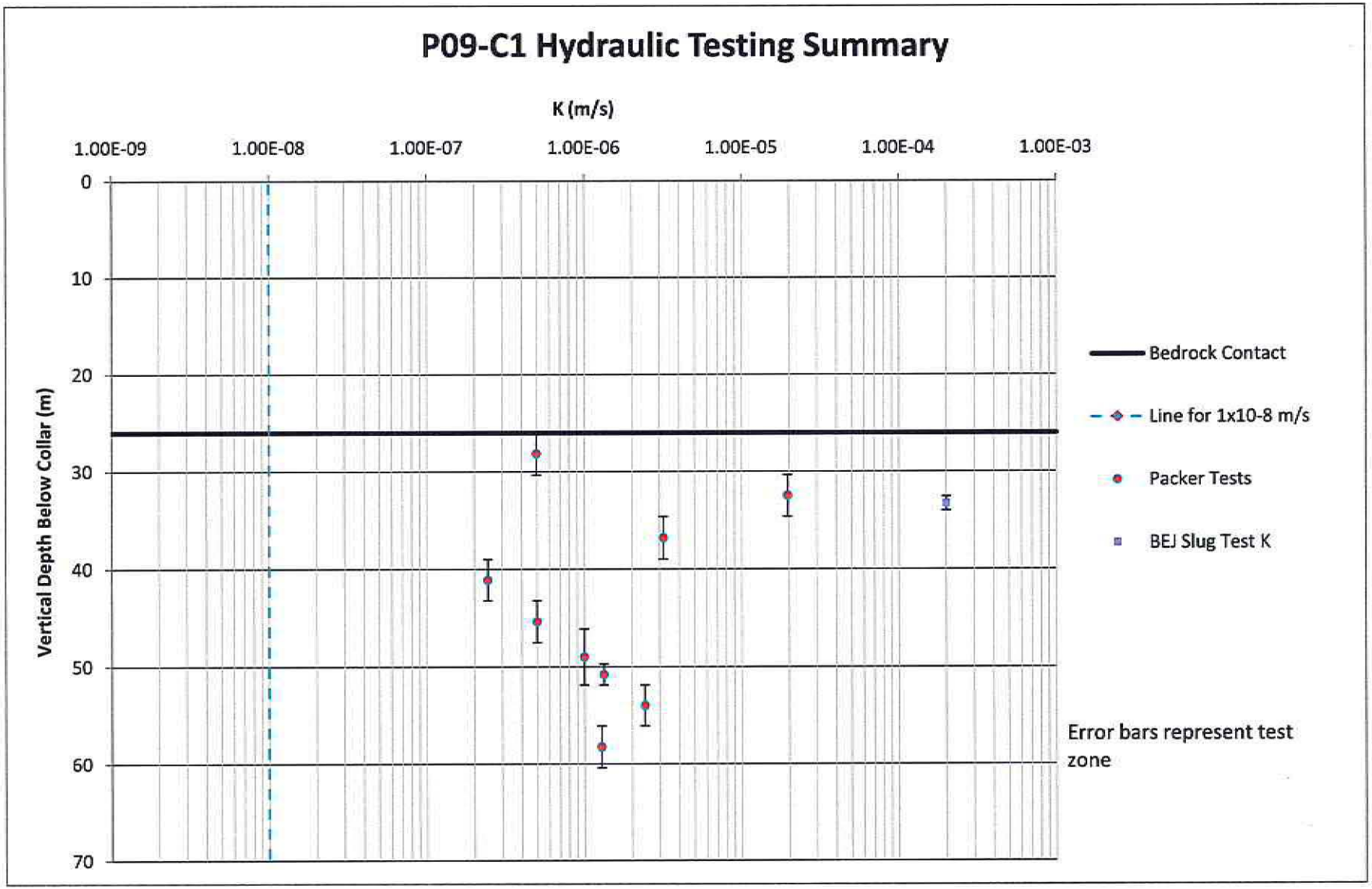
Glossary of Abbreviations

BEJ	best engineering judgment
fh	falling head
rh	rising head
ms	medium slug (PVC: 33.5mm outer diameter x 1.60m length)
ss	small slug (PVC: 33.5mm outer diameter x 1.05m length)
hl	pumped using Hydrolift
hp	pumped by hand
tr	tubing removed, acting as "slug removal"


P09-C1 Hydraulic Testing Summary
K (m/s)
1.00E-09
1.00E-08
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
Vertical Depth Below Collar (m)
0
10
20
30
40
50
60
70
Bedrock Contact
Line for 1x10-8 m/s
Packer Tests
BEJ Slug Test K
Error bars represent test zone

PACKER INJECTION TEST

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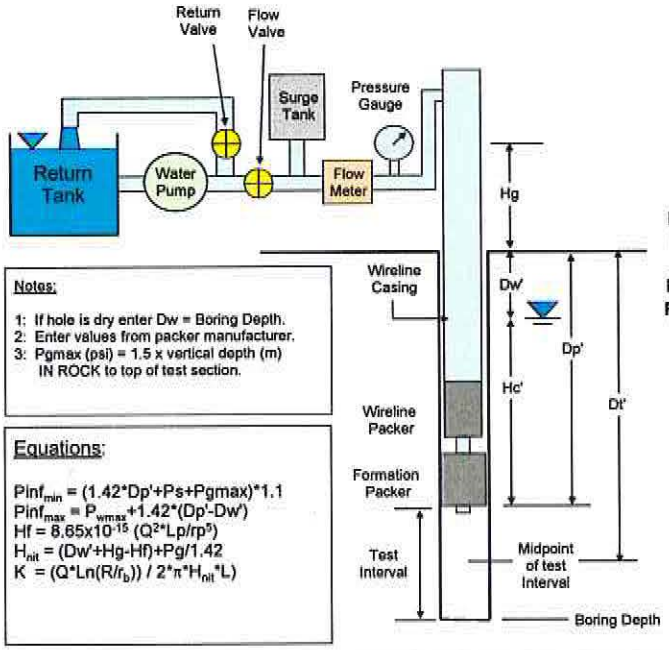
Project:	Faro 2009	**Test Interval (m):**	27.7	to	32.3	**Boring N°:**	P09-C1
Northing:		**Date:**	24-Jul-09	**Start Time:**	7:40	**Test N°:**	1
Easting:				**End Time:**		**Boring Depth (m):**	32.3
GS Elevation:			91		106	**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

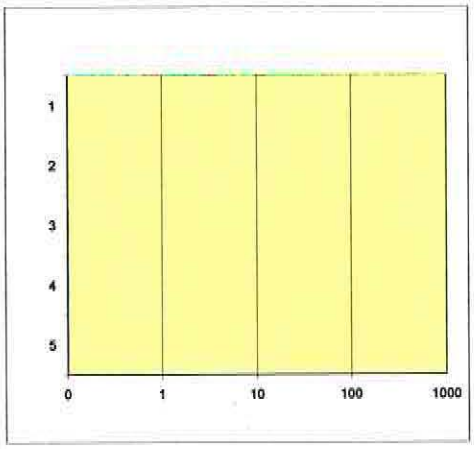
Equations:

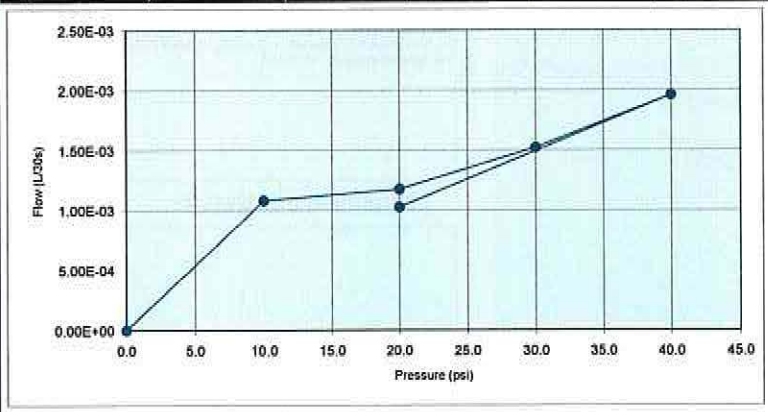
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	27.7	m
Dt	Measured depth to midpoint of test	30.0	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	26.0	m
Dt'	Vertical depth to midpoint of test	28.2	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	350	psi
Pgmax	Maximum injection gauge pressure (3)	42	psi
Pinfmin	Minimum packer inflation pressure	279.0	psi
Pinfmax	Maximum packer inflation pressure	740.0	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	20	30	40	20
1	0.0010	0.0013	0.0015	0.0020	0.0012
2	0.0010	0.0012	0.0015	0.0019	0.0010
3	0.0012	0.0012	0.0015	0.0020	0.0009
4	0.0013	0.0010	0.0015	0.0019	0.0010
5	0.0009		0.0016	0.0020	
Qavg (m3/30s)	0.0011	0.0012	0.0015	0.0020	0.0010
Q_{avg} (m³/day)	3.110	3.384	4.378	5.645	2.952
Hf (m)	0.08	0.09	0.15	0.25	0.07
Hnit (m)	8.0	15.0	22.0	28.9	15.0
K (m/day)	7.2E-02	4.2E-02	3.7E-02	3.6E-02	3.6E-02
K (m/sec)	8.35E-07	4.83E-07	4.26E-07	4.17E-07	4.20E-07
Lugeons	0.033	0.019	0.017	0.016	0.016





Field Observations

at 0 psi there was some flow - this could be due to trying to stick the packer into fractured rock, we will drill some more and then try to do a packer test lower down. Less than 500 mL/30 sec.

Interpretation of Results

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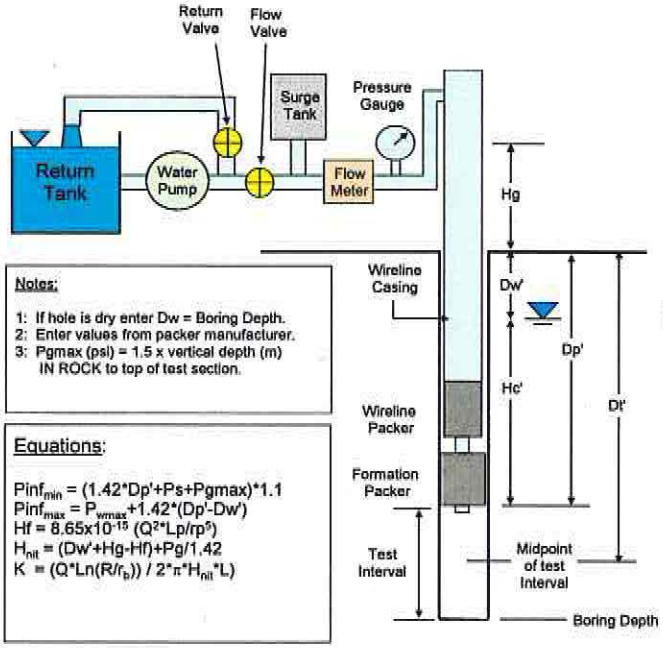
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	32.3	to	36.9	**Boring N°:**	P09-C2
Northing:		**Date:**	23-Jul-09	**Start Time:**	12:00	**Test N°:**	2
Easting:				**End Time:**	1:40	**Boring Depth (m):**	36.9
GS Elevation:				106	121	**Supervisor:**	MP



Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	32.3	m
Dt	Measured depth to midpoint of test	34.6	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	30.4	m
Dt'	Vertical depth to midpoint of test	32.5	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	49	psi
Pinfmin	Minimum packer inflation pressure	292.1	psi
Pinfmax	Maximum packer inflation pressure	746.2	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

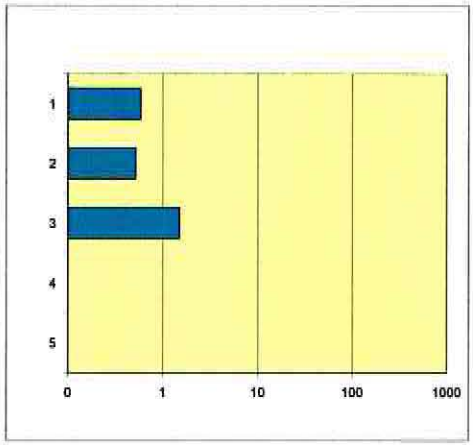
Equations:

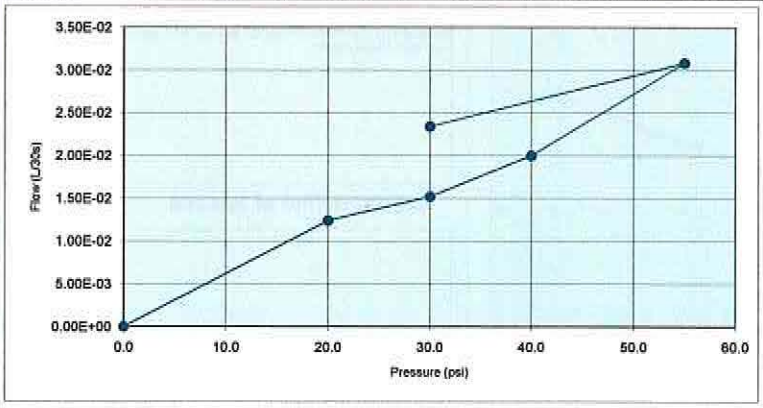
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Conversion Factors:

10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	30	40	55	30
1	0.0130	0.0150	0.0200	0.0290	0.0230
2	0.0130	0.0150	0.0200	0.0310	0.0220
3	0.0110	0.0150	0.0200	0.0300	0.0250
4	0.0130	0.0150	0.0230	0.0310	0.0230
5	0.0120	0.0160	0.0170	0.0330	0.0240
Qavg (m3/30s)	0.0124	0.0152	0.0200	0.0308	0.0234
Q_{avg} (m³/day)	35.712	43.776	57.600	88.704	67.392
Hf (m)	9.98	14.99	25.96	61.56	35.53
Hnit (m)	5.1	7.1	3.2	-21.8	-13.4
K (m/day)	1.3E+00	1.1E+00	3.3E+00	-7.5E-01	-9.3E-01
K (m/sec)	1.50E-05	1.31E-05	3.83E-05	-8.69E-06	-1.07E-05
Lugeons	0.587	0.515	1.504	-0.341	-0.422





Field Observations

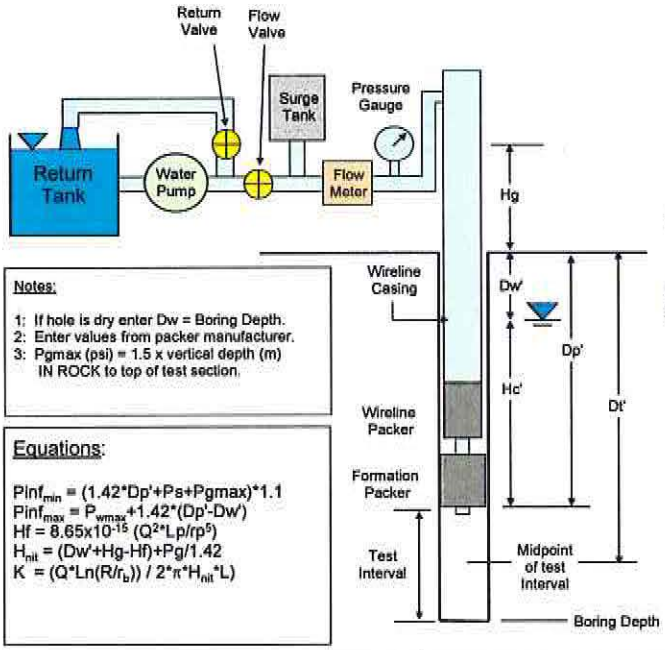
Tried test, flow out of casing and high flows with no pressure. Remove packer and performed a rod test no leak. Will drill another 5 feet and packer test. Packer test has a very high flow, even with no pressure. There is no flow from the casing. Rock has vugs and openings. Air lift test.

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting
Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	36.9	to	41.5	**Boring N°:**	P09-C1
Northing:		**Date:**	24-Jul-09	**Start Time:**	6:15	**Test N°:**	3
Easting:				**End Time:**	7:30	**Boring Depth (m):**	41.5
GS Elevation:				121	136	**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

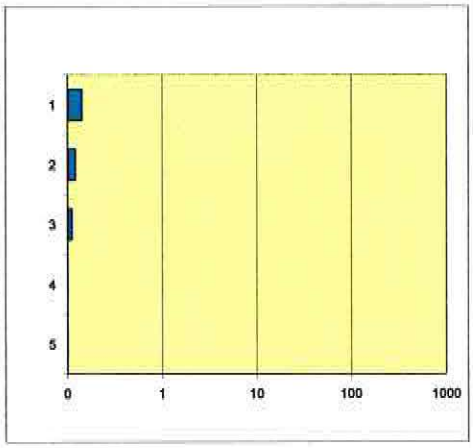
Equations:

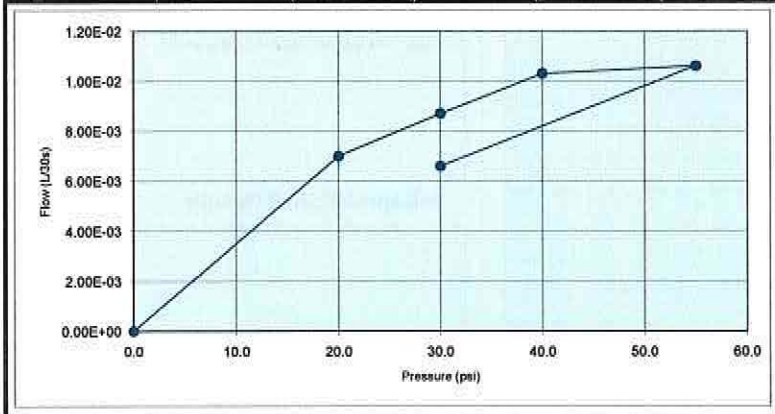
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	36.9	m
Dt	Measured depth to midpoint of test	39.2	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	34.7	m
Dt'	Vertical depth to midpoint of test	36.8	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	56	psi
Pinfmin	Minimum packer inflation pressure	305.2	psi
Pinfmax	Maximum packer inflation pressure	752.3	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	30	40	55	30
1	0.0070	0.0100	0.0105	0.0105	0.0065
2	0.0070	0.0080	0.0105	0.0115	0.0065
3	0.0070	0.0080	0.0105	0.0100	0.0065
4	0.0070	0.0090	0.0100	0.0110	0.0065
5	0.0070	0.0085	0.0100	0.0100	0.0070
Qavg (m3/30s)	0.0070	0.0087	0.0103	0.0106	0.0066
Q_{avg} (m^3/day)	20.160	25.056	29.664	30.528	19.008
Hf (m)	3.18	4.91	6.88	7.29	2.83
Hnit (m)	11.9	17.2	22.3	32.4	19.3
K (m/day)	3.1E-01	2.7E-01	2.5E-01	1.7E-01	1.8E-01
K (m/sec)	3.62E-06	3.11E-06	2.85E-06	2.01E-06	2.11E-06
Lugeons	0.142	0.122	0.112	0.079	0.083





Field Observations

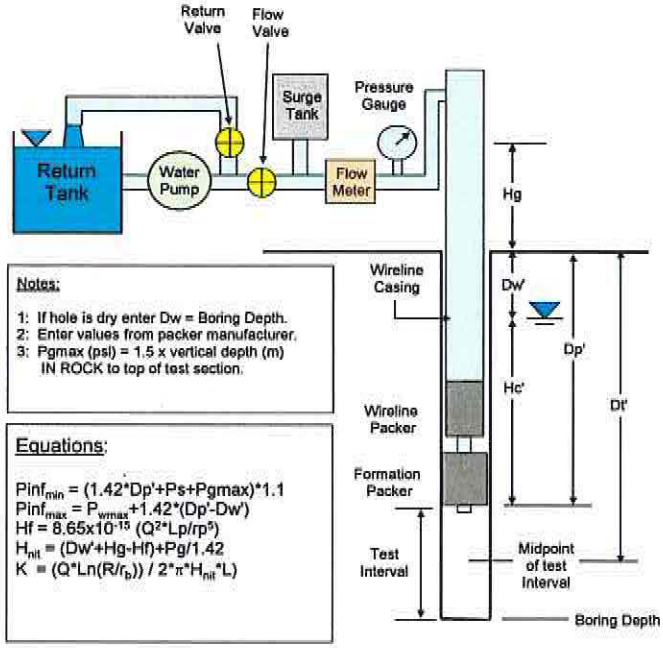
Rock was more broken up in the second run of this set, part of it was washed away. Therefore higher flows are expected. Rock has alot of quartz veining and vugs in it.

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting
Engineers and Scientists

Project:	Faro 2009	Test Interval (m):	41.5	to	46.0	Boring N°:	P09-C1
Northing:		Date:	25-Jul-09	Start Time:	10:30	Test N°:	4
Easting:				End Time:	11:30	Boring Depth (m):	46.0
GS Elevation:				136	151	Supervisor:	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

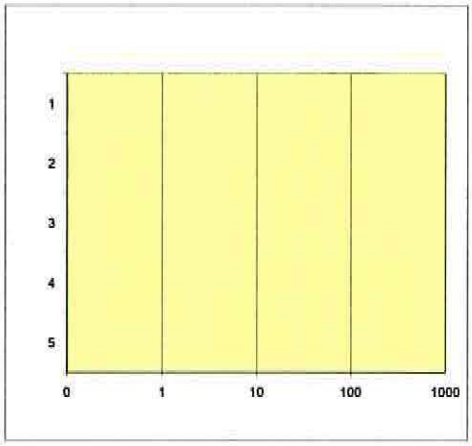
Equations:

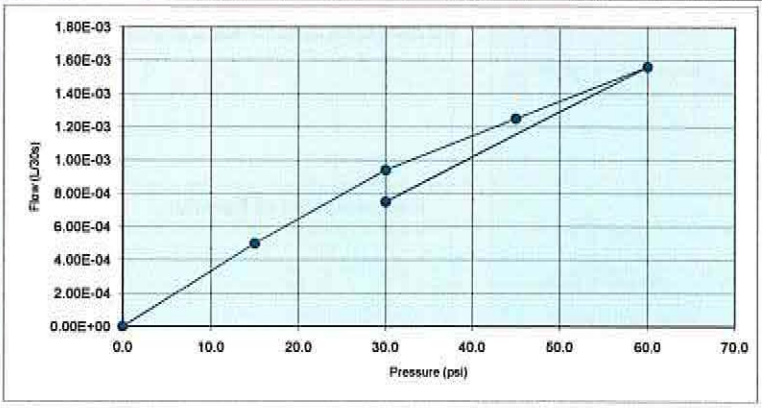
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	41.5	m
Dt	Measured depth to midpoint of test	43.8	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	39.0	m
Dt'	Vertical depth to midpoint of test	41.1	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	63	psi
Pinfmin	Minimum packer inflation pressure	318.4	psi
Pinfmax	Maximum packer inflation pressure	758.4	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.5	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	15	30	45	60	30
1	0.0005	0.0009		0.0015	0.0008
2	0.0005	0.0009	0.0013	0.0015	0.0007
3	0.0004	0.0010	0.0012	0.0016	0.0007
4	0.0006	0.0009	0.0012	0.0016	0.0008
5		0.0010	0.0013	0.0016	
Qavg (m3/30s)	0.0005	0.0009	0.0013	0.0016	0.0008
Q_{avg} (m^3/day)	1.440	2.707	3.600	4.493	2.160
Hf (m)	0.02	0.06	0.10	0.16	0.04
Hnit (m)	11.5	22.1	32.6	43.1	22.1
K (m/day)	2.4E-02	2.3E-02	2.1E-02	2.0E-02	1.8E-02
K (m/sec)	2.73E-07	2.68E-07	2.41E-07	2.28E-07	2.14E-07
Lugeons	0.011	0.011	0.009	0.009	0.008





Field Observations

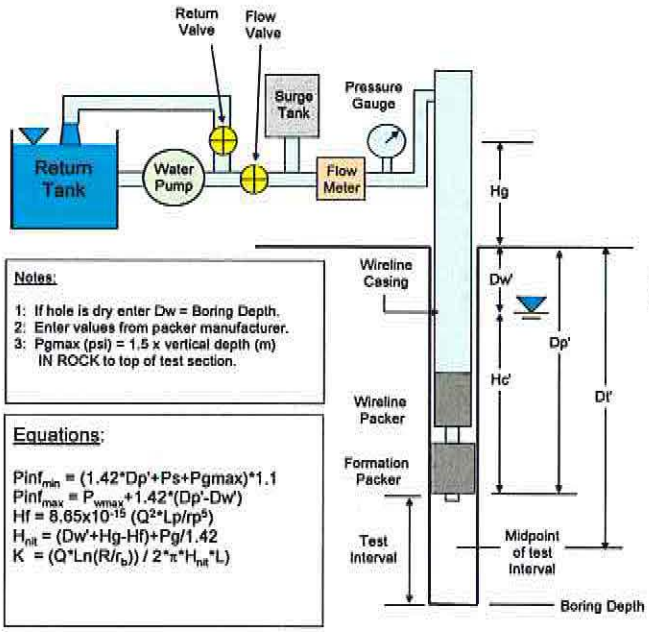
a bit of flow with 0 pressure, hard to set packer in a competent zone since we have not hit one yet. 0.0004 to 0.0003 m3/30 sec flows with no pressure. No leak through the casing. Rock is phyllite, very crubly and weathered.

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	46.0	to	50.6	**Boring N°:**	P09-C1
Northing:		**Date:**	25-Jul-09	**Start Time:**	1:00	**Test N°:**	5
Easting:				**End Time:**	2:00	**Boring Depth (m):**	50.6
GS Elevation:					151 166	**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

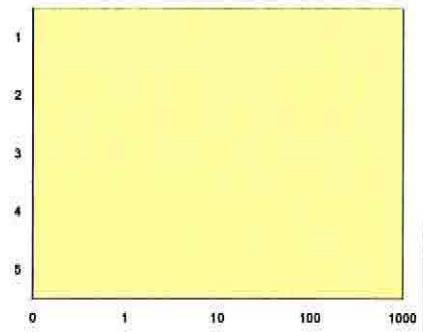
Equations:

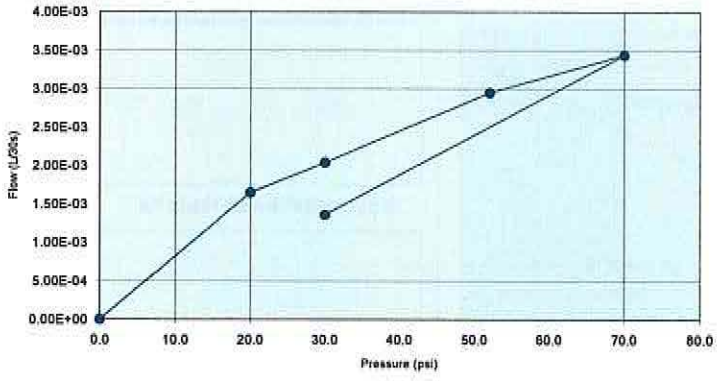
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	46.0	m
Dt	Measured depth to midpoint of test	48.3	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	43.2	m
Dt'	Vertical depth to midpoint of test	45.4	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	70	psi
Pinfmin	Minimum packer inflation pressure	331.4	psi
Pinfmax	Maximum packer inflation pressure	764.4	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	30	52	70	30
1	0.0016	0.0022	0.0030	0.0035	0.0012
2	0.0015	0.0020	0.0032	0.0035	0.0013
3	0.0017	0.0020	0.0028	0.0035	0.0014
4	0.0018	0.0020	0.0028	0.0035	0.0014
5		0.0020		0.0032	0.0015
Qavg (m3/30s)	0.0017	0.0020	0.0030	0.0034	0.0014
Q_{avg} (m^3/day)	4.752	5.875	8.496	9.907	3.917
Hf (m)	0.18	0.27	0.56	0.77	0.12
Hnit (m)	14.9	21.9	37.1	49.5	22.0
K (m/day)	5.9E-02	5.0E-02	4.2E-02	3.7E-02	3.3E-02
K (m/sec)	6.82E-07	5.75E-07	4.90E-07	4.28E-07	3.81E-07
Lugeons	0.027	0.023	0.019	0.017	0.015





Field Observations

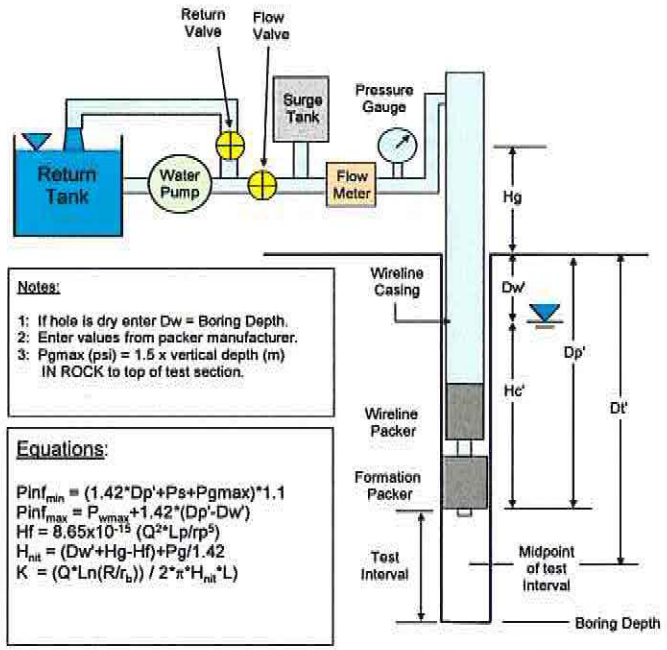
Packer is hard to set since we do not have a compitent zone to set it in. Flow before the test was 0.007 to 0.009 m3/sec. Rock is broken on the folation and has large qtz veins present and became vuggy at the bottom.

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	50.6	to	55.2	**Boring N°:**	P09-C1
Northing:		**Date:**	25-Jul-09	**Start Time:**	3:30	**Test N°:**	6
Easting:				**End Time:**	4:30	**Boring Depth (m):**	55.2
GS Elevation:					166 181	**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

Equations:

$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	50.6	m
Dt	Measured depth to midpoint of test	52.9	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	47.5	m
Dt'	Vertical depth to midpoint of test	49.7	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	76	psi
Pinfmin	Minimum packer inflation pressure	343.5	psi
Pinfmax	Maximum packer inflation pressure	770.6	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
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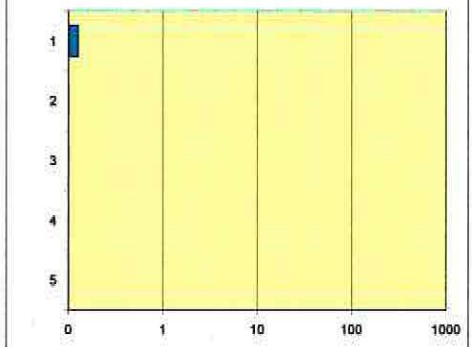
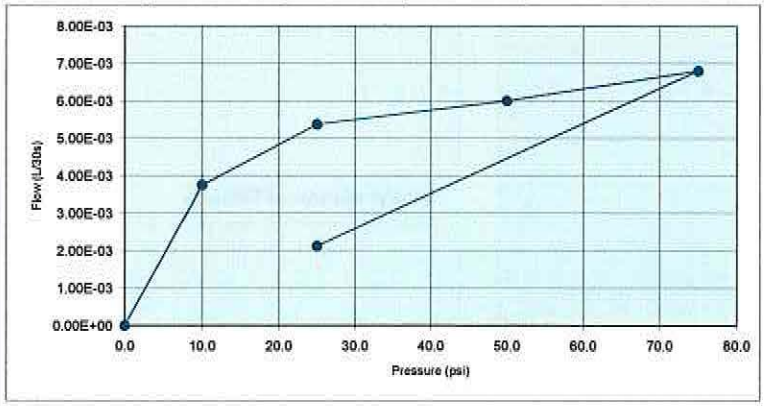
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	25	50	75	25
1	0.0040	0.0060	0.0060	0.0075	0.0022
2	0.0040	0.0050	0.0060	0.0070	0.0023
3	0.0035	0.0055	0.0065	0.0065	0.0020
4	0.0035	0.0050	0.0055	0.0065	0.0020
5			0.0060	0.0065	
Qavg (m3/30s)	0.0038	0.0054	0.0060	0.0068	0.0021
Q_{avg} (m^3/day)	10.800	15.480	17.280	19.584	6.120
Hf (m)	0.91	1.87	2.34	3.00	0.29
Hnit (m)	7.1	16.7	33.9	50.8	18.3
K (m/day)	2.8E-01	1.7E-01	9.4E-02	7.1E-02	6.2E-02
K (m/sec)	3.24E-06	1.98E-06	1.09E-06	8.24E-07	7.15E-07
Lugeons	0.127	0.078	0.043	0.032	0.028





Field Observations

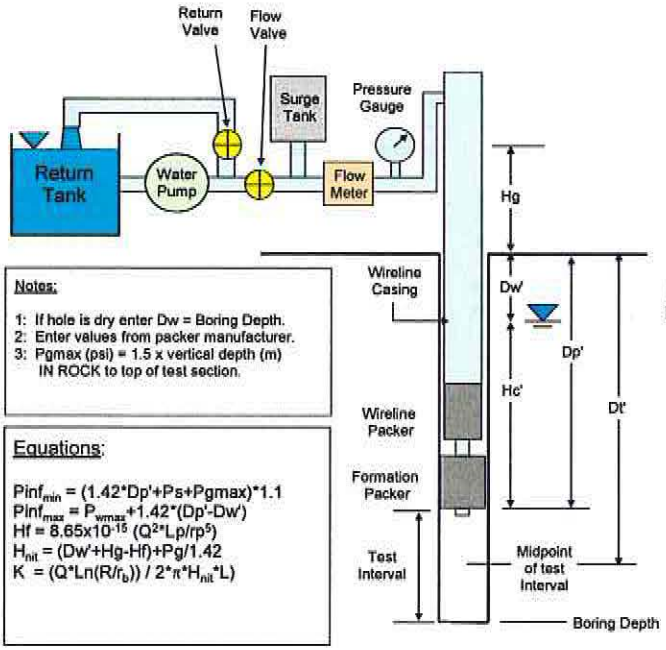
at 0 flow had 0.0015 m3/ 30 sec. Pulled back 5 feet and will try the test again.

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	49.1	to	55.2	**Boring N°:**	P09-C1
Northing:		**Date:**	25-Jul-09	**Start Time:**	5:00	**Test N°:**	7
Easting:				**End Time:**	6:20	**Boring Depth (m):**	55.2
GS Elevation:				161	181	**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

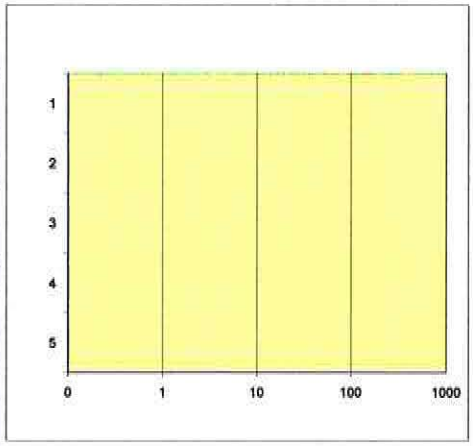
Equations:

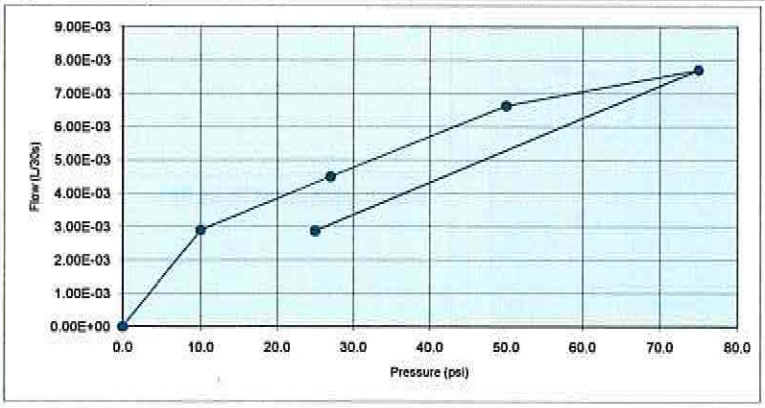
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	49.1	m
Dt	Measured depth to midpoint of test	52.2	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	46.1	m
Dt'	Vertical depth to midpoint of test	49.0	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	74	psi
Pinfmin	Minimum packer inflation pressure	339.5	psi
Pinfmax	Maximum packer inflation pressure	769.6	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	6.1	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	27	50	75	25
1	0.0030	0.0040	0.0070	0.0080	0.0035
2	0.0030	0.0050	0.0065	0.0080	0.0025
3	0.0030	0.0050	0.0070	0.0070	0.0030
4	0.0025	0.0045	0.0060	0.0080	0.0025
5	0.0030	0.0040		0.0075	
Qavg (m3/30s)	0.0029	0.0045	0.0066	0.0077	0.0029
Q_{avg} (m^3/day)	8.352	12.960	19.080	22.176	8.280
Hf (m)	0.55	1.31	2.85	3.85	0.54
Hnit (m)	7.5	18.7	33.4	50.0	18.1
K (m/day)	1.6E-01	9.7E-02	8.0E-02	6.2E-02	6.4E-02
K (m/sec)	1.80E-06	1.12E-06	9.22E-07	7.16E-07	7.39E-07
Lugeons	0.071	0.044	0.036	0.028	0.029





Field Observations

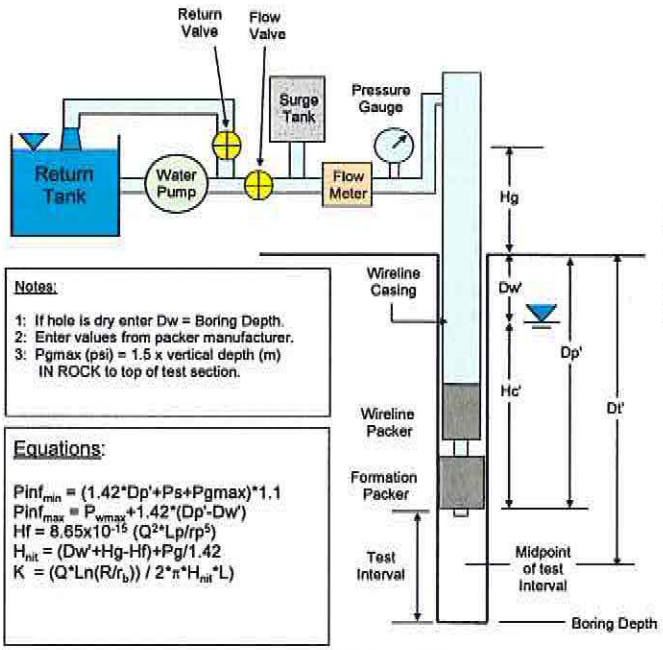
Retry of test 6.

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting — Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	55.2	to	59.7	**Boring N°:**	P09-C1
Northing:		**Date:**	26-Jul-09	**Start Time:**	8:00	**Test N°:**	8
Easting:				**End Time:**	9:40	**Boring Depth (m):**	59.7
GS Elevation:				181	196	**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

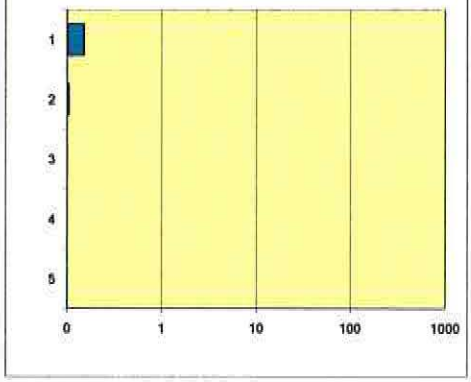
Equations:

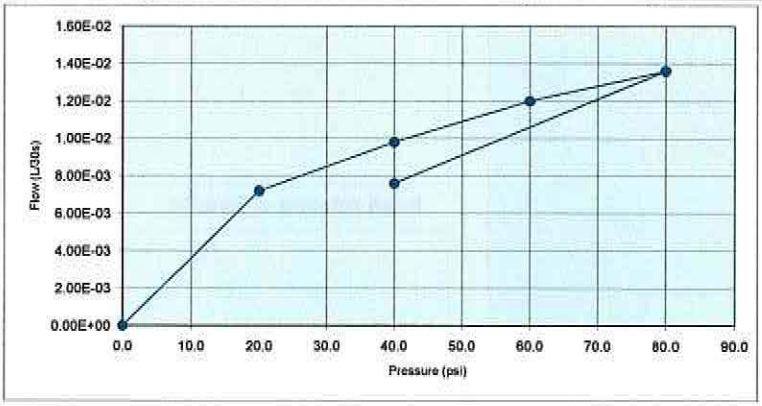
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	55.2	m
Dt	Measured depth to midpoint of test	57.5	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	51.9	m
Dt'	Vertical depth to midpoint of test	54.0	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	80	psi
Pinfmin	Minimum packer inflation pressure	353.7	psi
Pinfmax	Maximum packer inflation pressure	776.7	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.5	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4×10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	40	60	80	40
1	0.0080	0.0100	0.0120	0.0140	0.0080
2	0.0070	0.0090	0.0120	0.0140	0.0075
3	0.0070	0.0110	0.0120	0.0130	0.0075
4	0.0070	0.0100	0.0120	0.0140	0.0070
5	0.0070	0.0090	0.0120	0.0130	0.0080
Qavg (m3/30s)	0.0072	0.0098	0.0120	0.0136	0.0076
Q_{avg} (m^3/day)	20.736	28.224	34.560	39.168	21.888
Hf (m)	3.36	6.23	9.34	12.00	3.75
Hnit (m)	11.7	22.9	33.9	45.3	25.4
K (m/day)	3.3E-01	2.3E-01	1.9E-01	1.6E-01	1.6E-01
K (m/sec)	3.87E-06	2.69E-06	2.23E-06	1.89E-06	1.88E-06
Lugeons	0.152	0.106	0.087	0.074	0.074





Field Observations

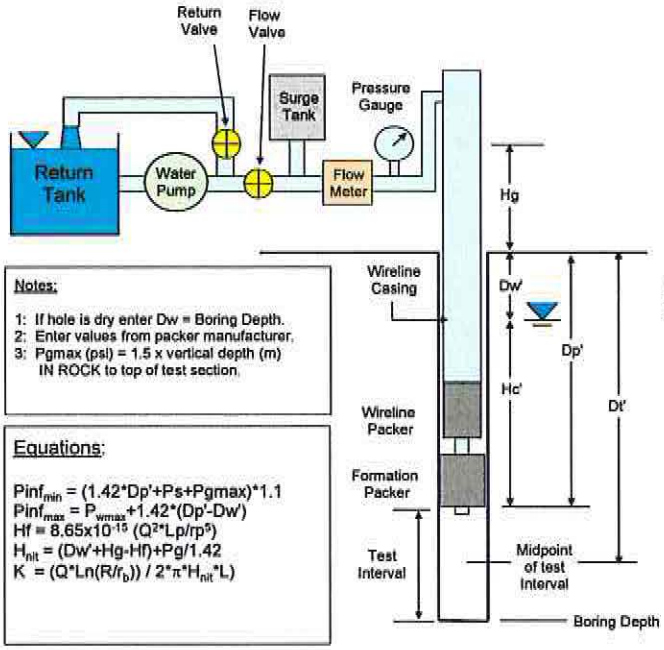
Retry of test 8.

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	59.7	to	64.3	**Boring N°:**	P09-C1
Northing:		**Date:**	26-Jul-09	**Start Time:**	12:00	**Test N°:**	9
Easting:				**End Time:**	1:20	**Boring Depth (m):**	64.3
GS Elevation:					196 211	**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

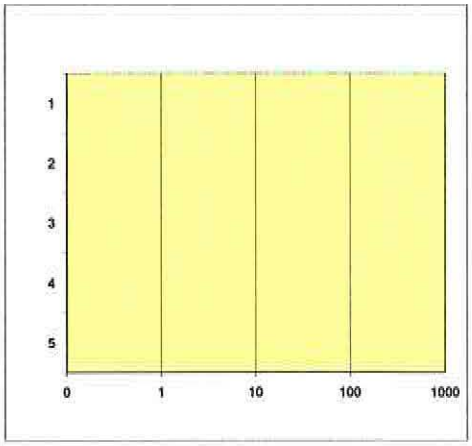
Equations:

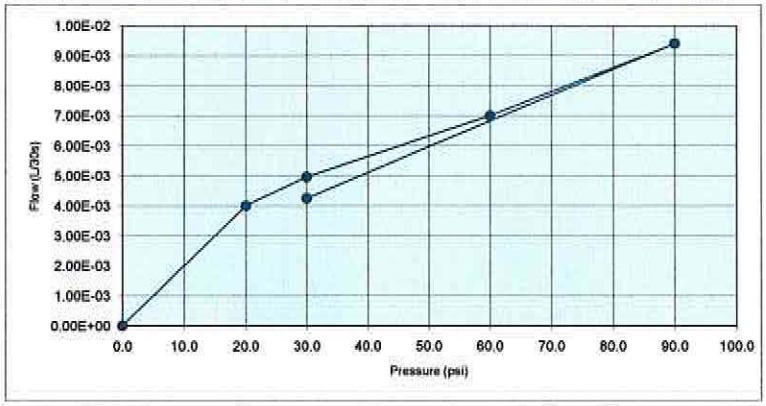
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	59.7	m
Dt	Measured depth to midpoint of test	62.0	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	56.1	m
Dt'	Vertical depth to midpoint of test	58.3	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	90	psi
Pinfmin	Minimum packer inflation pressure	369.7	psi
Pinfmax	Maximum packer inflation pressure	782.7	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	30	60	90	30
1	0.0040	0.0055	0.0070	0.0100	0.0040
2	0.0040	0.0047	0.0070	0.0090	0.0040
3	0.0040	0.0048	0.0070	0.0090	0.0045
4	0.0040	0.0050	0.0070	0.0100	0.0045
5	0.0040	0.0048	0.0070	0.0090	
Qavg (m3/30s)	0.0040	0.0050	0.0070	0.0094	0.0043
Q_{avg} (m³/day)	11.520	14.285	20.160	27.072	12.240
Hf (m)	1.04	1.60	3.18	5.73	1.17
Hnit (m)	14.0	20.5	40.1	58.6	21.0
K (m/day)	1.5E-01	1.3E-01	9.3E-02	8.5E-02	1.1E-01
K (m/sec)	1.75E-06	1.49E-06	1.08E-06	9.87E-07	1.25E-06
Lugeons	0.069	0.058	0.042	0.039	0.049

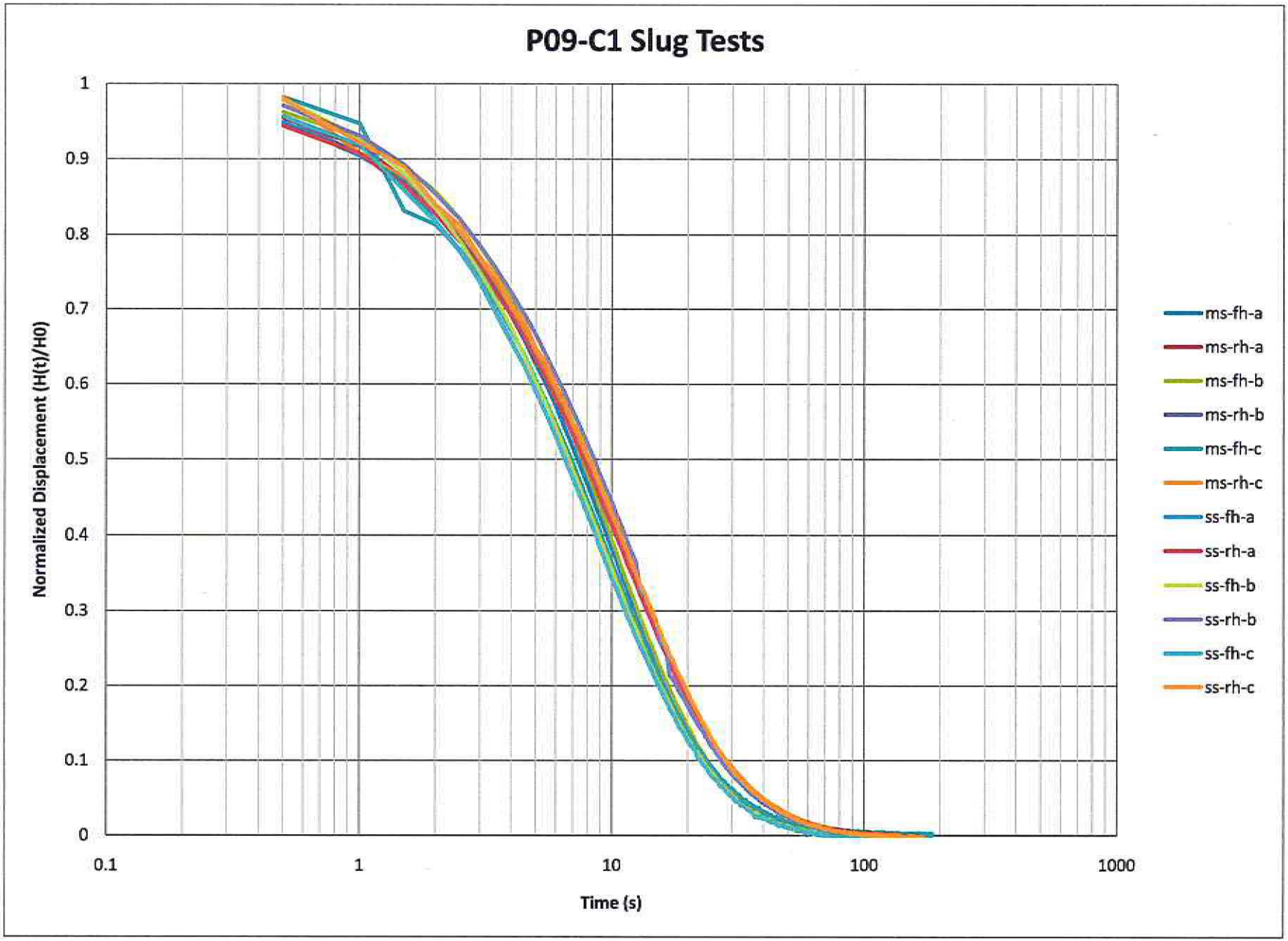


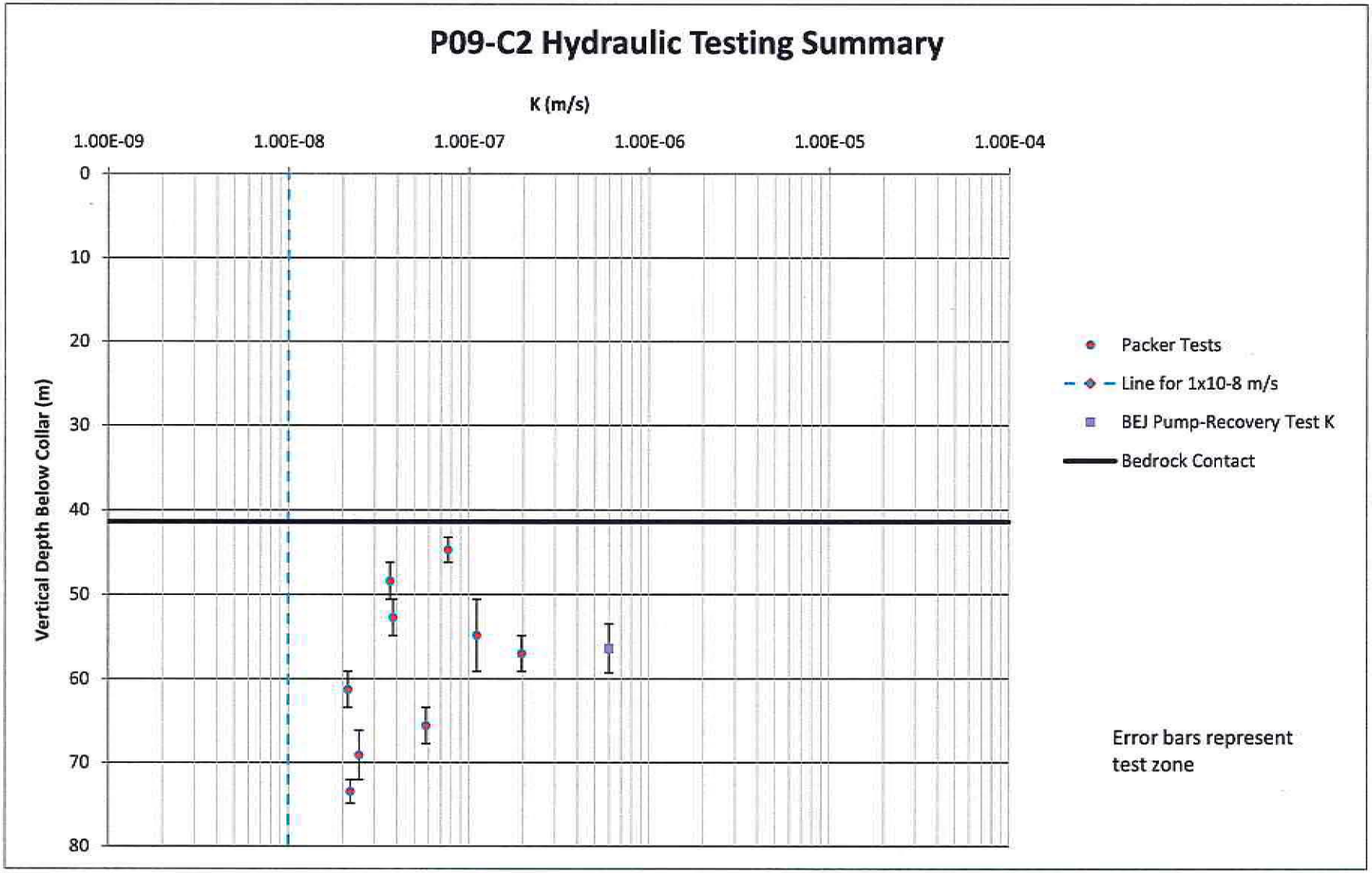


Field Observations

Retry of test 6.

Interpretation of Results

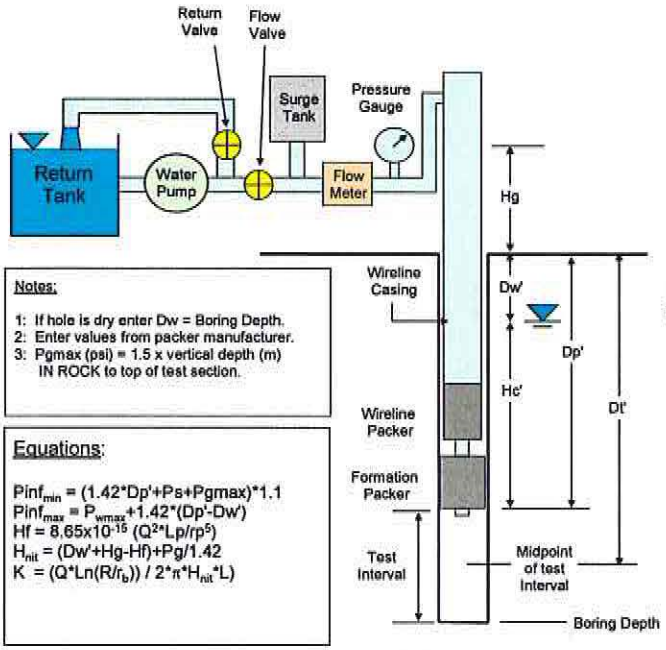

P09-C1 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ms-fh-c
ms-rh-c
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b
ss-fh-c
ss-rh-c


P09-C2 Hydraulic Testing Summary
K (m/s)
1.00E-09
1.00E-08
1.00E-07
1.00E-06
1.00E-05
1.00E-04
Vertical Depth Below Collar (m)
0
10
20
30
40
50
60
70
80
Packer Tests
Line for 1x10-8 m/s
BEJ Pump-Recovery Test K
Bedrock Contact
Error bars represent test zone

PACKER INJECTION TEST

SRK Consulting — Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	46.0	to	49.2	**Boring N°:**	P09-C2
Northing:		**Date:**	18-Jul-09	**Start Time:**	16:30	**Test N°:**	1
Easting:				**End Time:**		**Boring Depth (m):**	49.2
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

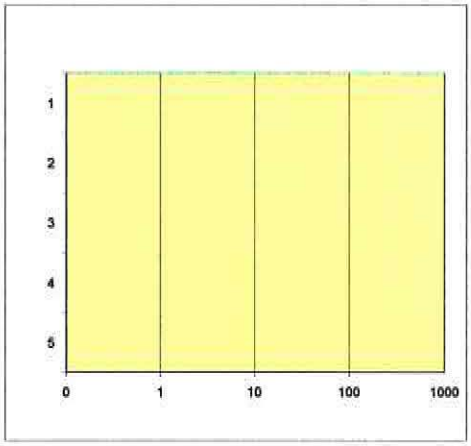
Equations:

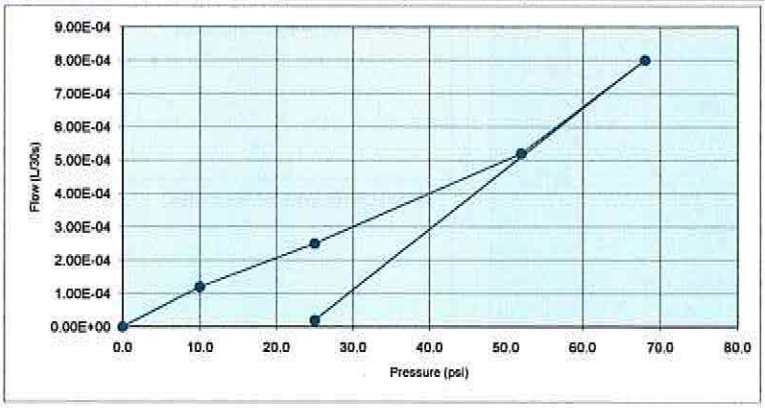
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	46.0	m
Dt	Measured depth to midpoint of test	47.6	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	43.2	m
Dt'	Vertical depth to midpoint of test	44.7	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	69	psi
Pinfmin	Minimum packer inflation pressure	330.4	psi
Pinfmax	Maximum packer inflation pressure	763.5	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	3.2	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	25	52	68	25
1	0.0002	0.0002	0.0006	0.0008	0.0001
2	0.0000	0.0002	0.0005		0.0000
3	0.0001	0.0003	0.0006	0.0008	0.0000
4	0.0002	0.0003	0.0004	0.0008	0.0000
5	0.0001		0.0005		0.0000
Qavg (m3/30s)	0.0001	0.0003	0.0005	0.0008	0.0000
Q_{avg} (m³/day)	0.346	0.720	1.498	2.304	0.058
Hf (m)	0.00	0.00	0.02	0.04	0.00
Hnit (m)	8.0	18.6	37.6	48.8	18.6
K (m/day)	1.1E-02	1.0E-02	1.1E-02	1.3E-02	8.2E-04
K (m/sec)	1.32E-07	1.19E-07	1.22E-07	1.45E-07	9.51E-09
Lugeons	0.005	0.005	0.005	0.006	0.000





Field Observations

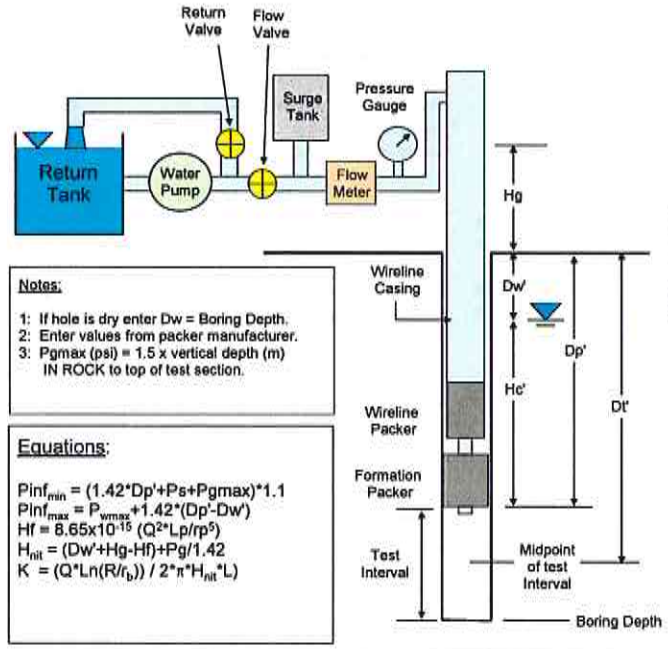
10 feet of testing. Very little flow, very hard to test. Did not perform a falling head test due to artesian conditions, will try to complete a falling head test the next time.

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	49.2	to	53.8	**Boring N°:**	P09-C2
Northing:		**Date:**	19-Jul-09	**Start Time:**	7:45	**Test N°:**	2
Easting:				**End Time:**	9:30	**Boring Depth (m):**	53.8
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

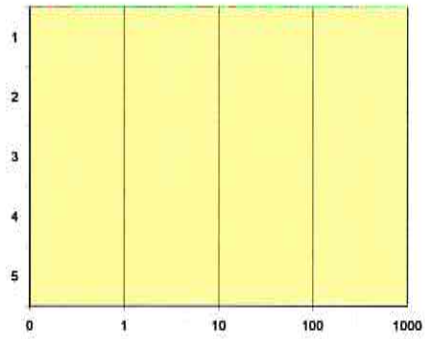
Equations:

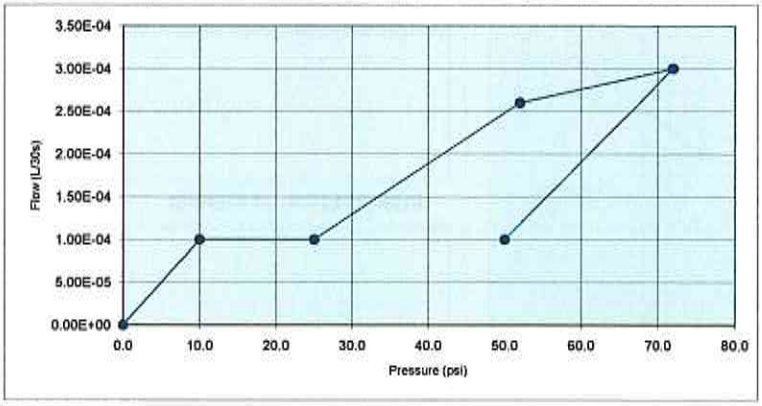
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	49.2	m
Dt	Measured depth to midpoint of test	51.5	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	46.2	m
Dt'	Vertical depth to midpoint of test	48.4	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	74	psi
Pinfmin	Minimum packer inflation pressure	339.7	psi
Pinfmax	Maximum packer inflation pressure	768.7	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	25	52	72	50
1	0.0001	0.0001	0.0002	0.0003	0.0001
2	0.0001	0.0001	0.0004	0.0002	0.0001
3	0.0001	0.0001	0.0003	0.0004	0.0001
4	0.0001	0.0001	0.0002	0.0003	0.0001
5			0.0002		0.0001
Qavg (m3/30s)	0.0001	0.0001	0.0003	0.0003	0.0001
Q_{avg} (m^3/day)	0.288	0.288	0.749	0.864	0.288
Hf (m)	0.00	0.00	0.00	0.01	0.00
Hnit (m)	8.0	18.6	37.6	51.7	36.2
K (m/day)	6.6E-03	2.9E-03	3.7E-03	3.1E-03	1.5E-03
K (m/sec)	7.66E-08	3.31E-08	4.26E-08	3.57E-08	1.70E-08
Lugeons	0.003	0.001	0.002	0.001	0.001





Field Observations

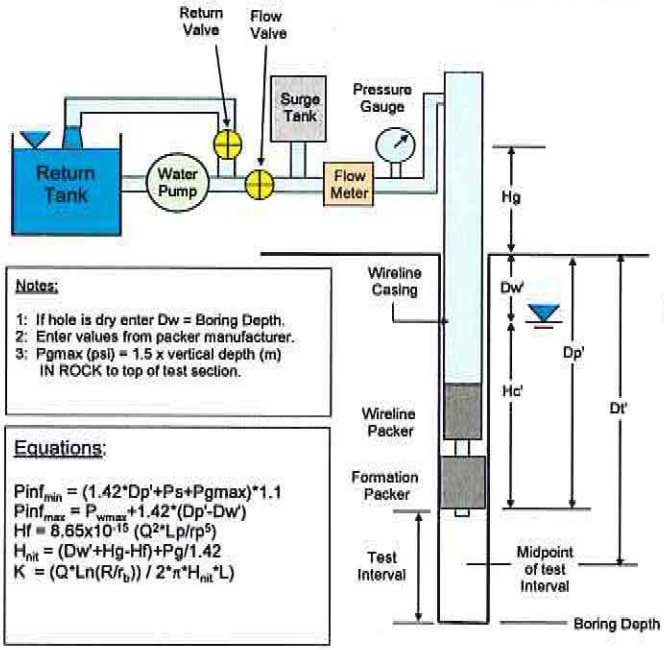
15 feet of testing. Very little flow, very hard to test. falling head test, dropped 10 cm in 30 minutes. artesian conditons in 6 inch casing.

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting — Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	53.8	to	58.4	**Boring N°:**	P09-C2
Northing:		**Date:**	19-Jul-09	**Start Time:**	12:00	**Test N°:**	3
Easting:				**End Time:**	13:15	**Boring Depth (m):**	58.4
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

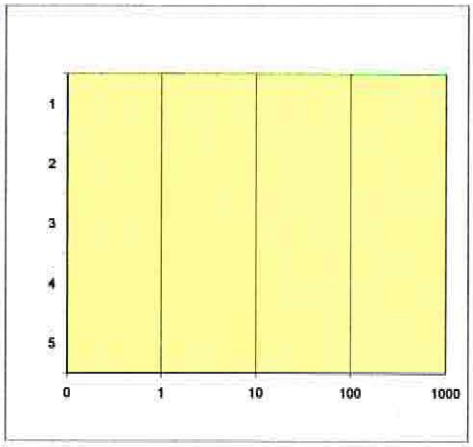
Equations:

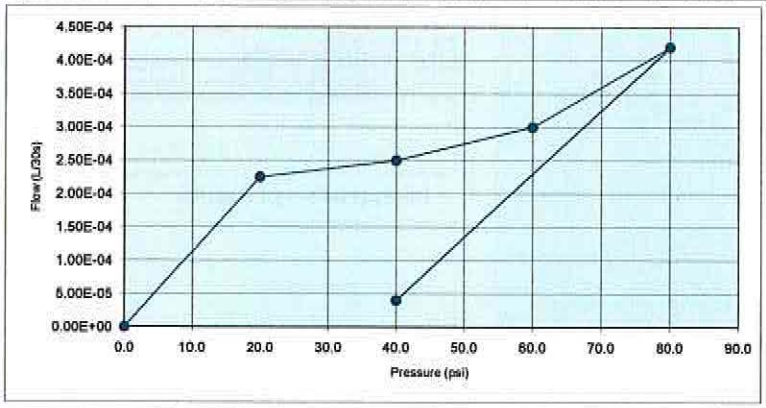
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	53.8	m
Dt	Measured depth to midpoint of test	56.1	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	50.6	m
Dt'	Vertical depth to midpoint of test	52.7	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	80	psi
Pinfmin	Minimum packer inflation pressure	351.8	psi
Pinfmax	Maximum packer inflation pressure	774.9	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	40	60	80	40
1	0.0002	0.0002	0.0003	0.0005	0.0001
2	0.0002	0.0002	0.0003	0.0003	0.0001
3	0.0003	0.0003	0.0003	0.0005	0.0000
4	0.0002	0.0003	0.0003	0.0004	0.0000
5			0.0003	0.0004	0.0000
Qavg (m3/30s)	0.0002	0.0003	0.0003	0.0004	0.0000
Q_{avg} (m^3/day)	0.648	0.720	0.864	1.210	0.115
Hf (m)	0.00	0.00	0.01	0.01	0.00
Hnit (m)	15.1	29.2	43.2	57.3	29.2
K (m/day)	7.9E-03	4.6E-03	3.7E-03	3.9E-03	7.3E-04
K (m/sec)	9.19E-08	5.28E-08	4.27E-08	4.51E-08	8.44E-09
Lugeons	0.004	0.002	0.002	0.002	0.000





Field Observations

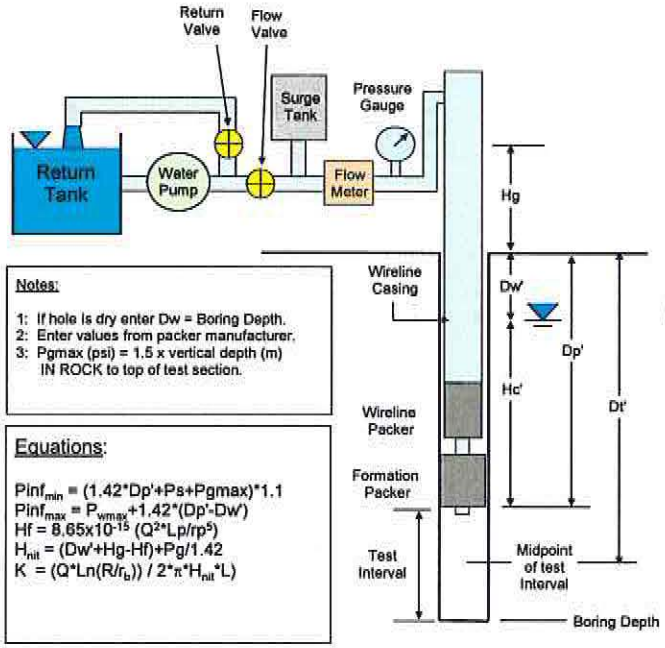
Rock was more broken up in the second run of this set, part of it was washed away. Therefore higher flows are expected.

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting — Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	53.8	to	62.9	**Boring N°:**	P09-C2
Northing:		**Date:**	20-Jul-09	**Start Time:**	10:00	**Test N°:**	4
Easting:				**End Time:**	11:30	**Boring Depth (m):**	62.9
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

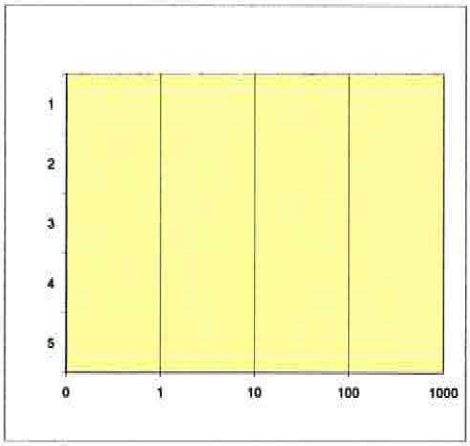
Equations:

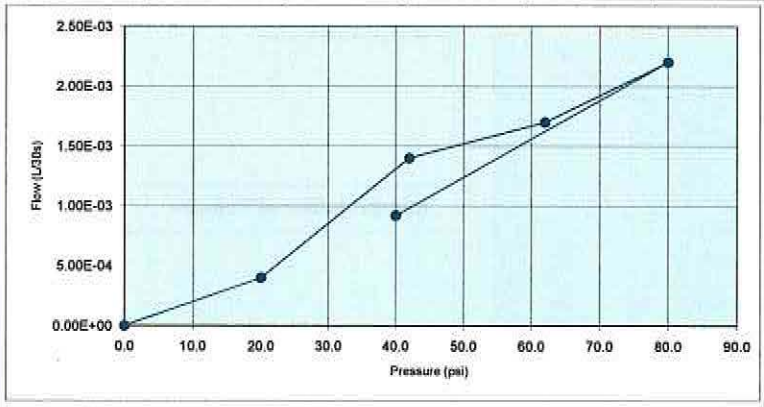
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	53.8	m
Dt	Measured depth to midpoint of test	58.4	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	50.6	m
Dt'	Vertical depth to midpoint of test	54.8	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	80	psi
Pinfmin	Minimum packer inflation pressure	351.8	psi
Pinfmax	Maximum packer inflation pressure	777.9	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	9.1	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	42	62	80	40
1	0.0004	0.0015	0.0015	0.0022	0.0008
2	0.0004	0.0018	0.0020	0.0018	0.0010
3	0.0004	0.0010	0.0015	0.0028	0.0008
4		0.0013	0.0020	0.0021	0.0010
5			0.0015	0.0021	0.0010
Qavg (m3/30s)	0.0004	0.0014	0.0017	0.0022	0.0009
Q_{avg} (m³/day)	1.152	4.032	4.896	6.336	2.650
Hf (m)	0.01	0.13	0.19	0.31	0.05
Hnit (m)	15.1	30.5	44.5	57.0	29.1
K (m/day)	7.1E-03	1.2E-02	1.0E-02	1.0E-02	8.5E-03
K (m/sec)	8.26E-08	1.43E-07	1.19E-07	1.20E-07	9.84E-08
Lugeons	0.003	0.006	0.005	0.005	0.004





Field Observations

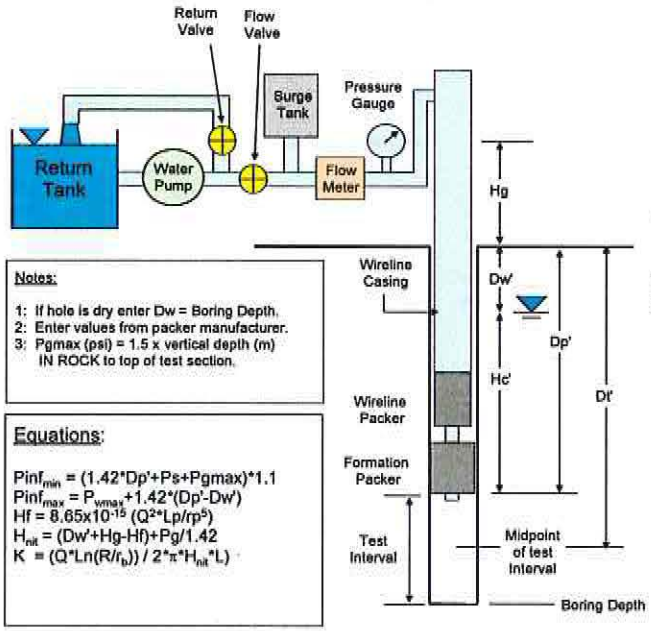
Flow coming up the 4" casing, took 3 hours to packer test yesterday and another 5 today, but now have completed 2 tests. Completed a surface test packer inflated fine, no kinks in the lines.
20 psi = 1L = 3.15 minutes = .15L/30 sec
40 psi = 1L = 1.50 minutes, 2L = 3.44 minutes = .27L/30 sec
60 psi = 1L = 1.20 minutes, 2L = 2.47 minutes = .36L/30 sec
80 psi = 1L = 1.09 minutes, 2L = 2.20 minutes = .43L/30sec

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	58.4	to	62.9	**Boring N°:**	P09-C2
Northing:		**Date:**	20-Jul-09	**Start Time:**	11:30	**Test N°:**	5
Easting:				**End Time:**	13:00	**Boring Depth (m):**	62.9
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

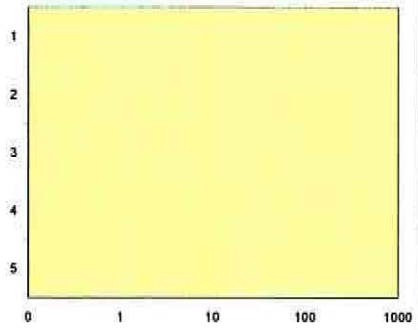
Equations:

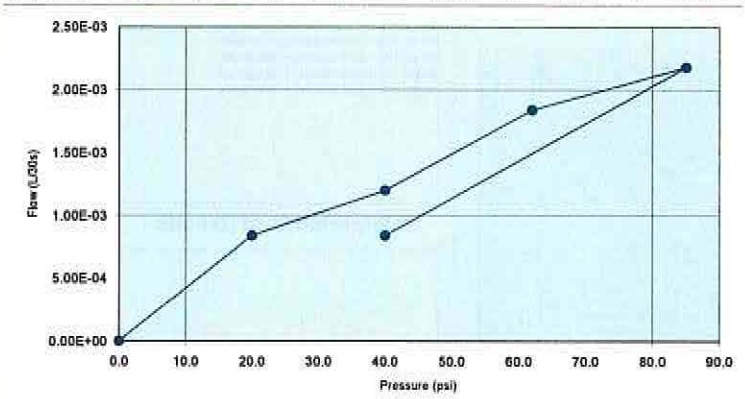
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	58.4	m
Dt	Measured depth to midpoint of test	60.7	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	54.9	m
Dt'	Vertical depth to midpoint of test	57.0	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	88	psi
Pinfmin	Minimum packer inflation pressure	365.9	psi
Pinfmax	Maximum packer inflation pressure	780.9	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.5	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	40	62	85	40
1	0.0010	0.0015	0.0020	0.0027	0.0008
2	0.0009	0.0010	0.0015	0.0022	0.0007
3	0.0010	0.0015	0.0020	0.0020	0.0010
4	0.0006	0.0010	0.0017	0.0020	0.0010
5	0.0007	0.0010	0.0020	0.0020	0.0007
Qavg (m3/30s)	0.0008	0.0012	0.0018	0.0022	0.0008
Q_{avg} (m³/day)	2.419	3.456	5.299	6.278	2.419
Hf (m)	0.05	0.09	0.22	0.31	0.05
Hnit (m)	15.0	29.1	44.4	60.6	29.1
K (m/day)	3.0E-02	2.2E-02	2.3E-02	2.0E-02	1.6E-02
K (m/sec)	3.52E-07	2.60E-07	2.61E-07	2.27E-07	1.82E-07
Lugeons	0.014	0.010	0.010	0.009	0.007





Field Observations

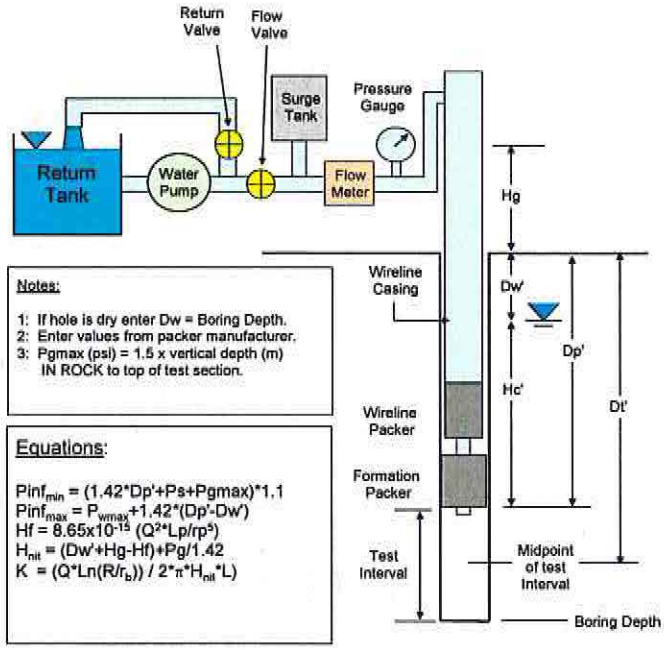
Flow coming up the 4" casing, took 3 hours to packer test yesterday and another 5 today, but now have completed 2 tests.
20 psi = 1L = 1.42 minutes, 2L = 3.33 minutes = .28L/30 sec
40 psi = 1L = 1.13 minutes, 2L = 2.30 minutes, 3L = 3.46 minutes = .40L/30 sec
60 psi = 1L = 1.00 minutes, 2L = 2.05 minutes, 3L = 3.08 minutes = .48L/30 sec
85 psi = 1L = 49 seconds, 2L = 1.44 minutes, 3L = 2.38 minutes = .57L/30 sec

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting — Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	62.9	to	67.5	**Boring N°:**	P09-C2
Northing:		**Date:**	20-Jul-09	**Start Time:**	2:45	**Test N°:**	6
Easting:				**End Time:**	3:30	**Boring Depth (m):**	62.9
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

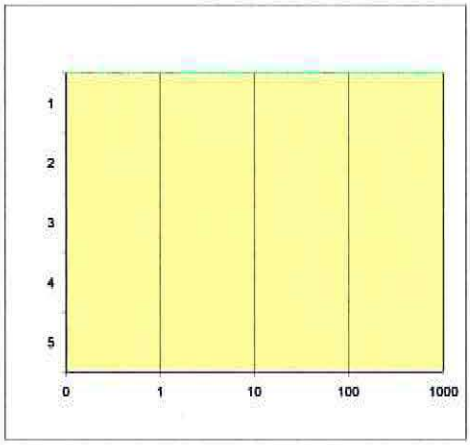
Equations:

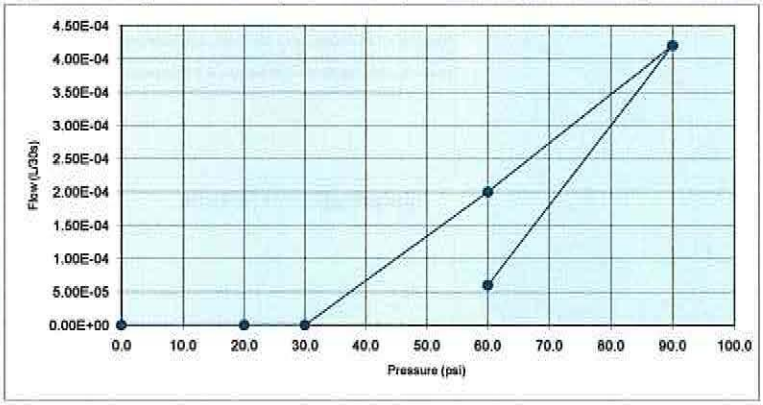
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	62.9	m
Dt	Measured depth to midpoint of test	65.2	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	59.1	m
Dt'	Vertical depth to midpoint of test	61.3	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	94	psi
Pinfmin	Minimum packer inflation pressure	377.9	psi
Pinfmax	Maximum packer inflation pressure	787.0	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	20	30	60	90	60
1	0.0000	0.0000	0.0002	0.0004	0.0001
2	0.0000	0.0000	0.0001	0.0005	0.0000
3	0.0000	0.0000	0.0003	0.0003	0.0000
4	0.0000	0.0000	0.0003	0.0005	0.0001
5	0.0000	0.0000	0.0001	0.0004	0.0001
Qavg (m3/30s)	0.0000	0.0000	0.0002	0.0004	0.0001
Q_{avg} (m³/day)	0.000	0.000	0.576	1.210	0.173
Hf (m)	0.00	0.00	0.00	0.01	0.00
Hnit (m)	15.1	22.1	43.3	64.4	43.3
K (m/day)	0.0E+00	0.0E+00	2.5E-03	3.5E-03	7.4E-04
K (m/sec)	0.00E+00	0.00E+00	2.85E-08	4.02E-08	8.54E-09
Lugeons	0.000	0.000	0.001	0.002	0.000





Field Observations

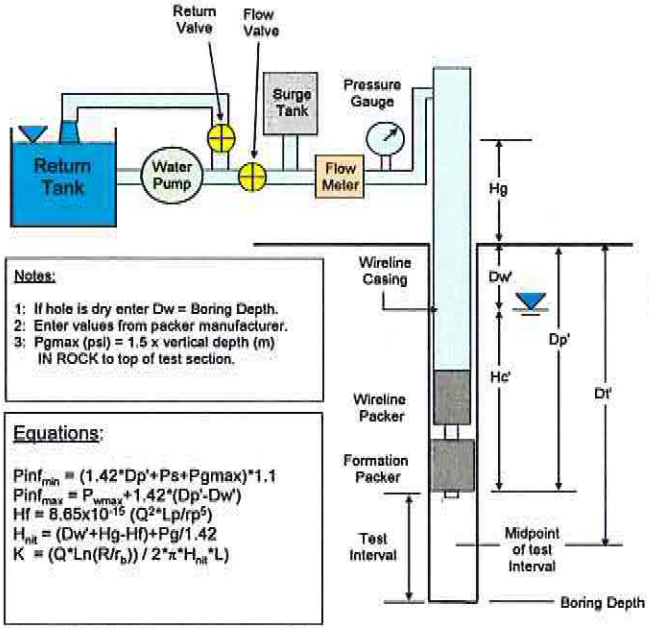
20 psi = 1L = 1.40 minutes = .30L/30 sec
40 psi = 1L = 1.23 minutes = .36L/30 sec
60 psi = 1L = 1.16 minutes = .39L/30 sec
90 psi = 1L = 1.09 minutes = .43L/30 sec

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	Test Interval (m):	67.5	to	72.1	Boring N°:	P09-C2
Northing:		Date:	20-Jul-09	Start Time:	6:30	Test N°:	7
Easting:				End Time:	7:30	Boring Depth (m):	72.1
GS Elevation:						Supervisor:	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

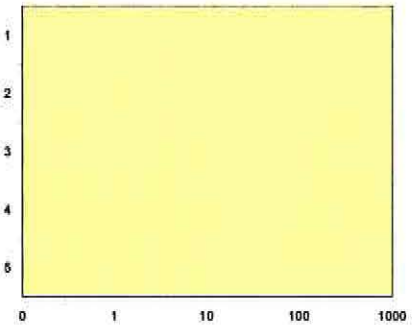
Equations:

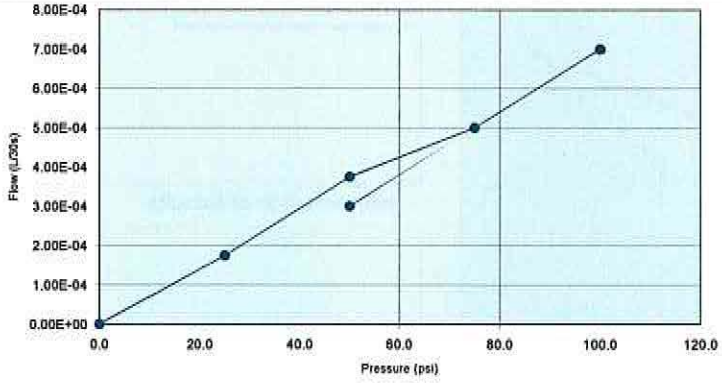
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	67.5	m
Dt	Measured depth to midpoint of test	69.8	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	63.4	m
Dt'	Vertical depth to midpoint of test	65.6	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	101	psi
Pinfmin	Minimum packer inflation pressure	391.1	psi
Pinfmax	Maximum packer inflation pressure	793.1	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	25	50	75	100	50
1	0.0001	0.0005	0.0005	0.0009	
2	0.0002	0.0003	0.0004	0.0006	0.0003
3	0.0001	0.0003	0.0005	0.0006	0.0003
4	0.0003	0.0004	0.0006	0.0007	0.0003
5				0.0007	0.0003
Qavg (m3/30s)	0.0002	0.0004	0.0005	0.0007	0.0003
Q_{avg} (m^3/day)	0.504	1.080	1.440	2.016	0.864
Hf (m)	0.00	0.01	0.02	0.03	0.01
Hnit (m)	18.6	36.2	53.8	71.4	36.2
K (m/day)	5.0E-03	5.5E-03	4.9E-03	5.2E-03	4.4E-03
K (m/sec)	5.79E-08	6.38E-08	5.72E-08	6.04E-08	5.10E-08
Lugeons	0.002	0.003	0.002	0.002	0.002





Field Observations

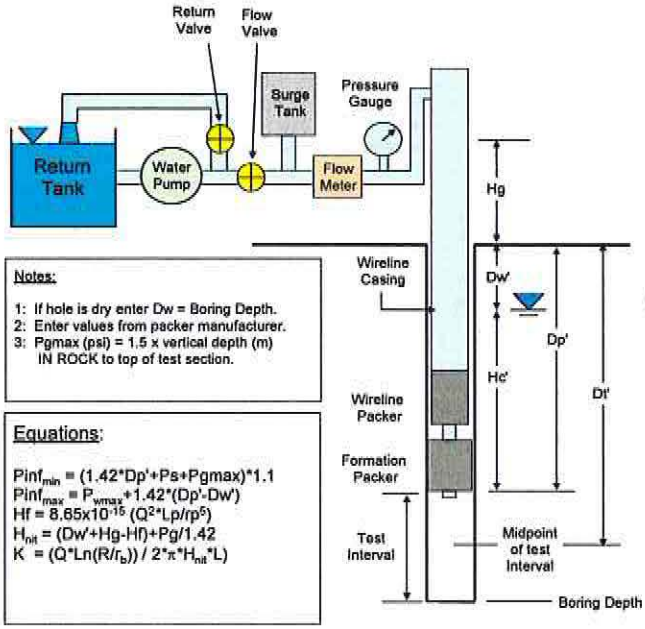
Rod test done, rods do not leak. Cable broke a bit before test.
50 psi = 1L = 2.04 minutes, 2L = 4.14 minutes = .24L/30 sec
75 psi = 1L = 1.27 minutes, 2L = 2.04 minutes = .48L/30 sec
100 psi = 1L = 1.41 minutes, 2L = 2.51 minutes = .35L/30 sec

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting
Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	70.4	to	76.7	**Boring N°:**	P09-C2
Northing:		**Date:**	21-Jul-09	**Start Time:**	2:45	**Test N°:**	8
Easting:				**End Time:**	4:23	**Boring Depth (m):**	76.7
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1,5 x vertical depth (m) IN ROCK to top of test section.

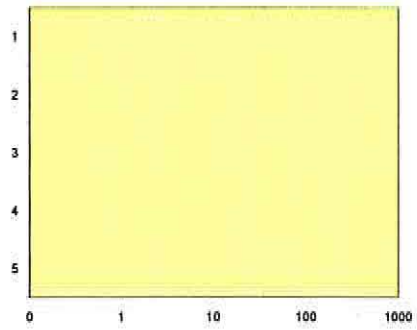
Equations:

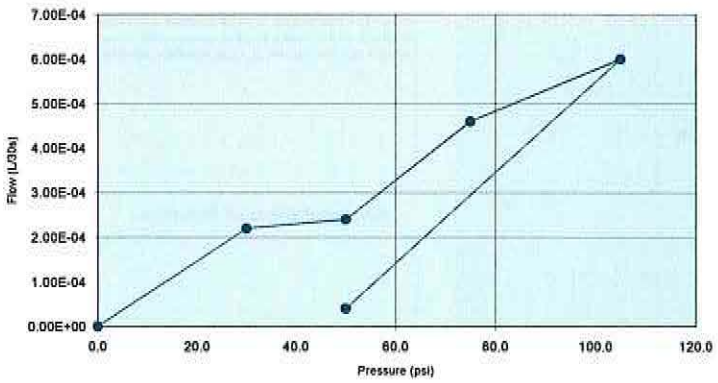
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	70.4	m
Dt	Measured depth to midpoint of test	73.6	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	66.2	m
Dt'	Vertical depth to midpoint of test	69.1	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	105	psi
Pinfmin	Minimum packer inflation pressure	398.9	psi
Pinfmax	Maximum packer inflation pressure	798.1	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	6.3	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	30	50	75	105	50
1	0.0001	0.0003	0.0005	0.0007	0.0000
2	0.0002	0.0003	0.0005	0.0007	0.0000
3	0.0003	0.0002	0.0004	0.0006	0.0001
4	0.0003	0.0002	0.0004	0.0005	0.0000
5	0.0002	0.0002	0.0005	0.0005	0.0001
Qavg (m3/30s)	0.0002	0.0002	0.0005	0.0006	0.0000
Q_{avg} (m³/day)	0.634	0.691	1.325	1.728	0.115
Hf (m)	0.00	0.00	0.01	0.02	0.00
Hnit (m)	22.1	36.2	53.8	74.9	36.2
K (m/day)	3.9E-03	2.6E-03	3.3E-03	3.1E-03	4.3E-04
K (m/sec)	4.47E-08	2.98E-08	3.84E-08	3.60E-08	4.97E-09
Lugeons	0.002	0.001	0.002	0.001	0.000





Field Observations

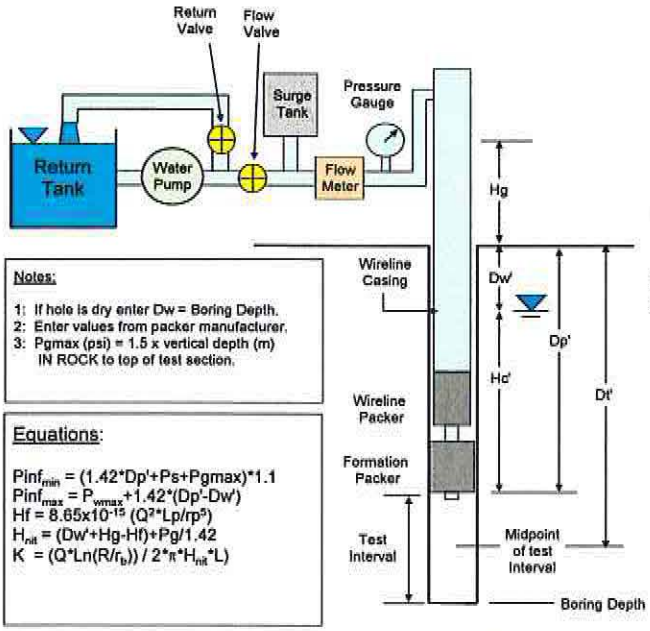
First test failed - water everywhere. did a rod test 1.5 to 2 L/minute. Pulled rods and taped them, redid rod test no flow. Set packer 5 feet above test zone. Test failed when packer blew - took packer out and replaced lost 1.5 hours.

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	76.7	to	79.7	**Boring N°:**	P09-C2
Northing:		**Date:**	22-Jul-09	**Start Time:**	7:45	**Test N°:**	9
Easting:				**End Time:**	9:00	**Boring Depth (m):**	79.7
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

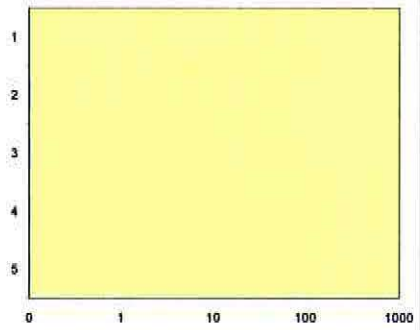
Equations:

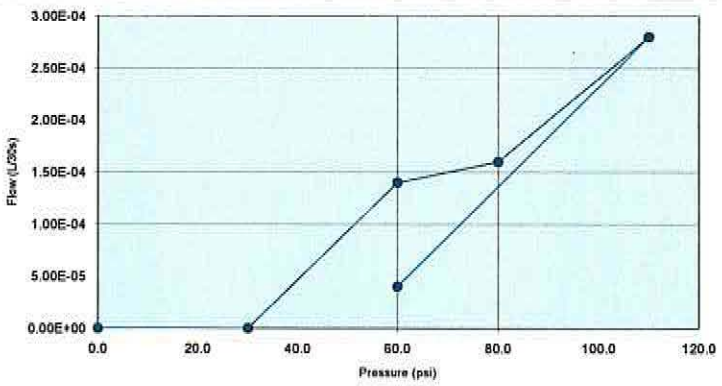
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	76.7	m
Dt	Measured depth to midpoint of test	78.2	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	72.1	m
Dt'	Vertical depth to midpoint of test	73.5	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	115	psi
Pinfmin	Minimum packer inflation pressure	417.3	psi
Pinfmax	Maximum packer inflation pressure	804.3	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	3.0	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	30	60	80	110	60
1	0.0000	0.0002	0.0002	0.0003	0.0001
2	0.0000	0.0002	0.0001	0.0002	0.0000
3	0.0000	0.0002	0.0002	0.0003	0.0000
4	0.0000	0.0001	0.0001	0.0003	0.0001
5	0.0000	0.0000	0.0002	0.0003	0.0000
Qavg (m3/30s)	0.0000	0.0001	0.0002	0.0003	0.0000
Q_{avg} (m³/day)	0.000	0.403	0.461	0.806	0.115
Hf (m)	0.00	0.00	0.00	0.01	0.00
Hnit (m)	22.1	43.3	57.3	78.5	43.3
K (m/day)	0.0E+00	2.6E-03	2.3E-03	2.9E-03	7.5E-04
K (m/sec)	0.00E+00	3.06E-08	2.63E-08	3.37E-08	8.73E-09
Lugeons	0.000	0.001	0.001	0.001	0.000

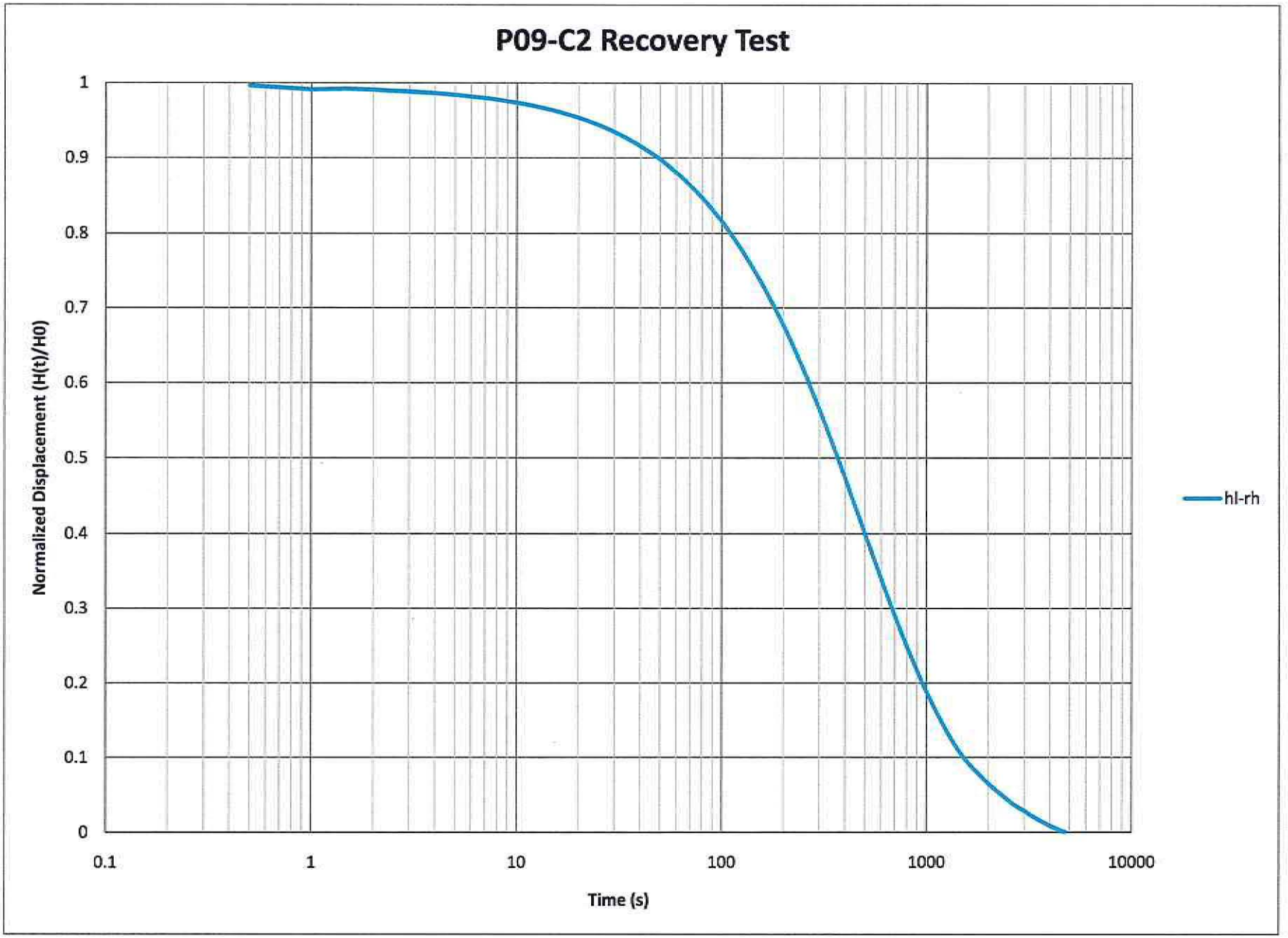


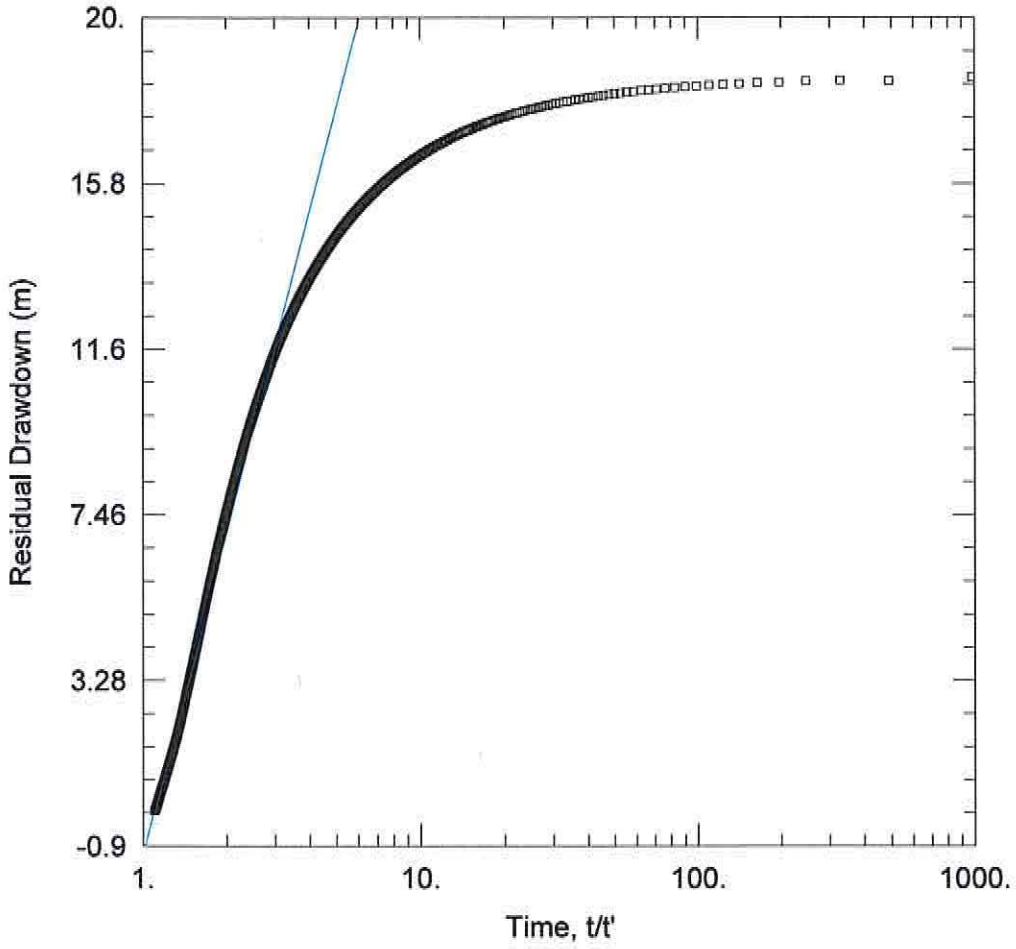


Field Observations

First test failed - water everywhere. did a rod test 1.5 to 2 L/minute. Pulled rods and taped them, redid rod test no flow. Set packer 5 feet above test zone. Test failed when packer blew - took packer out and replaced lost 1.5 hours.

Interpretation of Results


P09-C2 Recovery Test
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
10000
Time (s)
hl-rh



C2-HL-RH

Data Set: Y:\...\C2-hl-rh-T.aqt
Date: 10/30/09 Time: 10:01:22

PROJECT INFORMATION

Company: SRK Consulting
Location: Faro Mine
Test Well: C2
Test Date: 8 August 2009

AQUIFER DATA

Saturated Thickness: 5.826 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
C2-hl-rh	0	0

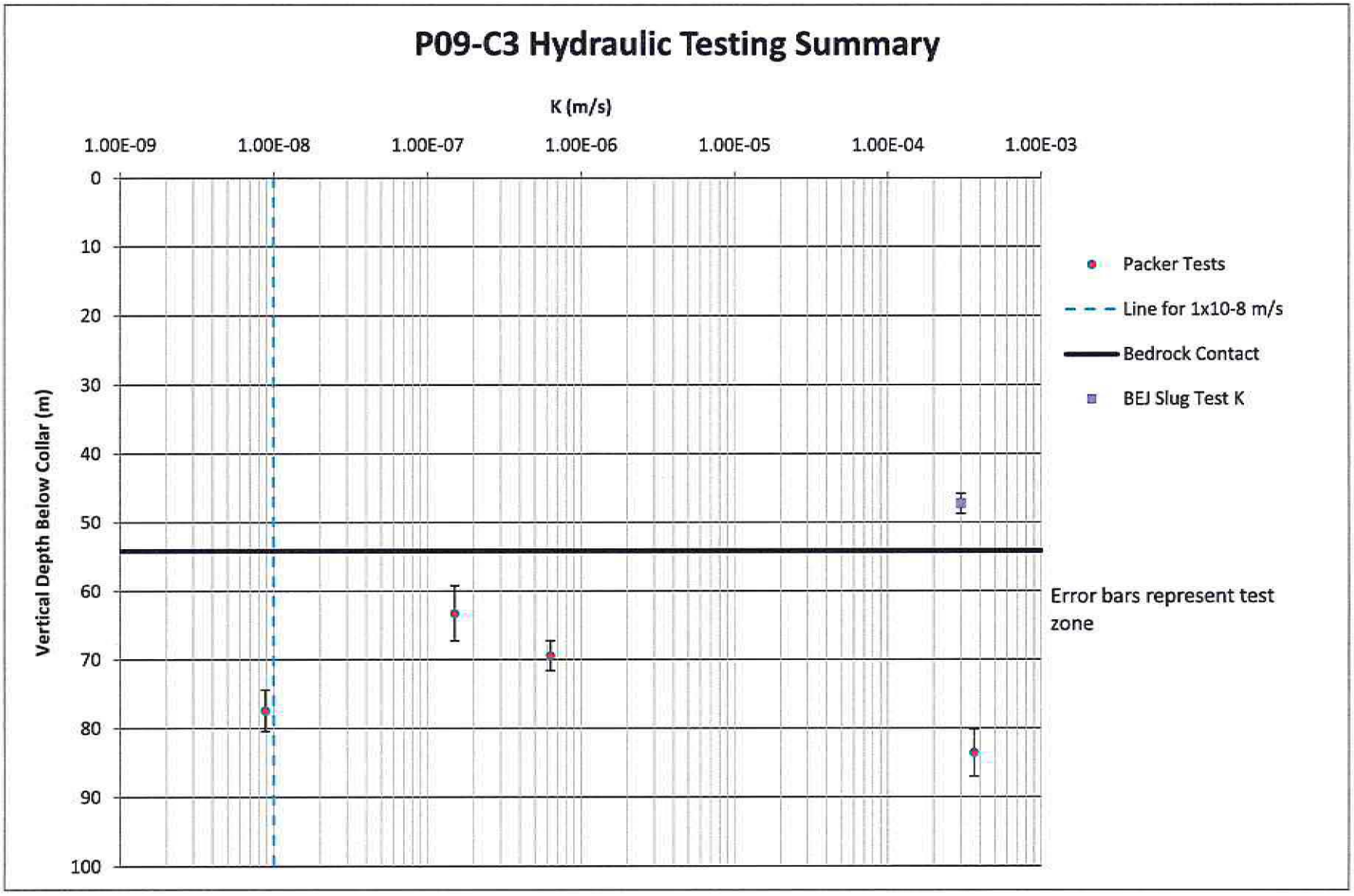
Observation Wells

Well Name	X (m)	Y (m)
C2-hl-rh	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

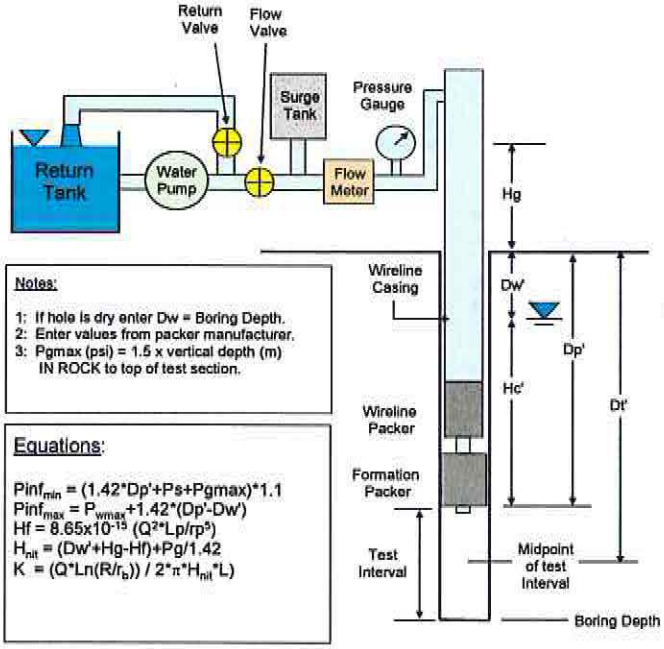
T = 6.241E-7 m^2/sec S/S' = 1.101


P09-C3 Hydraulic Testing Summary
K (m/s)
1.00E-09
1.00E-08
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
Vertical Depth Below Collar (m)
0
10
20
30
40
50
60
70
80
90
100
Packer Tests
Line for 1x10-8 m/s
Bedrock Contact
BEJ Slug Test K
Error bars represent test zone

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	Test Interval (m):	63.0	to	71.6	Boring N°:	P09-C3
Northing:		Date:	26-Jun-09	Start Time:	9:45	Test N°:	1
Easting:				End Time:	12:00	Boring Depth (m):	71.6
GS Elevation:						Supervisor:	DM



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

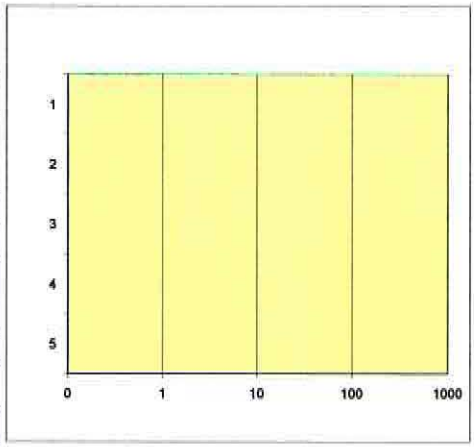
Equations:

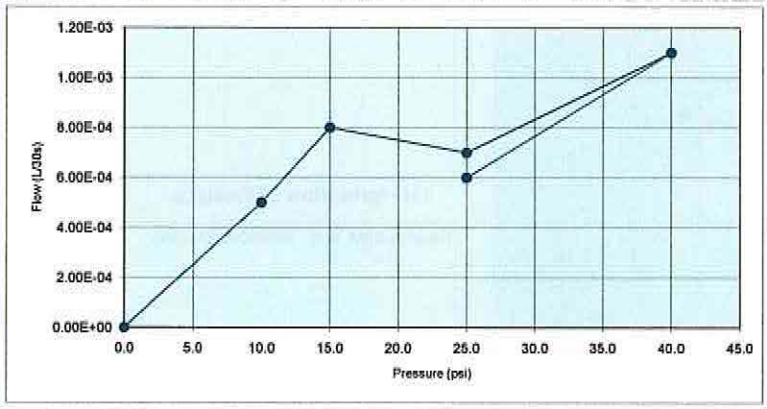
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	63.0	m
Dt	Measured depth to midpoint of test	67.3	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	59.2	m
Dt'	Vertical depth to midpoint of test	63.2	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	69	psi
Pinfmin	Minimum packer inflation pressure	353.1	psi
Pinfmax	Maximum packer inflation pressure	789.8	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	8.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	15	25	40	25
1	0.0010	0.0010	0.0010	0.0015	0.0005
2	0.0005	0.0010	0.0005	0.0010	0.0005
3	0.0005	0.0010	0.0005	0.0010	0.0010
4	0.0000	0.0000	0.0010	0.0010	0.0000
5	0.0005	0.0010	0.0005	0.0010	0.0010
Qavg (m3/30s)	0.0005	0.0008	0.0007	0.0011	0.0006
Q_{avg} (m³/day)	1.440	2.304	2.016	3.168	1.729
Hf (m)	0.02	0.04	0.03	0.08	0.02
Hnit (m)	8.0	11.5	18.6	29.1	18.6
K (m/day)	1.8E-02	2.0E-02	1.1E-02	1.1E-02	9.2E-03
K (m/sec)	2.05E-07	2.29E-07	1.24E-07	1.25E-07	1.06E-07
Lugeons	0.008	0.009	0.005	0.005	0.004





Field Observations

Original record lost.

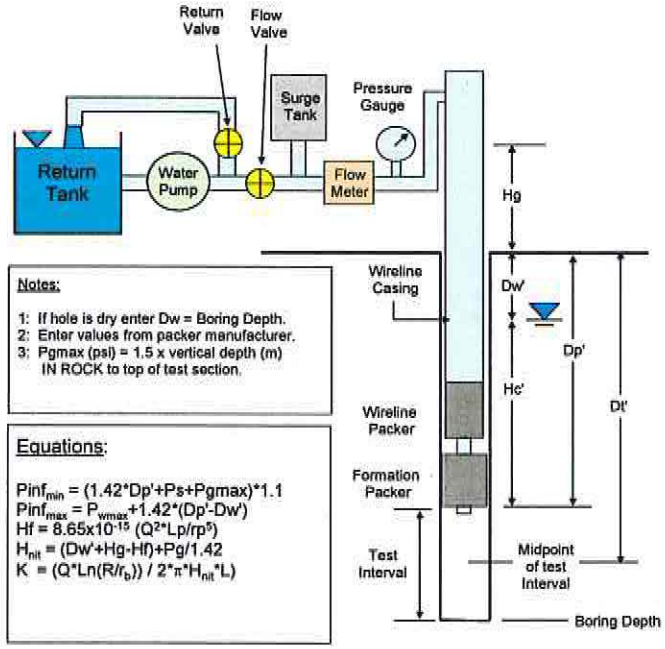
Interpretation of Results

Marginal. Low K

PACKER INJECTION TEST

SRK Consulting
Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	71.6	to	76.2	**Boring N°:**	P09-C3
Northing:		**Date:**	27-Jun-09	**Start Time:**	14:30	**Test N°:**	2
Easting:				**End Time:**	16:00	**Boring Depth (m):**	76.2
GS Elevation:						**Supervisor:**	DM



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

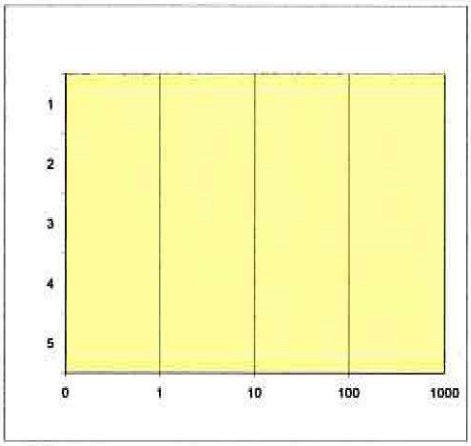
Equations:

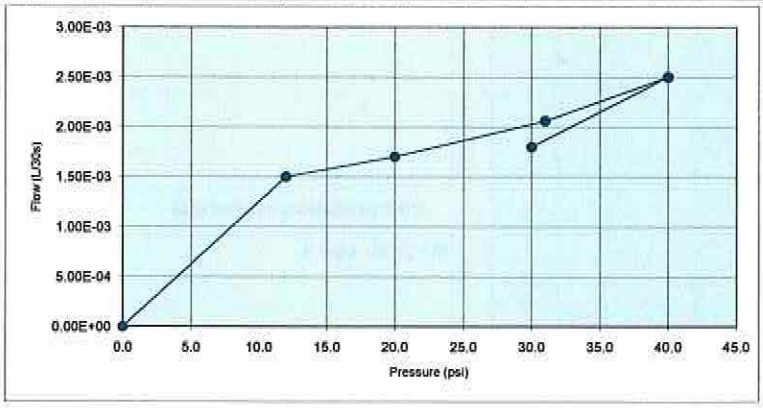
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	71.6	m
Dt	Measured depth to midpoint of test	73.9	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	67.3	m
Dt'	Vertical depth to midpoint of test	69.4	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	74	psi
Pinfmin	Minimum packer inflation pressure	369.5	psi
Pinfmax	Maximum packer inflation pressure	798.6	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0065	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	12	20	31	40	30
1	0.0015	0.0020	0.0025	0.0025	0.0020
2	0.0010	0.0020	0.0018	0.0030	0.0020
3	0.0020	0.0015	0.0020	0.0025	0.0015
4	0.0015	0.0015	0.0020	0.0025	0.0015
5	0.0015	0.0015	0.0020	0.0020	0.0020
Qavg (m3/30s)	0.0015	0.0017	0.0021	0.0025	0.0018
Q_{avg} (m³/day)	4.320	4.896	5.933	7.200	5.184
Hf (m)	0.04	0.05	0.08	0.12	0.06
Hnit (m)	9.4	15.0	22.8	29.1	22.1
K (m/day)	8.5E-02	6.0E-02	4.8E-02	4.6E-02	4.3E-02
K (m/sec)	9.82E-07	6.96E-07	5.58E-07	5.30E-07	5.02E-07
Lugeons	0.039	0.027	0.022	0.021	0.020





Field Observations

original records lost

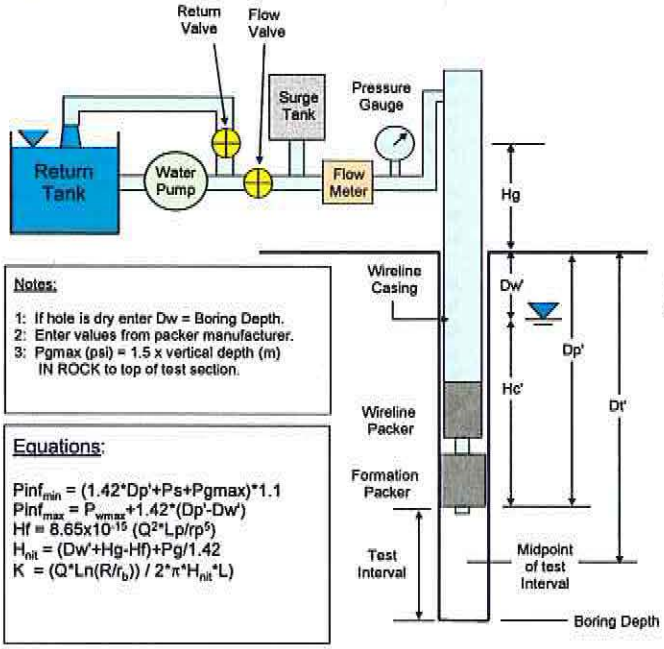
Interpretation of Results

Reasonable test. Reasonable flow.

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:		**Test Interval (m):**	79.2 — 85.6	**Boring N°:**	P09-C3
Northing:		**Date:** 28-Jun-09	**Start Time:** 11:15	**Test N°:**	3
Easting:			**End Time:** 12:00	**Boring Depth (m):**	85.6
GS Elevation:				**Supervisor:**	RC



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

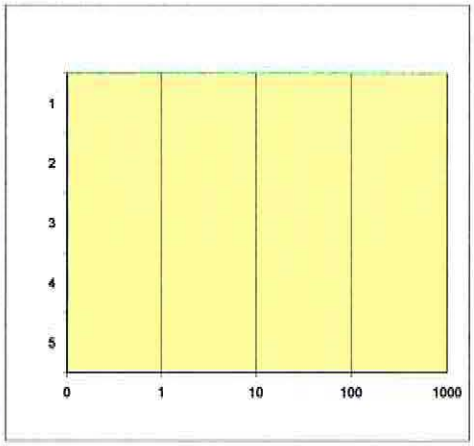
Equations:

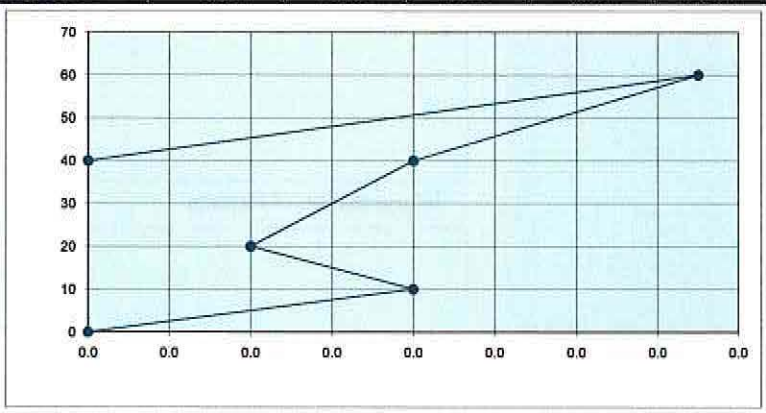
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	79.2	m
Dt	Measured depth to midpoint of test	82.4	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	74.4	m
Dt'	Vertical depth to midpoint of test	77.4	m
Ps	Packer stretch pressure (2)	60	psi
Pwmax	Maximum packer working pressure (2)	350	psi
Pgmax	Maximum injection gauge pressure (3)	142	psi
Pinfmin	Minimum packer inflation pressure	447.7	psi
Pinfmax	Maximum packer inflation pressure	810.0	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	6.4	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (L/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	20	40	60	40
1	0.0010	0.0005	0.0005	0.0005	
2	0.0005	0.0000	0.0005	0.0010	
3	0.0000	0.0005	0.0000		
4	0.0005	0.0000	0.0005		
5	0.0000	0.0000	0.0005		
Qavg (L/30s)	0.0004	0.0002	0.0004	0.0008	#DIV/0!
Q_{avg} (m^3/day)	0.001	0.001	0.001	0.002	#DIV/0!
Hf (m)	0.00	0.00	0.00	0.00	#DIV/0!
Hnit (m)	8.0	15.1	29.2	43.3	#DIV/0!
K (m/day)	1.9E-05	5.1E-06	5.2E-06	6.6E-06	#DIV/0!
K (cm/sec)	2.20E-08	5.87E-09	6.07E-09	7.67E-09	#DIV/0!
Lugeons	0.009	0.002	0.002	0.003	#DIV/0!





Field Observations

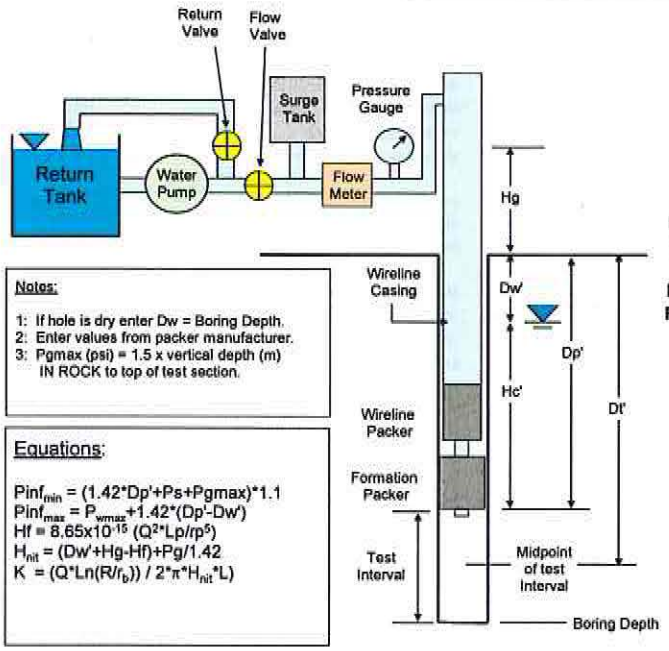
Two attempts were made at this test. The first attempt failed when fitting connecting the N line to the packer was dislodged (the driller suggested that he bumped it initially and it was tested at 10m depth where the packer did inflate; likely failed when higher pressures were obtained). There was a small leak at the top of the entry assembly which may have caused some minor water loss - started during the 155psi interval.

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting
Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	85.3	to	92.6	**Boring N°:**	P09-C3
Northing:		**Date:**	29-Jun-09	**Start Time:**	8:00	**Test N°:**	4
Easting:				**End Time:**	11:00	**Boring Depth (m):**	92.6
GS Elevation:						**Supervisor:**	DM



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

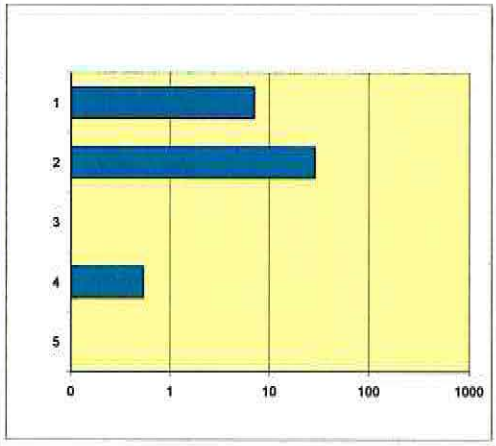
Equations:

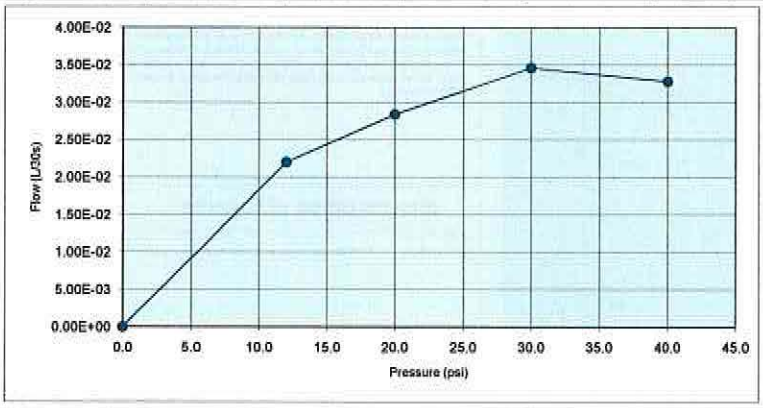
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	85.3	m
Dt	Measured depth to midpoint of test	89.0	m
ß	Inclination from horizontal (degrees)	70	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	80.2	m
Dt'	Vertical depth to midpoint of test	83.6	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	80	psi
Pinfmin	Minimum packer inflation pressure	393.8	psi
Pinfmax	Maximum packer inflation pressure	818.7	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0065	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	7.3	m
Hf	Friction Loss		
Hnit	Net Injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	12	20	30	40	
1	0.0230	0.0285	0.0450	0.0300	
2	0.0230	0.0290	0.0330	0.0260	
3	0.0220		0.0330	0.0370	
4	0.0200	0.0280	0.0320	0.0350	
5	0.0220	0.0280	0.0300	0.0360	
Qavg (m3/30s)	0.0220	0.0284	0.0346	0.0328	#DIV/0!
Q_{avg} (m³/day)	63.360	81.720	99.648	94.464	#DIV/0!
Hf (m)	8.98	14.94	22.21	19.96	#DIV/0!
Hnit (m)	0.5	0.1	-0.1	9.2	#DIV/0!
K (m/day)	1.6E+01	6.4E+01	-1.4E+02	1.2E+00	#DIV/0!
K (m/sec)	1.81E-04	7.40E-04	-1.65E-03	1.38E-05	#DIV/0!
Lugeons	7.095	29.055	-64.940	0.542	#DIV/0!

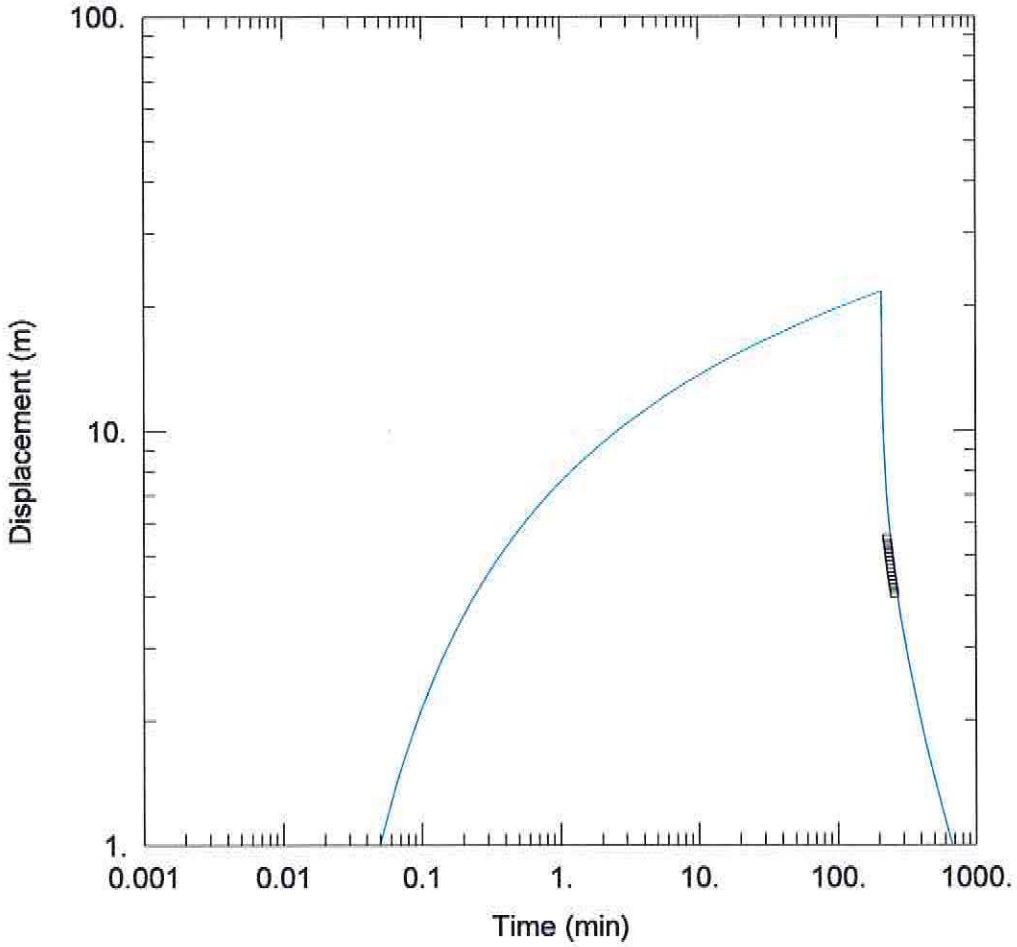




Field Observations

Rock was more broken up in the second run of this set, part of it was washed away. Therefore higher flows are expected.

Interpretation of Results



WELL TEST ANALYSIS

Data Set: Y:\...\P09-C3 Airlift Recovery.aqt
Date: 10/30/09 Time: 10:51:39

PROJECT INFORMATION

Company: SRK
Client: YG
Project: 1CY001.034
Location: C3 85.3-92.6
Test Well: C3
Test Date: June 29, 2009

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
C3	0	0

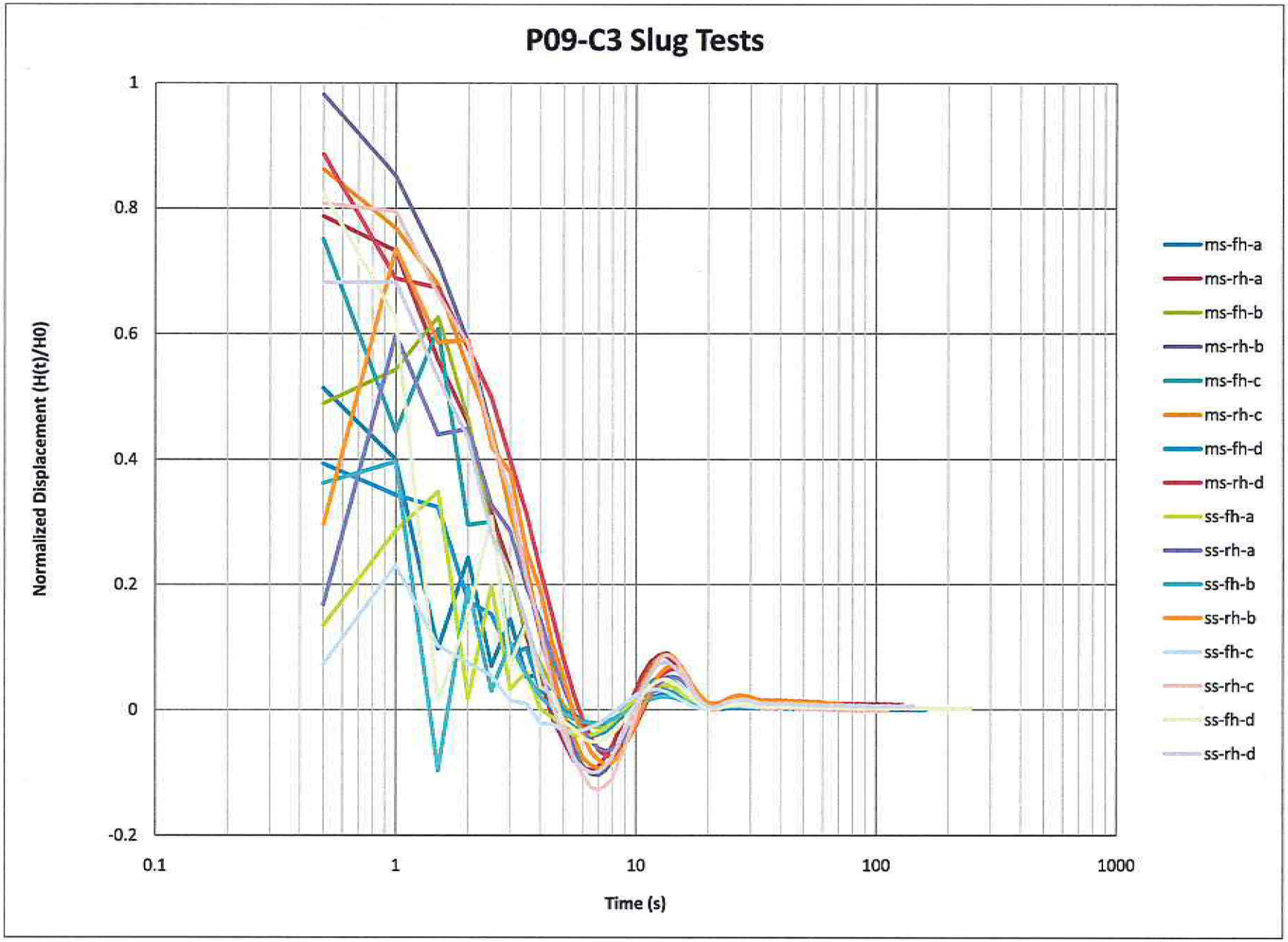
Observation Wells

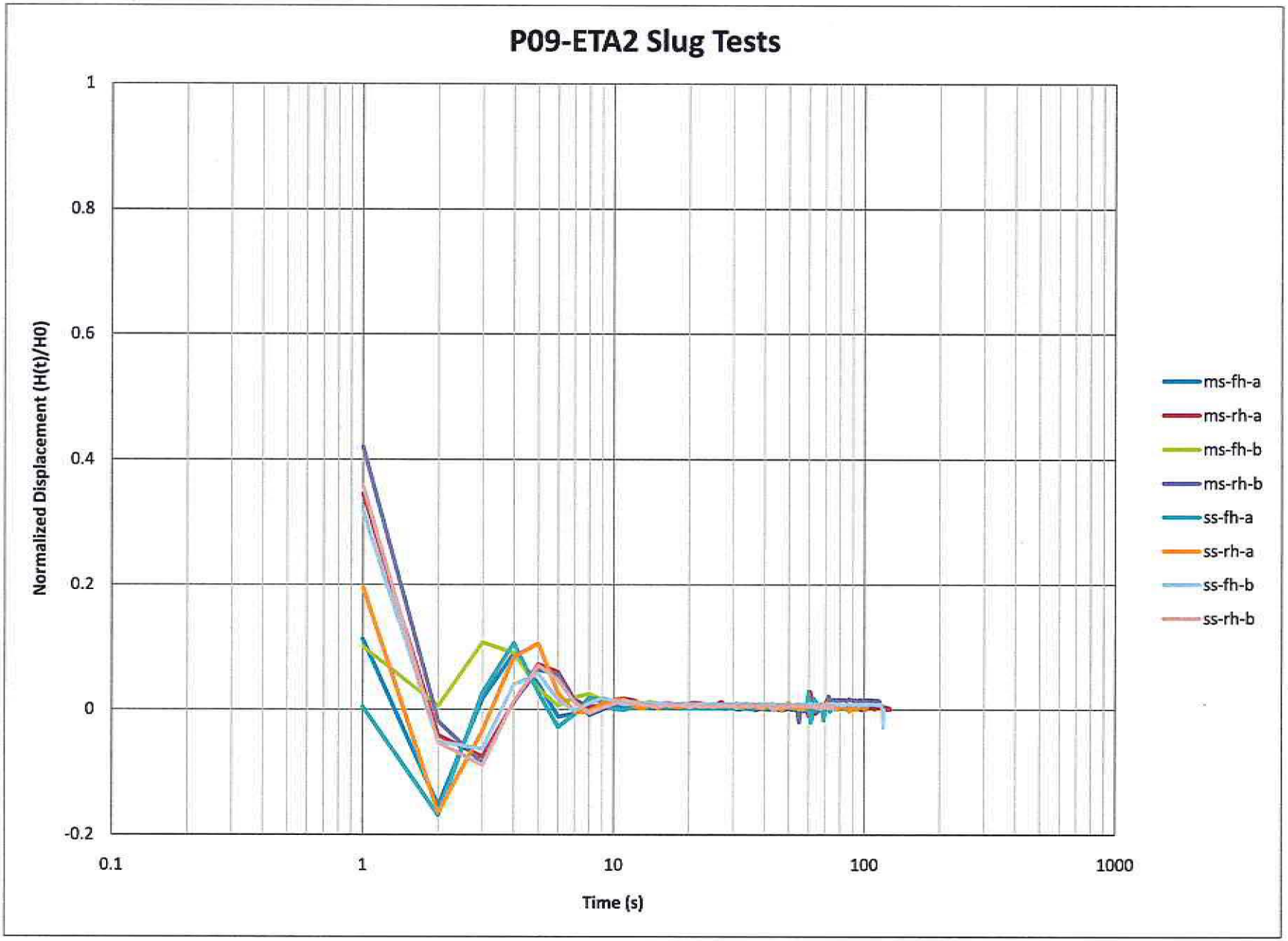
Well Name	X (m)	Y (m)
▫ C3	0	0

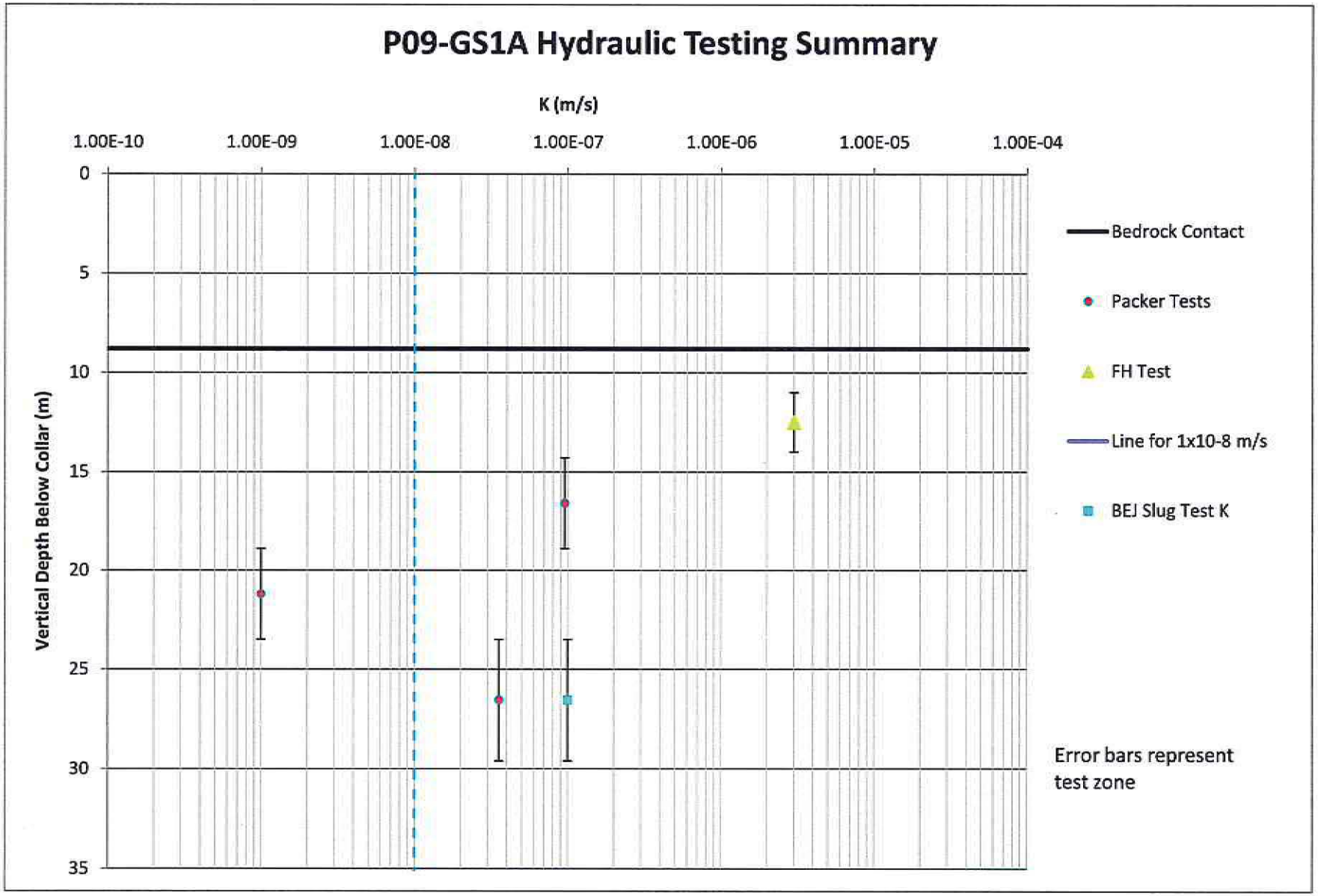
SOLUTION

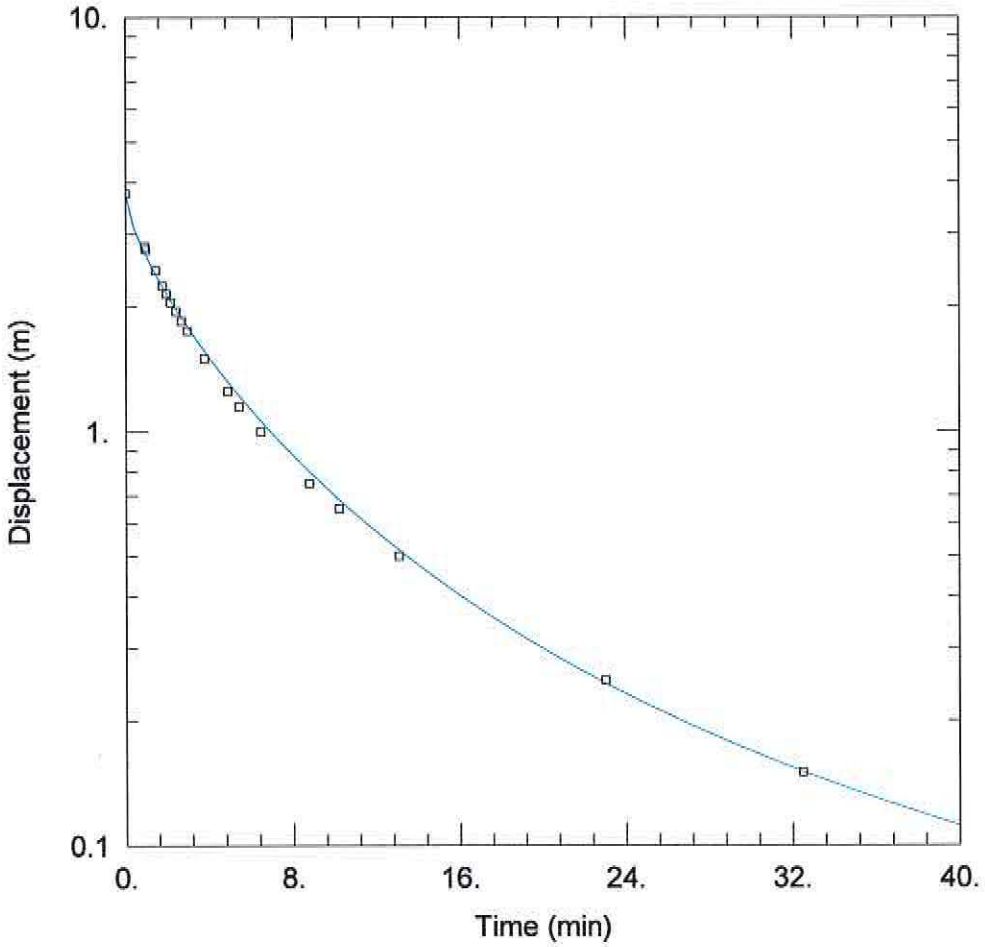
Aquifer Model: Confined
Solution Method: Theis

T = 1.505E-5 m^2/sec
S = 0.01254
Kz/Kr = 1.
b = 8. m


P09-C3 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.8
0.6
0.4
0.2
0
-0.2
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ms-fh-c
ms-rh-c
ms-fh-d
ms-rh-d
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b
ss-fh-c
ss-rh-c
ss-fh-d
ss-rh-d


P09-ETA2 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.8
0.6
0.4
0.2
0
-0.2
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b


P09-GS1A Hydraulic Testing Summary
K (m/s)
1.00E-10
1.00E-09
1.00E-08
1.00E-07
1.00E-06
1.00E-05
1.00E-04
Vertical Depth Below Collar (m)
0
5
10
15
20
25
30
35
Bedrock Contact
Packer Tests
FH Test
Line for 1x10-8 m/s
BEJ Slug Test K
Error bars represent test zone



WELL TEST ANALYSIS

Data Set: Y:\...\GS1FH_11-14m.aqt
Date: 10/30/09 Time: 10:52:17

PROJECT INFORMATION

Company: SRK
Client: YG
Project: 1CY001.034
Location: P09-GS1 - 11to14m
Test Well: GS1
Test Date: July 14, 2009

AQUIFER DATA

Saturated Thickness: 12.75 m

WELL DATA (GS1)

Initial Displacement: 3.75 m
Total Well Penetration Depth: 12.75 m
Casing Radius: 0.048 m
Static Water Column Height: 12.75 m
Screen Length: 3. m
Well Radius: 0.048 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.176E-6 m/sec
Kz/Kr = 1.
Ss = 0.007843 m^{-1}

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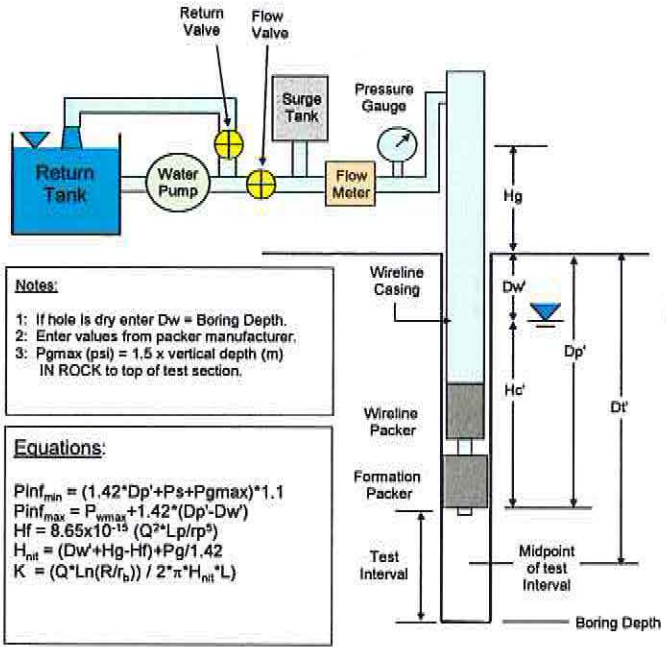
PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	14.3	to	18.9	**Boring N°:**	P09-GS1A
Northing:		**Date:**	14-Jul-09	**Start Time:**	12:30	**Test N°:**	2
Easting:				**End Time:**		**Boring Depth (m):**	18.9
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

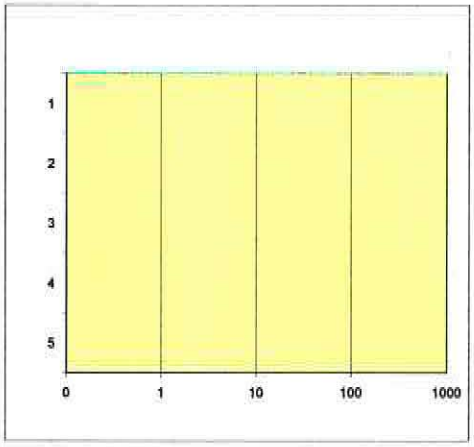
Equations:

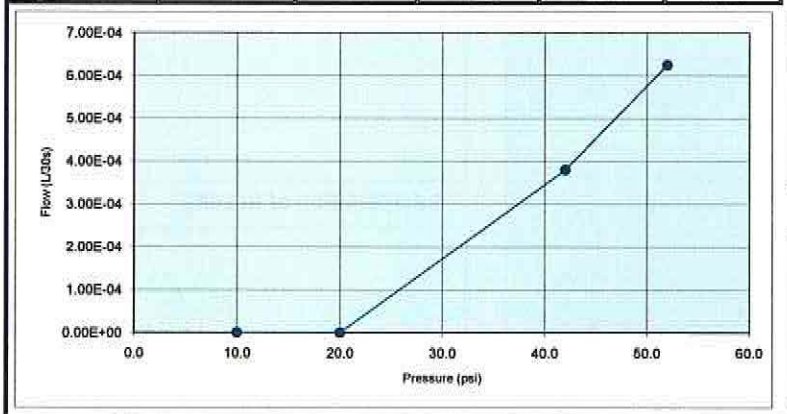
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	-2.5	m
Dp	Measured depth to packer	14.3	m
Dt	Measured depth to midpoint of test	16.6	m
ß	Inclination from horizontal (degrees)	90	°
Dw'	Vertical depth to static water level	-2.5	m
Dp'	Vertical depth to packer	14.3	m
Dt'	Vertical depth to midpoint of test	16.6	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	350	psi
Pgmax	Maximum injection gauge pressure (3)	50	psi
Pinfmin	Minimum packer inflation pressure	273.8	psi
Pinfmax	Maximum packer inflation pressure	727.1	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	20	42	52	
1	0.0000	0.0000	0.0000	0.0009	0.0000
2	0.0000	0.0000	0.0000	0.0004	0.0000
3	0.0000	0.0000	0.0008	0.0005	0.0000
4	0.0000	0.0000	0.0005	0.0007	0.0000
5	0.0000	0.0000	0.0006		0.0000
Qavg (m3/30s)	0.0000	0.0000	0.0004	0.0006	0.0000
Q_{avg} (m³/day)	0.000	0.000	1.094	1.800	0.000
Hf (m)	0.00	0.00	0.01	0.03	0.00
Hnit (m)	5.6	12.6	28.1	35.1	-1.5
K (m/day)	0.0E+00	0.0E+00	7.2E-03	9.5E-03	0.0E+00
K (m/sec)	0.00E+00	0.00E+00	8.33E-08	1.10E-07	0.00E+00
Lugeons	0.000	0.000	0.003	0.004	0.000





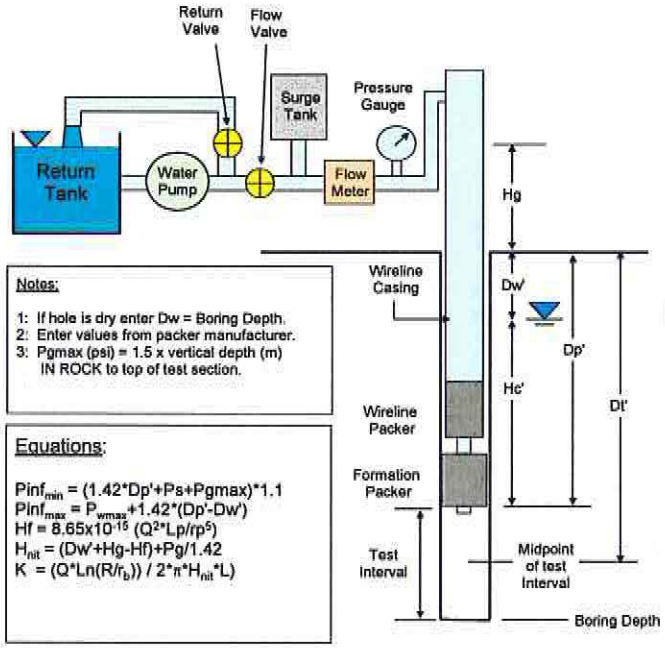
Field Observations

Interpretation of Results

PACKER INJECTION TEST

SRK Consulting
Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	18.9	to	23.5	**Boring N°:**	P09-GS1A
Northing:		**Date:**	15-Jul-09	**Start Time:**	9:00	**Test N°:**	3
Easting:				**End Time:**	9:45	**Boring Depth (m):**	18.9
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

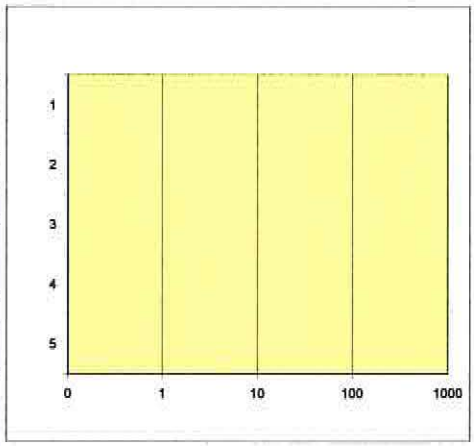
Equations:

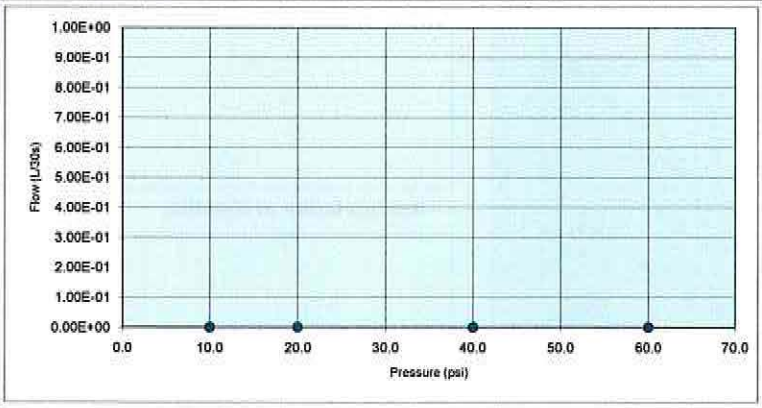
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	18.9	m
Dt	Measured depth to midpoint of test	21.2	m
ß	Inclination from horizontal (degrees)	90	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	18.9	m
Dt'	Vertical depth to midpoint of test	21.2	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	350	psi
Pgmax	Maximum injection gauge pressure (3)	50	psi
Pinfmin	Minimum packer inflation pressure	276.8	psi
Pinfmax	Maximum packer inflation pressure	730.1	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.6	m
Hf	Friction Loss		
Hnit	Net Injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	20	40	60	
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000
Qavg (m3/30s)	0.0000	0.0000	0.0000	0.0000	0.0000
Q_{avg} (m³/day)	0.000	0.000	0.000	0.000	0.000
Hf (m)	0.00	0.00	0.00	0.00	0.00
Hnit (m)	8.0	15.1	29.2	43.3	1.0
K (m/day)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
K (m/sec)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lugeons	0.000	0.000	0.000	0.000	0.000





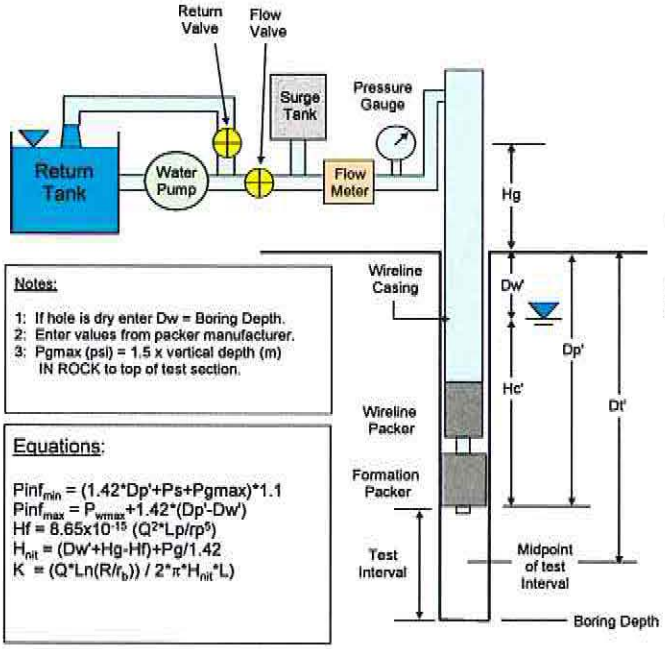
Field Observations

Interpretation of Results

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	23.5	to	29.6	**Boring N°:**	P09-GS1A
Northing:		**Date:**	15-Jul-09	**Start Time:**	11:45	**Test N°:**	4
Easting:				**End Time:**		**Boring Depth (m):**	18.9
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

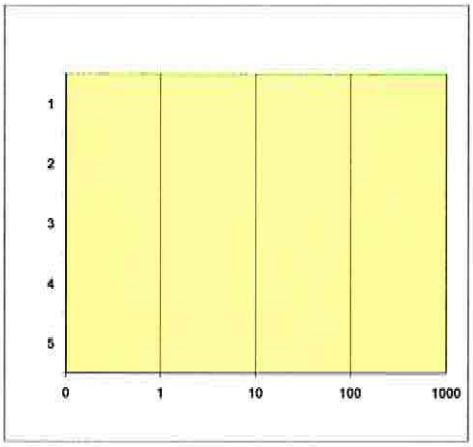
Equations:

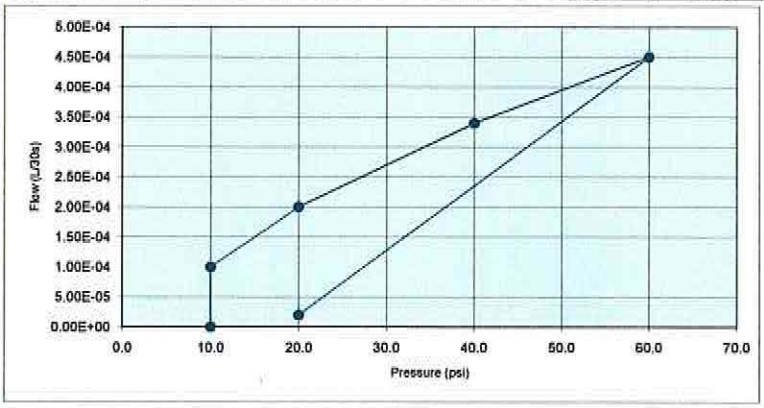
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15}\ (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b))\ /\ 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	23.5	m
Dt	Measured depth to midpoint of test	26.6	m
ß	Inclination from horizontal (degrees)	90	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	23.5	m
Dt'	Vertical depth to midpoint of test	26.6	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	350	psi
Pgmax	Maximum injection gauge pressure (3)	60	psi
Pinfmin	Minimum packer inflation pressure	293.4	psi
Pinfmax	Maximum packer inflation pressure	737.7	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	6.1	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4×10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

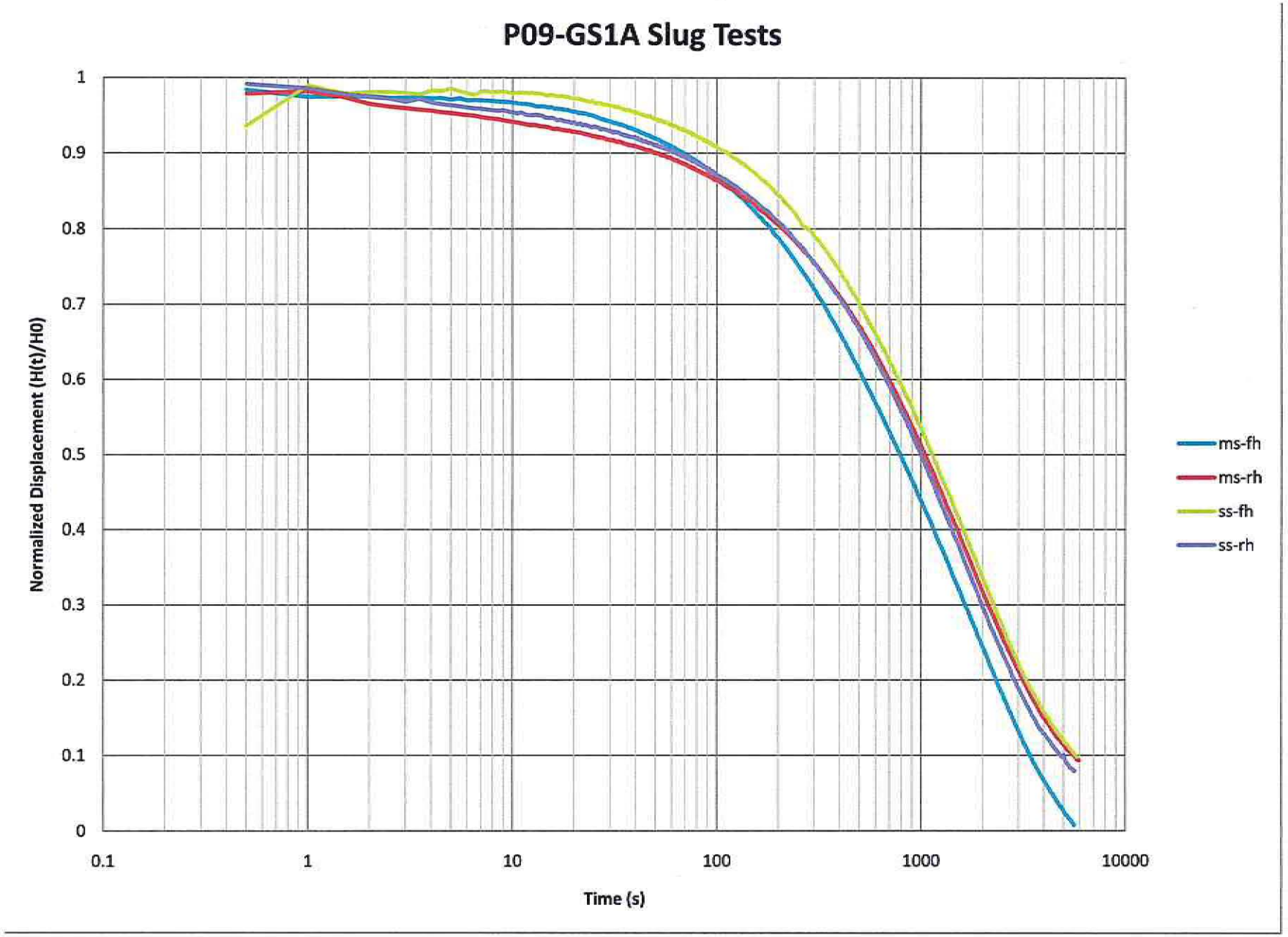
Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	20	40	60	20
1	0.0002	0.0003	0.0005	0.0004	0.0001
2	0.0002	0.0003	0.0002	0.0004	0.0000
3	0.0001	0.0002	0.0003	0.0004	0.0000
4	0.0000	0.0002	0.0005	0.0006	0.0000
5	0.0000	0.0000	0.0002		0.0000
Qavg (m3/30s)	0.0001	0.0002	0.0003	0.0005	0.0000
Q_{avg} (m³/day)	0.288	0.576	0.979	1.296	0.058
Hf (m)	0.00	0.00	0.01	0.01	0.00
Hnit (m)	8.0	15.1	29.2	43.2	15.1
K (m/day)	5.0E-03	5.3E-03	4.7E-03	4.2E-03	5.3E-04
K (m/sec)	5.77E-08	6.16E-08	5.41E-08	4.83E-08	6.16E-09
Lugeons	0.002	0.002	0.002	0.002	0.000

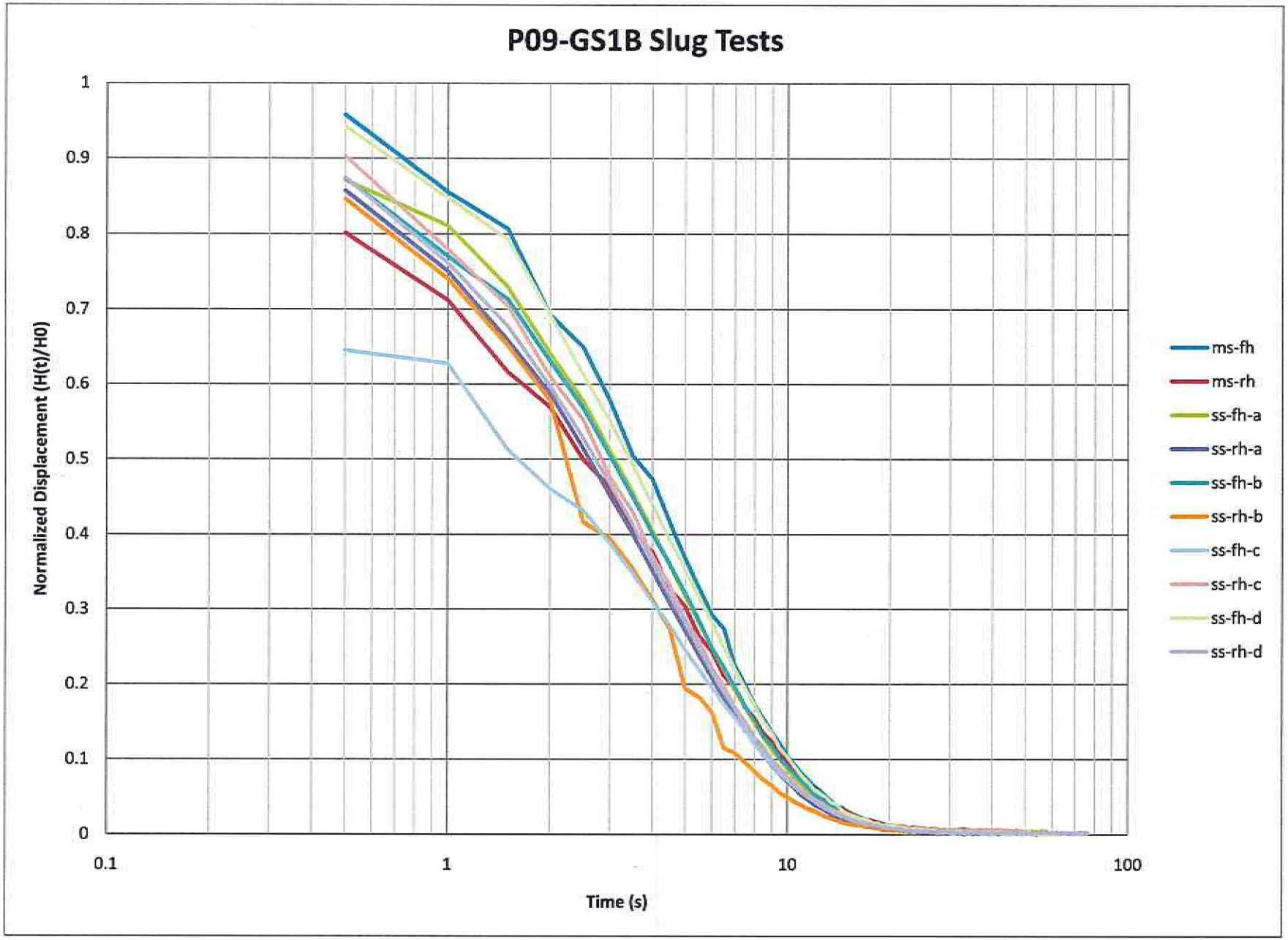


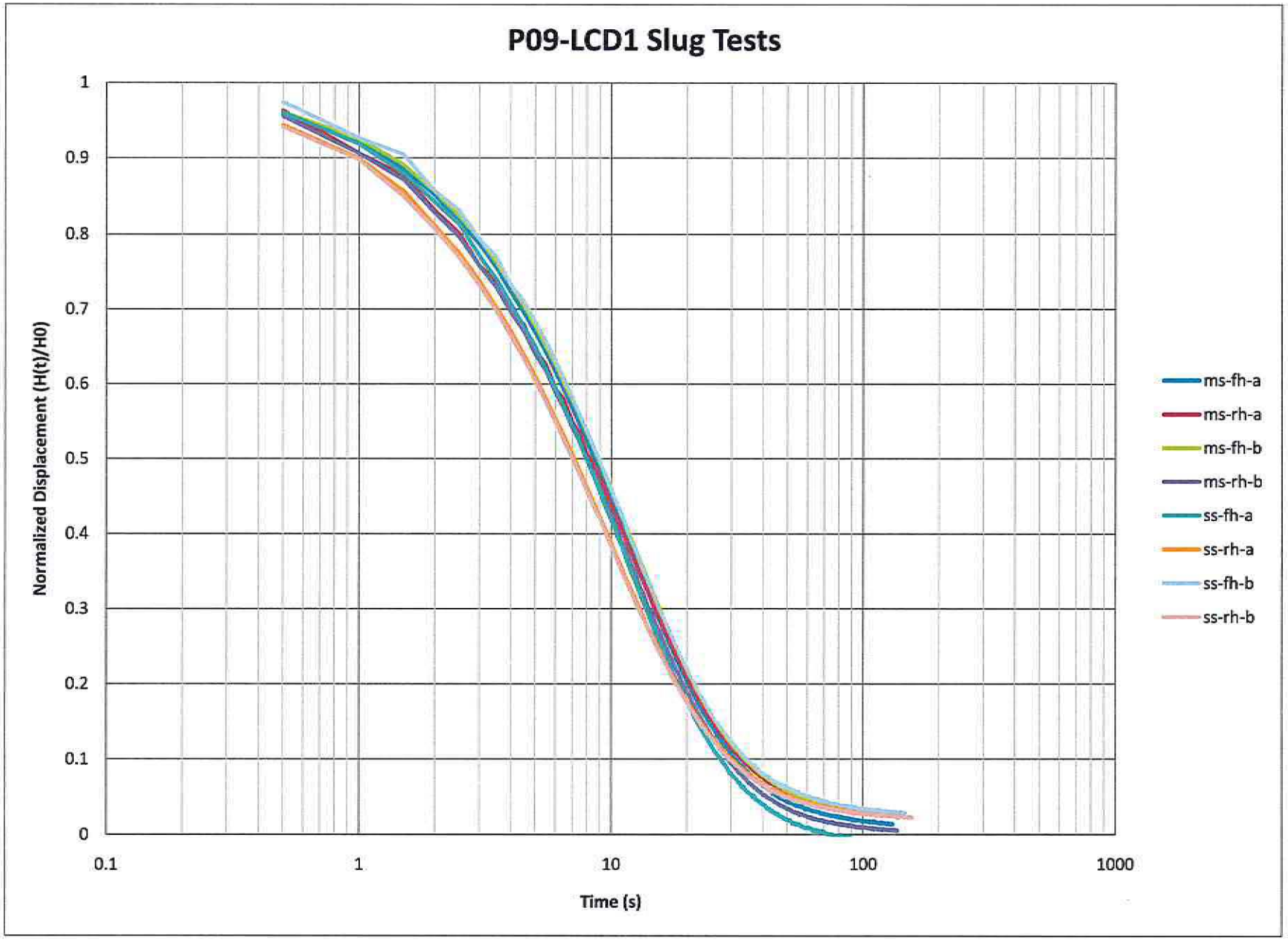


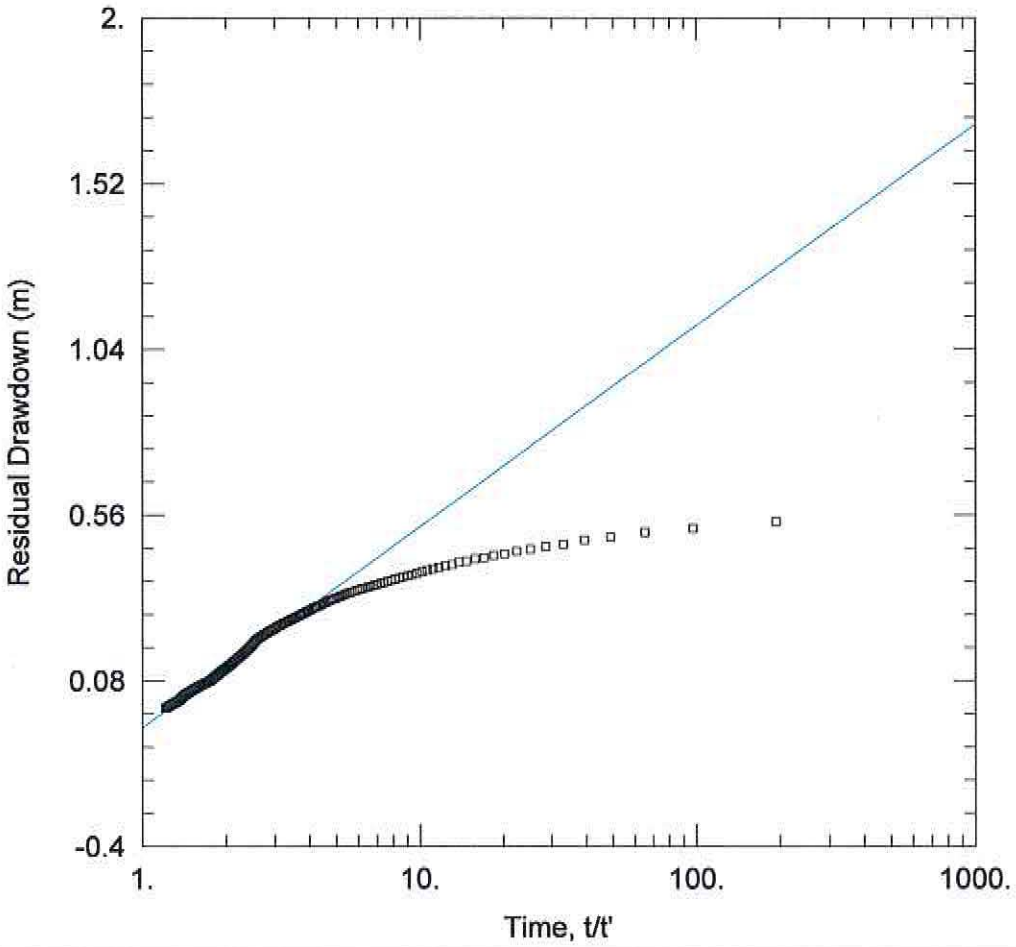
Field Observations

Interpretation of Results


P09-GS1A Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
10000
Time (s)
ms-fh
ms-rh
ss-fh
ss-rh


P09-GS1B Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
Time (s)
ms-fh
ms-rh
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b
ss-fh-c
ss-rh-c
ss-fh-d
ss-rh-d


P09-LCD1 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b



LCD02-HP-RH-A

Data Set: Y:\...\LCD02-hp-rh-a-T.aqt
Date: 10/30/09 Time: 10:20:53

PROJECT INFORMATION

Company: SRK Consulting
Location: Faro Mine
Test Well: LCD02
Test Date: 7 August 2009

AQUIFER DATA

Saturated Thickness: 1.2 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
LCD02-hp-rh-a	0	0

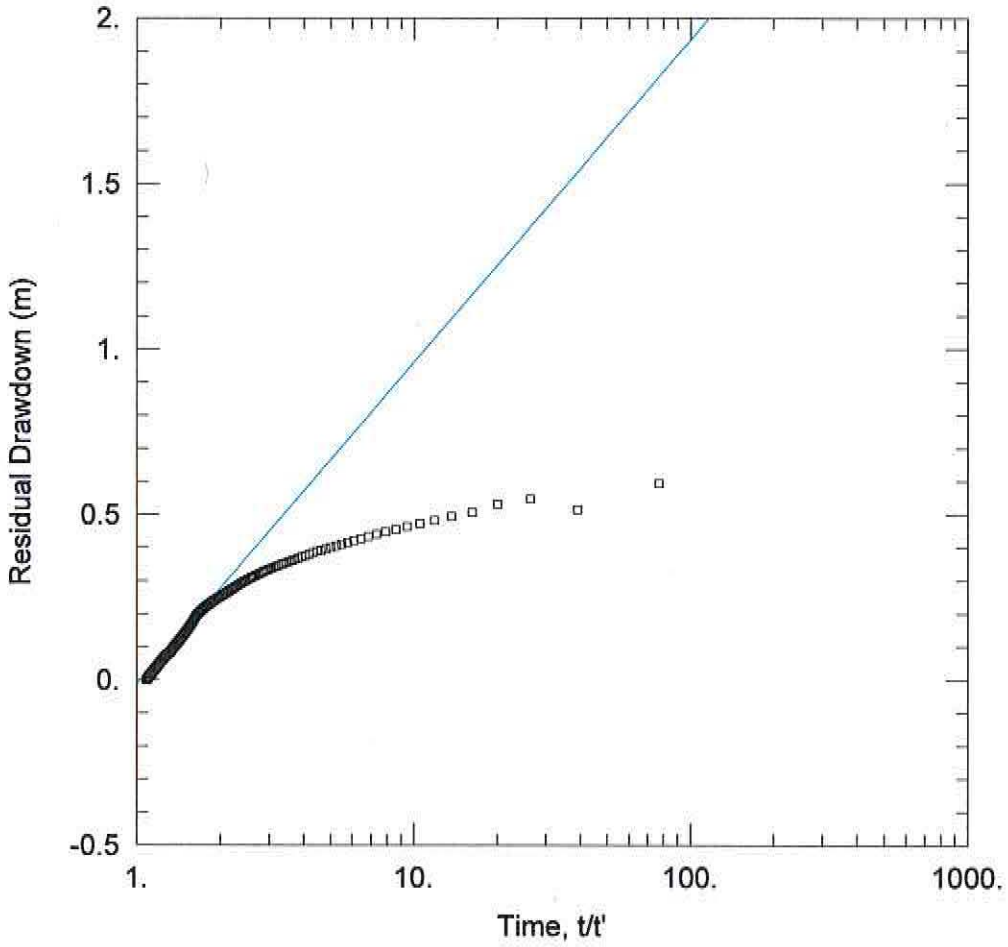
Observation Wells

Well Name	X (m)	Y (m)
▫ LCD02-hp-rh-a	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 3.878E-6 m^2/sec S/S' = 1.255



LCD02-HP-RH-B

Data Set: Y:\...\LCD02-hp-rh-b-T.aqt
Date: 10/30/09 Time: 10:20:44

PROJECT INFORMATION

Company: SRK Consulting
Location: Faro Mine
Test Well: LCD02
Test Date: 7 August 2009

AQUIFER DATA

Saturated Thickness: 1.2 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
LCD02-hp-rh-b	0	0

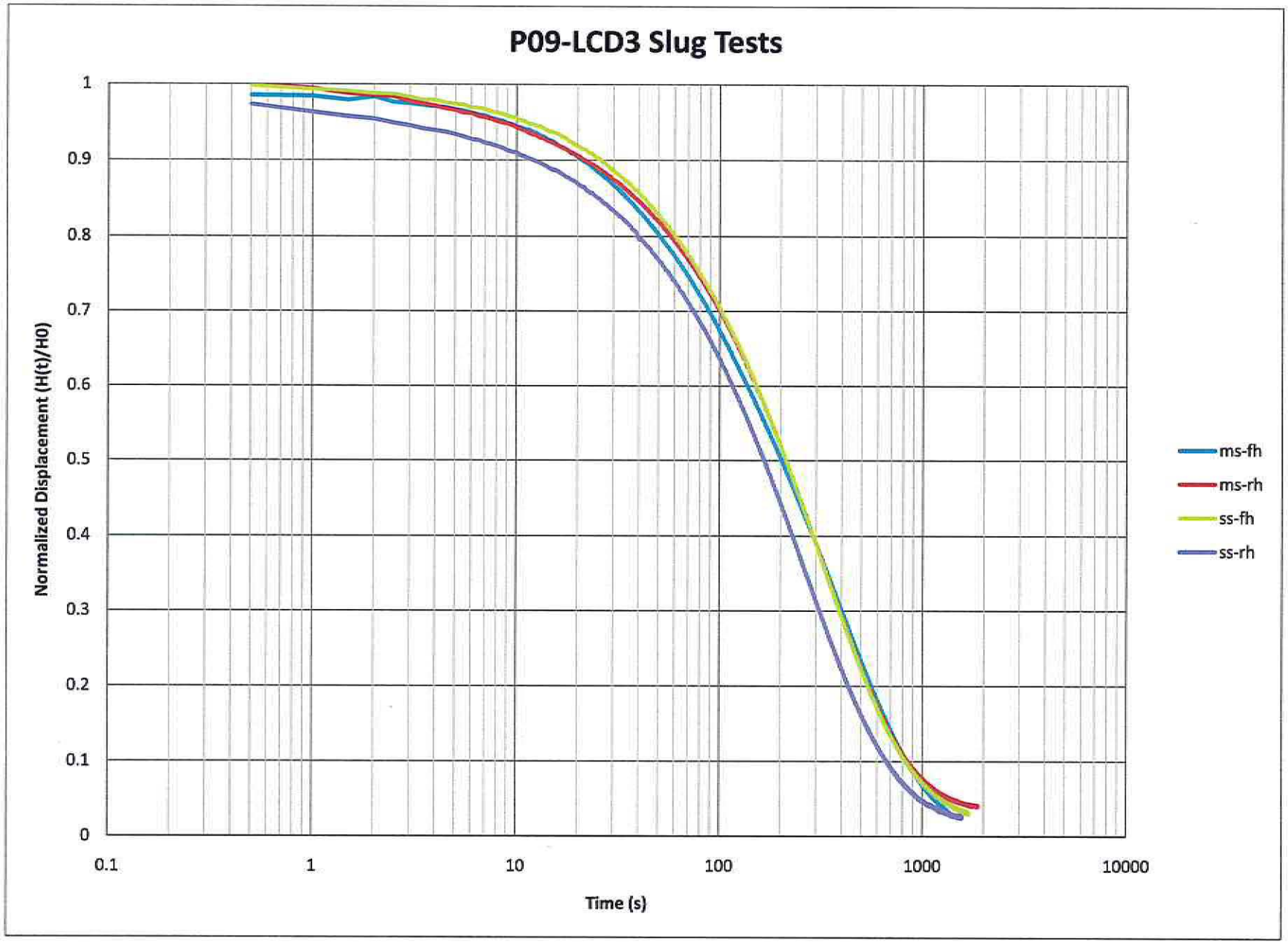
Observation Wells

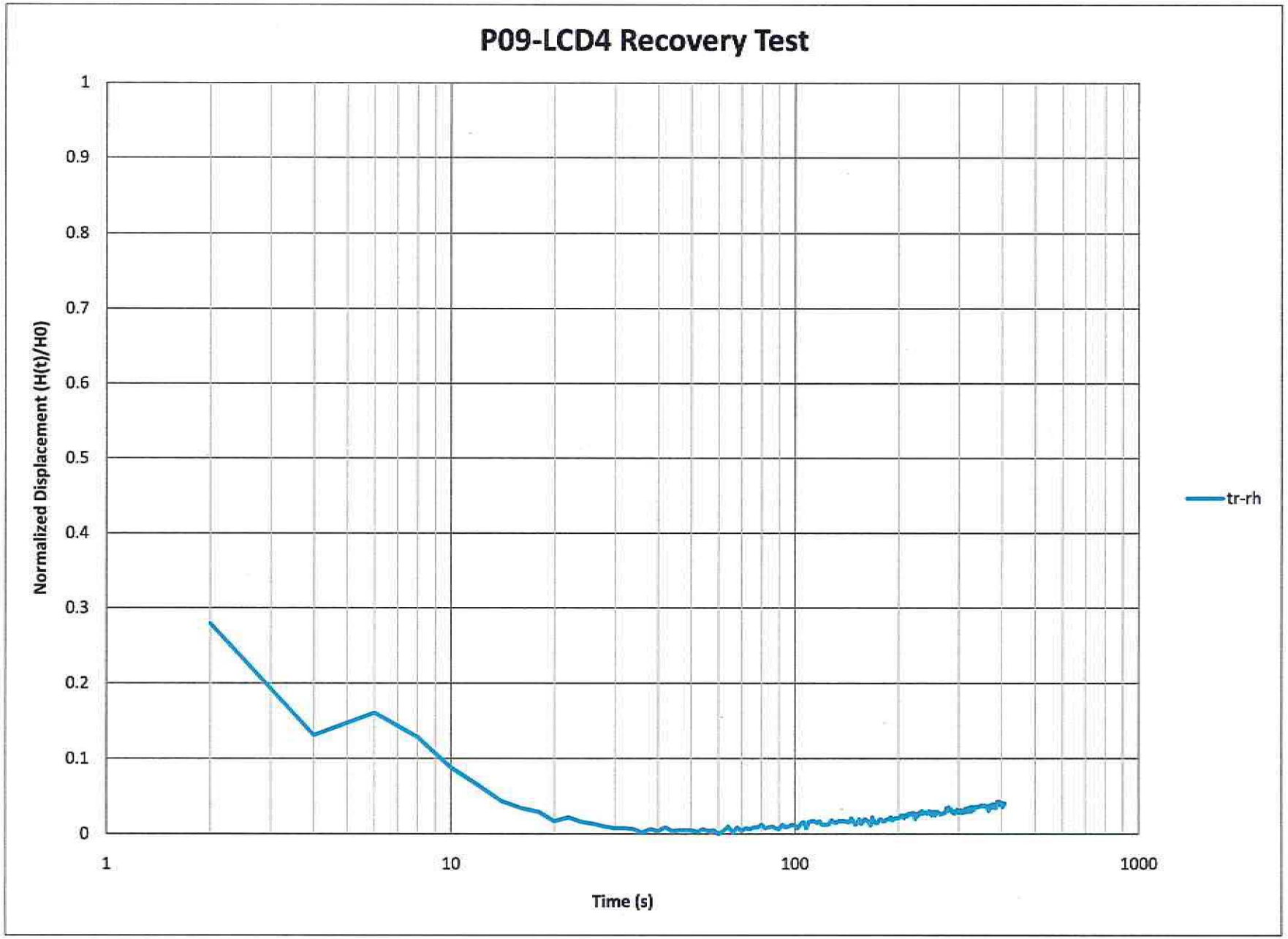
Well Name	X (m)	Y (m)
▫ LCD02-hp-rh-b	0	0

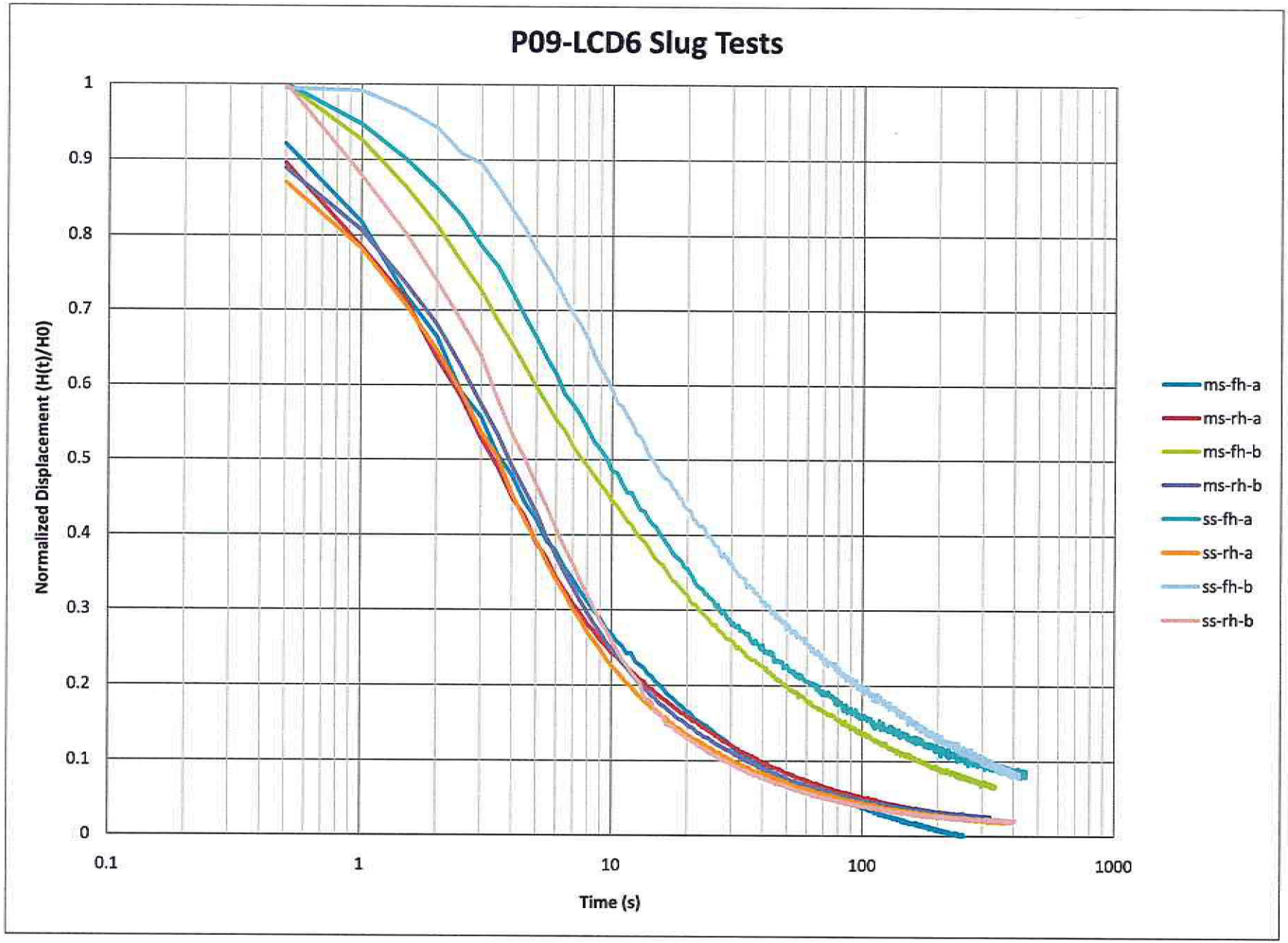
SOLUTION

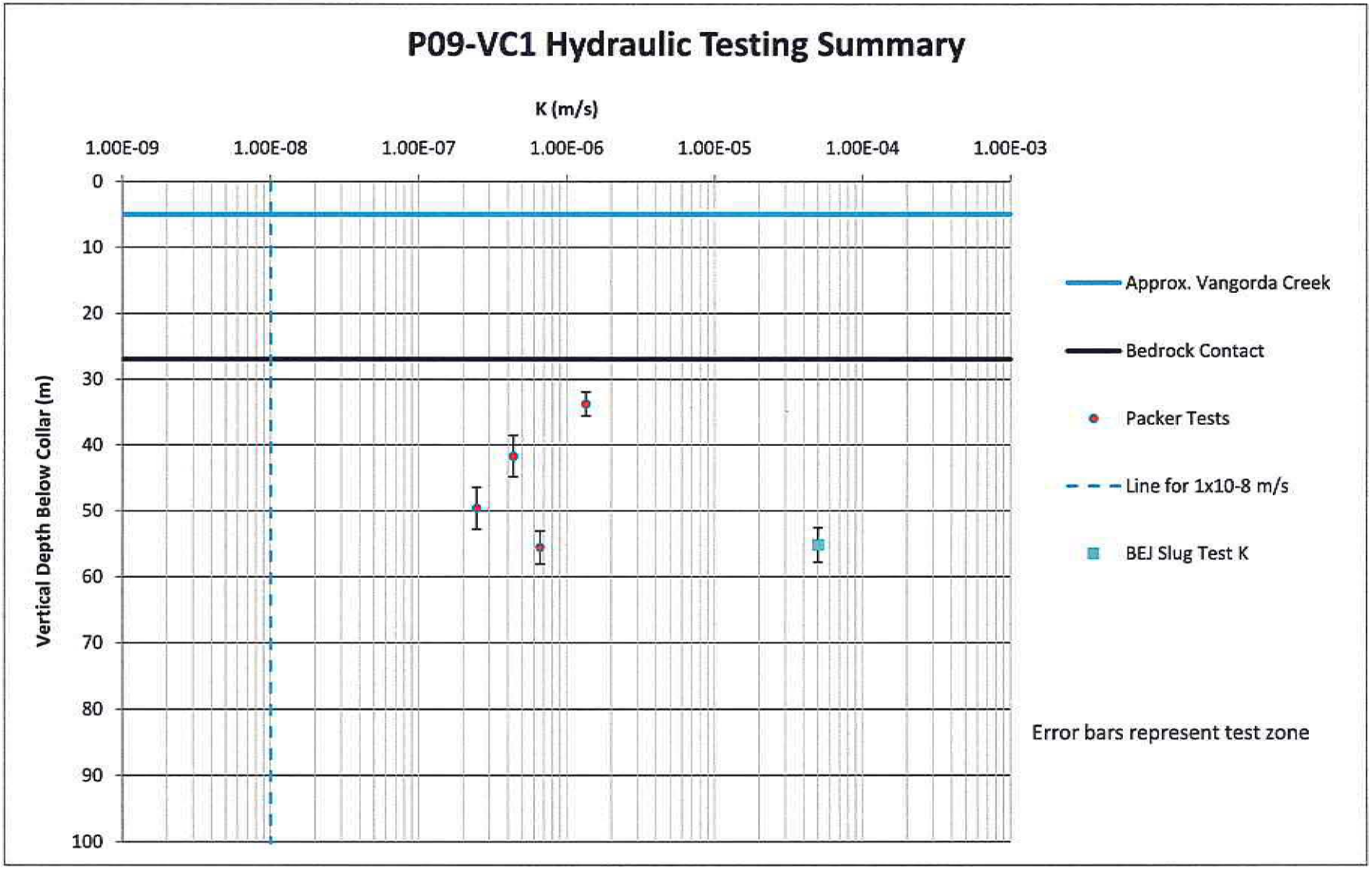
Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 6.348E-6 m^2/sec S/S' = 1.039


P09-LCD3 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
10000
Time (s)
ms-fh
ms-rh
ss-fh
ss-rh


P09-LCD4 Recovery Test
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
10
100
1000
Time (s)
tr-rh


P09-LCD6 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b


P09-VC1 Hydraulic Testing Summary
K (m/s)
1.00E-09
1.00E-08
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
Vertical Depth Below Collar (m)
0
10
20
30
40
50
60
70
80
90
100
Approx. Vangorda Creek
Bedrock Contact
Packer Tests
Line for 1x10-8 m/s
BEJ Slug Test K
Error bars represent test zone

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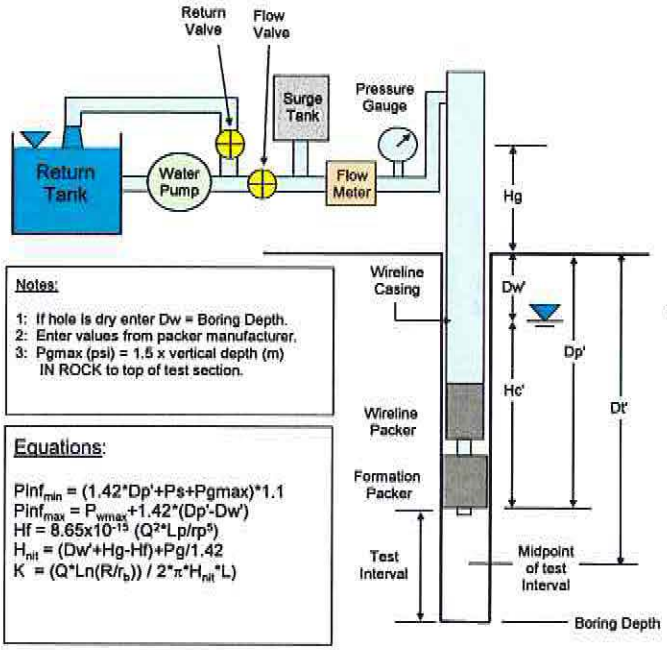
PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	36.9	to	41.1	**Boring N°:**	P09-VC1
Northing:		**Date:**	11-Jul-09	**Start Time:**	9:00	**Test N°:**	1
Easting:				**End Time:**	12:40	**Boring Depth (m):**	41.1
GS Elevation:						**Supervisor:**	DM



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

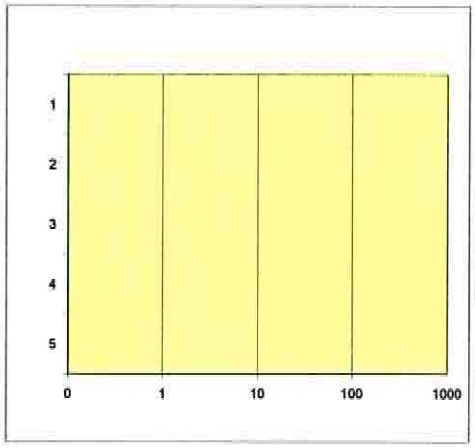
Equations:

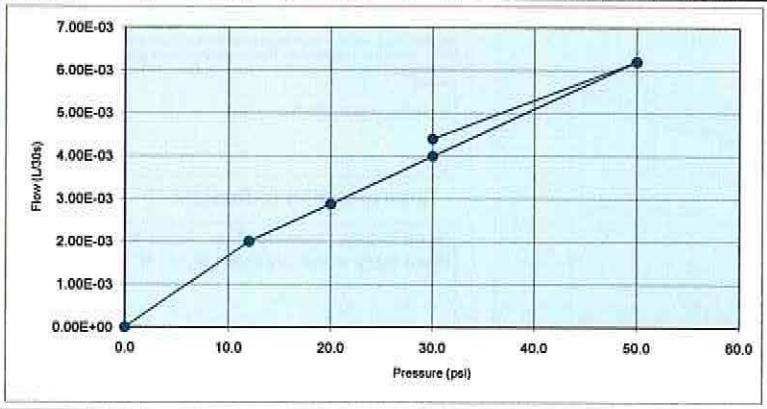
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	36.9	m
Dt	Measured depth to midpoint of test	39.0	m
ß	Inclination from horizontal (degrees)	60	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	32.0	m
Dt'	Vertical depth to midpoint of test	33.8	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	350	psi
Pgmax	Maximum injection gauge pressure (3)	25	psi
Pinfmin	Minimum packer inflation pressure	270.4	psi
Pinfmax	Maximum packer inflation pressure	748.0	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	4.2	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	12	20	30	50	30
1	0.0020	0.0030	0.0040	0.0065	0.0040
2	0.0020	0.0025	0.0040	0.0065	0.0055
3	0.0020	0.0030	0.0040	0.0060	0.0040
4	0.0020	0.0030	0.0040	0.0060	0.0045
5	0.0020		0.0040	0.0060	0.0040
Qavg (m3/30s)	0.0020	0.0029	0.0040	0.0062	0.0044
Q_{avg} (m^3/day)	5.760	8.280	11.520	17.856	12.672
Hf (m)	0.26	0.54	1.04	2.49	1.26
Hnit (m)	9.2	14.5	21.1	33.7	20.9
K (m/day)	1.3E-01	1.2E-01	1.1E-01	1.1E-01	1.2E-01
K (m/sec)	1.47E-06	1.33E-06	1.28E-06	1.24E-06	1.42E-06
Lugeons	0.058	0.052	0.050	0.049	0.056





Field Observations

First attempt blew inflation line. Line probably abraded installing and blew at about 300psi. Pulled, blew out water and repaired. Re-installed.

During test, no leaks, decent steady pressure. Flows linear.

Rock is highly broken up. Breaks on foliation. Black phyllite with qtz and sulphides. Top of test zone about 10ft drilled depth below OB-BR contact.

K values makes sense in such broken, weathered rock. Weathering observed as "cruddy" looking foliations and high number of foliation breaks. Rock is crumbly.

All system was good. Confident of results.

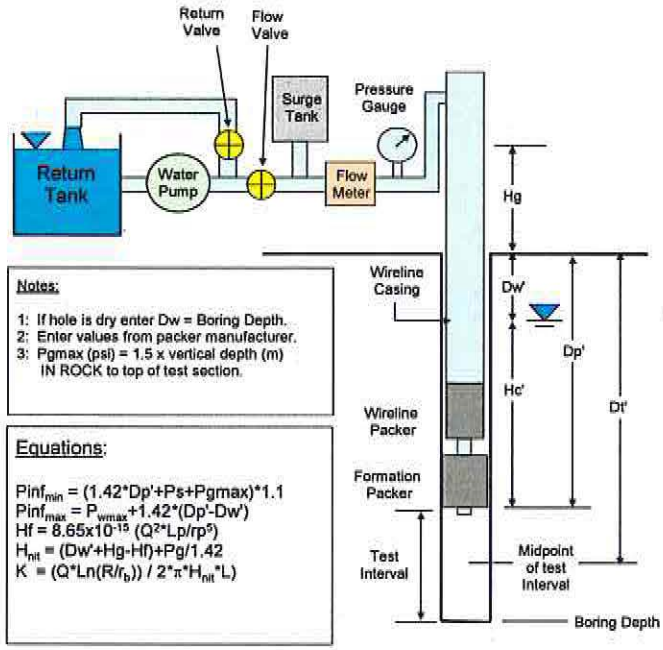
Interpretation of Results

Good results. Laminar flow. lower flow on step down likely within pressure error (+/- 2psi).

SRK Consulting
Engineers and Scientists

PACKER INJECTION TEST

Project:	Faro 2009	**Test Interval (m):**	44.5	to	51.8	**Boring N°:**	P09-VC1
Northing:		**Date:**	11-Jul-09	**Start Time:**	9:00	**Test N°:**	2
Easting:				**End Time:**	12:40	**Boring Depth (m):**	51.8
GS Elevation:						**Supervisor:**	DM



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

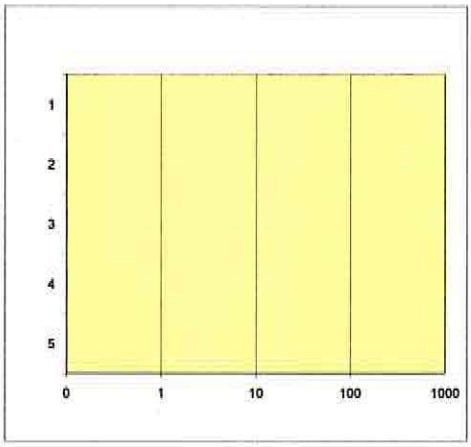
Equations:

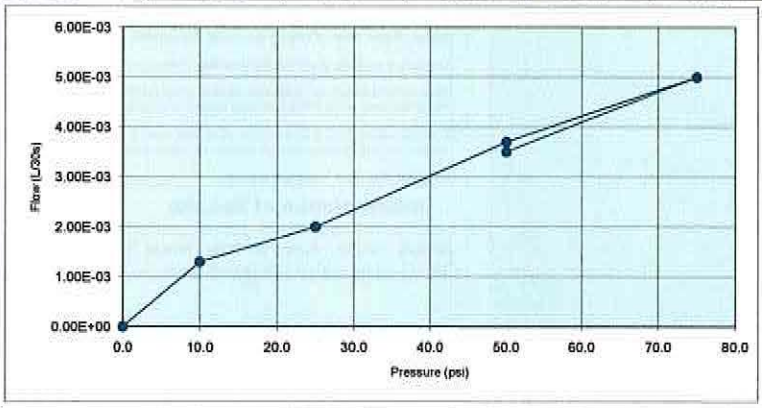
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	44.5	m
Dt	Measured depth to midpoint of test	48.2	m
ß	Inclination from horizontal (degrees)	60	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	38.5	m
Dt'	Vertical depth to midpoint of test	41.7	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	75	psi
Pinfmin	Minimum packer inflation pressure	329.7	psi
Pinfmax	Maximum packer inflation pressure	759.2	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	7.3	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	10	25	50	75	50
1	0.0015	0.0020	0.0040	0.0050	0.0035
2	0.0020	0.0020	0.0045	0.0050	0.0035
3	0.0010	0.0020	0.0035	0.0050	0.0035
4	0.0010	0.0020	0.0030	0.0050	0.0035
5	0.0010	0.0020	0.0035	0.0050	0.0035
Qavg (m3/30s)	0.0013	0.0020	0.0037	0.0050	0.0035
Q_{avg} (m³/day)	3.744	5.760	10.656	14.400	10.080
Hf (m)	0.11	0.26	0.89	1.62	0.79
Hnit (m)	7.9	18.3	35.3	52.2	35.4
K (m/day)	5.5E-02	3.7E-02	3.5E-02	3.2E-02	3.3E-02
K (m/sec)	6.36E-07	4.23E-07	4.06E-07	3.72E-07	3.83E-07
Lugeons	0.025	0.017	0.016	0.015	0.015





Field Observations

During test, no leaks, decent steady pressure. Flows linear.

Multiple shear zones or small faults (don't think they are ductile, but there are offset veins. Sulphides in fault veins. Rock is generally black phyllite or shist with carbonate(?) and sulphides. Top of test zone about 40ft drilled depth below OB-BR contact.

All system was good. Confident of results.

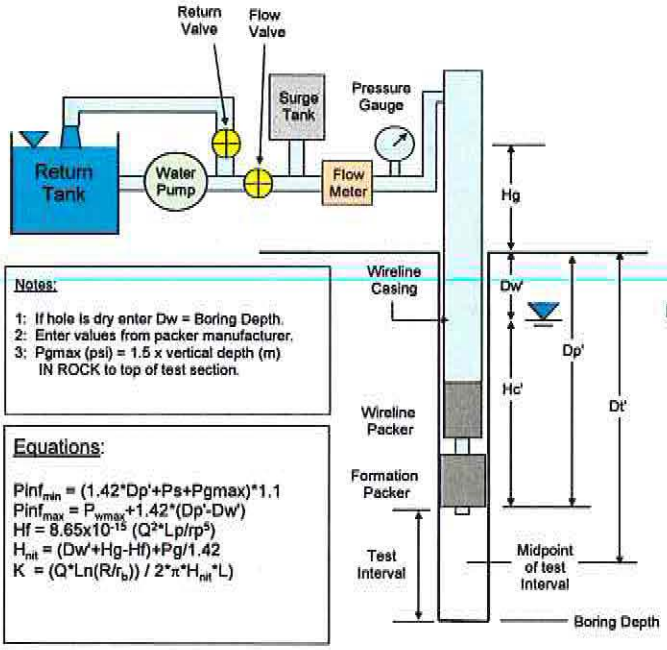
Interpretation of Results

Good results. Laminar flow. lower flow on step down likely within pressure error (+/- 2psi).

PACKER INJECTION TEST

SRK Consulting
Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	53.6	to	61.0	**Boring N°:**	P09-VC1
Northing:		**Date:**	12-Jul-09	**Start Time:**	11:25	**Test N°:**	3
Easting:				**End Time:**	14:45	**Boring Depth (m):**	61.0
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

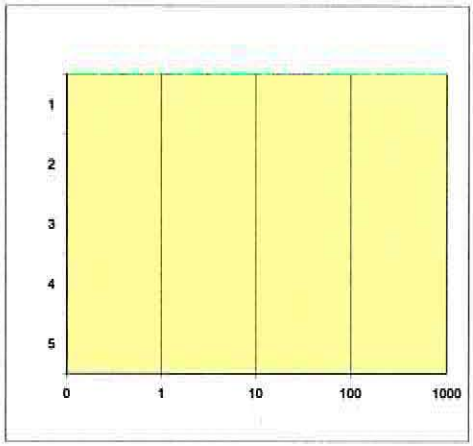
Equations:

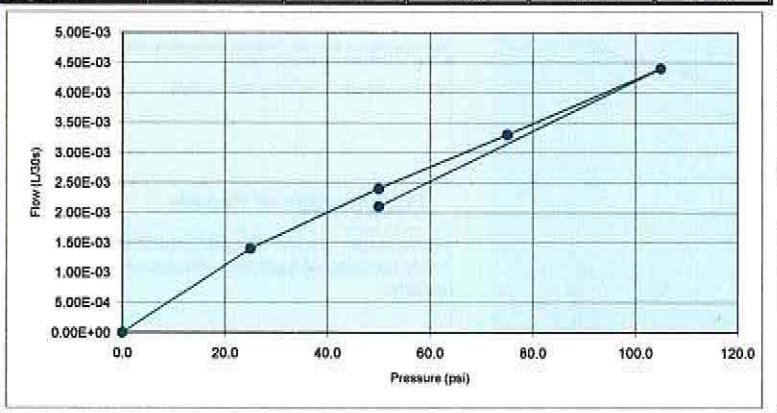
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	53.6	m
Dt	Measured depth to midpoint of test	57.3	m
ß	Inclination from horizontal (degrees)	60	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	46.4	m
Dt'	Vertical depth to midpoint of test	49.6	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	100	psi
Pinfmin	Minimum packer inflation pressure	365.9	psi
Pinfmax	Maximum packer inflation pressure	770.5	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	7.4	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	25	50	75	105	50
1	0.0015	0.0025	0.0035	0.0045	0.0020
2	0.0015	0.0025	0.0030	0.0045	0.0020
3	0.0010	0.0025	0.0035	0.0040	0.0020
4	0.0020	0.0025	0.0030	0.0040	0.0020
5	0.0010	0.0020	0.0035	0.0050	0.0025
Qavg (m3/30s)	0.0014	0.0024	0.0033	0.0044	0.0021
Q_{avg} (m^3/day)	4.032	6.912	9.504	12.672	6.048
Hf (m)	0.13	0.37	0.71	1.26	0.29
Hnit (m)	18.5	35.8	53.1	73.7	35.9
K (m/day)	2.5E-02	2.2E-02	2.1E-02	2.0E-02	1.9E-02
K (m/sec)	2.90E-07	2.56E-07	2.38E-07	2.29E-07	2.24E-07
Lugeons	0.011	0.010	0.009	0.009	0.009





Field Observations

First attempt 181 to 200 feet (55.2 to 61m) at no pressure significant flow up casing increased Packer pressure, no change. Pull packer, check lines, pull casing back to 170, have packer in better rock. Trouble with second seat also, same issue, packer dropped further before pulling. Piece of core stuck in bit. Packer wasn't set in bedrock for first two attempts.

Test zone 28-30m horizontal from collar. About 48m vertical below collar or about 40m below creek.

All system was good. Confident of results or about

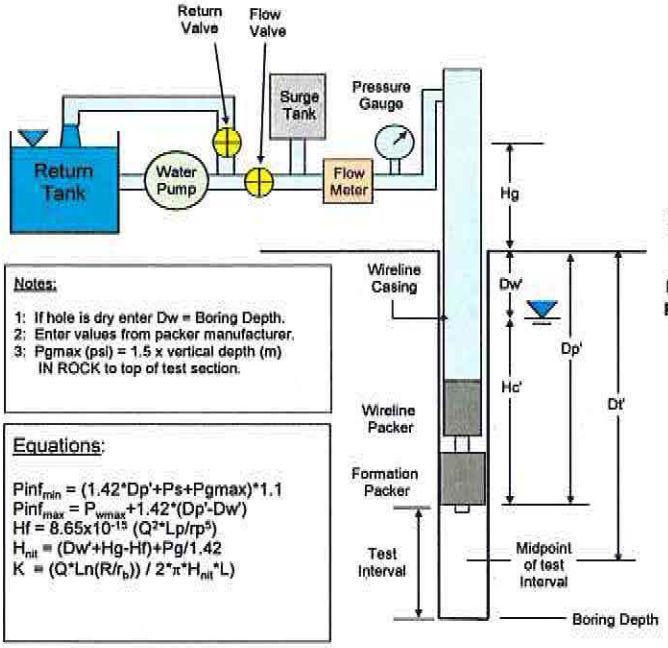
Interpretation of Results

Good results. Laminar flow. lower flow on step down likely within pressure error (+/- 2psi).

PACKER INJECTION TEST

SRK Consulting — Engineers and Scientists

Project:	Faro 2009	**Test Interval (m):**	61.3	to	67.1	**Boring N°:**	P09-VC1
Northing:		**Date:**	12-Jul-09	**Start Time:**	17:00	**Test N°:**	4
Easting:				**End Time:**	14:45	**Boring Depth (m):**	67.1
GS Elevation:						**Supervisor:**	MP



Notes:

1: If hole is dry enter Dw = Boring Depth.
2: Enter values from packer manufacturer.
3: Pgmax (psi) = 1.5 x vertical depth (m) IN ROCK to top of test section.

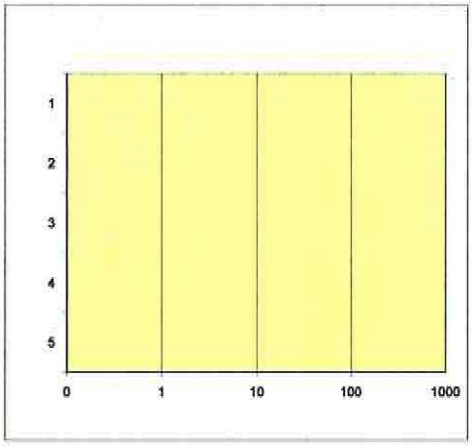
Equations:

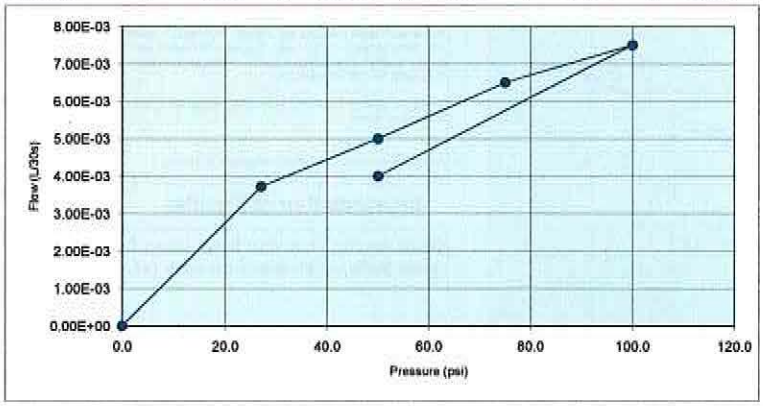
$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$
$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$
$Hf = 8.65x10^{-10} (Q^2*Lp/rp^5)$
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Dw	Measured depth of static water level (1)	0.0	m
Dp	Measured depth to packer	61.3	m
Dt	Measured depth to midpoint of test	64.2	m
ß	Inclination from horizontal (degrees)	60	°
Dw'	Vertical depth to static water level	0.0	m
Dp'	Vertical depth to packer	53.1	m
Dt'	Vertical depth to midpoint of test	55.6	m
Ps	Packer stretch pressure (2)	50	psi
Pwmax	Maximum packer working pressure (2)	700	psi
Pgmax	Maximum injection gauge pressure (3)	100	psi
Pinfmin	Minimum packer inflation pressure	375.4	psi
Pinfmax	Maximum packer inflation pressure	779.0	psi
Hg	Gauge height	1.0	m
Lp	Length of discharge pipe	3.00	m
rp	Radius of discharge pipe (1"=0.0127m)	0.0051	m
R	Radius of influence (10 m is standard value)	10	m
rb	Borehole radius (HQ=0.048m, NQ=0.038m)	0.048	m
L	Length of test section	5.8	m
Hf	Friction Loss		
Hnit	Net injection head at midpoint of test		
K	Hydraulic conductivity		

Conversion Factors:
10 m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1 cm/sec = 864 m/day
1 Lugeon = 1 lit/min per meter at 10 bars which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 lit/min = 5.45 m³/day

Measurement	Q (m3/ 30 seconds)				
	P_g (psi) Step 1	P_g (psi) Step 2	P_g (psi) Step 3	P_g (psi) Step 4	P_g (psi) Step 5
	27	50	75	100	50
1	0.0036	0.0045	0.0065	0.0070	0.0045
2	0.0036	0.0055	0.0065	0.0080	0.0035
3	0.0038	0.0050	0.0065	0.0075	0.0042
4	0.0030	0.0052		0.0075	0.0040
5	0.0046	0.0048		0.0075	0.0038
Qavg (m3/30s)	0.0037	0.0050	0.0065	0.0075	0.0040
Q_{avg} (m³/day)	10.714	14.400	18.720	21.600	11.520
Hf (m)	0.90	1.62	2.74	3.65	1.04
Hnit (m)	19.1	34.6	51.1	67.8	35.2
K (m/day)	8.2E-02	6.1E-02	5.4E-02	4.7E-02	4.8E-02
K (m/sec)	9.50E-07	7.06E-07	6.22E-07	5.40E-07	5.55E-07
Lugeons	0.037	0.028	0.024	0.021	0.022





Field Observations

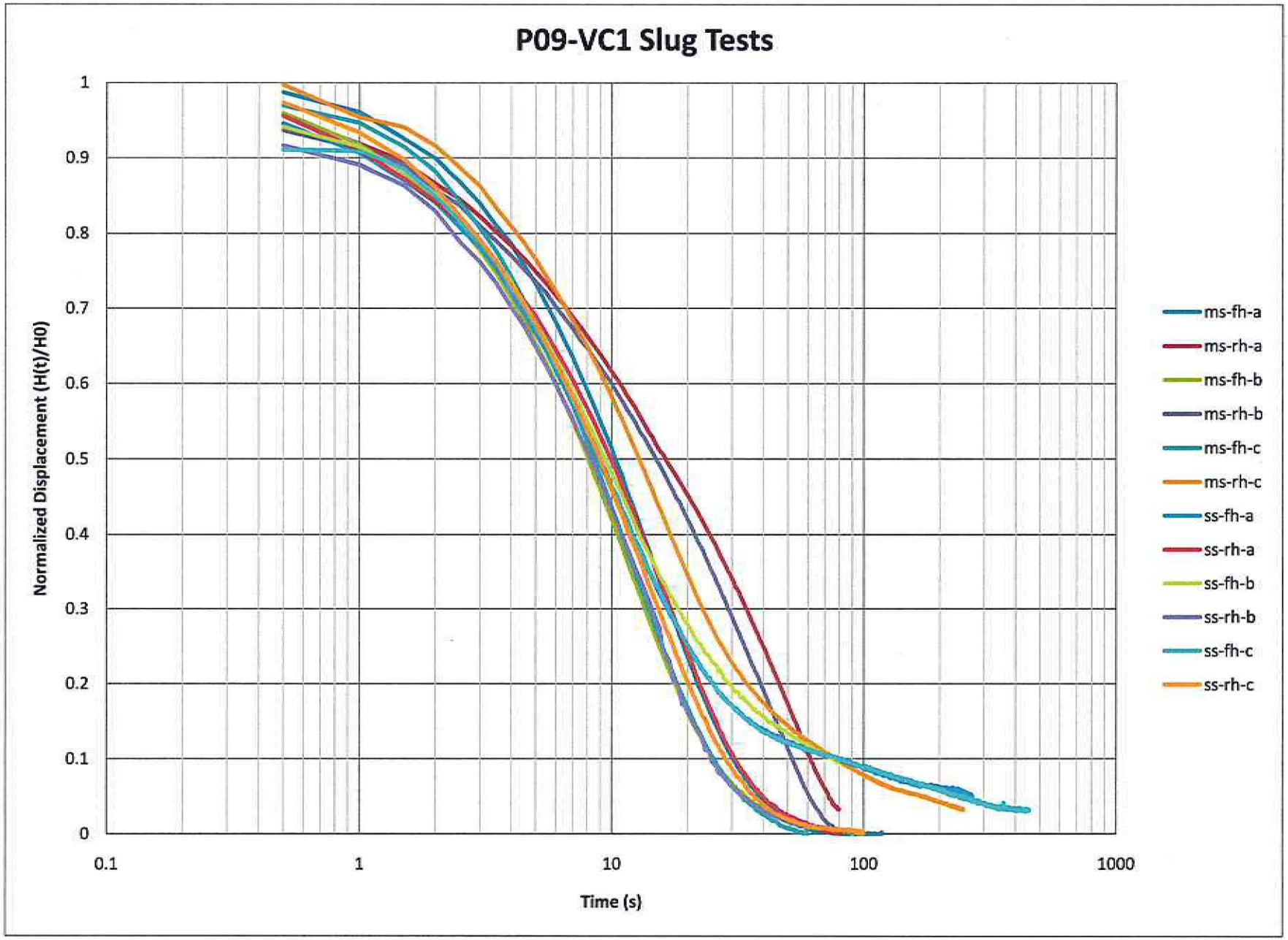
First attempt had leak at stuffing box. Second attempt went well.

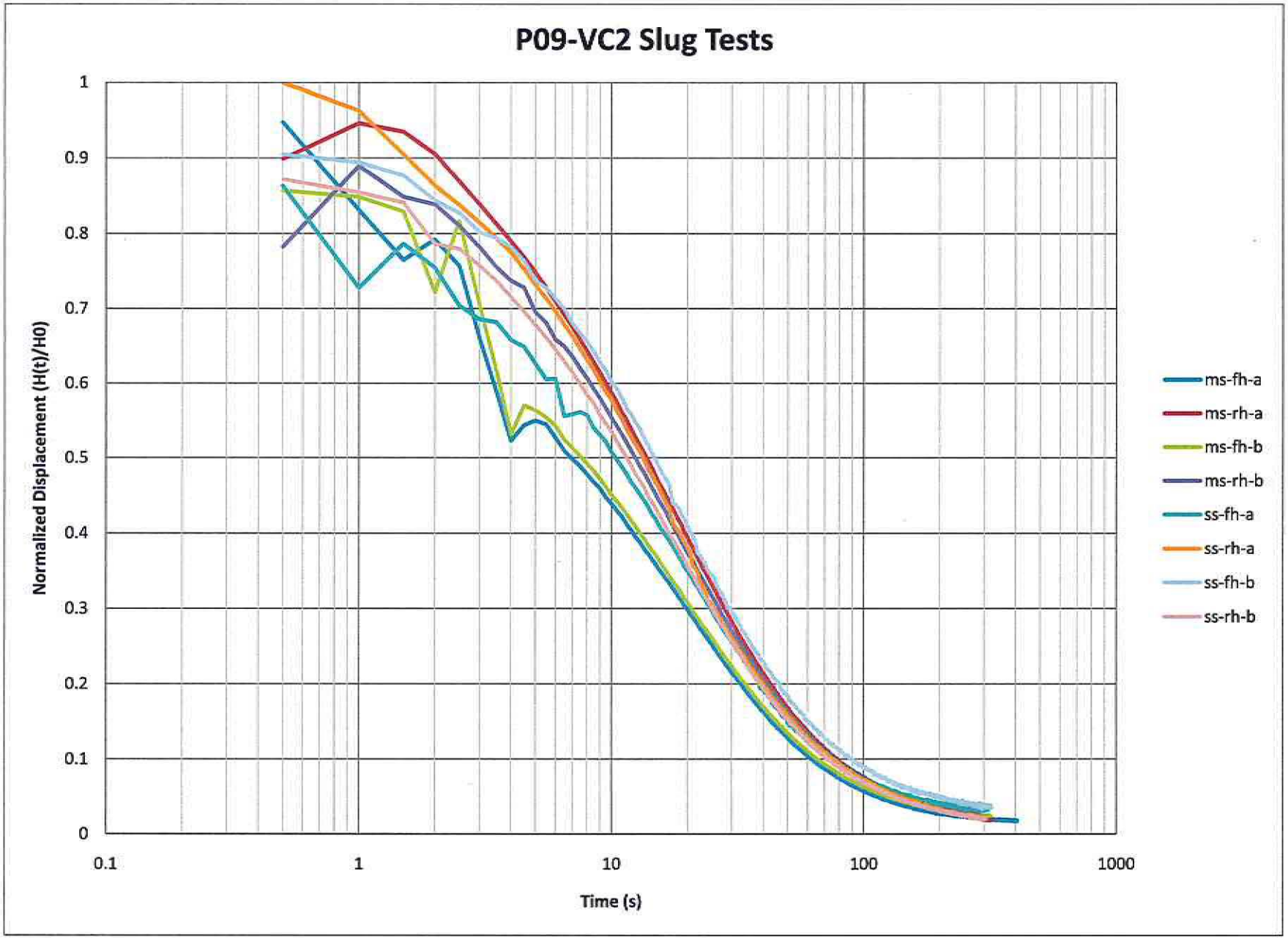
Test zone included zone with 10cm vein and much more highly "weathered" or cruddy looking rock immediately above it.

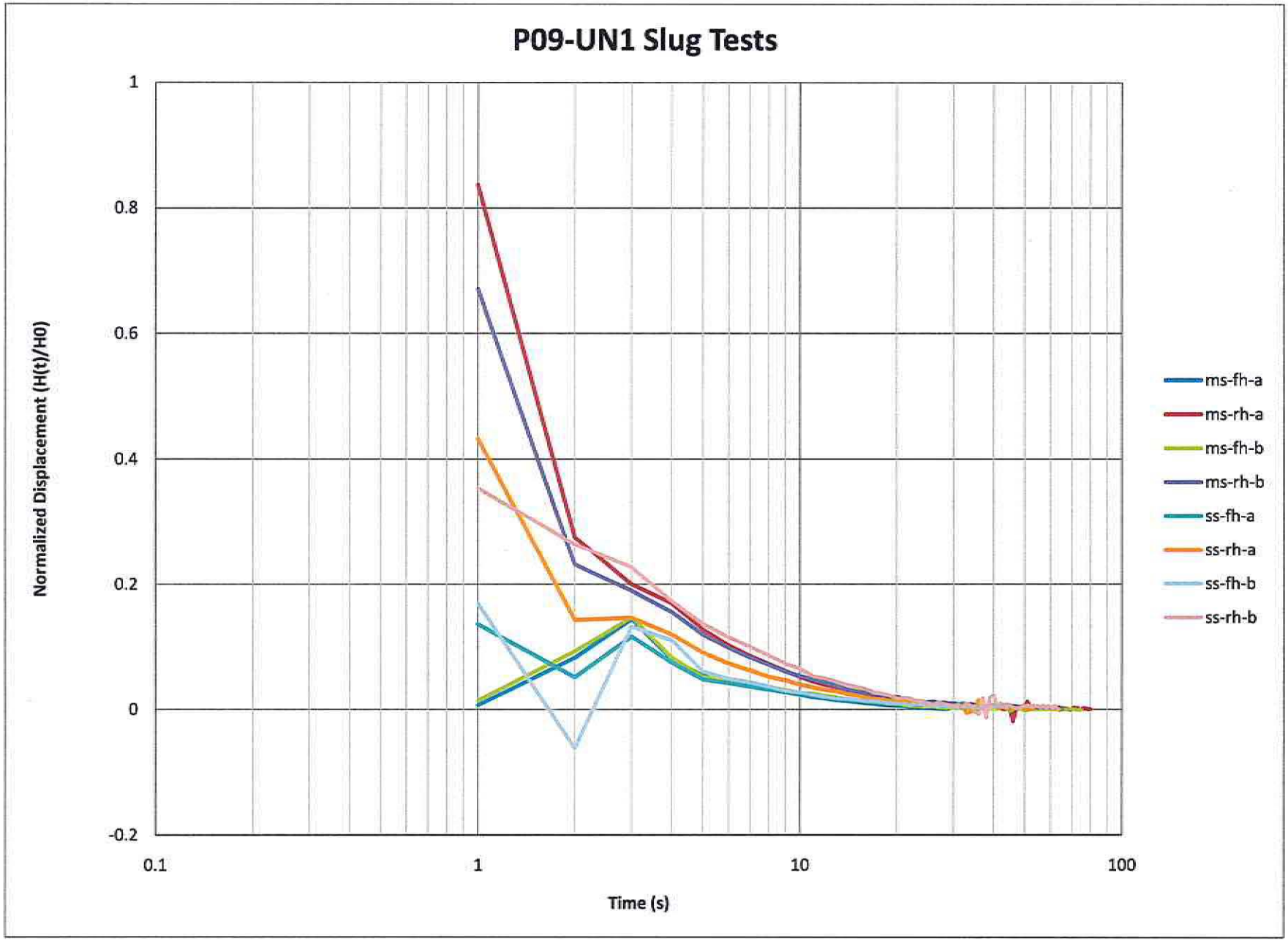
All system was good. Confident of results.or about

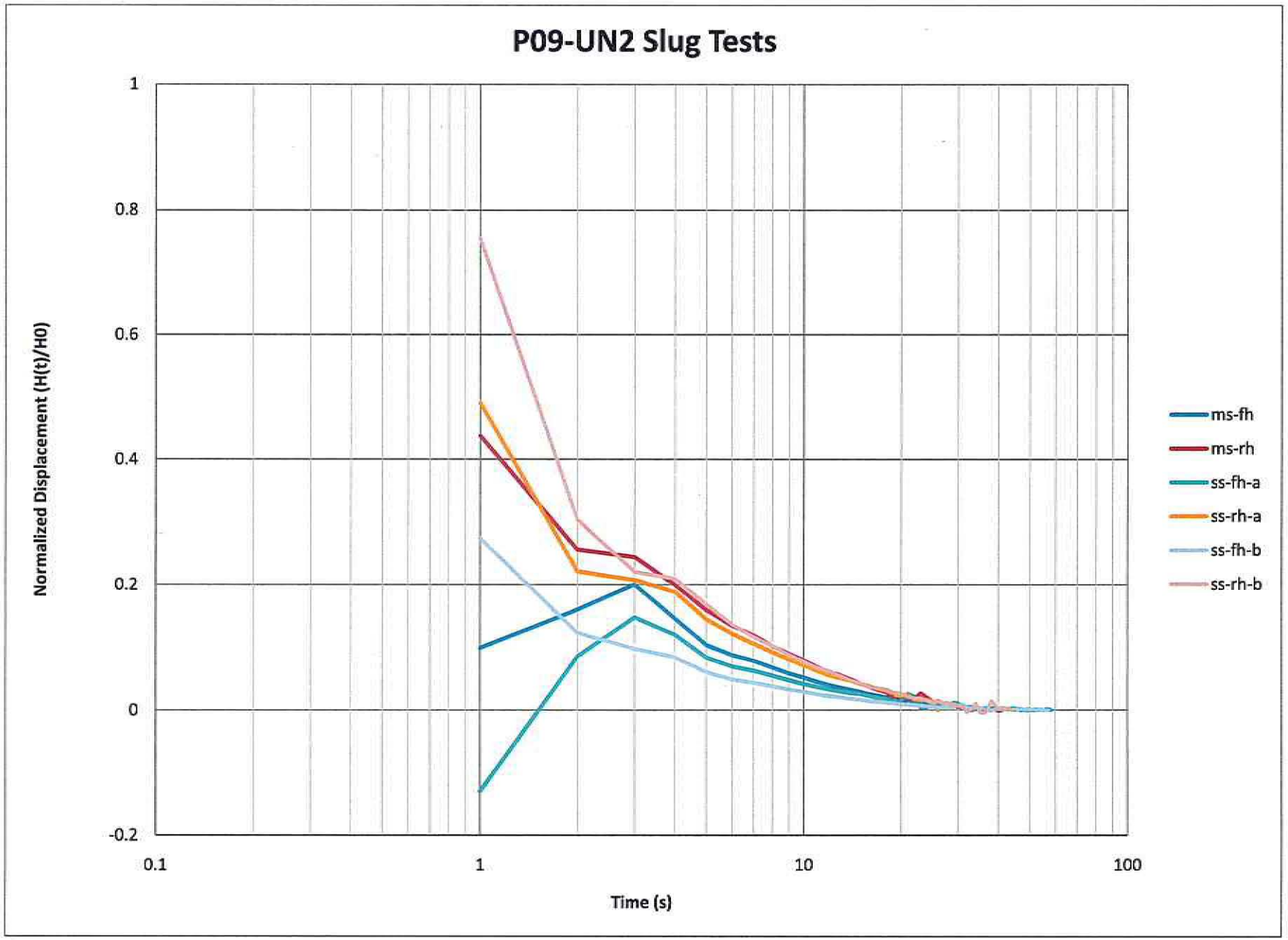
Interpretation of Results

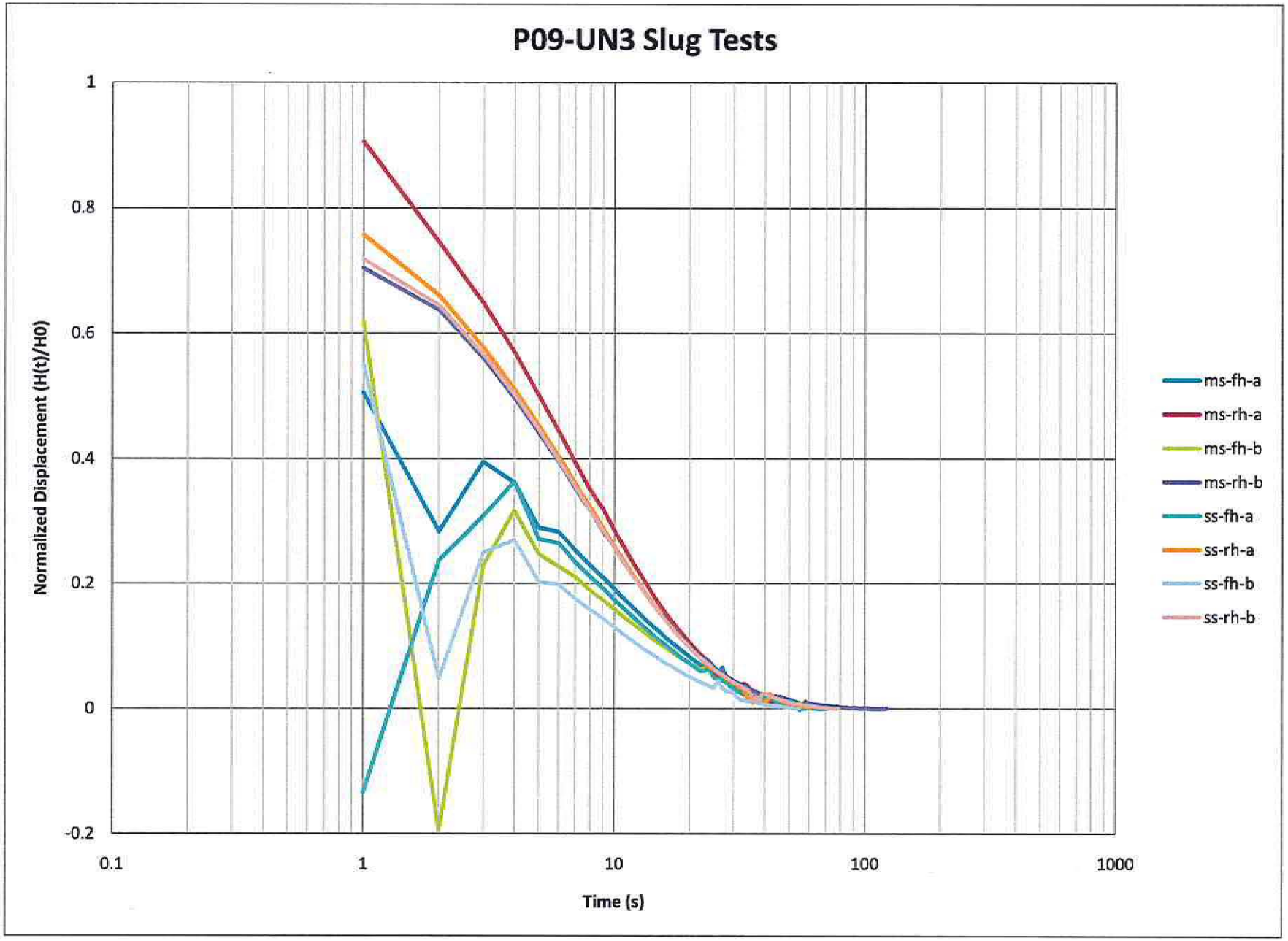
Reasonable results. Possible turbulent flow or more likely blocking of fractures. Pressures were quite steady.


P09-VC1 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ms-fh-c
ms-rh-c
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b
ss-fh-c
ss-rh-c


P09-VC2 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b


P09-UN1 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.8
0.6
0.4
0.2
0
-0.2
0.1
1
10
100
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b


P09-UN2 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.8
0.6
0.4
0.2
0
-0.2
0.1
1
10
100
Time (s)
ms-fh
ms-rh
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b


P09-UN3 Slug Tests
Normalized Displacement (H(t)/H0)
1
0.8
0.6
0.4
0.2
0
-0.2
0.1
1
10
100
1000
Time (s)
ms-fh-a
ms-rh-a
ms-fh-b
ms-rh-b
ss-fh-a
ss-rh-a
ss-fh-b
ss-rh-b

P09-C1

1/2

Slug Test - Data Acquisition Sheet

General Information

Well Number: P09-C1
Well Location: CROSS VALLEY DAM
Project: FARO MINE

Date: 8/AUG/2009
Tests Performed by: MARIC STOREY
CHRIS DOUGHTY

Reported Well Depth from Land Surface: 34.90 (WITHOUT EXTENSION) >
Measured Depth from TOC (top of casing): 35.19m
Casing Diameter and Schedule: 2" SCHED 40
Screen Length and Slot Size: 1.5m
Depth to Top of Screen from TOC: 34.4m
Filter Pack Details:

Date of Last Well Development: 03/08/09 (DD/mm/YY)
Initial Static Water Level from TOC: 1.095m WITH EXTENDED CASING
Final Static Water Level from TOC:
TOC from land surface: 0.903m + 1.530m EXTENSION (SEE NOTE ⇒ 2.43)
Borehole Diameter: 3.54" ⇒ 9cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	LEVELOGGER M10	1023982	SLUG TEST 6m	0.716m
Transducer #2				

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5s
Pressure or Pressure Head Units: m Time Units: S
Comments: FILENAME: 1023982_P09-C1_2009_08-08_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	MEDIUM SLUG	←	←	←	←
Rising/falling head	FALLING	RISING	FALLING	RISING	FALLING
* Pre-test value	5.380	5.377	5.377	5.377	5.377
* Post-test value	5.377	5.377	5.377	5.377	5.377
Expected H_0	0.716	0.716	0.716	0.716	0.716
Additional comments					
Test 01	14:15:27				
Test 02	14:19:25				
Test 03	14:22:06				
Test 04	14:24:42				
Test 05	14:27:26				

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method	MEDIUM SLUG	SMALL SLUG	←	←	←
Rising/falling head	RISING	FALLING	RISING	FALLING	RISING
Pre-test value	5.377	5.377	5.376	5.377	5.376
Post-test value	5.377	5.376	5.377	5.376	5.378
Expected H_0	0.716	0.49	0.49	0.49	0.49
Additional comments					
Test 06	14:30:50				
Test 07	14:34:48				
Test 08	14:37:25				
Test 09	14:40:33				
Test 10	14:43:42				

File for Field Data:

Prepared by the Kansas Geological Survey (distributed with permission)

MEDIUM SLUG: 5/8" x 1.60m

SMALL SLUG: 5/8" x 1.05m

* READING FROM DATA LOGGER ⇒ HEAD (m) ABOVE LOGGER.

NOTE: WATER LEVEL @ 0.435m BEFORE EXTENSION ATTACHED. WATER LEVEL TOO HIGH FOR BOTH SLUGS ($H_{0\,medium}$ = .70m, $H_{0\,small}$ = .46m). THEREFORE ADDED EXTENSION.

P09-C1

2/2

Slug Test - Data Acquisition Sheet

General Information

Well Number P09-C1
Well Location
Project

Date 8/AUG/2009
Tests Performed by:

Reported Well Depth from Land Surface
Measured Depth from TOC (top of casing)
Casing Diameter and Schedule
Screen Length and Slot Size
Depth to Top of Screen from TOC
Filter Pack Details

Date of Last Well Development
Initial Static Water Level from TOC
Final Static Water Level from TOC
TOC from land surface
Borehole Diameter
Annular Seal Details

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1				
Transducer #2				

Data Logger Type and Serial Number
Logging Program: Acquisition Rate:
Pressure or Pressure Head Units: Time Units:
Comments: FILENAME: 023982_P09-C1_2009_08_08_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	SMALL SLUG	←			
Rising/falling head	FALLING	RISING			
Pre-test value	5.378	5.376			
Post-test value	5.376	5.377			
Expected H_0	0.49	0.49			

Additional comments:
Test 01: 14:47:20
Test 02: 14:50:52

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method					
Rising/falling head					
Pre-test value					
Post-test value					
Expected H_0					

Additional comments:
Test 06:
Test 07:
Test 08:
Test 09:
Test 10:

File for Field Data:

Prepared by the Kansas Geological Survey (distributed with permission)

SMALL SLUG: 5/8" x 1.05m

P09-C2

Slug Test - Data Acquisition Sheet

General Information

Well Number: P09-C2
Well Location: CROSS VALLEY DAM
Project: FARO MINE

Date: 8/AUG/09
Tests Performed by: MARK STOREY
CHRIS DOUGHTY

Reported Well Depth from Land Surface: 60.2m
Measured Depth from TOC (top of casing): 61m
Casing Diameter and Schedule: 2" ϕ SCHED40
Screen Length and Slot Size: 6m 1M
Depth to Top of Screen from TOC: 54.9m
Filter Pack Details:

Date of Last Well Development: 04/08/09 (dd/mm/yy)
Initial Static Water Level from TOC: ARTESIAN
Final Static Water Level from TOC: ARTESIAN
TOC from land surface: 0.80m
Borehole Diameter: 3.5" ⇒ 9cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading In Air
Transducer #1	LEVELOGGER M10	1023982	"PUMP" TEST 70M	0.709m
Transducer #2				

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5S
Pressure or Pressure Head Units: m Time Units: S
Comments: FILENAME: 1023982_P09-C2_2009_08_08_pumptest.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	HYDROLIFT PUMP				
Rising/falling head	RISING				
Pre-test value	ARTESIAN (+1.949)				
Post-test value	ARTESIAN				
Expected H_0	—				
Additional comments					
Test 01	10:53:42 → PUMPED ~ 45L. LOGGER READING 1.52m				
Test 02	AT END OF PUMPING, RECOVERED TO ARTESIAN BY 12:10				
Test 03					
Test 04					
Test 05					

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method					
Rising/falling head					
Pre-test value					
Post-test value					
Expected H_0					
Additional comments					
Test 06					
Test 07					
Test 08					
Test 09					
Test 10					

File for Field Data:

Prepared by the Kansas Geological Survey (distributed with permission)

P09-C3

1/2

Slug Test - Data Acquisition Sheet

General Information

Well Number: P09-C3
Well Location: CROSS VALLEY DAM
Project: FARO MINE

Date: 8/AUG/2009
Tests Performed by: MARIE STOREY
CHRIS DOUGHTY

Reported Well Depth from Land Surface	Date of Last Well Development
Measured Depth from TOC (top of casing)	Initial Static Water Level from TOC: 1.560 m
Casing Diameter and Schedule	Final Static Water Level from TOC
Screen Length and Slot Size	TOC from land surface
Depth to Top of Screen from TOC	Borehole Diameter
Filter Pack Details	Annular Seal Details

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	LEVELOGGER M10	1023982	SLUG TEST 5m	0.710m
Transducer #2			LOGGER DEPTH 5m	

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5s
Pressure or Pressure Head Units: m Time Units: S
Comments: FILENAME: 1023982_P09-C3_2009_08_08_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	MEDIUM SLUG	←	BIG SLUG	MEDIUM SLUG	←
Rising/falling head	FALLING	RISING	—	FALLING	RISING
Pre-test value	3.918	3.918	—	3.914	3.918
Post-test value	3.918	3.918	—	3.918	3.916
Expected H_0	0.76	0.76	—	0.76	0.76

Additional comments:

Test 01	OSCILLATORY RESPONSE 12:48:25
Test 02	" " 12:51:10
Test 03	@ 12:53:45 - BIG SLUG DID NOT FIT DOWN WELL.
Test 04	12:57:10 OSCILLATORY RESPONSE
Test 05	12:58:40 " "

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method	MEDIUM SLUG	←	←	←	SMALL SLUG
Rising/falling head	FALLING	RISING	FALLING	RISING	FALLING
Pre-test value	3.916	3.919	3.914	3.916	3.914
Post-test value	3.919	3.914	3.916	3.914	3.916
Expected H_0	0.76	0.76	0.76	0.76	0.49

Additional comments:

Test 06	13:01:30 OSCILLATORY RESPONSE
Test 07	13:02:45 " "
Test 08	13:04:10 " "
Test 09	13:05:37 " "
Test 10	13:09:59 " "

File for Field Data:

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BIG SLUG: 1.5" x 1.60m
MEDIUM SLUG: 5/8" x 1.60m
SMALL SLUG: 5/8" x 1.05m

P09-C3

2/2

Slug Test - Data Acquisition Sheet

General Information

Well Number P09-C3 Date 8/AUG/2009

Well Location Tests Performed by:

Project

Reported Well Depth from Land Surface Date of Last Well Development

Measured Depth from TOC (top of casing) Initial Static Water Level from TOC

Casing Diameter and Schedule Final Static Water Level from TOC

Screen Length and Slot Size TOC from land surface

Depth to Top of Screen from TOC Borehole Diameter

Filter Pack Details Annular Seal Details

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1				
Transducer #2				

Data Logger Type and Serial Number

Logging Program: Acquisition Rate:

Pressure or Pressure Head Units: Time Units:

Comments: FILENAME: 1023982_P09-C3_2009_08_08_.lev

Test Information

	Test 01 11	Test 02 12	Test 03 13	Test 04 14	Test 05 15
Initiation method	SMALL SLUG	←	←	←	←
Rising/falling head	RISING	FALLING	RISING	FALLING	RISING
Pre-test value	3.916	3.913	3.916	3.912	3.913
Post-test value	3.913	3.916	3.912	3.913	3.914
Expected H_0	0.49	0.49	0.49	0.49	0.49

Additional comments:

Test 01	13:12:05 OSCILLATORY RESPONSE
Test 02	13:15:44 " "
Test 03	13:18:10 " "
Test 04	13:20:40 " "
Test 05	13:24:15 " "

	Test 06 16	Test 07 17	Test 08	Test 09	Test 10
Initiation method	SMALL SLUG	←			
Rising/falling head	FALLING	RISING			
Pre-test value	3.914	3.915			
Post-test value	3.915	3.914			
Expected H_0	0.49	0.49			

Additional comments:

Test 06	13:32:50 OSCILLATORY RESPONSE
Test 07	13:37:03 " "
Test 08	
Test 09	
Test 10	

File for Field Data:

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SMALL SLUG : 5/8" X 1.05m

GS1A

Slug Test - Data Acquisition Sheet

General Information

Well Number: GS1A
Well Location: GRUM SLOT
Project: FARO MINE

Date: 6/AUG/2009
Tests Performed by: MARK STO REY, CHRIS DOUGHTY

Reported Well Depth from Land Surface: 29.16m
Measured Depth from TOC (top of casing): 28.74m
Casing Diameter and Schedule: 2" ø SCH40
Screen Length and Slot Size: 6.1m
Depth to Top of Screen from TOC: 23.65m
Filter Pack Details:

Date of Last Well Development: 2/AUG/2009
Initial Static Water Level from TOC: 2.521m
Final Static Water Level from TOC:
TOC from land surface: 0.86m
Borehole Diameter: 3.54"
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	SOLINST M20	1023982	SLUG TEST 7.6m	0.491 m
Transducer #2				

Data Logger Type and Serial Number: SOLINST LEVELOGGER GOLD
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5 S
Pressure or Pressure Head Units: m Time Units: S
Comments: FILENAMES: 1023982 - GS1A - 2009_08_06_.lev (TESTS 1-3)
" " 08_06_2.lev (TEST 4)

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	SOLID SLUG	←	←	←	
Rising/falling head	FALLING	RISING	FALLING	RISING	
Pre-test value	5.480	5.485	5.420	5.461	
Post-test value	5.485	5.420	5.461	5.427	
Expected H_0	0.76	0.78	0.449	0.449	

Additional comments		
Test 01	MEDIUM SLUG 5/8" x 1.60m	11:26:52
Test 02	" "	13:02:30
Test 03	SMALL SLUG 5/8" x 1.05m	14:42:48
Test 04	" "	16:35:05
Test 05		

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method					
Rising/falling head					
Pre-test value					
Post-test value					
Expected H_0					

Additional comments	
Test 06	
Test 07	
Test 08	
Test 09	
Test 10	
File for Field Data:	SEE ABOVE

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* HEAD (m) ABOVE DATA LOGGER.

GS 1B

Slug Test - Data Acquisition Sheet

General Information

Well Number GS 1B
Well Location GRUM SLOT
Project FARO MINE

Date 5/AUG/2009
Tests Performed by: MARK STOREY, CHRIS DOUGHTY

Reported Well Depth from Land Surface 29.6m
Measured Depth from TOC (top of casing) 28.74m
Casing Diameter and Schedule 2" SCHED 40
Screen Length and Slot Size 6.1m
Depth to Top of Screen from TOC 23.5m
Filter Pack Details

Date of Last Well Development 1/AUG/2009
Initial Static Water Level from TOC 7.52m
Final Static Water Level from TOC
TOC from land surface 0.81m
Borehole Diameter 3.54"
Annular Seal Details

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	SOLINST L.G.	1023982	SLUG TEST 4.6m	
Transducer #2				

Data Logger Type and Serial Number SOLINST LEVELOGGER GOLD
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5 s
Pressure or Pressure Head Units: m Time Units: Seconds
Comments: FILENAMES: 1023982 - GS1B - 2009 - 08 - 05 - .lev (TESTS 1 - 6)
1023982 - GS1B - 2009 - 08 - 05 - 2.lev (TESTS 7 - 10)

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG
Rising/falling head	FALLING	RISING	FALLING	RISING	FALLING
Pre-test value	3.713m	3.714m	3.712m	3.713m	3.712m
Post-test value	3.714m	3.712m	3.713m	3.712m	3.713m
Expected H_0	0.76m	0.76m	0.49m	0.49m	0.49m
Additional comments					
Test 01	MEDIUM SLUG 5/8" x 1.60m			15:26:55	
Test 02	SMALL SLUG 5/8" x 1.05m			15:28:03	
Test 03	SMALL SLUG	"		15:29:21	
Test 04	SMALL SLUG	"		15:30:21	
Test 05	SMALL SLUG	"		15:31:09	

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG
Rising/falling head	RISING	FALLING	RISING	FALLING	RISING
Pre-test value	3.713m	3.712m	3.713m	3.712m	3.712m
Post-test value	3.712m	3.713m	3.712m	3.712m	3.711m
Expected H_0	0.49m	0.49m	0.49m	0.49m	0.49m
Additional comments					
Test 06	SMALL SLUG 5/8" x 1.05m			15:31:52	
Test 07	"	"		15:37:07	
Test 08	"	"		15:38:03	
Test 09	"	"		15:38:59	
Test 10	"	"		15:40:04	
File for Field Data:					

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* HEAD ABOVE DATA LOGGER

LCD-01

Slug Test - Data Acquisition Sheet

General Information

Well Number: LCD-01
Well Location: LITTLE CREEK DAM
Project: FARO MINE

Date: 7 AUG 2009
Tests Performed by: MARIE STOREY
CHRIS DOUGHTY

Reported Well Depth from Land Surface: 6.47m
Measured Depth from TOC (top of casing): 7.38m
Casing Diameter and Schedule: 2" SCHED 40
Screen Length and Slot Size: 0.5m
Depth to Top of Screen from TOC: 0.908
Filter Pack Details:

Date of Last Well Development: 03/08/05 dd/mm/yy
Initial Static Water Level from TOC: 3.877m
Final Static Water Level from TOC:
TOC from land surface: 0.908m
Borehole Diameter: 3.54" - 9cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	LEVELOGGER M20	1023982	SLUG TEST 7m	0.607m
Transducer #2				

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5 s
Pressure or Pressure Head Units: m Time Units: s
Comments:
FILENAME: 1023982 _ LCD-01 _ 2009_08-07_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	MEDIUM SLUG	←	←	←	SMALL SLUG
Rising/falling head	FALLING	RISING	FALLING	RISING	FALLING
Pre-test value	3.766	3.773	3.758	3.770	3.755
Post-test value	3.773	3.758	3.770	3.755	3.767
Expected H_0	0.76m	0.76m	0.76m	0.76m	0.49

Additional comments:
Test 01: 15:40:20
Test 02: 15:42:42
Test 03: 15:45:05
Test 04: 15:47:30
Test 05: 15:49:56

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method	SMALL SLUG	←	←		
Rising/falling head	RISING	FALLING	RISING		
Pre-test value	3.767	3.757	3.767		
Post-test value	3.757	3.767	3.758		
Expected H_0	0.49m	0.49m	0.49m		

Additional comments:
Test 06: 15:52:00
Test 07: 15:54:20
Test 08: 15:57:00
Test 09:
Test 10:

File for Field Data:

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* MEDIUM SLUG : 5/8" x 1.60m
SMALL SLUG : 5/8" X 1.05m

* HEAD OF WATER ABOVE LOGGER.

LCD-02

Slug Test - Data Acquisition Sheet

General Information

Well Number: LCD-02
Well Location: LITTLE CREEK DAM
Project: FARO MINE

Date: 7/AUG/2009
Tests Performed by: MARK STOREY, CHRIS DOUGHTY

Reported Well Depth from Land Surface:
Measured Depth from TOC (top of casing): 5.71m
Casing Diameter and Schedule: 2" ϕ SCH40
Screen Length and Slot Size: 1.2m
Depth to Top of Screen from TOC: 4.5m
Filter Pack Details:

Date of Last Well Development: 02/08/09
Initial Static Water Level from TOC: 4.42m
Final Static Water Level from TOC:
TOC from land surface: .895
Borehole Diameter: 3.54" ϕ, 9cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	LEVELOGGER M20	1023982	PUMP TEST	0.609m
Transducer #2				

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5s
Pressure or Pressure Head Units: M Time Units: S
Comments: FILENAME: 1023982_LCD-02_2009-08-07_pumptest.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	PUMPED BY HAND	←			
Rising/falling head	RISING	RISING			
Pre-test value	1.805	1.941			
Post-test value	1.940	1.940			
Expected H_0	—	—			

Additional comments:
Test 01: LEVELOGGER DROPPED DURING PUMPING. 18:09:19
Test 02: 18:18:20
Test 03:
Test 04:
Test 05:

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method					
Rising/falling head					
Pre-test value					
Post-test value					
Expected H_0					

Additional comments:
Test 06:
Test 07:
Test 08:
Test 09:
Test 10:

File for Field Data:

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** HEAD (m) ABOVE DATA LOGGER

LCD-03

Slug Test - Data Acquisition Sheet

General Information

Well Number: LCD-03
Well Location: LITTLE CREEK DAM
Project: FARO MINE

Date: 7/AUG/09
Tests Performed by: MARK STOREY
CHRIS DOUGHTY

Reported Well Depth from Land Surface: 5.997m
Measured Depth from TOC (top of casing): 6.860m
Casing Diameter and Schedule: 2", SCHED 40
Screen Length and Slot Size: 0.3m
Depth to Top of Screen from TOC: 4.5m
Filter Pack Details:

Date of Last Well Development: 5/AUG/09
Initial Static Water Level from TOC: 1.688m
Final Static Water Level from TOC:
TOC from land surface: 0.863m
Borehole Diameter: 3.54" / 9cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	LEVELOGGER M10	1023982	SLUG TEST 6m	0.617m
Transducer #2				

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5 S
Pressure or Pressure Head Units: m Time Units: S
Comments: FILENAME: 1023982_LCD-03_2009_08_07_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	MEDIUM SLUG	←	SMALL SLUG	←	
Rising/falling head	FALLING	RISING	FALLING	RISING	
Pre-test value	4.873	4.892	4.866	4.878	
Post-test value	4.892	4.866	4.878	4.867	
Expected H_0	0.76	0.76	0.49	0.49	

Additional comments:

Test 01	13:37:18
Test 02	13:59:59
Test 03	14:31:20
Test 04	14:59:46
Test 05	

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method					
Rising/falling head					
Pre-test value					
Post-test value					
Expected H_0					

Additional comments:

Test 06	
Test 07	
Test 08	
Test 09	
Test 10	

File for Field Data:

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MEDIUM SLUG = 5/8" x 1.60m
SMALL SLUG = 5/8" x 1.05m

* HEAD (m) ABOVE DATA LOGGER

LCD-04

Slug Test - Data Acquisition Sheet

General Information

Well Number: LCD-04
Well Location: LITTLE CREEK DAM
Project: FARO MINE

Date: 6/AUG/2009
Tests Performed by: MARK STOREY
CHRIS DOUGHTY

Reported Well Depth from Land Surface:
Measured Depth from TOC (top of casing): 11.957m
Casing Diameter and Schedule: 2"Φ, SCHED 40
Screen Length and Slot Size: 0.9m,
Depth to Top of Screen from TOC: 11.057m
Filter Pack Details:

Date of Last Well Development: 5/AUG/2009
Initial Static Water Level from TOC: 11.957m
Final Static Water Level from TOC:
TOC from land surface: 0.843
Borehole Diameter: 7.54"D, 0cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	LEVELOGGER M10	1034543	"PUMP" TEST 12m	0.696m
Transducer #2				

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 2 5*
Pressure or Pressure Head Units: m Time Units: S
Comments: FILENAME: 1034543_LCD-04_2009_08_07-pumptest.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	PUMP / SLUG				
Rising/falling head	RISING				
Pre-test value	SEE FILE				
Post-test value	SEE FILE				
Expected H_0	N/A				

Additional comments:
Test 01: COULD NOT PUMP SO JUST REMOVED TUBING TO ACT LIKE A SMALL SLUG. STARTED 1940 ON 6/AUG/09, FINISHED 1756 ON 7/AUG/09.
Test 02:
Test 03:
Test 04:
Test 05:

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method					
Rising/falling head					
Pre-test value					
Post-test value					
Expected H_0					

Additional comments:
Test 06:
Test 07:
Test 08:
Test 09:
Test 10:

File for Field Data:

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* NOTE; PREVIOUS RECHARGE DATA INDICATED THAT IT WAS TAKE VERY LONG TO RECHARGE. ∴ SET LOGGER ACQUISITION RATE TO 2 S FOR 72 HOUR COVERAGE.

** WATER LEVEL TOO LOW FOR PROPER SLUG TESTS

LCD-06

Slug Test - Data Acquisition Sheet

General Information

Well Number: LCD-06
Well Location: LITTLE CREEK DAM
Project: FARO MINE

Date: 6/AUG/2009
Tests Performed by: MARK STOREY, CHRIS DOUGHTY

Reported Well Depth from Land Surface: 11.354m
Measured Depth from TOC (top of casing): 12.254m
Casing Diameter and Schedule: 2" / SCHED 40
Screen Length and Slot Size: 0.9m
Depth to Top of Screen from TOC: 11.354m
Filter Pack Details:

Date of Last Well Development: 2/AUG/2009
Initial Static Water Level from TOC: 5.620m
Final Static Water Level from TOC:
TOC from land surface: 0.843m
Borehole Diameter: 5.54" ϕ, 9cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	LEVELOGGER M10	1023982	SLUG TEST 7.85m	0.620m
Transducer #2				

Data Logger Type and Serial Number: SOLINST
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5s
Pressure or Pressure Head Units: m Time Units: S
Comments: FILENAME: 1023982_LCD-06_2009_08_06_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	SOLID SLUG	←			
Rising/falling head	FALLING	RISING	FALLING	RISING	FALLING
Pre-test value	2.890	2.889	2.880	2.893	2.882
Post-test value	2.889	2.880	2.893	2.882	2.892
Expected H_0	0.76m	0.76	0.76	0.76	0.44
Additional comments					
Test 01	MEDIUM SLUG 5/8" x 1.60m			18:43:45	
Test 02	"		"	18:49:05	
Test 03	"		"	18:55:40	
Test 04	"		"	19:01:30	
Test 05	SMALL SLUG 5/8" x 1.05m				

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method	SOLID SLUG	←	←		
Rising/falling head	RISING	FALLING	RISING		
Pre-test value	2.892	2.886	2.894		
Post-test value	2.886	2.894	2.887		
Expected H_0	0.44	0.44	0.44		
Additional comments					
Test 06	SMALL SLUG 5/8" x 1.05m				
Test 07	"	"			
Test 08	"	"			
Test 09					
Test 10					

File for Field Data: SEE ABOVE

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* HEAD OF WATER (m) ABOVE LOGGER

VC1

(1/2)

Slug Test - Data Acquisition Sheet

General Information

Well Number VC1
Well Location VANGORDA CREEK
Project FARO MINE

Date 5/AUG/2009
Tests Performed by: MARK STOREY, CHRIS DOUGHTY

Reported Well Depth from Land Surface 64.97m
Measured Depth from TOC (top of casing) 64m
Casing Diameter and Schedule 2" SCHED 40
Screen Length and Slot Size 6m
Depth to Top of Screen from TOC 61m
Filter Pack Details

Date of Last Well Development 31/ JULY/ 2009
Initial Static Water Level from TOC 4.615m
Final Static Water Level from TOC
TOC from land surface 1.03m
Borehole Diameter 3.54" / 9cm
Annular Seal Details

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	SOLINST LG	1023982	SLUG TEST 9.0 m	
Transducer #2				

Data Logger Type and Serial Number SOLINST LEVELOGGER GOLD
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5 s
Pressure or Pressure Head Units: m Time Units: seconds
Comments: FILENAME: 1023982_VC1_2009_08_05_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG
Rising/falling head	FALLING	RISING	FALLING	RISING	FALLING
* Pre-test value	4.298m	4.292m	4.307m	4.336m	4.299m
* Post-test value	4.292m	4.307m	4.336m	4.279m	4.299m
Expected H_0	0.76m	0.76m	0.76m	0.76m	0.76m
Additional comments					
Test 01	MEDIUM SLUG	5/8" x 1.60m		17:17:58	
Test 02	MEDIUM SLUG	"		17:21:44	
Test 03	MEDIUM SLUG	"		17:24:46	
Test 04	MEDIUM SLUG	"		17:32:55	
Test 05	MEDIUM SLUG	"		17:38:43	

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG
Rising/falling head	RISING	FALLING	RISING	FALLING	RISING
Pre-test value	4.299m	4.281m	4.295m	4.279m	4.198m
Post-test value	4.281m	4.295m	4.299m	4.198m	4.187m
Expected H_0	0.76m	0.49m	0.49m	0.49m	0.49m
Additional comments					
Test 06	MEDIUM SLUG	"		17:48:31	
Test 07	SMALL SLUG	5/8" x 1.05m		17:54:04	
Test 08	SMALL SLUG			17:58:41	
Test 09	SMALL SLUG			18:04:12	
Test 10	SMALL SLUG			18:18:27	
File for Field Data:				SEE ABOVE	

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* HEAD ABOVE DATA LOGGER (m)

VC1

2/2

Slug Test - Data Acquisition Sheet

General Information

Well Number: VC1
Well Location: JANGORDA CREEK
Project: FARO MINE

Date: 5/AUG/2009
Tests Performed by: MARK STOREY, CHRIS DOUGHTY

Reported Well Depth from Land Surface:
Measured Depth from TOC (top of casing):
Casing Diameter and Schedule:
Screen Length and Slot Size:
Depth to Top of Screen from TOC:
Filter Pack Details:

Date of Last Well Development:
Initial Static Water Level from TOC: 4.615m
Final Static Water Level from TOC:
TOC from land surface:
Borehole Diameter:
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	SOLINST LC	1023982		
Transducer #2				

Data Logger Type and Serial Number:
Logging Program: Acquisition Rate:
Pressure or Pressure Head Units: Time Units:
Comments: FILENAME: 1023982_VC1_2009-08-05_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	SOLID SLUG	SOLID SLUG			
Rising/falling head	FALLING	RISING			
Pre-test value	4.187m	4.197m			
Post-test value	4.197m	4.192m			
Expected H_0	0.49m	0.49m			

Additional comments:

Test 01	SMALL SLUG	5/8" x 1.05m	18:20:18
Test 02	SMALL SLUG	"	18:27:57
Test 03			
Test 04			
Test 05			

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method					
Rising/falling head					
Pre-test value					
Post-test value					
Expected H_0					

Additional comments:

Test 06	
Test 07	
Test 08	
Test 09	
Test 10	

File for Field Data:

Prepared by the Kansas Geological Survey (distributed with permission)

VC2

Slug Test - Data Acquisition Sheet

General Information

Well Number: VC 2
Well Location: VANGORDA CREEK
Project: FARO MINE

Date: 5 AUGUST 2009
Tests Performed by: MARK STOREY, CHRIS DOUGHTY

Reported Well Depth from Land Surface: 24.1m
Measured Depth from TOC (top of casing): 25m
Casing Diameter and Schedule: 2" SCHED 40
Screen Length and Slot Size: 3m
Depth to Top of Screen from TOC: 21.3m
Filter Pack Details:

Date of Last Well Development: 1/AUG/2009
Initial Static Water Level from TOC: 1.63
Final Static Water Level from TOC:
TOC from land surface: 0.9m
Borehole Diameter: 3.42" 9cm
Annular Seal Details:

	Type	Serial Number	Purpose and Placement	Reading in Air
Transducer #1	SOLINST L.A.	1023982	SLUG TEST 6.6 m	
Transducer #2				

Data Logger Type and Serial Number: SOLINST LEVELOGGER GOLD
Logging Program: LEVELOGGER 3.2.1 Acquisition Rate: 0.5 seconds
Pressure or Pressure Head Units: m Time Units: Seconds
Comments: FILENAME 1023982_VC2_2009_08_05_.lev

Test Information

	Test 01	Test 02	Test 03	Test 04	Test 05
Initiation method	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG	SOLID SLUG
Rising/falling head	FALLING	RISING	FALLING	RISING	FALLING
Pre-test value	5.484m	5.496m	5.486m	5.502m	5.488m
Post-test value	5.496m	5.486m	5.502m	5.488m	5.500m
Expected H_0	0.76m	0.76m	0.76m	0.76m	0.49m
Additional comments					
Test 01	MEDIUM SLUG	5/8" x 1.60 m	16:09:59		
Test 02	MEDIUM SLUG	5/8" x 1.60 m	16:17:26		
Test 03	MEDIUM SLUG	5/8" x 1.60m	16:23:00		
Test 04	MEDIUM SLUG	5/8" x 1.60m	16:28:26		
Test 05	SMALL SLUG	5/8" x 1.05m	16:33:51		

	Test 06	Test 07	Test 08	Test 09	Test 10
Initiation method	SOLID SLUG	SOLID SLUG	SOLID SLUG		
Rising/falling head	RISING	FALLING	RISING		
Pre-test value	5.500m	5.493m	5.503m		
Post-test value	5.493m	5.503m	5.496m		
Expected H_0	0.49m	0.49m	0.49m		
Additional comments					
Test 06	SMALL SLUG	5/8" x 1.05 m	16:39:43		
Test 07	SMALL SLUG	5/8" x 1.05 m	16:45:04		
Test 08	SMALL SLUG	5/8" x 1.05 m	16:51:00		
Test 09					
Test 10					

File for Field Data: 1023982_VC2_2009_08_05_.lev

Prepared by the Kansas Geological Survey (distributed with permission)

* HEAD ABOVE LEVEL LOGGER (m)

Appendix C
Water Quality Laboratory Reports

		Cross Valley Dam					
Well ID	**Units**	**P09-C1**	**P09-C11**	**P09-C2**	**P09-C3**	**P09-C3-D**	**P09-C3**
Maxxam ID		Q12005	P97629	Q21013	Q21014	Q21015	R66107
Sampling Date		7/31/2009	7/24/2009	8/4/2009	8/7/2009	8/7/2009	11/4/2009
COC Number		F130713	8302437	F130716	F130716	F130716	8305641
Notes						Duplicate	
Field EC	uS/cm	2070		2435	846	846	880
Field pH	pH Units	7.06		6.36	6.98	6.98	7.55
Misc. Inorganics							
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acidity (pH 8.3)	mg/L	51.4	24.5	203	41.2	33.8	16.8
Preparation							
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	410	350	1500	390	390	450
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	510	430	1900	470	470	550
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anions							
Dissolved Sulphate (SO4)	mg/L	1000	1300	28	100	100	94
Dissolved Chloride (Cl)	mg/L	3.2	3.0	20	2.9	2.8	3.9
Physical Properties							
Conductivity	uS/cm	2400	2400	2520	868	867	934
pH	pH Units	7.7	7.8	7.6	7.7	7.7	7.4
Physical Properties							
Total Suspended Solids	mg/L	360		33	52	57	15
TDS	mg/L						520
Misc. Inorganics							
Dissolved Hardness (CaCO3)	mg/L	1470	1390	877	389	380	460
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	ug/L	11	4	48	<3	<3	2.2
Dissolved Antimony (Sb)	ug/L	1.1	1.8	2.2	0.8	0.9	0.07
Dissolved Arsenic (As)	ug/L	7.5	10.1	0.6	2.7	2.8	2.51
Dissolved Barium (Ba)	ug/L	47.2	40.5	508	80	80	172
Dissolved Beryllium (Be)	ug/L	0.10	0.10	1.4	<0.1	<0.1	0.08
Dissolved Bismuth (Bi)	ug/L	<0.03	<0.03	<1	<1	<1	<0.005
Dissolved Boron (B)	ug/L	<300	<300	75	<50	<50	<50
Dissolved Cadmium (Cd)	ug/L	0.07	0.04	0.02	<0.01	<0.01	0.011
Dissolved Chromium (Cr)	ug/L	<0.5	<0.5	<1	<1	<1	0.2
Dissolved Cobalt (Co)	ug/L	0.23	0.19	<0.5	<0.5	<0.5	0.078
Dissolved Copper (Cu)	ug/L	0.4	0.8	<0.2	0.2	0.8	<0.05
Dissolved Iron (Fe)	ug/L	9720	10900	3120	2120	2140	2700
Dissolved Lead (Pb)	ug/L	0.34	0.09	<0.2	<0.2	<0.2	0.015
Dissolved Lithium (Li)	ug/L	159	107	725	58	57	78.0
Dissolved Manganese (Mn)	ug/L	12200	12200	167	567	558	324
Dissolved Mercury (Hg)	ug/L			<0.02	0.03	<0.02	
Dissolved Molybdenum (Mo)	ug/L	10.9	12.7	2	2	2	0.98
Dissolved Nickel (Ni)	ug/L	2.5	2.2	5	4	4	0.34
Dissolved Selenium (Se)	ug/L	<0.2	<0.2	0.1	<0.1	<0.1	<0.04
Dissolved Silicon (Si)	ug/L	9360	10000	9020	6180	6230	7530
Dissolved Silver (Ag)	ug/L	<0.03	<0.03	0.19	0.04	0.03	0.072
Dissolved Strontium (Sr)	ug/L	2040	1890	3630	1010	1000	1600
Dissolved Thallium (Tl)	ug/L	0.01	<0.01	<0.05	<0.05	<0.05	<0.002
Dissolved Tin (Sn)	ug/L	0.09	<0.05	<5	<5	<5	<0.01
Dissolved Titanium (Ti)	ug/L	3	<3	12	<5	9	0.6
Dissolved Uranium (U)	ug/L	3.60	3.77	3.0	2.5	2.6	1.55
Dissolved Vanadium (V)	ug/L	<1	<1	<5	<5	<5	<0.2
Dissolved Zinc (Zn)	ug/L	2.4	29.1	8	<5	7	1.2
Dissolved Zirconium (Zr)	ug/L	1.2	1.0	59.7	2.1	2.6	19.3
Dissolved Calcium (Ca)	mg/L	433	416	207	96.9	94.5	116
Dissolved Magnesium (Mg)	mg/L	95.3	86.2	87.7	35.8	35.1	41.5
Dissolved Potassium (K)	mg/L	7.28	6.63	10.1	3.00	2.95	3.32
Dissolved Sodium (Na)	mg/L	76.8	52.3	305	42.3	41.9	45.7
Dissolved Sulphur (S)	mg/L	443	437	13	41	39	34

		Cross Valley Dam - Airlift Test Samples			
Well ID	**Units**	**P09-C33**	**P09-C31**	**P09-C32**	**P09-C3-DRILL**
Maxxam ID					
Sampling Date		6/30/2009	6/29/2009	6/29/2009	6/29/2009
COC Number					
Notes		165 ft	275-280ft (bedrock)	275-280 duplicate	Drillwater source
Field EC	uS/cm				
Field pH	pH Units				
Misc. Inorganics					
Acidity (pH 4.5)	mg/L				
Acidity (pH 8.3)	mg/L				
Preparation					
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	330	2000	430	320
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	400	2500	520	390
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5
Anions					
Dissolved Sulphate (SO4)	mg/L	320	11	9.6	800
Dissolved Chloride (Cl)	mg/L	2.9	33	33	1.9
Physical Properties					
Conductivity	uS/cm	1200	3100	3200	1800
pH	pH Units	8.1	7.9	7.9	7.9
Physical Properties					
Total Suspended Solids	mg/L	1300			
TDS	mg/L	830	2000	2100	1600
Misc. Inorganics					
Dissolved Hardness (CaCO3)	mg/L	579	1660	1570	1060
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	ug/L	1.2	8.0	18	2
Dissolved Antimony (Sb)	ug/L	2.86	0.26	0.2	<0.1
Dissolved Arsenic (As)	ug/L	2.30	0.47	0.5	1.0
Dissolved Barium (Ba)	ug/L	63.5	1240	1200	69.2
Dissolved Beryllium (Be)	ug/L	<0.01	1.02	1.12	<0.05
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	<0.03	<0.03
Dissolved Boron (B)	ug/L	<50	54	<300	<300
Dissolved Cadmium (Cd)	ug/L	0.034	0.095	0.15	0.26
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.5	<0.5
Dissolved Cobalt (Co)	ug/L	1.37	0.314	0.35	5.66
Dissolved Copper (Cu)	ug/L	0.11	0.14	0.8	1.1
Dissolved Iron (Fe)	ug/L	18	8530	7330	1840
Dissolved Lead (Pb)	ug/L	0.288	0.120	0.20	0.07
Dissolved Lithium (Li)	ug/L	38.3	561	686	12
Dissolved Manganese (Mn)	ug/L	1650	457	419	14100
Dissolved Mercury (Hg)	ug/L				
Dissolved Molybdenum (Mo)	ug/L	8.55	3.94	3.7	1.1
Dissolved Nickel (Ni)	ug/L	10.1	2.69	3.4	22.4
Dissolved Selenium (Se)	ug/L	0.48	<0.04	<0.2	<0.2
Dissolved Silicon (Si)	ug/L	6120	19100	16900	8190
Dissolved Silver (Ag)	ug/L	0.016	0.975	0.81	<0.03
Dissolved Strontium (Sr)	ug/L	941	10700	10600	785
Dissolved Thallium (Tl)	ug/L	0.013	0.002	<0.01	0.02
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.05	<0.05
Dissolved Titanium (Ti)	ug/L	<0.5	10.3	9	<3
Dissolved Uranium (U)	ug/L	11.1	1.36	1.25	9.47
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<1	<1
Dissolved Zinc (Zn)	ug/L	2.6	176	200	17.0
Dissolved Zirconium (Zr)	ug/L	7.2	381	331	2.5
Dissolved Calcium (Ca)	mg/L	153	418	386	315
Dissolved Magnesium (Mg)	mg/L	47.9	149	146	65.8
Dissolved Potassium (K)	mg/L	4.34	9.24	8.54	5.12
Dissolved Sodium (Na)	mg/L	69.8	315	298	32.7
Dissolved Sulphur (S)	mg/L	127	7	8	287

		Emergency Tailings Area			
Well ID	**Units**	**P09-ETA1**	**P09-ETA1**	**P09-ETA2**	**P09-ETA2**
Maxxam ID		Q45266	R66108	Q45267	R66109
Sampling Date		8/23/2009	11/4/2009	8/23/2009	11/4/2009
COC Number		F146381	8305641	F146381	8305641
Notes					
Field EC	uS/cm		670		>4000
Field pH	pH Units		7.67		6.40
Misc. Inorganics					
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	<0.5
Acidity (pH 8.3)	mg/L	1.0	<0.5	569	511
Preparation					
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	180	210	170	160
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	220	260	210	190
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5
Anions					
Dissolved Sulphate (SO4)	mg/L	39	25	4300	4500
Dissolved Chloride (Cl)	mg/L	1.3	0.8	17	14
Physical Properties					
Conductivity	uS/cm	415	447	5200	5150
pH	pH Units	8.1	8.0	6.7	6.6
Physical Properties					
Total Suspended Solids	mg/L	360	270	1300	420
TDS	mg/L		270		4900
Misc. Inorganics					
Dissolved Hardness (CaCO3)	mg/L	164	222	3530	3550
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	ug/L	<3	1.6	12	16
Dissolved Antimony (Sb)	ug/L	<0.5	0.07	1	0.7
Dissolved Arsenic (As)	ug/L	0.4	0.07	46.5	53.9
Dissolved Barium (Ba)	ug/L	28	9.12	9	8.7
Dissolved Beryllium (Be)	ug/L	<0.1	<0.01	0.4	0.3
Dissolved Bismuth (Bi)	ug/L	<1	<0.005	<2	<0.05
Dissolved Boron (B)	ug/L	<50	<50	<100	<500
Dissolved Cadmium (Cd)	ug/L	<0.01	<0.005	<0.02	<0.05
Dissolved Chromium (Cr)	ug/L	<1	<0.1	<2	<1
Dissolved Cobalt (Co)	ug/L	<0.5	0.078	212	181
Dissolved Copper (Cu)	ug/L	<0.2	0.06	1.6	<0.5
Dissolved Iron (Fe)	ug/L	<5	11	291000	254000
Dissolved Lead (Pb)	ug/L	1.9	0.102	2.4	1.16
Dissolved Lithium (Li)	ug/L	<5	0.6	81	62
Dissolved Manganese (Mn)	ug/L	22	15.8	39200	39500
Dissolved Mercury (Hg)	ug/L	<0.02		0.08	
Dissolved Molybdenum (Mo)	ug/L	4	0.36	<2	0.7
Dissolved Nickel (Ni)	ug/L	1	0.24	252	184
Dissolved Selenium (Se)	ug/L	0.1	<0.04	0.2	<0.4
Dissolved Silicon (Si)	ug/L	9200	9420	11100	11500
Dissolved Silver (Ag)	ug/L	<0.02	<0.005	0.06	0.11
Dissolved Strontium (Sr)	ug/L	417	540	3150	3500
Dissolved Thallium (Tl)	ug/L	<0.05	0.005	<0.1	0.08
Dissolved Tin (Sn)	ug/L	<5	0.02	<10	<0.1
Dissolved Titanium (Ti)	ug/L	<5	<0.5	27	<5
Dissolved Uranium (U)	ug/L	0.5	0.145	11.0	7.93
Dissolved Vanadium (V)	ug/L	<5	<0.2	<10	<2
Dissolved Zinc (Zn)	ug/L	<5	1.4	94500	70600
Dissolved Zirconium (Zr)	ug/L	<0.5	0.1	<1	<1
Dissolved Calcium (Ca)	mg/L	51.3	70.1	504	551
Dissolved Magnesium (Mg)	mg/L	8.69	11.4	551	529
Dissolved Potassium (K)	mg/L	0.68	0.31	8.51	8.46
Dissolved Sodium (Na)	mg/L	28.1	17.1	54.0	49.5
Dissolved Sulphur (S)	mg/L	17	12	1420	1460 (1)

		S-Wells				
Well ID	**Units**	**END of SIS Pipe**	**P09-SIS1**	**P09-SIS2**	**P09-SIS2**	**P09-SIS3**
Maxxam ID			R66101	Q53021	R66102	Q53020
Sampling Date		8/16/2009	11/3/2009	8/25/2009	11/3/2009	8/26/2009
COC Number			8305640	F116612	8305640	F116612
Notes						
Field EC	uS/cm		7670		8660	
Field pH	pH Units		6.64		6.28	
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	8	<0.5		<0.5	
Acidity (pH 8.3)	mg/L	2380	337		1140	
Preparation						
Filter and HNO3 Preservation	N/A	Lab	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	<0.5	250	180	170	170
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	<0.5	310	220	210	210
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Anions						
Dissolved Sulphate (SO4)	mg/L	7400	6800	6900	8700	6000
Dissolved Chloride (Cl)	mg/L	9.5	6.2	6.3	6.1	6.5
Physical Properties						
Conductivity	uS/cm	8060	7280	7650	8270	7080
pH	pH Units	4.3	7.0	7.0	6.8	7.0
Physical Properties						
Total Suspended Solids	mg/L	150	4000	970	3600	930
TDS	mg/L	12000	8000		11000	
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	4610	6320	6260	7210	5470
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	381	12	33	48	40
Dissolved Antimony (Sb)	ug/L	<0.4	<0.4	<5	<2	<5
Dissolved Arsenic (As)	ug/L	1.9	11.5	2	2	<1
Dissolved Barium (Ba)	ug/L	15.4	59.1	31	33	24
Dissolved Beryllium (Be)	ug/L	0.9	<0.2	<1	<1	<1
Dissolved Bismuth (Bi)	ug/L	<0.1	<0.1	<10	<0.5	<10
Dissolved Boron (B)	ug/L	<1000	<1000	<500	<5000	<500
Dissolved Cadmium (Cd)	ug/L	140	9.7	89.2	121	89.5
Dissolved Chromium (Cr)	ug/L	<2	<2	<10	<10	<10
Dissolved Cobalt (Co)	ug/L	1640	65.2	110	372	12
Dissolved Copper (Cu)	ug/L	113	2	15	12	25
Dissolved Iron (Fe)	ug/L	885000	50100	642	3090	<50
Dissolved Lead (Pb)	ug/L	0.4	0.2	<2	4.1	<2
Dissolved Lithium (Li)	ug/L	179	170	184	222	180
Dissolved Manganese (Mn)	ug/L	106000	54400	85000	130000	69300
Dissolved Mercury (Hg)	ug/L			<0.2		<0.2
Dissolved Molybdenum (Mo)	ug/L	<1	<1	<10	<5	<10
Dissolved Nickel (Ni)	ug/L	1400	703	2310	3090	2230
Dissolved Selenium (Se)	ug/L	<0.8	<0.8	<1	<4	<1
Dissolved Silicon (Si)	ug/L	11100	11600	10000	13800	10900
Dissolved Silver (Ag)	ug/L	0.4	0.1	0.3	0.8	0.2
Dissolved Strontium (Sr)	ug/L	3840	2280	2140	2530	2020
Dissolved Thallium (Tl)	ug/L	1.01	<0.04	<0.5	<0.2	<0.5
Dissolved Tin (Sn)	ug/L	<0.2	<0.2	<50	<1	<50
Dissolved Titanium (Ti)	ug/L	<10	<10	<50	<50	<50
Dissolved Uranium (U)	ug/L	2.7	1.50	4	3.3	6
Dissolved Vanadium (V)	ug/L	<4	<4	<50	<20	<50
Dissolved Zinc (Zn)	ug/L	662000	150000	396000	586000	357000
Dissolved Zirconium (Zr)	ug/L	<2	<2	<5	<10	<5
Dissolved Calcium (Ca)	mg/L	467	642	509	560	454
Dissolved Magnesium (Mg)	mg/L	837	1140	1210	1410	1050
Dissolved Potassium (K)	mg/L	14.1	12.0	14.6	15	14.0
Dissolved Sodium (Na)	mg/L	65.9	52.0	58.3	53	45.2
Dissolved Sulphur (S)	mg/L	2500	2360	2420	2820	2210

		S-Wells					
Well ID	**Units**	**P09-SIS3-D**	**P09-SIS3**	**P09-SIS4**	**P09-SIS4**	**P09-SIS5**	**P09-SIS6**
Maxxam ID		Q53019	R66103	Q53018	R66104	R66105	R66106
Sampling Date		8/26/2009	11/3/2009	8/26/2009	11/3/2009	11/3/2009	11/3/2009
COC Number		F116612	8305640	F116612	8305640	8305640	8305640
Notes		Duplicate					
Field EC	uS/cm		7910		7050		5190
Field pH	pH Units		6.29		6.28		7.35
Misc. Inorganics							
Acidity (pH 4.5)	mg/L		<0.5		<0.5	<0.5	<0.5
Acidity (pH 8.3)	mg/L		780		607	28.7	42.8
Preparation							
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	180	180	180	280	300	520
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	210	220	220	340	360	640
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anions							
Dissolved Sulphate (SO4)	mg/L	6200	7600	6000	6000	4000	3700
Dissolved Chloride (Cl)	mg/L	6.0	5.9	6.3	6.0	10	8.5
Physical Properties							
Conductivity	uS/cm	6930	7600	6600	6490	5150	4910
pH	pH Units	6.9	7.0	6.9	6.9	8.0	7.7
Physical Properties							
Total Suspended Solids	mg/L	930	330	3200	4900	57000	15000
TDS	mg/L		9500		8100	5000	4900
Misc. Inorganics							
Dissolved Hardness (CaCO3)	mg/L	5550	6210	5150	5460	3820	4010
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	ug/L	42	26	55	28	11	5
Dissolved Antimony (Sb)	ug/L	<5	<2	<5	2	0.7	0.5
Dissolved Arsenic (As)	ug/L	1	<2	<1	6	7.3	2.5
Dissolved Barium (Ba)	ug/L	23	20	26	17	23.3	19.3
Dissolved Beryllium (Be)	ug/L	<1	<1	<1	<0.5	<0.05	<0.05
Dissolved Bismuth (Bi)	ug/L	<10	<0.5	<10	<0.3	<0.03	<0.03
Dissolved Boron (B)	ug/L	<500	<5000	<500	<3000	<300	<300
Dissolved Cadmium (Cd)	ug/L	89.8	109	72.2	61.2	0.47	4.83
Dissolved Chromium (Cr)	ug/L	<10	<10	<10	<5	<0.5	<0.5
Dissolved Cobalt (Co)	ug/L	13	39.5	8	9.5	98.9	32.3
Dissolved Copper (Cu)	ug/L	26	20	25	14	1.1	2.7
Dissolved Iron (Fe)	ug/L	82	337	244	56	1350	38
Dissolved Lead (Pb)	ug/L	<2	1.9	2	1.0	0.28	1.24
Dissolved Lithium (Li)	ug/L	179	183	157	130	71	90
Dissolved Manganese (Mn)	ug/L	70500	112000	58100	74100	43800	28000
Dissolved Mercury (Hg)	ug/L	<0.2		<0.2			
Dissolved Molybdenum (Mo)	ug/L	<10	<5	<10	<3	4.0	2.0
Dissolved Nickel (Ni)	ug/L	2230	2910	2080	1870	162	279
Dissolved Selenium (Se)	ug/L	<1	<4	<1	<2	0.2	0.2
Dissolved Silicon (Si)	ug/L	11100	12900	11900	14100	12500	11700
Dissolved Silver (Ag)	ug/L	0.3	<0.5	0.3	<0.3	0.03	0.03
Dissolved Strontium (Sr)	ug/L	2000	2130	2130	2150	2290	1980
Dissolved Thallium (Tl)	ug/L	<0.5	<0.2	<0.5	<0.1	0.05	0.02
Dissolved Tin (Sn)	ug/L	<50	<1	<50	<0.5	0.22	0.20
Dissolved Titanium (Ti)	ug/L	<50	<50	<50	<30	<3	<3
Dissolved Uranium (U)	ug/L	6	6.4	4	7.2	21.6	12.9
Dissolved Vanadium (V)	ug/L	<50	<20	<50	<10	2	1
Dissolved Zinc (Zn)	ug/L	362000	530000	307000	285000	7390	14200
Dissolved Zirconium (Zr)	ug/L	<5	<10	<5	<5	0.8	<0.5
Dissolved Calcium (Ca)	mg/L	457	485	462	505	507	559
Dissolved Magnesium (Mg)	mg/L	1070	1220	971	1020	621	635
Dissolved Potassium (K)	mg/L	13.9	13	12.7	11.7	9.38	10.7
Dissolved Sodium (Na)	mg/L	46.4	43	63.2	37.9	135	44.3
Dissolved Sulphur (S)	mg/L	2120	2470	2020	2170	1420	1370

		Grum Slot					
Well ID	**Units**	**P09-GS1A**	**P09-GS1A**	**P09-GS1B**	**P09-GS1B**	**P09-GS1B**	**P09-GS-SW**
Maxxam ID		Q12014	R66110	Q12015	Q53016	R66111	Q53017
Sampling Date		8/2/2009	11/4/2009	8/1/2009	8/27/2009	11/4/2009	8/27/2009
COC Number		F130715	8305641	F130715	F116612	8305641	F116612
Notes							
Field EC	uS/cm	1168	1661	1164		1263	
Field pH	pH Units	7.20	7.72	6.89		7.24	
Misc. Inorganics							
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5		<0.5	
Acidity (pH 8.3)	mg/L	13.9	5.6	22.1		7.4	
Preparation							
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	190	230	230	230	180	79
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	230	280	290	280	220	96
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anions							
Dissolved Sulphate (SO4)	mg/L	450	640	410	440	460	310
Dissolved Chloride (Cl)	mg/L	3.7	1.4	0.7	0.6	1.1	<0.5
Physical Properties							
Conductivity	uS/cm	1200	1500	1200	1140	1200	738
pH	pH Units	8.0	7.6	7.9	7.6	7.7	7.9
Physical Properties							
Total Suspended Solids	mg/L	240	190	110	13	27	5
TDS	mg/L		1200			980	
Misc. Inorganics							
Dissolved Hardness (CaCO3)	mg/L	584	980	621	660	701	391
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	ug/L	<3	4.8	<3	4	1.6	12
Dissolved Antimony (Sb)	ug/L	2.7	0.66	21.3	19.2	14.7	0.8
Dissolved Arsenic (As)	ug/L	546	712	158	148	63.9	1.0
Dissolved Barium (Ba)	ug/L	72	62.6	21	18	12.6	41
Dissolved Beryllium (Be)	ug/L	<0.1	0.01	<0.1	<0.1	<0.01	<0.1
Dissolved Bismuth (Bi)	ug/L	<1	<0.005	<1	<1	<0.005	<1
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50	<50
Dissolved Cadmium (Cd)	ug/L	0.05	0.029	0.26	0.35	1.24	0.02
Dissolved Chromium (Cr)	ug/L	<1	<0.1	<1	<1	0.1	<1
Dissolved Cobalt (Co)	ug/L	1.7	4.52	40.1	53.1	50.8	<0.5
Dissolved Copper (Cu)	ug/L	0.5	<0.05	0.4	0.3	0.29	1.4
Dissolved Iron (Fe)	ug/L	996	1540	2230	1570	623	8
Dissolved Lead (Pb)	ug/L	0.2	0.056	0.6	4.8	16.4	0.3
Dissolved Lithium (Li)	ug/L	9	10.0	9	11	7.7	<5
Dissolved Manganese (Mn)	ug/L	265	874	1380	1480	1420	4
Dissolved Mercury (Hg)	ug/L	<0.02		<0.02	<0.02		<0.02
Dissolved Molybdenum (Mo)	ug/L	5	4.32	5	3	2.65	2
Dissolved Nickel (Ni)	ug/L	8	8.83	141	162	145	2
Dissolved Selenium (Se)	ug/L	<0.1	0.07	<0.1	<0.1	<0.04	0.5
Dissolved Silicon (Si)	ug/L	6030	7290	2000	1900	1990	324
Dissolved Silver (Ag)	ug/L	<0.02	<0.005	<0.02	<0.02	<0.005	<0.02
Dissolved Strontium (Sr)	ug/L	1430	2010	589	594	669	358
Dissolved Thallium (Tl)	ug/L	<0.05	0.051	0.65	2.68	3.82	<0.05
Dissolved Tin (Sn)	ug/L	<5	0.09	<5	<5	<0.01	<5
Dissolved Titanium (Ti)	ug/L	8	<0.5	6	<5	<0.5	<5
Dissolved Uranium (U)	ug/L	3.9	4.12	15.8	14.4	15.9	14.1
Dissolved Vanadium (V)	ug/L	<5	<0.2	<5	<5	<0.2	<5
Dissolved Zinc (Zn)	ug/L	56	52.5	4360	4710	4190	10
Dissolved Zirconium (Zr)	ug/L	<0.5	0.2	<0.5	<0.5	<0.1	<0.5
Dissolved Calcium (Ca)	mg/L	149	250	155	163	176	90.0
Dissolved Magnesium (Mg)	mg/L	51.7	86.6	56.6	61.8	63.6	40.4
Dissolved Potassium (K)	mg/L	2.15	2.69	3.77	4.11	3.57	2.59
Dissolved Sodium (Na)	mg/L	34.5	22.9	11.6	11.4	15.1	9.78
Dissolved Sulphur (S)	mg/L	175	285	165	179	209	116

		Little Creek Dam				
Well ID	**Units**	**P09-LCD1**	**P09-LCD1**	**P09-LCD2**	**P09-LCD2**	**P09-LCD3**
Maxxam ID		Q12006	R66114	Q12007	R66115	Q12008
Sampling Date		8/3/2009	11/4/2009	8/2/2009	11/4/2009	8/3/2009
COC Number		F130713	8305641	F130713	8305641	F130713
Notes						
Field EC	uS/cm	775	850	857	840	790
Field pH	pH Units	7.24	7.53	7.13	7.45	7.23
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Acidity (pH 8.3)	mg/L	11.0	4.6	16.6	2.7	15.5
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	280	280	280	280	290
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	340	340	340	340	360
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Anions						
Dissolved Sulphate (SO4)	mg/L	160	170	190	160	140
Dissolved Chloride (Cl)	mg/L	0.8	0.9	0.5	1.0	0.8
Physical Properties						
Conductivity	uS/cm	800	825	870	826	790
pH	pH Units	8.0	7.8	8.2	7.7	8.2
Physical Properties						
Total Suspended Solids	mg/L	1800	890	1800	13000	190
TDS	mg/L		520		540	
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	420	444	491	454	462
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	2.0	0.8	3.2	4.1	5.1
Dissolved Antimony (Sb)	ug/L	0.08	0.14	0.08	0.27	0.14
Dissolved Arsenic (As)	ug/L	70.1	61.1	94.9	63.9	50.6
Dissolved Barium (Ba)	ug/L	38.1	33.3	36.7	37.0	40.3
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	<0.005	0.006
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50
Dissolved Cadmium (Cd)	ug/L	0.034	0.059	0.062	0.084	0.123
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Cobalt (Co)	ug/L	0.620	0.405	1.61	1.39	1.79
Dissolved Copper (Cu)	ug/L	0.07	<0.05	0.16	0.19	0.34
Dissolved Iron (Fe)	ug/L	2220	952	1780	62	1280
Dissolved Lead (Pb)	ug/L	5.56	0.349	11.3	7.38	6.43
Dissolved Lithium (Li)	ug/L	9.6	10.4	11.1	10.9	8.2
Dissolved Manganese (Mn)	ug/L	478	513	416	426	554
Dissolved Mercury (Hg)	ug/L					
Dissolved Molybdenum (Mo)	ug/L	6.23	6.13	2.42	3.16	2.95
Dissolved Nickel (Ni)	ug/L	0.99	0.75	2.95	2.58	3.48
Dissolved Selenium (Se)	ug/L	<0.04	<0.04	<0.04	<0.04	<0.04
Dissolved Silicon (Si)	ug/L	6480	7550	7020	7210	6450
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Strontium (Sr)	ug/L	677	712	808	749	736
Dissolved Thallium (Tl)	ug/L	0.016	0.013	0.025	0.029	0.041
Dissolved Tin (Sn)	ug/L	0.01	<0.01	0.01	<0.01	0.01
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Uranium (U)	ug/L	6.06	6.73	7.07	7.72	8.77
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dissolved Zinc (Zn)	ug/L	3.8	3.9	11.5	8.8	5.0
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Calcium (Ca)	mg/L	116	124	137	127	127
Dissolved Magnesium (Mg)	mg/L	31.5	32.9	36.1	33.3	34.9
Dissolved Potassium (K)	mg/L	2.75	2.96	3.09	3.10	2.86
Dissolved Sodium (Na)	mg/L	21.6	19.3	10.1	11.4	8.72
Dissolved Sulphur (S)	mg/L	64	73	79	70	60

		Little Creek Dam			
Well ID	**Units**	**P09-LCD3**	**P09-LCD4**	**P09-LCD6**	**P09-LCD6**
Maxxam ID		R66116	R66117	Q12009	R66118
Sampling Date		11/4/2009	11/4/2009	8/2/2009	11/4/2009
COC Number		8305641	8305641	F130713	8305641
Notes					
Field EC	uS/cm	1020	1774	783	1010
Field pH	pH Units	7.36	7.37	7.16	7.60
Misc. Inorganics					
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	<0.5
Acidity (pH 8.3)	mg/L	10.4	1.3	15.6	4.9
Preparation					
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	280	330	300	280
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	340	410	360	350
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5
Anions					
Dissolved Sulphate (SO4)	mg/L	160	270	130	150
Dissolved Chloride (Cl)	mg/L	1.3	3.8	1.0	1.3
Physical Properties					
Conductivity	uS/cm	788	1210	800	806
pH	pH Units	7.7	7.8	8.1	7.7
Physical Properties					
Total Suspended Solids	mg/L	8500	1100	220	3500
TDS	mg/L	530	820		510
Misc. Inorganics					
Dissolved Hardness (CaCO3)	mg/L	462	450	458	451
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	ug/L	3.6	5.4	1.5	0.9
Dissolved Antimony (Sb)	ug/L	0.42	1.50	0.02	0.08
Dissolved Arsenic (As)	ug/L	48.9	6.32	102	45.2
Dissolved Barium (Ba)	ug/L	42.6	132	51.7	44.3
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	<0.01
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	0.009	<0.005
Dissolved Boron (B)	ug/L	<50	<50	<50	<50
Dissolved Cadmium (Cd)	ug/L	0.213	0.034	0.056	0.066
Dissolved Chromium (Cr)	ug/L	<0.1	0.1	<0.1	<0.1
Dissolved Cobalt (Co)	ug/L	2.32	2.47	3.49	1.56
Dissolved Copper (Cu)	ug/L	0.12	0.34	0.15	0.39
Dissolved Iron (Fe)	ug/L	9	25	4830	43
Dissolved Lead (Pb)	ug/L	7.90	1.61	1.03	0.320
Dissolved Lithium (Li)	ug/L	9.6	5.1	8.6	8.4
Dissolved Manganese (Mn)	ug/L	554	1240	868	591
Dissolved Mercury (Hg)	ug/L				
Dissolved Molybdenum (Mo)	ug/L	5.33	12.4	1.55	2.04
Dissolved Nickel (Ni)	ug/L	8.97	9.13	1.50	1.46
Dissolved Selenium (Se)	ug/L	0.06	0.39	<0.04	<0.04
Dissolved Silicon (Si)	ug/L	7760	5070	7260	7810
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	<0.005
Dissolved Strontium (Sr)	ug/L	789	630	633	646
Dissolved Thallium (Tl)	ug/L	0.061	0.014	0.014	0.010
Dissolved Tin (Sn)	ug/L	0.03	0.16	0.01	0.03
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	0.6	<0.5
Dissolved Uranium (U)	ug/L	11.8	8.52	2.21	2.34
Dissolved Vanadium (V)	ug/L	<0.2	0.7	<0.2	<0.2
Dissolved Zinc (Zn)	ug/L	2.3	3.8	14.9	11.1
Dissolved Zirconium (Zr)	ug/L	<0.1	0.6	<0.1	<0.1
Dissolved Calcium (Ca)	mg/L	129	127	129	125
Dissolved Magnesium (Mg)	mg/L	33.9	32.2	33.1	33.8
Dissolved Potassium (K)	mg/L	2.80	2.79	2.14	2.79
Dissolved Sodium (Na)	mg/L	8.53	114	6.07	6.61
Dissolved Sulphur (S)	mg/L	66	132	57	64

		Vangorda Creek				
Well ID	**Units**	**P09-VC1**	**P09-VC1**	**P09-VC2**	**P09-VC2-Airlift**	**P09-VC2**
Maxxam ID		Q12013	R66112	Q12010		R66113
Sampling Date		8/1/2009	11/4/2009	8/1/2009	7/16/2009	11/4/2009
COC Number		F130715	8305641	F130713		8305641
Notes						
Field EC	uS/cm	450	390	337		429
Field pH	pH Units	7.85	7.90	7.18		7.67
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Acidity (pH 8.3)	mg/L	0.6	<0.5	3.8	0.7	2.9
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	FIELD	FIELD
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	140	140	160	150	170
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	170	170	190	180	200
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Anions						
Dissolved Sulphate (SO4)	mg/L	83	59	28	44	24
Dissolved Chloride (Cl)	mg/L	<0.5	0.6	<0.5	0.7	<0.5
Physical Properties						
Conductivity	uS/cm	450	404	350	370	384
pH	pH Units	8.2	8.0	8.2	8.2	7.8
Physical Properties						
Total Suspended Solids	mg/L	590	270	620		13
TDS	mg/L		220		230	210
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	169	176	188	174	201
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	6	14.8	3.9	3.5	1.1
Dissolved Antimony (Sb)	ug/L	<0.5	0.39	2.05	34.2	0.67
Dissolved Arsenic (As)	ug/L	6.8	6.45	95.3	6.19	103
Dissolved Barium (Ba)	ug/L	18	17.7	61.4	84.2	48.4
Dissolved Beryllium (Be)	ug/L	<0.1	<0.01	<0.01	<0.01	<0.01
Dissolved Bismuth (Bi)	ug/L	<1	<0.005	<0.005	<0.005	<0.005
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50
Dissolved Cadmium (Cd)	ug/L	<0.01	0.007	0.006	0.023	0.008
Dissolved Chromium (Cr)	ug/L	<1	<0.1	<0.1	<0.1	<0.1
Dissolved Cobalt (Co)	ug/L	<0.5	0.047	0.857	0.110	0.481
Dissolved Copper (Cu)	ug/L	3.4	0.14	0.08	1.28	<0.05
Dissolved Iron (Fe)	ug/L	23	25	674	8	787
Dissolved Lead (Pb)	ug/L	<0.2	0.282	0.378	22.9	0.264
Dissolved Lithium (Li)	ug/L	6	5.3	5.1	8.1	6.3
Dissolved Manganese (Mn)	ug/L	19	21.1	114	32.0	98.4
Dissolved Mercury (Hg)	ug/L	<0.02				
Dissolved Molybdenum (Mo)	ug/L	2	0.74	11.5	51.4	9.46
Dissolved Nickel (Ni)	ug/L	<1	0.26	0.94	0.34	0.44
Dissolved Selenium (Se)	ug/L	<0.1	<0.04	<0.04	0.06	<0.04
Dissolved Silicon (Si)	ug/L	6230	5720	6340	2370	7220
Dissolved Silver (Ag)	ug/L	<0.02	<0.005	<0.005	<0.005	<0.005
Dissolved Strontium (Sr)	ug/L	675	687	674	723	794
Dissolved Thallium (Tl)	ug/L	<0.05	0.015	0.008	0.014	0.007
Dissolved Tin (Sn)	ug/L	<5	0.02	0.03	<0.01	<0.01
Dissolved Titanium (Ti)	ug/L	<5	<0.5	<0.5	<0.5	<0.5
Dissolved Uranium (U)	ug/L	7.9	6.66	5.56	87.8	5.00
Dissolved Vanadium (V)	ug/L	<5	<0.2	<0.2	0.2	<0.2
Dissolved Zinc (Zn)	ug/L	9	3.1	31.5	15.9	55.1
Dissolved Zirconium (Zr)	ug/L	<0.5	<0.1	<0.1	<0.1	<0.1
Dissolved Calcium (Ca)	mg/L	51.5	53.2	58.1	52.0	62.4
Dissolved Magnesium (Mg)	mg/L	9.72	10.5	10.4	10.7	11.0
Dissolved Potassium (K)	mg/L	1.13	1.06	1.19	2.06	1.16
Dissolved Sodium (Na)	mg/L	24.7	17.7	5.43	8.07	5.24
Dissolved Sulphur (S)	mg/L	34	25	12	15	13

		Upper NFRC		
Well ID	**Units**	**PO9-UN1**	**PO9-UN2**	**PO9-UN3**
Maxxam ID		Q45268	Q45269	Q45270
Sampling Date		8/23/2009	8/23/2009	8/23/2009
COC Number		F146381	F146381	F146381
Notes				
Field EC	uS/cm			
Field pH	pH Units			
Misc. Inorganics				
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5
Acidity (pH 8.3)	mg/L	6.8	6.9	12.5
Preparation				
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	120	210	110
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5
Bicarbonate (HCO3)	mg/L	140	250	130
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5
Anions				
Dissolved Sulphate (SO4)	mg/L	8.7	16	8.2
Dissolved Chloride (Cl)	mg/L	<0.5	<0.5	0.6
Physical Properties				
Conductivity	uS/cm	233	415	215
pH	pH Units	7.8	7.8	7.5
Physical Properties				
Total Suspended Solids	mg/L	590	550	270
TDS	mg/L			
Misc. Inorganics				
Dissolved Hardness (CaCO3)	mg/L	114	218	98.9
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	16	8	22
Dissolved Antimony (Sb)	ug/L	<0.5	<0.5	<0.5
Dissolved Arsenic (As)	ug/L	1.0	1.7	0.8
Dissolved Barium (Ba)	ug/L	74	147	46
Dissolved Beryllium (Be)	ug/L	<0.1	<0.1	<0.1
Dissolved Bismuth (Bi)	ug/L	<1	<1	<1
Dissolved Boron (B)	ug/L	<50	<50	<50
Dissolved Cadmium (Cd)	ug/L	0.02	0.11	0.15
Dissolved Chromium (Cr)	ug/L	<1	<1	<1
Dissolved Cobalt (Co)	ug/L	<0.5	0.6	0.8
Dissolved Copper (Cu)	ug/L	3.2	3.2	2.6
Dissolved Iron (Fe)	ug/L	19	102	57
Dissolved Lead (Pb)	ug/L	<0.2	<0.2	1.1
Dissolved Lithium (Li)	ug/L	11	17	10
Dissolved Manganese (Mn)	ug/L	3	75	50
Dissolved Mercury (Hg)	ug/L	<0.02	<0.02	<0.02
Dissolved Molybdenum (Mo)	ug/L	13	80	110
Dissolved Nickel (Ni)	ug/L	1	4	3
Dissolved Selenium (Se)	ug/L	1.3	2.5	1.0
Dissolved Silicon (Si)	ug/L	6580	6050	5950
Dissolved Silver (Ag)	ug/L	<0.02	<0.02	<0.02
Dissolved Strontium (Sr)	ug/L	165	313	134
Dissolved Thallium (Tl)	ug/L	<0.05	<0.05	<0.05
Dissolved Tin (Sn)	ug/L	<5	<5	<5
Dissolved Titanium (Ti)	ug/L	<5	<5	<5
Dissolved Uranium (U)	ug/L	2.7	14.3	2.3
Dissolved Vanadium (V)	ug/L	<5	<5	<5
Dissolved Zinc (Zn)	ug/L	<5	31	11
Dissolved Zirconium (Zr)	ug/L	<0.5	<0.5	<0.5
Dissolved Calcium (Ca)	mg/L	33.8	62.0	30.5
Dissolved Magnesium (Mg)	mg/L	7.27	15.3	5.55
Dissolved Potassium (K)	mg/L	1.40	2.66	1.72
Dissolved Sodium (Na)	mg/L	2.84	4.84	6.21
Dissolved Sulphur (S)	mg/L	4	8	5

Your Project #: SRK WATER SAMPLES FOR DAN MACK
Your C.O.C. #: 08301959

Attention: Roy Morrell
DENISON ENVIRONMENTAL SERVICES
ONTARIO
8 Kilborn Way
ELLIOT LAKE, ON
CANADA P5A 2T1

Report Date: 2009/07/10

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A934274
Received: 2009/07/06, 14:30

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	4	2009/07/07	2009/07/08	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	4	N/A	2009/07/08	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	4	N/A	2009/07/08	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	4	N/A	2009/07/10		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	4	N/A	2009/07/09	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	4	N/A	2009/07/09	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	4	N/A	2009/07/07	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	4	N/A	2009/07/08	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	4	N/A	2009/07/08	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Dissolved Solids (Filt. Residue)	4	N/A	2009/07/09	BRN SOP 00276 R4.0	SM 2540C
Total Suspended Solids	1	N/A	2009/07/08	BRN SOP-00277 R5.0	Based on SM-2540 D

* Results relate only to the items tested.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

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Total cover pages: 1

Maxxam Job #: A934274
Report Date: 2009/07/10

DENISON ENVIRONMENTAL SERVICES
Client Project #: SRK WATER SAMPLES FOR DAN MACK

Sampler Initials: DM

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		P65143	P65144		P65145	P65146		
Sampling Date		2009/06/29	2009/06/29		2009/06/30	2009/06/29		
	Units	**P09-C31**	**P09-C32**	**RDL**	**P09-C33**	**P09-C3-DRILL**	**RDL**	**QC Batch**
Preparation								
Filter and HNO3 Preservation	N/A	FIELD	FIELD	N/A	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics								
Alkalinity (Total as CaCO3)	mg/L	2000	430	0.5	330	320	0.5	3257830
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	0.5	<0.5	<0.5	0.5	3257830
Bicarbonate (HCO3)	mg/L	2500	520	0.5	400	390	0.5	3257830
Carbonate (CO3)	mg/L	<0.5	<0.5	0.5	<0.5	<0.5	0.5	3257830
Hydroxide (OH)	mg/L	<0.5	<0.5	0.5	<0.5	<0.5	0.5	3257830
Anions								
Dissolved Sulphate (SO4)	mg/L	11	9.6	0.5	320	800	5	3262442
Dissolved Chloride (Cl)	mg/L	33	33	0.5	2.9	1.9	0.5	3262357
Physical Properties								
Conductivity	uS/cm	3100	3200	1	1200	1800	1	3257828
pH	pH Units	7.9	7.9		8.1	7.9		3257650
Physical Properties								
Total Suspended Solids	mg/L				1300		1	3255521
Total Dissolved Solids	mg/L	2000	2100	10	830	1600	10	3260374

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: A934274
Report Date: 2009/07/10

DENISON ENVIRONMENTAL SERVICES
Client Project #: SRK WATER SAMPLES FOR DAN MACK

Sampler Initials: DM

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		P65143		P65144		P65145		P65146		
Sampling Date		2009/06/29		2009/06/29		2009/06/30		2009/06/29		
	Units	P09-C31	RDL	P09-C32	RDL	P09-C33	RDL	P09-C3-DRILL	RDL	QC Batch
Misc. Inorganics										
Dissolved Hardness (CaCO3)	mg/L	1660	0.5	1570	0.5	579	0.5	1060	0.5	3255445
Dissolved Metals by ICPMS										
Dissolved Aluminum (Al)	ug/L	8.0	0.2	18	1	1.2	0.2	2	1	3260584
Dissolved Antimony (Sb)	ug/L	0.26	0.02	0.2	0.1	2.86	0.02	<0.1	0.1	3260584
Dissolved Arsenic (As)	ug/L	0.47	0.02	0.5	0.1	2.30	0.02	1.0	0.1	3260584
Dissolved Barium (Ba)	ug/L	1240	0.02	1200	0.1	63.5	0.02	69.2	0.1	3260584
Dissolved Beryllium (Be)	ug/L	1.02	0.01	1.12	0.05	<0.01	0.01	<0.05	0.05	3260584
Dissolved Bismuth (Bi)	ug/L	<0.005	0.005	<0.03	0.03	<0.005	0.005	<0.03	0.03	3260584
Dissolved Boron (B)	ug/L	54	50	<300	300	<50	50	<300	300	3260584
Dissolved Cadmium (Cd)	ug/L	0.095	0.005	0.15	0.03	0.034	0.005	0.26	0.03	3260584
Dissolved Chromium (Cr)	ug/L	<0.1	0.1	<0.5	0.5	<0.1	0.1	<0.5	0.5	3260584
Dissolved Cobalt (Co)	ug/L	0.314	0.005	0.35	0.03	1.37	0.005	5.66	0.03	3260584
Dissolved Copper (Cu)	ug/L	0.14	0.05	0.8	0.3	0.11	0.05	1.1	0.3	3260584
Dissolved Iron (Fe)	ug/L	8530	1	7330	5	18	1	1840	5	3260584
Dissolved Lead (Pb)	ug/L	0.120	0.005	0.20	0.03	0.288	0.005	0.07	0.03	3260584
Dissolved Lithium (Li)	ug/L	561	0.5	686	3	38.3	0.5	12	3	3260584
Dissolved Manganese (Mn)	ug/L	457	0.05	419	0.3	1650	0.05	14100	0.3	3260584
Dissolved Molybdenum (Mo)	ug/L	3.94	0.05	3.7	0.3	8.55	0.05	1.1	0.3	3260584
Dissolved Nickel (Ni)	ug/L	2.69	0.02	3.4	0.1	10.1	0.02	22.4	0.1	3260584
Dissolved Selenium (Se)	ug/L	<0.04	0.04	<0.2	0.2	0.48	0.04	<0.2	0.2	3260584
Dissolved Silicon (Si)	ug/L	19100	100	16900	500	6120	100	8190	500	3260584
Dissolved Silver (Ag)	ug/L	0.975	0.005	0.81	0.03	0.016	0.005	<0.03	0.03	3260584
Dissolved Strontium (Sr)	ug/L	10700	0.05	10600	0.3	941	0.05	785	0.3	3260584
Dissolved Thallium (Tl)	ug/L	0.002	0.002	<0.01	0.01	0.013	0.002	0.02	0.01	3260584
Dissolved Tin (Sn)	ug/L	<0.01	0.01	<0.05	0.05	<0.01	0.01	<0.05	0.05	3260584
Dissolved Titanium (Ti)	ug/L	10.3	0.5	9	3	<0.5	0.5	<3	3	3260584
Dissolved Uranium (U)	ug/L	1.36	0.002	1.25	0.01	11.1	0.002	9.47	0.01	3260584
Dissolved Vanadium (V)	ug/L	<0.2	0.2	<1	1	<0.2	0.2	<1	1	3260584
Dissolved Zinc (Zn)	ug/L	176	0.1	200	0.5	2.6	0.1	17.0	0.5	3260584
Dissolved Zirconium (Zr)	ug/L	381	0.1	331	0.5	7.2	0.1	2.5	0.5	3260584
Dissolved Calcium (Ca)	mg/L	418	0.05	386	0.05	153	0.05	315	0.05	3262230
Dissolved Magnesium (Mg)	mg/L	149	0.05	146	0.05	47.9	0.05	65.8	0.05	3262230
Dissolved Potassium (K)	mg/L	9.24	0.05	8.54	0.05	4.34	0.05	5.12	0.05	3262230
Dissolved Sodium (Na)	mg/L	315	0.05	298	0.05	69.8	0.05	32.7	0.05	3262230
Dissolved Sulphur (S)	mg/L	7	3	8	3	127	3	287	3	3262230

RDL = Reportable Detection Limit

Maxxam Job #: A934274
Report Date: 2009/07/10

DENISON ENVIRONMENTAL SERVICES
Client Project #: SRK WATER SAMPLES FOR DAN MACK

Sampler Initials: DM

LOW LEVEL DISSOLVED METALS - WATER (WATER) Comments

Sample	P65144-02 Elements by ICPMS Low Level (dissolved): RDL raised due to sample matrix interference.
Sample	P65146-02 Elements by ICPMS Low Level (dissolved): RDL raised due to sample matrix interference.

Maxxam Job #: A934274
Report Date: 2009/07/10

DENISON ENVIRONMENTAL SERVICES
Client Project #: SRK WATER SAMPLES FOR DAN MACK

Sampler Initials: DM

QUALITY ASSURANCE REPORT

			Matrix Spike		Spike		Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3255521	Total Suspended Solids	2009/07/08			103	N/A	<1	mg/L		
3257828	Conductivity	2009/07/07			102	80 - 120	1, RDL=1	uS/cm	0	20
3257830	Alkalinity (Total as CaCO3)	2009/07/07	NC	80 - 120	101	80 - 120	<0.5	mg/L	0.2	20
3257830	Alkalinity (PP as CaCO3)	2009/07/07					<0.5	mg/L	NC	20
3257830	Bicarbonate (HCO3)	2009/07/07					<0.5	mg/L	0.2	20
3257830	Carbonate (CO3)	2009/07/07					<0.5	mg/L	NC	20
3257830	Hydroxide (OH)	2009/07/07					<0.5	mg/L	NC	20
3260374	Total Dissolved Solids	2009/07/09	106	80 - 120	108	80 - 120	<10	mg/L	0.9	20
3260584	Dissolved Arsenic (As)	2009/07/09	94	80 - 120	101	80 - 120	<0.02	ug/L	NC	20
3260584	Dissolved Beryllium (Be)	2009/07/09	100	80 - 120	101	80 - 120	<0.01	ug/L	NC	20
3260584	Dissolved Cadmium (Cd)	2009/07/09	100	80 - 120	99	80 - 120	<0.005	ug/L	NC	20
3260584	Dissolved Chromium (Cr)	2009/07/09	97	80 - 120	100	80 - 120	<0.1	ug/L	NC	20
3260584	Dissolved Cobalt (Co)	2009/07/09	95	80 - 120	101	80 - 120	<0.005	ug/L	NC	20
3260584	Dissolved Copper (Cu)	2009/07/09	97	80 - 120	104	80 - 120	<0.05	ug/L	NC	20
3260584	Dissolved Lead (Pb)	2009/07/09	105	80 - 120	106	80 - 120	<0.005	ug/L	NC	20
3260584	Dissolved Lithium (Li)	2009/07/09	99	80 - 120	103	80 - 120	<0.5	ug/L	NC	20
3260584	Dissolved Nickel (Ni)	2009/07/09	95	80 - 120	102	80 - 120	<0.02	ug/L	NC	20
3260584	Dissolved Selenium (Se)	2009/07/09	95	80 - 120	101	80 - 120	<0.04	ug/L	NC	20
3260584	Dissolved Uranium (U)	2009/07/09	106	80 - 120	108	80 - 120	<0.002	ug/L	NC	20
3260584	Dissolved Vanadium (V)	2009/07/09	94	80 - 120	98	80 - 120	<0.2	ug/L	NC	20
3260584	Dissolved Zinc (Zn)	2009/07/09	102	80 - 120	100	80 - 120	<0.1	ug/L	17.6	20
3260584	Dissolved Aluminum (Al)	2009/07/09					<0.2	ug/L	NC	20
3260584	Dissolved Antimony (Sb)	2009/07/09					<0.02	ug/L	NC	20
3260584	Dissolved Barium (Ba)	2009/07/09					<0.02	ug/L	NC	20
3260584	Dissolved Bismuth (Bi)	2009/07/09					<0.005	ug/L	NC	20
3260584	Dissolved Boron (B)	2009/07/09					<50	ug/L	NC	20
3260584	Dissolved Iron (Fe)	2009/07/09					<1	ug/L	NC	20
3260584	Dissolved Manganese (Mn)	2009/07/09					<0.05	ug/L	NC	20
3260584	Dissolved Molybdenum (Mo)	2009/07/09					<0.05	ug/L	NC	20
3260584	Dissolved Silicon (Si)	2009/07/09					<100	ug/L	NC	20
3260584	Dissolved Silver (Ag)	2009/07/09					<0.005	ug/L	NC	20
3260584	Dissolved Strontium (Sr)	2009/07/09					<0.05	ug/L	NC	20
3260584	Dissolved Thallium (Tl)	2009/07/09					<0.002	ug/L	NC	20
3260584	Dissolved Tin (Sn)	2009/07/09					<0.01	ug/L	NC	20
3260584	Dissolved Titanium (Ti)	2009/07/09					<0.5	ug/L	NC	20
3260584	Dissolved Zirconium (Zr)	2009/07/09					<0.1	ug/L	NC	20
3262230	Dissolved Calcium (Ca)	2009/07/09					<0.05	mg/L	NC	20
3262230	Dissolved Magnesium (Mg)	2009/07/09					<0.05	mg/L	NC	20
3262230	Dissolved Potassium (K)	2009/07/09					<0.05	mg/L	NC	20
3262230	Dissolved Sodium (Na)	2009/07/09					<0.05	mg/L	NC	20

Maxxam Job #: A934274
Report Date: 2009/07/10

DENISON ENVIRONMENTAL SERVICES
Client Project #: SRK WATER SAMPLES FOR DAN MACK

Sampler Initials: DM

QUALITY ASSURANCE REPORT

			Matrix Spike		Spike		Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3262230	Dissolved Sulphur (S)	2009/07/09					<3	mg/L	NC	20
3262357	Dissolved Chloride (Cl)	2009/07/08	NC	80 - 120	103	80 - 120	<0.5	mg/L	NC	20
3262442	Dissolved Sulphate (SO4)	2009/07/08	NC	75 - 125	97	80 - 120	<0.5	mg/L	0.4	20

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference

Your Project #: FARO - ICY001.034
Your C.O.C. #: 08302259

Attention: Roy Morrell
DENISON ENVIRONMENTAL SERVICES
ONTARIO
8 Kilborn Way
ELLIOT LAKE, ON
CANADA P5A 2T1

Report Date: 2009/07/27

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A937530
Received: 2009/07/20, 12:55

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	1	N/A	2009/07/25	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	1	2009/07/24	2009/07/24	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	1	N/A	2009/07/23	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	1	N/A	2009/07/24	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	1	N/A	2009/07/24		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2009/07/24	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	1	N/A	2009/07/24	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	1	N/A	2009/07/22	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	1	N/A	2009/07/24	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	1	N/A	2009/07/23	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Dissolved Solids (Filt. Residue)	1	N/A	2009/07/24	BRN SOP 00276 R4.0	SM 2540C

* Results relate only to the items tested.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

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Total cover pages: 1

Maxxam Job #: A937530
Report Date: 2009/07/27

DENISON ENVIRONMENTAL SERVICES
Client Project #: FARO - ICY001.034

Sampler Initials: MP

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		P86985		
Sampling Date		2009/07/16 14:00		
	Units	**FARO-ICY001.034**	**RDL**	**QC Batch**
Misc. Inorganics				
Acidity (pH 4.5)	mg/L	<0.5	0.5	3301463
Acidity (pH 8.3)	mg/L	0.7	0.5	3301463
Preparation				
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	150	0.5	3299515
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	3299515
Bicarbonate (HCO3)	mg/L	180	0.5	3299515
Carbonate (CO3)	mg/L	<0.5	0.5	3299515
Hydroxide (OH)	mg/L	<0.5	0.5	3299515
Anions				
Dissolved Sulphate (SO4)	mg/L	44	0.5	3299759
Dissolved Chloride (Cl)	mg/L	0.7	0.5	3299649
Physical Properties				
Conductivity	uS/cm	370	1	3299513
pH	pH Units	8.2		3299450
Physical Properties				
Total Dissolved Solids	mg/L	230	10	3295660

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: A937530
Report Date: 2009/07/27

DENISON ENVIRONMENTAL SERVICES
Client Project #: FARO - ICY001.034

Sampler Initials: MP

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		P86985		
Sampling Date		2009/07/16 14:00		
	Units	**FARO-ICY001.034**	**RDL**	**QC Batch**
Misc. Inorganics				
Dissolved Hardness (CaCO3)	mg/L	174	0.5	3290746
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	3.5	0.2	3296647
Dissolved Antimony (Sb)	ug/L	34.2	0.02	3296647
Dissolved Arsenic (As)	ug/L	6.19	0.02	3296647
Dissolved Barium (Ba)	ug/L	84.2	0.02	3296647
Dissolved Beryllium (Be)	ug/L	<0.01	0.01	3296647
Dissolved Bismuth (Bi)	ug/L	<0.005	0.005	3296647
Dissolved Boron (B)	ug/L	<50	50	3296647
Dissolved Cadmium (Cd)	ug/L	0.023	0.005	3296647
Dissolved Chromium (Cr)	ug/L	<0.1	0.1	3296647
Dissolved Cobalt (Co)	ug/L	0.110	0.005	3296647
Dissolved Copper (Cu)	ug/L	1.28	0.05	3296647
Dissolved Iron (Fe)	ug/L	8	1	3296647
Dissolved Lead (Pb)	ug/L	22.9	0.005	3296647
Dissolved Lithium (Li)	ug/L	8.1	0.5	3296647
Dissolved Manganese (Mn)	ug/L	32.0	0.05	3296647
Dissolved Molybdenum (Mo)	ug/L	51.4	0.05	3296647
Dissolved Nickel (Ni)	ug/L	0.34	0.02	3296647
Dissolved Selenium (Se)	ug/L	0.06	0.04	3296647
Dissolved Silicon (Si)	ug/L	2370	100	3296647
Dissolved Silver (Ag)	ug/L	<0.005	0.005	3296647
Dissolved Strontium (Sr)	ug/L	723	0.05	3296647
Dissolved Thallium (Tl)	ug/L	0.014	0.002	3296647
Dissolved Tin (Sn)	ug/L	<0.01	0.01	3296647
Dissolved Titanium (Ti)	ug/L	<0.5	0.5	3296647
Dissolved Uranium (U)	ug/L	87.8	0.002	3296647
Dissolved Vanadium (V)	ug/L	0.2	0.2	3296647
Dissolved Zinc (Zn)	ug/L	15.9	0.1	3296647
Dissolved Zirconium (Zr)	ug/L	<0.1	0.1	3296647
Dissolved Calcium (Ca)	mg/L	52.0	0.05	3297461
Dissolved Magnesium (Mg)	mg/L	10.7	0.05	3297461
Dissolved Potassium (K)	mg/L	2.06	0.05	3297461
Dissolved Sodium (Na)	mg/L	8.07	0.05	3297461
Dissolved Sulphur (S)	mg/L	15	3	3297461

RDL = Reportable Detection Limit

Maxxam Job #: A937530
Report Date: 2009/07/27

DENISON ENVIRONMENTAL SERVICES
Client Project #: FARO - ICY001.034

Sampler Initials: MP

QUALITY ASSURANCE REPORT

			Matrix Spike		Spike		Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3295660	Total Dissolved Solids	2009/07/24	114	80 - 120	110	80 - 120	<10	mg/L	1.7	20
3296647	Dissolved Arsenic (As)	2009/07/24	94	80 - 120	101	80 - 120	<0.02	ug/L	9.7	20
3296647	Dissolved Beryllium (Be)	2009/07/24	103	80 - 120	103	80 - 120	<0.01	ug/L	2.2	20
3296647	Dissolved Cadmium (Cd)	2009/07/24	NC	80 - 120	99	80 - 120	<0.005	ug/L	1.0	20
3296647	Dissolved Chromium (Cr)	2009/07/24	99	80 - 120	102	80 - 120	<0.1	ug/L	NC	20
3296647	Dissolved Cobalt (Co)	2009/07/24	NC	80 - 120	99	80 - 120	<0.005	ug/L	0.2	20
3296647	Dissolved Copper (Cu)	2009/07/24	NC	80 - 120	102	80 - 120	<0.05	ug/L	1.8	20
3296647	Dissolved Lead (Pb)	2009/07/24	103	80 - 120	104	80 - 120	<0.005	ug/L	7.8	20
3296647	Dissolved Lithium (Li)	2009/07/24	NC	80 - 120	101	80 - 120	<0.5	ug/L	0.05	20
3296647	Dissolved Nickel (Ni)	2009/07/24	NC	80 - 120	103	80 - 120	<0.02	ug/L	0.6	20
3296647	Dissolved Selenium (Se)	2009/07/24	100	80 - 120	102	80 - 120	<0.04	ug/L	NC	20
3296647	Dissolved Uranium (U)	2009/07/24	111	80 - 120	107	80 - 120	<0.002	ug/L	1.6	20
3296647	Dissolved Vanadium (V)	2009/07/24	100	80 - 120	99	80 - 120	<0.2	ug/L	NC	20
3296647	Dissolved Zinc (Zn)	2009/07/24	NC	80 - 120	115	80 - 120	<0.1	ug/L	1.4	20
3296647	Dissolved Aluminum (Al)	2009/07/24					<0.2	ug/L	4.0	20
3296647	Dissolved Antimony (Sb)	2009/07/24					<0.02	ug/L	NC	20
3296647	Dissolved Barium (Ba)	2009/07/24					<0.02	ug/L	1.3	20
3296647	Dissolved Bismuth (Bi)	2009/07/24					<0.005	ug/L	NC	20
3296647	Dissolved Boron (B)	2009/07/24					<50	ug/L	NC	20
3296647	Dissolved Iron (Fe)	2009/07/24					<1	ug/L	9.8	20
3296647	Dissolved Manganese (Mn)	2009/07/24					<0.05	ug/L	0.2	20
3296647	Dissolved Molybdenum (Mo)	2009/07/24					<0.05	ug/L	NC	20
3296647	Dissolved Silicon (Si)	2009/07/24					<100	ug/L	3.8	20
3296647	Dissolved Silver (Ag)	2009/07/24					<0.005	ug/L	NC	20
3296647	Dissolved Strontium (Sr)	2009/07/24					<0.05	ug/L	0.6	20
3296647	Dissolved Thallium (Tl)	2009/07/24					<0.002	ug/L	1.5	20
3296647	Dissolved Tin (Sn)	2009/07/24					<0.01	ug/L	NC	20
3296647	Dissolved Titanium (Ti)	2009/07/24					<0.5	ug/L	NC	20
3296647	Dissolved Zirconium (Zr)	2009/07/24					<0.1	ug/L	NC	20
3297461	Dissolved Calcium (Ca)	2009/07/24					<0.05	mg/L	0.4	20
3297461	Dissolved Magnesium (Mg)	2009/07/24					<0.05	mg/L	0.6	20
3297461	Dissolved Potassium (K)	2009/07/24					<0.05	mg/L	1.2	20
3297461	Dissolved Sodium (Na)	2009/07/24					<0.05	mg/L	NC	20
3297461	Dissolved Sulphur (S)	2009/07/24					<3	mg/L	2.4	20
3299513	Conductivity	2009/07/24			101	80 - 120	<1	uS/cm	0.1	20
3299515	Alkalinity (Total as CaCO3)	2009/07/24	NC	80 - 120	99	80 - 120	<0.5	mg/L	0.4	20
3299515	Alkalinity (PP as CaCO3)	2009/07/24					<0.5	mg/L	NC	20
3299515	Bicarbonate (HCO3)	2009/07/24					<0.5	mg/L	0.4	20
3299515	Carbonate (CO3)	2009/07/24					<0.5	mg/L	NC	20
3299515	Hydroxide (OH)	2009/07/24					<0.5	mg/L	NC	20

Maxxam Job #: A937530
Report Date: 2009/07/27

DENISON ENVIRONMENTAL SERVICES
Client Project #: FARO - ICY001.034

Sampler Initials: MP

QUALITY ASSURANCE REPORT

			Matrix Spike		Spike		Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3299649	Dissolved Chloride (Cl)	2009/07/23	107	80 - 120	99	80 - 120	<0.5	mg/L	2.1	20
3299759	Dissolved Sulphate (SO4)	2009/07/23	NC	75 - 125	92	80 - 120	<0.5	mg/L	2.6	20
3301463	Acidity (pH 8.3)	2009/07/25			98	80 - 120	<0.5	mg/L	14.0	20
3301463	Acidity (pH 4.5)	2009/07/25					<0.5	mg/L		

N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference

Your Project #: SRK JULY 26,2009
Your C.O.C. #: 08302437

Attention: Daniel Mackie
SRK CONSULTING
SRKCONSU-VAN
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2

Report Date: 2009/08/04

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A939161
Received: 2009/07/27, 13:25

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	1	N/A	2009/07/29	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	1	2009/07/30	2009/07/29	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	1	N/A	2009/07/29	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	1	N/A	2009/07/29	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	1	N/A	2009/08/04		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2009/07/31	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	1	N/A	2009/07/31	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	1	N/A	2009/07/29	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	1	N/A	2009/07/29	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	1	N/A	2009/07/29	BRN-SOP 00243 R1.0	Based on EPA 375.4

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A939161
Report Date: 2009/08/04

SRK CONSULTING
Client Project #: SRK JULY 26,2009

Sampler Initials: MP

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		P97629		
Sampling Date		2009/07/24		
COC Number		08302437		
	Units	**P09-C11**	**RDL**	**QC Batch**
Misc. Inorganics				
Acidity (pH 4.5)	mg/L	<0.5	0.5	3310967
Acidity (pH 8.3)	mg/L	24.5	0.5	3310967
Preparation				
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	350	0.5	3312727
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	3312727
Bicarbonate (HCO3)	mg/L	430	0.5	3312727
Carbonate (CO3)	mg/L	<0.5	0.5	3312727
Hydroxide (OH)	mg/L	<0.5	0.5	3312727
Anions				
Dissolved Sulphate (SO4)	mg/L	1300	0.5	3310444
Dissolved Chloride (Cl)	mg/L	3.0	0.5	3310387
Physical Properties				
Conductivity	uS/cm	2400	1	3312726
pH	pH Units	7.8		3312722

RDL = Reportable Detection Limit

Maxxam Job #: A939161
Report Date: 2009/08/04

SRK CONSULTING
Client Project #: SRK JULY 26,2009

Sampler Initials: MP

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		P97629		
Sampling Date		2009/07/24		
COC Number		08302437		
	Units	**P09-C11**	**RDL**	**QC Batch**
Misc. Inorganics				
Dissolved Hardness (CaCO3)	mg/L	1390	0.5	3305805
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	4	1	3310759
Dissolved Antimony (Sb)	ug/L	1.8	0.1	3310759
Dissolved Arsenic (As)	ug/L	10.1	0.1	3310759
Dissolved Barium (Ba)	ug/L	40.5	0.1	3310759
Dissolved Beryllium (Be)	ug/L	0.10	0.05	3310759
Dissolved Bismuth (Bi)	ug/L	<0.03	0.03	3310759
Dissolved Boron (B)	ug/L	<300	300	3310759
Dissolved Cadmium (Cd)	ug/L	0.04	0.03	3310759
Dissolved Chromium (Cr)	ug/L	<0.5	0.5	3310759
Dissolved Cobalt (Co)	ug/L	0.19	0.03	3310759
Dissolved Copper (Cu)	ug/L	0.8	0.3	3310759
Dissolved Iron (Fe)	ug/L	10900	5	3310759
Dissolved Lead (Pb)	ug/L	0.09	0.03	3310759
Dissolved Lithium (Li)	ug/L	107	3	3310759
Dissolved Manganese (Mn)	ug/L	12200	0.3	3310759
Dissolved Molybdenum (Mo)	ug/L	12.7	0.3	3310759
Dissolved Nickel (Ni)	ug/L	2.2	0.1	3310759
Dissolved Selenium (Se)	ug/L	<0.2	0.2	3310759
Dissolved Silicon (Si)	ug/L	10000	500	3310759
Dissolved Silver (Ag)	ug/L	<0.03	0.03	3310759
Dissolved Strontium (Sr)	ug/L	1890	0.3	3310759
Dissolved Thallium (Tl)	ug/L	<0.01	0.01	3310759
Dissolved Tin (Sn)	ug/L	<0.05	0.05	3310759
Dissolved Titanium (Ti)	ug/L	<3	3	3310759
Dissolved Uranium (U)	ug/L	3.77	0.01	3310759
Dissolved Vanadium (V)	ug/L	<1	1	3310759
Dissolved Zinc (Zn)	ug/L	29.1	0.5	3310759
Dissolved Zirconium (Zr)	ug/L	1.0	0.5	3310759
Dissolved Calcium (Ca)	mg/L	416	0.05	3315592
Dissolved Magnesium (Mg)	mg/L	86.2	0.05	3315592
Dissolved Potassium (K)	mg/L	6.63	0.05	3315592

RDL = Reportable Detection Limit

Maxxam Job #: A939161
Report Date: 2009/08/04

SRK CONSULTING
Client Project #: SRK JULY 26,2009

Sampler Initials: MP

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		P97629		
Sampling Date		2009/07/24		
COC Number		08302437		
	Units	**P09-C11**	**RDL**	**QC Batch**
Dissolved Sodium (Na)	mg/L	52.3	0.05	3315592
Dissolved Sulphur (S)	mg/L	437	3	3315592

RDL = Reportable Detection Limit

Maxxam Job #: A939161
Report Date: 2009/08/04

SRK CONSULTING
Client Project #: SRK JULY 26,2009

Sampler Initials: MP

LOW LEVEL DISSOLVED METALS - WATER (WATER) Comments

Sample P97629-03 Elements by ICPMS Low Level (dissolved): RDL raised due to sample matrix interference.

Results relate only to the items tested.

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: SRK JULY 26,2009
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA939161

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3310387 IC4	MATRIX SPIKE	Dissolved Chloride (Cl)	2009/07/29		87	%	80 - 120
	SPIKE	Dissolved Chloride (Cl)	2009/07/29		105	%	80 - 120
	BLANK	Dissolved Chloride (Cl)	2009/07/29	<0.5		mg/L	
	RPD [P97629-02]	Dissolved Chloride (Cl)	2009/07/29	0.5		%	20
3310444 IC4	MATRIX SPIKE	Dissolved Sulphate (SO4)	2009/07/29		117	%	75 - 125
	SPIKE	Dissolved Sulphate (SO4)	2009/07/29		100	%	80 - 120
	BLANK	Dissolved Sulphate (SO4)	2009/07/29	<0.5		mg/L	
	RPD [P97629-02]	Dissolved Sulphate (SO4)	2009/07/29	2.0		%	20
3310759 AA1	MATRIX SPIKE	Dissolved Arsenic (As)	2009/07/31		104	%	80 - 120
		Dissolved Beryllium (Be)	2009/07/31		104	%	80 - 120
		Dissolved Cadmium (Cd)	2009/07/31		107	%	80 - 120
		Dissolved Chromium (Cr)	2009/07/31		104	%	80 - 120
		Dissolved Cobalt (Co)	2009/07/31		101	%	80 - 120
		Dissolved Copper (Cu)	2009/07/31		102	%	80 - 120
		Dissolved Lead (Pb)	2009/07/31		108	%	80 - 120
		Dissolved Lithium (Li)	2009/07/31		102	%	80 - 120
		Dissolved Nickel (Ni)	2009/07/31		NC	%	80 - 120
		Dissolved Selenium (Se)	2009/07/31		107	%	80 - 120
		Dissolved Uranium (U)	2009/07/31		114	%	80 - 120
		Dissolved Vanadium (V)	2009/07/31		106	%	80 - 120
		Dissolved Zinc (Zn)	2009/07/31		NC	%	80 - 120
	SPIKE	Dissolved Arsenic (As)	2009/07/31		95	%	80 - 120
		Dissolved Beryllium (Be)	2009/07/31		94	%	80 - 120
		Dissolved Cadmium (Cd)	2009/07/31		94	%	80 - 120
		Dissolved Chromium (Cr)	2009/07/31		95	%	80 - 120
		Dissolved Cobalt (Co)	2009/07/31		94	%	80 - 120
		Dissolved Copper (Cu)	2009/07/31		99	%	80 - 120
		Dissolved Lead (Pb)	2009/07/31		100	%	80 - 120
		Dissolved Lithium (Li)	2009/07/31		97	%	80 - 120
		Dissolved Nickel (Ni)	2009/07/31		93	%	80 - 120
		Dissolved Selenium (Se)	2009/07/31		98	%	80 - 120
		Dissolved Uranium (U)	2009/07/31		100	%	80 - 120
		Dissolved Vanadium (V)	2009/07/31		92	%	80 - 120
		Dissolved Zinc (Zn)	2009/07/31		94	%	80 - 120
	BLANK	Dissolved Aluminum (Al)	2009/07/31	<0.2		ug/L	
		Dissolved Antimony (Sb)	2009/07/31	<0.02		ug/L	
		Dissolved Arsenic (As)	2009/07/31	<0.02		ug/L	
		Dissolved Barium (Ba)	2009/07/31	<0.02		ug/L	
		Dissolved Beryllium (Be)	2009/07/31	<0.01		ug/L	
		Dissolved Bismuth (Bi)	2009/07/31	<0.005		ug/L	
		Dissolved Boron (B)	2009/07/31	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/07/31	<0.005		ug/L	
		Dissolved Chromium (Cr)	2009/07/31	<0.1		ug/L	
		Dissolved Cobalt (Co)	2009/07/31	<0.005		ug/L	
		Dissolved Copper (Cu)	2009/07/31	<0.05		ug/L	
		Dissolved Iron (Fe)	2009/07/31	<1		ug/L	
		Dissolved Lead (Pb)	2009/07/31	<0.005		ug/L	
		Dissolved Lithium (Li)	2009/07/31	<0.5		ug/L	
		Dissolved Manganese (Mn)	2009/07/31	<0.05		ug/L	
		Dissolved Molybdenum (Mo)	2009/07/31	<0.05		ug/L	
		Dissolved Nickel (Ni)	2009/07/31	<0.02		ug/L	
		Dissolved Selenium (Se)	2009/07/31	<0.04		ug/L	
		Dissolved Silicon (Si)	2009/07/31	<100		ug/L	
		Dissolved Silver (Ag)	2009/07/31	<0.005		ug/L	
		Dissolved Strontium (Sr)	2009/07/31	<0.05		ug/L	

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: SRK JULY 26,2009
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA939161

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3310759 AA1	BLANK	Dissolved Thallium (Tl)	2009/07/31	<0.002		ug/L	
		Dissolved Tin (Sn)	2009/07/31	<0.01		ug/L	
		Dissolved Titanium (Ti)	2009/07/31	<0.5		ug/L	
		Dissolved Uranium (U)	2009/07/31	<0.002		ug/L	
		Dissolved Vanadium (V)	2009/07/31	<0.2		ug/L	
		Dissolved Zinc (Zn)	2009/07/31	<0.1		ug/L	
		Dissolved Zirconium (Zr)	2009/07/31	<0.1		ug/L	
	RPD	Dissolved Aluminum (Al)	2009/07/31	1.8		%	20
		Dissolved Antimony (Sb)	2009/07/31	0.6		%	20
		Dissolved Arsenic (As)	2009/07/31	16.1		%	20
		Dissolved Barium (Ba)	2009/07/31	0.5		%	20
		Dissolved Beryllium (Be)	2009/07/31	NC		%	20
		Dissolved Bismuth (Bi)	2009/07/31	NC		%	20
		Dissolved Boron (B)	2009/07/31	NC		%	20
		Dissolved Cadmium (Cd)	2009/07/31	2.9		%	20
		Dissolved Chromium (Cr)	2009/07/31	NC		%	20
		Dissolved Cobalt (Co)	2009/07/31	1.3		%	20
		Dissolved Copper (Cu)	2009/07/31	5.1		%	20
		Dissolved Iron (Fe)	2009/07/31	NC		%	20
		Dissolved Lead (Pb)	2009/07/31	0.4		%	20
		Dissolved Lithium (Li)	2009/07/31	NC		%	20
		Dissolved Manganese (Mn)	2009/07/31	1.6		%	20
		Dissolved Molybdenum (Mo)	2009/07/31	2.7		%	20
		Dissolved Nickel (Ni)	2009/07/31	5.3		%	20
		Dissolved Selenium (Se)	2009/07/31	0.5		%	20
		Dissolved Silicon (Si)	2009/07/31	0.2		%	20
		Dissolved Silver (Ag)	2009/07/31	NC		%	20
		Dissolved Strontium (Sr)	2009/07/31	0.8		%	20
		Dissolved Thallium (Tl)	2009/07/31	5.1		%	20
		Dissolved Tin (Sn)	2009/07/31	NC		%	20
		Dissolved Titanium (Ti)	2009/07/31	NC		%	20
		Dissolved Uranium (U)	2009/07/31	0.5		%	20
		Dissolved Vanadium (V)	2009/07/31	NC		%	20
		Dissolved Zinc (Zn)	2009/07/31	2.6		%	20
		Dissolved Zirconium (Zr)	2009/07/31	NC		%	20
3310967 MM3	SPIKE	Acidity (pH 8.3)	2009/07/29		96	%	80 - 120
	BLANK	Acidity (pH 4.5)	2009/07/29	<0.5		mg/L	
		Acidity (pH 8.3)	2009/07/29	0.8, RDL=0.5		mg/L	
	RPD [P97629-02]	Acidity (pH 4.5)	2009/07/29	NC		%	20
		Acidity (pH 8.3)	2009/07/29	7.6		%	20
3312726 MM3	SPIKE	Conductivity	2009/07/29		102	%	80 - 120
	BLANK	Conductivity	2009/07/29	2, RDL=1		uS/cm	
	RPD	Conductivity	2009/07/29	NC		%	20
3312727 MM3	MATRIX SPIKE	Alkalinity (Total as CaCO3)	2009/07/29		NC	%	80 - 120
	SPIKE	Alkalinity (Total as CaCO3)	2009/07/29		100	%	80 - 120
	BLANK	Alkalinity (Total as CaCO3)	2009/07/29	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/07/29	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/07/29	<0.5		mg/L	
		Carbonate (CO3)	2009/07/29	<0.5		mg/L	
		Hydroxide (OH)	2009/07/29	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2009/07/29	NC		%	20
3315592 AA1	BLANK	Dissolved Calcium (Ca)	2009/07/31	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/07/31	<0.05		mg/L	
		Dissolved Potassium (K)	2009/07/31	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/07/31	<0.05		mg/L	

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: SRK JULY 26,2009
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA939161

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3315592 AA1	BLANK	Dissolved Sulphur (S)	2009/07/31	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/07/31	3.1		%	20
		Dissolved Magnesium (Mg)	2009/07/31	2.5		%	20
		Dissolved Potassium (K)	2009/07/31	0.4		%	20
		Dissolved Sodium (Na)	2009/07/31	NC		%	20
		Dissolved Sulphur (S)	2009/07/31	10.7		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Sample Integrity Form

Invoice To:
SRK CONSULTING
SRKCONSU-VAN
ATTN: Daniel Mackie
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2
Client Contact:
Daniel Mackie

Maxxam Job #:	A939161
Date Received:	2009/07/27
Your C.O.C. #:	08302437
Your Project #:	SRK JULY 26,2009
Maxxam Project Manager:	ASHLEY NIVISON
Quote #:	A80211

No discrepancies noted.

Report Comments

Received Date: 2009/07/27 **Time:** 13:25 **By:** _____

Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

Maxxam Job #: A941237
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: KY001.034

Sampler Initials: MS

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q12007	Q12008	Q12009		
Sampling Date		2009/08/02 18:30	2009/08/03 12:15	2009/08/02 17:00		
COC Number		F130713	F130713	F130713		
	Units	**LCD-02**	**LCD-03**	**LCD-06**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	3.2	5.1	1.5	0.2	3334703
Dissolved Antimony (Sb)	ug/L	0.08	0.14	0.02	0.02	3334703
Dissolved Arsenic (As)	ug/L	94.9	50.6	102	0.02	3334703
Dissolved Barium (Ba)	ug/L	36.7	40.3	51.7	0.02	3334703
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3334703
Dissolved Bismuth (Bi)	ug/L	<0.005	0.006	0.009	0.005	3334703
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3334703
Dissolved Cadmium (Cd)	ug/L	0.062	0.123	0.056	0.005	3334703
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3334703
Dissolved Cobalt (Co)	ug/L	1.61	1.79	3.49	0.005	3334703
Dissolved Copper (Cu)	ug/L	0.16	0.34	0.15	0.05	3334703
Dissolved Iron (Fe)	ug/L	1780	1280	4830	1	3334703
Dissolved Lead (Pb)	ug/L	11.3	6.43	1.03	0.005	3334703
Dissolved Lithium (Li)	ug/L	11.1	8.2	8.6	0.5	3334703
Dissolved Manganese (Mn)	ug/L	416	554	868	0.05	3334703
Dissolved Molybdenum (Mo)	ug/L	2.42	2.95	1.55	0.05	3334703
Dissolved Nickel (Ni)	ug/L	2.95	3.48	1.50	0.02	3334703
Dissolved Selenium (Se)	ug/L	<0.04	<0.04	<0.04	0.04	3334703
Dissolved Silicon (Si)	ug/L	7020	6450	7260	100	3334703
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3334703
Dissolved Strontium (Sr)	ug/L	808	736	633	0.05	3334703
Dissolved Thallium (Tl)	ug/L	0.025	0.041	0.014	0.002	3334703
Dissolved Tin (Sn)	ug/L	0.01	0.01	0.01	0.01	3334703
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	0.6	0.5	3334703
Dissolved Uranium (U)	ug/L	7.07	8.77	2.21	0.002	3334703
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3334703
Dissolved Zinc (Zn)	ug/L	11.5	5.0	14.9	0.1	3334703
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3334703
Dissolved Calcium (Ca)	mg/L	137	127	129	0.05	3336276
Dissolved Magnesium (Mg)	mg/L	36.1	34.9	33.1	0.05	3336276
Dissolved Potassium (K)	mg/L	3.09	2.86	2.14	0.05	3336276
Dissolved Sodium (Na)	mg/L	10.1	8.72	6.07	0.05	3336276

RDL = Reportable Detection Limit

Maxxam Job #: A941237
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: KY001.034

Sampler Initials: MS

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q12007	Q12008	Q12009		
Sampling Date		2009/08/02 18:30	2009/08/03 12:15	2009/08/02 17:00		
COC Number		F130713	F130713	F130713		
	Units	**LCD-02**	**LCD-03**	**LCD-06**	**RDL**	**QC Batch**
Dissolved Sulphur (S)	mg/L	79	60	57	3	3336276
RDL = Reportable Detection Limit						

Maxxam Job #: A941237
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: KY001.034

Sampler Initials: MS

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q12010		
Sampling Date		2009/08/01 22:45		
COC Number		F130713		
	Units	**VC2**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	3.9	0.2	3334703
Dissolved Antimony (Sb)	ug/L	2.05	0.02	3334703
Dissolved Arsenic (As)	ug/L	95.3	0.02	3334703
Dissolved Barium (Ba)	ug/L	61.4	0.02	3334703
Dissolved Beryllium (Be)	ug/L	<0.01	0.01	3334703
Dissolved Bismuth (Bi)	ug/L	<0.005	0.005	3334703
Dissolved Boron (B)	ug/L	<50	50	3334703
Dissolved Cadmium (Cd)	ug/L	0.006	0.005	3334703
Dissolved Chromium (Cr)	ug/L	<0.1	0.1	3334703
Dissolved Cobalt (Co)	ug/L	0.857	0.005	3334703
Dissolved Copper (Cu)	ug/L	0.08	0.05	3334703
Dissolved Iron (Fe)	ug/L	674	1	3334703
Dissolved Lead (Pb)	ug/L	0.378	0.005	3334703
Dissolved Lithium (Li)	ug/L	5.1	0.5	3334703
Dissolved Manganese (Mn)	ug/L	114	0.05	3334703
Dissolved Molybdenum (Mo)	ug/L	11.5	0.05	3334703
Dissolved Nickel (Ni)	ug/L	0.94	0.02	3334703
Dissolved Selenium (Se)	ug/L	<0.04	0.04	3334703
Dissolved Silicon (Si)	ug/L	6340	100	3334703
Dissolved Silver (Ag)	ug/L	<0.005	0.005	3334703
Dissolved Strontium (Sr)	ug/L	674	0.05	3334703
Dissolved Thallium (Tl)	ug/L	0.008	0.002	3334703
Dissolved Tin (Sn)	ug/L	0.03	0.01	3334703
Dissolved Titanium (Ti)	ug/L	<0.5	0.5	3334703
Dissolved Uranium (U)	ug/L	5.56	0.002	3334703
Dissolved Vanadium (V)	ug/L	<0.2	0.2	3334703
Dissolved Zinc (Zn)	ug/L	31.5	0.1	3334703
Dissolved Zirconium (Zr)	ug/L	<0.1	0.1	3334703
Dissolved Calcium (Ca)	mg/L	58.1	0.05	3336276
Dissolved Magnesium (Mg)	mg/L	10.4	0.05	3336276
Dissolved Potassium (K)	mg/L	1.19	0.05	3336276
Dissolved Sodium (Na)	mg/L	5.43	0.05	3336276

RDL = Reportable Detection Limit

Maxxam Job #: A941237
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: KY001.034

Sampler Initials: MS

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q12010		
Sampling Date		2009/08/01 22:45		
COC Number		F130713		
	Units	**VC2**	**RDL**	**QC Batch**
Dissolved Sulphur (S)	mg/L	12	3	3336276

RDL = Reportable Detection Limit

Maxxam Job #: A941237
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: KY001.034

Sampler Initials: MS

LOW LEVEL DISSOLVED METALS - WATER (WATER) Comments

Sample Q12005-03 Elements by ICPMS Low Level (dissolved): RDL raised due to sample matrix interference.

Results relate only to the items tested.

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: KY001.034
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA941237

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3332348 AL8	Spiked Blank	Conductivity	2009/08/07		101	%	80 - 120
	Method Blank	Conductivity	2009/08/07	<1		uS/cm	
	RPD	Conductivity	2009/08/07	0.1		%	20
3332351 AL8	Matrix Spike	Alkalinity (Total as CaCO3)	2009/08/08		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/08/08		99	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/08/08	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/08/08	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/08/08	<0.5		mg/L	
		Carbonate (CO3)	2009/08/08	<0.5		mg/L	
		Hydroxide (OH)	2009/08/08	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2009/08/08	0.7		%	20
		Alkalinity (PP as CaCO3)	2009/08/08	15.8		%	20
		Bicarbonate (HCO3)	2009/08/08	0.1		%	20
		Carbonate (CO3)	2009/08/08	15.8		%	20
		Hydroxide (OH)	2009/08/08	NC		%	20
3332702 TW2	Matrix Spike	Total Suspended Solids	2009/08/08		106	%	N/A
	Spiked Blank	Total Suspended Solids	2009/08/08		103	%	N/A
	Method Blank	Total Suspended Solids	2009/08/08	<4		mg/L	
	RPD	Total Suspended Solids	2009/08/08	10.8		%	25
3333320 AL8	Spiked Blank	Acidity (pH 8.3)	2009/08/08		100	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2009/08/08	<0.5		mg/L	
		Acidity (pH 8.3)	2009/08/08	<0.5		mg/L	
	RPD	Acidity (pH 4.5)	2009/08/08	NC		%	20
		Acidity (pH 8.3)	2009/08/08	NC		%	20
3334703 JC8	Matrix Spike	Dissolved Arsenic (As)	2009/08/10		98	%	80 - 120
		Dissolved Beryllium (Be)	2009/08/10		100	%	80 - 120
		Dissolved Cadmium (Cd)	2009/08/10		103	%	80 - 120
		Dissolved Chromium (Cr)	2009/08/10		98	%	80 - 120
		Dissolved Cobalt (Co)	2009/08/10		93	%	80 - 120
		Dissolved Copper (Cu)	2009/08/10		93	%	80 - 120
		Dissolved Lead (Pb)	2009/08/10		97	%	80 - 120
		Dissolved Lithium (Li)	2009/08/10		102	%	80 - 120
		Dissolved Nickel (Ni)	2009/08/10		91	%	80 - 120
		Dissolved Selenium (Se)	2009/08/10		102	%	80 - 120
		Dissolved Uranium (U)	2009/08/10		103	%	80 - 120
		Dissolved Vanadium (V)	2009/08/10		98	%	80 - 120
		Dissolved Zinc (Zn)	2009/08/10		100	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/08/10		97	%	80 - 120
		Dissolved Beryllium (Be)	2009/08/10		97	%	80 - 120
		Dissolved Cadmium (Cd)	2009/08/10		99	%	80 - 120
		Dissolved Chromium (Cr)	2009/08/10		99	%	80 - 120
		Dissolved Cobalt (Co)	2009/08/10		96	%	80 - 120
		Dissolved Copper (Cu)	2009/08/10		100	%	80 - 120
		Dissolved Lead (Pb)	2009/08/10		100	%	80 - 120
		Dissolved Lithium (Li)	2009/08/10		99	%	80 - 120
		Dissolved Nickel (Ni)	2009/08/10		97	%	80 - 120
		Dissolved Selenium (Se)	2009/08/10		97	%	80 - 120
		Dissolved Uranium (U)	2009/08/10		103	%	80 - 120
		Dissolved Vanadium (V)	2009/08/10		96	%	80 - 120
		Dissolved Zinc (Zn)	2009/08/10		98	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/08/10	<0.2		ug/L	
		Dissolved Antimony (Sb)	2009/08/10	<0.02		ug/L	
		Dissolved Arsenic (As)	2009/08/10	<0.02		ug/L	
		Dissolved Barium (Ba)	2009/08/10	<0.02		ug/L	
		Dissolved Beryllium (Be)	2009/08/10	<0.01		ug/L	

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: KY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA941237

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3334703 JC8	Method Blank	Dissolved Bismuth (Bi)	2009/08/10	<0.005		ug/L	
		Dissolved Boron (B)	2009/08/10	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/08/10	<0.005		ug/L	
		Dissolved Chromium (Cr)	2009/08/10	<0.1		ug/L	
		Dissolved Cobalt (Co)	2009/08/10	<0.005		ug/L	
		Dissolved Copper (Cu)	2009/08/10	<0.05		ug/L	
		Dissolved Iron (Fe)	2009/08/10	<1		ug/L	
		Dissolved Lead (Pb)	2009/08/10	0.007, RDL=0.005		ug/L	
		Dissolved Lithium (Li)	2009/08/10	<0.5		ug/L	
		Dissolved Manganese (Mn)	2009/08/10	<0.05		ug/L	
		Dissolved Molybdenum (Mo)	2009/08/10	<0.05		ug/L	
		Dissolved Nickel (Ni)	2009/08/10	<0.02		ug/L	
		Dissolved Selenium (Se)	2009/08/10	<0.04		ug/L	
		Dissolved Silicon (Si)	2009/08/10	<100		ug/L	
		Dissolved Silver (Ag)	2009/08/10	<0.005		ug/L	
		Dissolved Strontium (Sr)	2009/08/10	<0.05		ug/L	
		Dissolved Thallium (Tl)	2009/08/10	<0.002		ug/L	
		Dissolved Tin (Sn)	2009/08/10	<0.01		ug/L	
		Dissolved Titanium (Ti)	2009/08/10	<0.5		ug/L	
		Dissolved Uranium (U)	2009/08/10	<0.002		ug/L	
		Dissolved Vanadium (V)	2009/08/10	<0.2		ug/L	
		Dissolved Zinc (Zn)	2009/08/10	<0.1		ug/L	
		Dissolved Zirconium (Zr)	2009/08/10	<0.1		ug/L	
	RPD	Dissolved Aluminum (Al)	2009/08/10	6.0		%	20
		Dissolved Antimony (Sb)	2009/08/10	5.8		%	20
		Dissolved Arsenic (As)	2009/08/10	4.4		%	20
		Dissolved Barium (Ba)	2009/08/10	0.3		%	20
		Dissolved Beryllium (Be)	2009/08/10	NC		%	20
		Dissolved Bismuth (Bi)	2009/08/10	NC		%	20
		Dissolved Boron (B)	2009/08/10	NC		%	20
		Dissolved Cadmium (Cd)	2009/08/10	NC		%	20
		Dissolved Chromium (Cr)	2009/08/10	NC		%	20
		Dissolved Cobalt (Co)	2009/08/10	NC		%	20
		Dissolved Copper (Cu)	2009/08/10	NC		%	20
		Dissolved Lead (Pb)	2009/08/10	NC		%	20
		Dissolved Lithium (Li)	2009/08/10	0.2		%	20
		Dissolved Manganese (Mn)	2009/08/10	9.0		%	20
		Dissolved Molybdenum (Mo)	2009/08/10	0.7		%	20
		Dissolved Nickel (Ni)	2009/08/10	NC		%	20
		Dissolved Selenium (Se)	2009/08/10	NC		%	20
		Dissolved Silver (Ag)	2009/08/10	NC		%	20
		Dissolved Strontium (Sr)	2009/08/10	0.9		%	20
		Dissolved Thallium (Tl)	2009/08/10	NC		%	20
		Dissolved Tin (Sn)	2009/08/10	NC		%	20
		Dissolved Uranium (U)	2009/08/10	0.6		%	20
		Dissolved Vanadium (V)	2009/08/10	NC		%	20
		Dissolved Zinc (Zn)	2009/08/10	NC		%	20
3336276 JC8	Method Blank	Dissolved Calcium (Ca)	2009/08/10	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/08/10	<0.05		mg/L	
		Dissolved Potassium (K)	2009/08/10	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/08/10	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/08/10	<3		mg/L	
	RPD	Dissolved Magnesium (Mg)	2009/08/10	2.2		%	20
3336837 BB3	Matrix Spike	Dissolved Chloride (Cl)	2009/08/10		NC	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/08/10		98	%	80 - 120

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: KY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA941237

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3336837	BB3	Method Blank	Dissolved Chloride (Cl)	2009/08/10	<0.5		mg/L	
		RPD	Dissolved Chloride (Cl)	2009/08/10	2.6		%	20
3336845	BB3	Matrix Spike	Dissolved Sulphate (SO4)	2009/08/10		NC	%	75 - 125
		Spiked Blank	Dissolved Sulphate (SO4)	2009/08/10		91	%	80 - 120
		Method Blank	Dissolved Sulphate (SO4)	2009/08/10	0.9, RDL=0.5		mg/L	
		RPD	Dissolved Sulphate (SO4)	2009/08/10	21.5 (1)		%	20

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

Sample Integrity Form

Invoice To:
SRK CONSULTING
SRKCONSU-VAN
ATTN: DYLAN McGREGOR
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2
Client Contact:
DYLAN McGREGOR

Maxxam Job #:	A941237
Date Received:	2009/08/05
Your C.O.C. #:	F130713
Your Project #:	KY001.034
Maxxam Project Manager:	ASHLEY NIVISON
Quote #:	A80211

No discrepancies noted.

Report Comments

Received Date: 2009/08/05 **Time:** 14:10 **By:** _____

Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

Maxxam Analytics
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PAGE ___ OF ___

MAXXAM JOB #: A941237 ANALYSIS REQUEST F130713

COMPANY NAME: SRK CONSULTING	PH. #: 604 681 4196 E-mail: dmackie@srk.com FAX #: 604 687-5532
COMPANY ADDRESS: 1066 WEST HASTINGS VANCOUVER BC V6E 3X2	CLIENT PROJECT ID: (#) 1CY001.034
SAMPLER NAME (PRINT): MARK STOREY	PROJECT MANAGER: DAN MACKIE

LAB USE ONLY

FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER / SURFACE WATER / SOIL / DRINKING WATER / OTHER	# CONTAINERS	SAMPLING: DATE (DD/MM/YY)	TIME	HEADSPACE VAPOUR	BTEX / LH	BTEX / VPH	MTBE	VOCs / VPH	TEH	EPH	PAH	LEPH/HEPH	CCME-PHC (FRACTIONS 1-4 PLUS BTEX)	CCME-PHCS (FRACTIONS 2-4)	CCME BTEX (FRACTION 1 PLUS BTEX)	PHENOLS BY 4AAP	PHENOLS BY GCMS	TOTAL O&G	MINERAL O&G	Dissolved Metals: Field Filtered? YES / NO	Total Metals: Field Preserved? YES / NO	NITRATE	NITRITE	AMMONIA	CHLORIDE	FLUORIDE	SULPHATE	TOTAL SUSPENDED SOLIDS (NFR)	CYANIDE SAD	WAD	LEACHABLE LEAD (AA)	(TCLP)	LEACHABLE BTEX (AA)	(TCLP)	- ROUTINE ORGANICS	HOLD
1 P09-C1		✓	3	31/3/09	12:35PM																	—														—	
2 LCO-01		✓	3	03/8/09	1:40PM																	—														—	
3 LCO-02		✓	3	02/8/09	18:30																	—														—	
4 LCO-03		✓	5	03/08/09	12:15PM																	—														—	
5 LCO-06		✓	3	03/08/09	5:00PM																	—														—	
6 VC2		✓	3	01/8/09	10:45PM																	—														—	
7																																							
8																																							
9																																							
10																																							
11																																							
12																																							

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD 5 BUSINESS DAYS ☑
RUSH 3 BUSINESS DAYS ☐
RUSH 2 BUSINESS DAYS ☐
URGENT 1 BUSINESS DAY ☐
OTHER BUSINESS DAYS ____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

☐ CCME ☐ CSR ☐ ALBERTA TIER 1 ☐ OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

SOIL JARS USED AND NOT SUBMITTED:

LAB USE ONLY:

ARRIVAL TEMPERATURE °C:	DUE DATE:	LOG IN CHECK:
4, 3, 5		

RELINQUISHED BY SAMPLER: MARK STOREY	DATE: DD/MM/YY 04/08/09	TIME: 11:00AM	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY 05/08/09	TIME: 14:10	RECEIVED BY LABORATORY:

Your Project #: 1CY001.034
Your C.O.C. #: F130715

Attention: DYLAN McGREGOR
SRK CONSULTING
SRKCONSU-VAN
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2

Report Date: 2009/08/11

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A941238
Received: 2009/08/05, 14:10

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	3	N/A	2009/08/08	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	3	2009/08/07	2009/08/08	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	3	N/A	2009/08/10	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	3	N/A	2009/08/08	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	3	N/A	2009/08/11		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	3	N/A	2009/08/10	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by CRC ICPMS (dissolved) (1)	3	N/A	2009/08/10	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	3	N/A	2009/08/07	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	3	N/A	2009/08/08	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	3	N/A	2009/08/10	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	3	N/A	2009/08/08	BRN SOP-00277 R5.0	Based on SM - 2540 D

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A941238
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q12013		Q12014		
Sampling Date		2009/08/01 09:15		2009/08/02 13:15		
COC Number		F130715		F130715		
	Units	**VC1**	**RDL**	**GS1A**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3333320
Acidity (pH 8.3)	mg/L	0.6	0.5	13.9	0.5	3333320
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	140	0.5	190	0.5	3332351
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3332351
Bicarbonate (HCO3)	mg/L	170	0.5	230	0.5	3332351
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3332351
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3332351
Anions						
Dissolved Sulphate (SO4)	mg/L	83	0.5	450	5	3336845
Dissolved Chloride (Cl)	mg/L	<0.5	0.5	3.7	0.5	3336837
Physical Properties						
Conductivity	uS/cm	450	1	1200	1	3332348
pH	pH Units	8.2		8.0		3332333
Physical Properties						
Total Suspended Solids	mg/L	590	4	240	4	3332702

RDL = Reportable Detection Limit

Maxxam Job #: A941238
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q12015		
Sampling Date		2009/08/01 16:00		
COC Number		F130715		
	Units	**GS1B**	**RDL**	**QC Batch**
Misc. Inorganics				
Acidity (pH 4.5)	mg/L	<0.5	0.5	3333320
Acidity (pH 8.3)	mg/L	22.1	0.5	3333320
Preparation				
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	230	0.5	3332351
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	3332351
Bicarbonate (HCO3)	mg/L	290	0.5	3332351
Carbonate (CO3)	mg/L	<0.5	0.5	3332351
Hydroxide (OH)	mg/L	<0.5	0.5	3332351
Anions				
Dissolved Sulphate (SO4)	mg/L	410	5	3336845
Dissolved Chloride (Cl)	mg/L	0.7	0.5	3336837
Physical Properties				
Conductivity	uS/cm	1200	1	3332348
pH	pH Units	7.9		3332333
Physical Properties				
Total Suspended Solids	mg/L	110	4	3332702

RDL = Reportable Detection Limit

Maxxam Job #: A941238
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q12013	Q12014	Q12015		
Sampling Date		2009/08/01 09:15	2009/08/02 13:15	2009/08/01 16:00		
COC Number		F130715	F130715	F130715		
	Units	**VC1**	**GS1A**	**GS1B**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	169	584	621	0.5	3329959
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	6	<3	<3	3	3332853
Dissolved Antimony (Sb)	ug/L	<0.5	2.7	21.3	0.5	3332853
Dissolved Arsenic (As)	ug/L	6.8	546	158	0.1	3332853
Dissolved Barium (Ba)	ug/L	18	72	21	1	3332853
Dissolved Beryllium (Be)	ug/L	<0.1	<0.1	<0.1	0.1	3332853
Dissolved Bismuth (Bi)	ug/L	<1	<1	<1	1	3332853
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3332853
Dissolved Cadmium (Cd)	ug/L	<0.01	0.05	0.26	0.01	3332853
Dissolved Chromium (Cr)	ug/L	<1	<1	<1	1	3332853
Dissolved Cobalt (Co)	ug/L	<0.5	1.7	40.1	0.5	3332853
Dissolved Copper (Cu)	ug/L	3.4	0.5	0.4	0.2	3332853
Dissolved Iron (Fe)	ug/L	23	996	2230	5	3332853
Dissolved Lead (Pb)	ug/L	<0.2	0.2	0.6	0.2	3332853
Dissolved Lithium (Li)	ug/L	6	9	9	5	3332853
Dissolved Manganese (Mn)	ug/L	19	265	1380	1	3332853
Dissolved Mercury (Hg)	ug/L	<0.02	<0.02	<0.02	0.02	3332853
Dissolved Molybdenum (Mo)	ug/L	2	5	5	1	3332853
Dissolved Nickel (Ni)	ug/L	<1	8	141	1	3332853
Dissolved Selenium (Se)	ug/L	<0.1	<0.1	<0.1	0.1	3332853
Dissolved Silicon (Si)	ug/L	6230	6030	2000	100	3332853
Dissolved Silver (Ag)	ug/L	<0.02	<0.02	<0.02	0.02	3332853
Dissolved Strontium (Sr)	ug/L	675	1430	589	1	3332853
Dissolved Thallium (Tl)	ug/L	<0.05	<0.05	0.65	0.05	3332853
Dissolved Tin (Sn)	ug/L	<5	<5	<5	5	3332853
Dissolved Titanium (Ti)	ug/L	<5	8	6	5	3332853
Dissolved Uranium (U)	ug/L	7.9	3.9	15.8	0.1	3332853
Dissolved Vanadium (V)	ug/L	<5	<5	<5	5	3332853
Dissolved Zinc (Zn)	ug/L	9	56	4360	5	3332853
Dissolved Zirconium (Zr)	ug/L	<0.5	<0.5	<0.5	0.5	3332853
Dissolved Calcium (Ca)	mg/L	51.5	149	155	0.05	3335899

RDL = Reportable Detection Limit

Maxxam Job #: A941238
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q12013	Q12014	Q12015		
Sampling Date		2009/08/01 09:15	2009/08/02 13:15	2009/08/01 16:00		
COC Number		F130715	F130715	F130715		
	Units	**VC1**	**GS1A**	**GS1B**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	9.72	51.7	56.6	0.05	3335899
Dissolved Potassium (K)	mg/L	1.13	2.15	3.77	0.05	3335899
Dissolved Sodium (Na)	mg/L	24.7	34.5	11.6	0.05	3335899
Dissolved Sulphur (S)	mg/L	34	175	165	3	3335899

RDL = Reportable Detection Limit

Maxxam Job #: A941238
Report Date: 2009/08/11

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

General Comments

Results relate only to the items tested.

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA941238

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3332348 AL8	Spiked Blank	Conductivity	2009/08/07		101	%	80 - 120
	Method Blank	Conductivity	2009/08/07	<1		uS/cm	
	RPD	Conductivity	2009/08/07	0.1		%	20
3332351 AL8	Matrix Spike	Alkalinity (Total as CaCO3)	2009/08/08		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/08/08		99	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/08/08	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/08/08	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/08/08	<0.5		mg/L	
		Carbonate (CO3)	2009/08/08	<0.5		mg/L	
		Hydroxide (OH)	2009/08/08	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2009/08/08	0.7		%	20
		Alkalinity (PP as CaCO3)	2009/08/08	15.8		%	20
		Bicarbonate (HCO3)	2009/08/08	0.1		%	20
		Carbonate (CO3)	2009/08/08	15.8		%	20
		Hydroxide (OH)	2009/08/08	NC		%	20
3332702 TW2	Matrix Spike	Total Suspended Solids	2009/08/08		106	%	N/A
	Spiked Blank	Total Suspended Solids	2009/08/08		103	%	N/A
	Method Blank	Total Suspended Solids	2009/08/08	<4		mg/L	
	RPD	Total Suspended Solids	2009/08/08	10.8		%	25
3332853 JT3	Matrix Spike	Dissolved Arsenic (As)	2009/08/10		99	%	80 - 120
		Dissolved Beryllium (Be)	2009/08/10		101	%	80 - 120
		Dissolved Cadmium (Cd)	2009/08/10		102	%	80 - 120
		Dissolved Chromium (Cr)	2009/08/10		96	%	80 - 120
		Dissolved Cobalt (Co)	2009/08/10		91	%	80 - 120
		Dissolved Copper (Cu)	2009/08/10		90	%	80 - 120
		Dissolved Lead (Pb)	2009/08/10		95	%	80 - 120
		Dissolved Lithium (Li)	2009/08/10		NC	%	80 - 120
		Dissolved Nickel (Ni)	2009/08/10		89	%	80 - 120
		Dissolved Selenium (Se)	2009/08/10		100	%	80 - 120
		Dissolved Uranium (U)	2009/08/10		103	%	80 - 120
		Dissolved Vanadium (V)	2009/08/10		97	%	80 - 120
		Dissolved Zinc (Zn)	2009/08/10		94	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/08/10		98	%	80 - 120
		Dissolved Beryllium (Be)	2009/08/10		104	%	80 - 120
		Dissolved Cadmium (Cd)	2009/08/10		102	%	80 - 120
		Dissolved Chromium (Cr)	2009/08/10		99	%	80 - 120
		Dissolved Cobalt (Co)	2009/08/10		97	%	80 - 120
		Dissolved Copper (Cu)	2009/08/10		99	%	80 - 120
		Dissolved Lead (Pb)	2009/08/10		104	%	80 - 120
		Dissolved Lithium (Li)	2009/08/10		102	%	80 - 120
		Dissolved Nickel (Ni)	2009/08/10		96	%	80 - 120
		Dissolved Selenium (Se)	2009/08/10		100	%	80 - 120
		Dissolved Uranium (U)	2009/08/10		106	%	80 - 120
		Dissolved Vanadium (V)	2009/08/10		101	%	80 - 120
		Dissolved Zinc (Zn)	2009/08/10		100	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/08/10	<3		ug/L	
		Dissolved Antimony (Sb)	2009/08/10	<0.5		ug/L	
		Dissolved Arsenic (As)	2009/08/10	<0.1		ug/L	
		Dissolved Barium (Ba)	2009/08/10	<1		ug/L	
		Dissolved Beryllium (Be)	2009/08/10	<0.1		ug/L	
		Dissolved Bismuth (Bi)	2009/08/10	<1		ug/L	
		Dissolved Boron (B)	2009/08/10	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/08/10	<0.01		ug/L	
		Dissolved Chromium (Cr)	2009/08/10	<1		ug/L	
		Dissolved Cobalt (Co)	2009/08/10	<0.5		ug/L	

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA941238

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3332853 JT3	Method Blank	Dissolved Copper (Cu)	2009/08/10	<0.2		ug/L	
		Dissolved Iron (Fe)	2009/08/10	<5		ug/L	
		Dissolved Lead (Pb)	2009/08/10	<0.2		ug/L	
		Dissolved Lithium (Li)	2009/08/10	<5		ug/L	
		Dissolved Manganese (Mn)	2009/08/10	<1		ug/L	
		Dissolved Mercury (Hg)	2009/08/10	<0.02		ug/L	
		Dissolved Molybdenum (Mo)	2009/08/10	<1		ug/L	
		Dissolved Nickel (Ni)	2009/08/10	<1		ug/L	
		Dissolved Selenium (Se)	2009/08/10	<0.1		ug/L	
		Dissolved Silicon (Si)	2009/08/10	<100		ug/L	
		Dissolved Silver (Ag)	2009/08/10	<0.02		ug/L	
		Dissolved Strontium (Sr)	2009/08/10	<1		ug/L	
		Dissolved Thallium (Tl)	2009/08/10	<0.05		ug/L	
		Dissolved Tin (Sn)	2009/08/10	<5		ug/L	
		Dissolved Titanium (Ti)	2009/08/10	<5		ug/L	
		Dissolved Uranium (U)	2009/08/10	<0.1		ug/L	
		Dissolved Vanadium (V)	2009/08/10	<5		ug/L	
		Dissolved Zinc (Zn)	2009/08/10	<5		ug/L	
		Dissolved Zirconium (Zr)	2009/08/10	<0.5		ug/L	
	RPD	Dissolved Iron (Fe)	2009/08/10	0.5		%	20
		Dissolved Manganese (Mn)	2009/08/10	0.7		%	20
3333320 AL8	Spiked Blank	Acidity (pH 8.3)	2009/08/08		100	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2009/08/08	<0.5		mg/L	
		Acidity (pH 8.3)	2009/08/08	<0.5		mg/L	
	RPD [Q12015-02]	Acidity (pH 4.5)	2009/08/08	NC		%	20
		Acidity (pH 8.3)	2009/08/08	11.7		%	20
3335899 JT3	Method Blank	Dissolved Calcium (Ca)	2009/08/10	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/08/10	<0.05		mg/L	
		Dissolved Potassium (K)	2009/08/10	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/08/10	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/08/10	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/08/10	0.9		%	20
		Dissolved Magnesium (Mg)	2009/08/10	2.2		%	20
		Dissolved Potassium (K)	2009/08/10	1.1		%	20
		Dissolved Sodium (Na)	2009/08/10	2.4		%	20
3336837 BB3	Matrix Spike	Dissolved Chloride (Cl)	2009/08/10		NC	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/08/10		98	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/08/10	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/08/10	2.6		%	20
3336845 BB3	Matrix Spike	Dissolved Sulphate (SO4)	2009/08/10		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/08/10		91	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/08/10	0.9, RDL=0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/08/10	21.5 (1)		%	20

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

Sample Integrity Form

Invoice To:
SRK CONSULTING
SRKCONSU-VAN
ATTN: DYLAN McGREGOR
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2
Client Contact:
DYLAN McGREGOR

Maxxam Job #:	A941238
Date Received:	2009/08/05
Your C.O.C. #:	F130715
Your Project #:	1CY001.034
Maxxam Project Manager:	ASHLEY NIVISON
Quote #:	A80211

No discrepancies noted.

Report Comments

Received Date: 2009/08/05 **Time:** 14:10 **By:** _____

Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

Maxxam Analytics

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
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CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PAGE 1 OF 1

MAXXAM JOB # A941235 ANALYSIS REQUEST F130715

COMPANY NAME: SRK CONSULTING	PH. #: 604 681 4196 E-mail: dmackie@srk.com FAX #: 604 687-5532
COMPANY ADDRESS: 1066 WEST HASTINGS VANCOUVER BC V6E 3X2	CLIENT PROJECT ID: (#) 1CY001.034
SAMPLER NAME (PRINT): MARK STOREY	PROJECT MANAGER: DAN MACKIE

LAB USE ONLY

	FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	DRINKING WATER	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	BTEX / LH	BTEX / VPH	MTBE	VOC's / VPH	EPH	TEH	PAH	LEPH/HEPH	CCME-PHC (FRACTIONS 1-4 PLUS BTEX)	CCME-PHCS (FRACTIONS 2-4)	CCME BTEX (FRACTION 1 PLUS BTEX)	PHENOLS BY 4AAP	PHENOLS BY GCMS	TOTAL O&G	MINERAL O&G	Dissolved Metals: Field Filtered? YES	NO	Field Preserved? YES	NO	Total Metals Field Preserved? YES	NO	NITRATE	NITRITE	AMMONIA	CHLORIDE	FLUORIDE	SULPHATE	TOTAL SUSPENDED SOLIDS (NFR)	CYANIDE SAD	WAD	LEACHABLE LEAD (AA)	(TCLP)	LEACHABLE BTEX (AA)	(TCLP)	ROUTINE PARAMETERS	HOLD
1	~~VC1~~		1					3	~~01/04/09~~	~~9:15AM~~																	+																					
2	VC1		1					3	01/04/09	9:15AM																	1											1									
3	GS1A		1					3	01/04/09	1:15PM																	1											1									
4	GS1B		1					3	01/04/09	4:00PM																	1											1									
5																																																	
6																																																	
7																																																	
8																																																	
9																																																	
10																																																	
11																																																	
12																																																	

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD	5 BUSINESS DAYS	☑
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

☐ CCME
☐ CSR
☐ ALBERTA TIER 1
☐ OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

SOIL JARS USED AND NOT SUBMITTED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C:	DUE DATE:	LOG IN CHECK:
3,3,3		

RELINQUISHED BY SAMPLER: MARK STOREY	DATE: DD/MM/YY 01/04/09	TIME: 11:00AM	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY 05/04/09	TIME: 14:10	RECEIVED BY LABORATORY:

COCFORM - BC - 09/08

ORIGINAL - MAXXAM YELLOW - CLIENT

Your Project #: 1CY001.034
Your C.O.C. #: F130716

Attention: DYLAN McGREGOR
SRK CONSULTING
SRKCONSU-VAN
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2

Report Date: 2009/08/18

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A942495
Received: 2009/08/12, 08:40

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	4	N/A	2009/08/16	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	4	2009/08/14	2009/08/14	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	3	N/A	2009/08/14	BRN-SOP 00234 R3.0	Based on EPA 325.2
Chloride by Automated Colourimetry	1	N/A	2009/08/15	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	4	N/A	2009/08/14	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	4	N/A	2009/08/17		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	4	N/A	2009/08/15	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by CRC ICPMS (dissolved) (1)	4	N/A	2009/08/15	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	4	N/A	2009/08/13	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	4	N/A	2009/08/14	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	3	N/A	2009/08/14	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	1	N/A	2009/08/15	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	4	N/A	2009/08/14	BRN SOP-00277 R5.0	Based on SM - 2540 D

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A942495
Report Date: 2009/08/18

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: CD

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q21013		Q21014		
Sampling Date		2009/08/04 14:50		2009/08/07 10:15		
COC Number		F130716		F130716		
	Units	**P09-C2**	**QC Batch**	**P09-C3**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	3351002	<0.5	0.5	3351002
Acidity (pH 8.3)	mg/L	203	3351002	41.2	0.5	3351002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	1500	3349977	390	0.5	3349977
Alkalinity (PP as CaCO3)	mg/L	<0.5	3349977	<0.5	0.5	3349977
Bicarbonate (HCO3)	mg/L	1900	3349977	470	0.5	3349977
Carbonate (CO3)	mg/L	<0.5	3349977	<0.5	0.5	3349977
Hydroxide (OH)	mg/L	<0.5	3349977	<0.5	0.5	3349977
Anions						
Dissolved Sulphate (SO4)	mg/L	28	3352883	100	0.5	3350504
Dissolved Chloride (Cl)	mg/L	20	3352774	2.9	0.5	3350490
Physical Properties						
Conductivity	uS/cm	2520	3349974	868	1	3349974
pH	pH Units	7.6	3349963	7.7		3349963
Physical Properties						
Total Suspended Solids	mg/L	33	3346486	52	4	3346486

RDL = Reportable Detection Limit

Maxxam Job #: A942495
Report Date: 2009/08/18

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: CD

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q21015	Q21016		
Sampling Date		2009/08/07 10:15	2009/08/07 08:10		
COC Number		F130716	F130716		
	Units	**P09-C3-D**	**BLANK**	**RDL**	**QC Batch**
Misc. Inorganics					
Acidity (pH 4.5)	mg/L	<0.5	<0.5	0.5	3351002
Acidity (pH 8.3)	mg/L	33.8	<0.5	0.5	3351002
Preparation					
Filter and HNO3 Preservation	N/A	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	390	<0.5	0.5	3349977
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	0.5	3349977
Bicarbonate (HCO3)	mg/L	470	<0.5	0.5	3349977
Carbonate (CO3)	mg/L	<0.5	<0.5	0.5	3349977
Hydroxide (OH)	mg/L	<0.5	<0.5	0.5	3349977
Anions					
Dissolved Sulphate (SO4)	mg/L	100	<0.5	0.5	3350504
Dissolved Chloride (Cl)	mg/L	2.8	<0.5	0.5	3350490
Physical Properties					
Conductivity	uS/cm	867	2	1	3349974
pH	pH Units	7.7	5.7		3349963
Physical Properties					
Total Suspended Solids	mg/L	57	<4	4	3346486

RDL = Reportable Detection Limit

Maxxam Job #: A942495
Report Date: 2009/08/18

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: CD

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q21013	Q21014	Q21015		
Sampling Date		2009/08/04 14:50	2009/08/07 10:15	2009/08/07 10:15		
COC Number		F130716	F130716	F130716		
	Units	**P09-C2**	**P09-C3**	**P09-C3-D**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	877	389	380	0.5	3340624
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	48	<3	<3	3	3347860
Dissolved Antimony (Sb)	ug/L	2.2	0.8	0.9	0.5	3347860
Dissolved Arsenic (As)	ug/L	0.6	2.7	2.8	0.1	3347860
Dissolved Barium (Ba)	ug/L	508	80	80	1	3347860
Dissolved Beryllium (Be)	ug/L	1.4	<0.1	<0.1	0.1	3347860
Dissolved Bismuth (Bi)	ug/L	<1	<1	<1	1	3347860
Dissolved Boron (B)	ug/L	75	<50	<50	50	3347860
Dissolved Cadmium (Cd)	ug/L	0.02	<0.01	<0.01	0.01	3347860
Dissolved Chromium (Cr)	ug/L	<1	<1	<1	1	3347860
Dissolved Cobalt (Co)	ug/L	<0.5	<0.5	<0.5	0.5	3347860
Dissolved Copper (Cu)	ug/L	<0.2	0.2	0.8	0.2	3347860
Dissolved Iron (Fe)	ug/L	3120	2120	2140	5	3347860
Dissolved Lead (Pb)	ug/L	<0.2	<0.2	<0.2	0.2	3347860
Dissolved Lithium (Li)	ug/L	725	58	57	5	3347860
Dissolved Manganese (Mn)	ug/L	167	567	558	1	3347860
Dissolved Mercury (Hg)	ug/L	<0.02	0.03	<0.02	0.02	3347860
Dissolved Molybdenum (Mo)	ug/L	2	2	2	1	3347860
Dissolved Nickel (Ni)	ug/L	5	4	4	1	3347860
Dissolved Selenium (Se)	ug/L	0.1	<0.1	<0.1	0.1	3347860
Dissolved Silicon (Si)	ug/L	9020	6180	6230	100	3347860
Dissolved Silver (Ag)	ug/L	0.19	0.04	0.03	0.02	3347860
Dissolved Strontium (Sr)	ug/L	3630	1010	1000	1	3347860
Dissolved Thallium (Tl)	ug/L	<0.05	<0.05	<0.05	0.05	3347860
Dissolved Tin (Sn)	ug/L	<5	<5	<5	5	3347860
Dissolved Titanium (Ti)	ug/L	12	<5	9	5	3347860
Dissolved Uranium (U)	ug/L	3.0	2.5	2.6	0.1	3347860
Dissolved Vanadium (V)	ug/L	<5	<5	<5	5	3347860
Dissolved Zinc (Zn)	ug/L	8	<5	7	5	3347860
Dissolved Zirconium (Zr)	ug/L	59.7	2.1	2.6	0.5	3347860
Dissolved Calcium (Ca)	mg/L	207	96.9	94.5	0.05	3350014

RDL = Reportable Detection Limit

Maxxam Job #: A942495
Report Date: 2009/08/18

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: CD

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q21013	Q21014	Q21015		
Sampling Date		2009/08/04 14:50	2009/08/07 10:15	2009/08/07 10:15		
COC Number		F130716	F130716	F130716		
	Units	**P09-C2**	**P09-C3**	**P09-C3-D**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	87.7	35.8	35.1	0.05	3350014
Dissolved Potassium (K)	mg/L	10.1	3.00	2.95	0.05	3350014
Dissolved Sodium (Na)	mg/L	305	42.3	41.9	0.05	3350014
Dissolved Sulphur (S)	mg/L	13	41	39	3	3350014

RDL = Reportable Detection Limit

Maxxam Job #: A942495
Report Date: 2009/08/18

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: CD

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q21016		
Sampling Date		2009/08/07 08:10		
COC Number		F130716		
	Units	**BLANK**	**RDL**	**QC Batch**
Misc. Inorganics				
Dissolved Hardness (CaCO3)	mg/L	<0.5	0.5	3340624
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	<3	3	3347860
Dissolved Antimony (Sb)	ug/L	<0.5	0.5	3347860
Dissolved Arsenic (As)	ug/L	<0.1	0.1	3347860
Dissolved Barium (Ba)	ug/L	<1	1	3347860
Dissolved Beryllium (Be)	ug/L	<0.1	0.1	3347860
Dissolved Bismuth (Bi)	ug/L	<1	1	3347860
Dissolved Boron (B)	ug/L	<50	50	3347860
Dissolved Cadmium (Cd)	ug/L	<0.01	0.01	3347860
Dissolved Chromium (Cr)	ug/L	<1	1	3347860
Dissolved Cobalt (Co)	ug/L	<0.5	0.5	3347860
Dissolved Copper (Cu)	ug/L	<0.2	0.2	3347860
Dissolved Iron (Fe)	ug/L	<5	5	3347860
Dissolved Lead (Pb)	ug/L	0.2	0.2	3347860
Dissolved Lithium (Li)	ug/L	<5	5	3347860
Dissolved Manganese (Mn)	ug/L	<1	1	3347860
Dissolved Mercury (Hg)	ug/L	<0.02	0.02	3347860
Dissolved Molybdenum (Mo)	ug/L	<1	1	3347860
Dissolved Nickel (Ni)	ug/L	<1	1	3347860
Dissolved Selenium (Se)	ug/L	<0.1	0.1	3347860
Dissolved Silicon (Si)	ug/L	<100	100	3347860
Dissolved Silver (Ag)	ug/L	<0.02	0.02	3347860
Dissolved Strontium (Sr)	ug/L	<1	1	3347860
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	3347860
Dissolved Tin (Sn)	ug/L	<5	5	3347860
Dissolved Titanium (Ti)	ug/L	<5	5	3347860
Dissolved Uranium (U)	ug/L	<0.1	0.1	3347860
Dissolved Vanadium (V)	ug/L	<5	5	3347860
Dissolved Zinc (Zn)	ug/L	<5	5	3347860
Dissolved Zirconium (Zr)	ug/L	<0.5	0.5	3347860
Dissolved Calcium (Ca)	mg/L	<0.05	0.05	3350014

RDL = Reportable Detection Limit

Maxxam Job #: A942495
Report Date: 2009/08/18

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: CD

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q21016		
Sampling Date		2009/08/07 08:10		
COC Number		F130716		
	Units	**BLANK**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	<0.05	0.05	3350014
Dissolved Potassium (K)	mg/L	<0.05	0.05	3350014
Dissolved Sodium (Na)	mg/L	<0.05	0.05	3350014
Dissolved Sulphur (S)	mg/L	<3	3	3350014

RDL = Reportable Detection Limit

Maxxam Job #: A942495
Report Date: 2009/08/18

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: CD

General Comments

Results relate only to the items tested.

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA942495

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3346486 TW2	Matrix Spike						
	[Q21016-01]	Total Suspended Solids	2009/08/14		101	%	N/A
	Spiked Blank	Total Suspended Solids	2009/08/14		103	%	N/A
	Method Blank	Total Suspended Solids	2009/08/14	<4		mg/L	
	RPD [Q21015-01]	Total Suspended Solids	2009/08/14	9.4		%	25
3347860 JT3	Matrix Spike	Dissolved Arsenic (As)	2009/08/15		NC	%	80 - 120
		Dissolved Beryllium (Be)	2009/08/15		97	%	80 - 120
		Dissolved Cadmium (Cd)	2009/08/15		98	%	80 - 120
		Dissolved Chromium (Cr)	2009/08/15		99	%	80 - 120
		Dissolved Cobalt (Co)	2009/08/15		94	%	80 - 120
		Dissolved Copper (Cu)	2009/08/15		91	%	80 - 120
		Dissolved Lead (Pb)	2009/08/15		95	%	80 - 120
		Dissolved Lithium (Li)	2009/08/15		NC	%	80 - 120
		Dissolved Nickel (Ni)	2009/08/15		91	%	80 - 120
		Dissolved Selenium (Se)	2009/08/15		95	%	80 - 120
		Dissolved Uranium (U)	2009/08/15		103	%	80 - 120
		Dissolved Vanadium (V)	2009/08/15		101	%	80 - 120
		Dissolved Zinc (Zn)	2009/08/15		93	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/08/15		97	%	80 - 120
		Dissolved Beryllium (Be)	2009/08/15		100	%	80 - 120
		Dissolved Cadmium (Cd)	2009/08/15		99	%	80 - 120
		Dissolved Chromium (Cr)	2009/08/15		98	%	80 - 120
		Dissolved Cobalt (Co)	2009/08/15		97	%	80 - 120
		Dissolved Copper (Cu)	2009/08/15		99	%	80 - 120
		Dissolved Lead (Pb)	2009/08/15		100	%	80 - 120
		Dissolved Lithium (Li)	2009/08/15		101	%	80 - 120
		Dissolved Nickel (Ni)	2009/08/15		97	%	80 - 120
		Dissolved Selenium (Se)	2009/08/15		96	%	80 - 120
		Dissolved Uranium (U)	2009/08/15		102	%	80 - 120
		Dissolved Vanadium (V)	2009/08/15		98	%	80 - 120
		Dissolved Zinc (Zn)	2009/08/15		99	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/08/15	3, RDL=3		ug/L	
		Dissolved Antimony (Sb)	2009/08/15	<0.5		ug/L	
		Dissolved Arsenic (As)	2009/08/15	<0.1		ug/L	
		Dissolved Barium (Ba)	2009/08/15	<1		ug/L	
		Dissolved Beryllium (Be)	2009/08/15	<0.1		ug/L	
		Dissolved Bismuth (Bi)	2009/08/15	<1		ug/L	
		Dissolved Boron (B)	2009/08/15	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/08/15	<0.01		ug/L	
		Dissolved Chromium (Cr)	2009/08/15	<1		ug/L	
		Dissolved Cobalt (Co)	2009/08/15	<0.5		ug/L	
		Dissolved Copper (Cu)	2009/08/15	<0.2		ug/L	
		Dissolved Iron (Fe)	2009/08/15	<5		ug/L	
		Dissolved Lead (Pb)	2009/08/15	<0.2		ug/L	
		Dissolved Lithium (Li)	2009/08/15	<5		ug/L	
		Dissolved Manganese (Mn)	2009/08/15	<1		ug/L	
		Dissolved Mercury (Hg)	2009/08/15	<0.02		ug/L	
		Dissolved Molybdenum (Mo)	2009/08/15	<1		ug/L	
		Dissolved Nickel (Ni)	2009/08/15	<1		ug/L	
		Dissolved Selenium (Se)	2009/08/15	<0.1		ug/L	
		Dissolved Silicon (Si)	2009/08/15	<100		ug/L	
		Dissolved Silver (Ag)	2009/08/15	<0.02		ug/L	
		Dissolved Strontium (Sr)	2009/08/15	<1		ug/L	
		Dissolved Thallium (Tl)	2009/08/15	<0.05		ug/L	
		Dissolved Tin (Sn)	2009/08/15	<5		ug/L	

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA942495

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3347860 JT3	Method Blank	Dissolved Titanium (Ti)	2009/08/15	<5		ug/L	
		Dissolved Uranium (U)	2009/08/15	<0.1		ug/L	
		Dissolved Vanadium (V)	2009/08/15	<5		ug/L	
		Dissolved Zinc (Zn)	2009/08/15	<5		ug/L	
		Dissolved Zirconium (Zr)	2009/08/15	<0.5		ug/L	
	RPD	Dissolved Aluminum (Al)	2009/08/15	NC		%	20
		Dissolved Antimony (Sb)	2009/08/15	NC		%	20
		Dissolved Arsenic (As)	2009/08/15	1.4		%	20
		Dissolved Barium (Ba)	2009/08/15	0.6		%	20
		Dissolved Beryllium (Be)	2009/08/15	NC		%	20
		Dissolved Bismuth (Bi)	2009/08/15	NC		%	20
		Dissolved Boron (B)	2009/08/15	1.4		%	20
		Dissolved Cadmium (Cd)	2009/08/15	NC		%	20
		Dissolved Chromium (Cr)	2009/08/15	NC		%	20
		Dissolved Cobalt (Co)	2009/08/15	NC		%	20
		Dissolved Copper (Cu)	2009/08/15	NC		%	20
		Dissolved Iron (Fe)	2009/08/15	1.2		%	20
		Dissolved Lead (Pb)	2009/08/15	NC		%	20
		Dissolved Lithium (Li)	2009/08/15	0.07		%	20
		Dissolved Manganese (Mn)	2009/08/15	2.0		%	20
		Dissolved Mercury (Hg)	2009/08/15	NC		%	20
		Dissolved Molybdenum (Mo)	2009/08/15	NC		%	20
		Dissolved Nickel (Ni)	2009/08/15	NC		%	20
		Dissolved Selenium (Se)	2009/08/15	NC		%	20
		Dissolved Silicon (Si)	2009/08/15	0.3		%	20
		Dissolved Silver (Ag)	2009/08/15	NC		%	20
		Dissolved Strontium (Sr)	2009/08/15	0.5		%	20
		Dissolved Thallium (Tl)	2009/08/15	NC		%	20
		Dissolved Tin (Sn)	2009/08/15	NC		%	20
		Dissolved Titanium (Ti)	2009/08/15	NC		%	20
		Dissolved Uranium (U)	2009/08/15	NC		%	20
		Dissolved Vanadium (V)	2009/08/15	NC		%	20
		Dissolved Zinc (Zn)	2009/08/15	NC		%	20
		Dissolved Zirconium (Zr)	2009/08/15	NC		%	20
3349974 AL8	Spiked Blank	Conductivity	2009/08/14		98	%	80 - 120
	Method Blank	Conductivity	2009/08/14	<1		uS/cm	
	RPD [Q21014-02]	Conductivity	2009/08/14	0		%	20
3349977 AL8	Matrix Spike	Alkalinity (Total as CaCO3)	2009/08/14		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/08/14		96	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/08/14	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/08/14	<0.5		mg/L	
	RPD [Q21014-02]	Alkalinity (Total as CaCO3)	2009/08/14	0.1		%	20
		Alkalinity (PP as CaCO3)	2009/08/14	NC		%	20
		Bicarbonate (HCO3)	2009/08/14	0.1		%	20
		Carbonate (CO3)	2009/08/14	NC		%	20
		Hydroxide (OH)	2009/08/14	NC		%	20
3350014 JT3	Method Blank	Dissolved Calcium (Ca)	2009/08/15	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/08/15	<0.05		mg/L	
		Dissolved Potassium (K)	2009/08/15	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/08/15	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/08/15	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/08/15	1.6		%	20
		Dissolved Magnesium (Mg)	2009/08/15	0.6		%	20
		Dissolved Potassium (K)	2009/08/15	1.3		%	20
		Dissolved Sodium (Na)	2009/08/15	1		%	20

SRK CONSULTING
Attention: DYLAN McGREGOR
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA942495

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3350014 JT3	RPD	Dissolved Sulphur (S)	2009/08/15	NC		%	20
3350490 SC2	Matrix Spike	Dissolved Chloride (Cl)	2009/08/14		97	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/08/14		103	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/08/14	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/08/14	0.7		%	20
3350504 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/08/14		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/08/14		93	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/08/14	<0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/08/14	1.2		%	20
3351002 AL8	Spiked Blank	Acidity (pH 8.3)	2009/08/16		98	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2009/08/16	<0.5		mg/L	
		Acidity (pH 8.3)	2009/08/16	<0.5		mg/L	
	RPD [Q21013-02]	Acidity (pH 4.5)	2009/08/16	NC		%	20
		Acidity (pH 8.3)	2009/08/16	6.9		%	20
3352774 BB3	Matrix Spike	Dissolved Chloride (Cl)	2009/08/15		101	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/08/15		100	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/08/15	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/08/15	NC		%	20
3352883 BB3	Spiked Blank	Dissolved Sulphate (SO4)	2009/08/15		86	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/08/15	<0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/08/15	2.1		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Sample Integrity Form

Invoice To:
SRK CONSULTING
SRKCONSU-VAN
ATTN: DYLAN McGREGOR
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2
Client Contact:
DYLAN McGREGOR

Maxxam Job #:	A942495
Date Received:	2009/08/12
Your C.O.C. #:	F130716
Your Project #:	1CY001.034
Maxxam Project Manager:	ASHLEY NIVISON
Quote #:	A80211

[x] Samples received after hold time exceeded

Report Comments
13. SAMPLE P-09-C2 RECEIVED PAST HOLD TIME FOR TSS

Received Date: 2009/08/12 **Time:** 08:40 **By:** ABL

Inspected Date: 2009/08/12 **Time:** 13:51 **By:** ABL

SIF Created Date: 2009/08/12 **Time:** 16:04 **By:** JSH

Maxxam Analytics

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PAGE ___ OF ___

MAXXAM JOB # B942445 ANALYSIS REQUEST F130716

COMPANY NAME: SRK CONSULTING	PH #: 604 681-4196 E-mail: dmackie@srk.com FAX #: 604 687-5532
COMPANY ADDRESS: 1066 WEST HASTINGS VANCOUVER, BC V6E 3X2	CLIENT PROJECT ID: (#) 1CY001.034
SAMPLER NAME (PRINT): CHRIS DOUGHTY	PROJECT MANAGER: DAN MACKIE

LAB USE ONLY

FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	DRINKING WATER	OTHER	# CONTAINERS	SAMPLING: DATE (DD/MM/YY)	TIME	HEADSPACE VAPOUR	BTEX / LH	MTBE	BTEX / VPH	VOCs / VPH	EPH	TEH	PAH	LEPH/HEPH	CCME-PHC (FRACTIONS 1-4 PLUS BTEX)	CCME-PHCS (FRACTIONS 2-4)	CCME BTEX (FRACTION 1 PLUS BTEX)	PHENOLS BY 4AAP	PHENOLS BY GCMS	TOTAL O&G	MINERAL O&G	Dissolved Metals	Field Filtered? YES	NO	Field Preserved? YES	NO	Total Metals Field Preserved? YES	NO	NITRATE	NITRITE	AMMONIA	CHLORIDE	FLUORIDE	SULPHATE	TOTAL SUSPENDED SOLIDS (NFR)	CYANIDE BAD	WAD	LEACHABLE LEAD (AA)	(TCLP)	LEACHABLE BTEX (AA)	(TCLP)	ROUTINE PARAMETERS	HOLD
1 P09-C2		✓					3	4/8/09	14:50																																								
2 P09-C3		✓					3	7/8/09	10:15																																								
3 P09-C3-D		✓					3	7/8/09	10:15																																								
4 BLANK						✓	3	7/8/09	08:20																																								
5																																															
6																																															
7																																															
8																																															
9																																															
10																																															
11																																															
12																																															

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD 5 BUSINESS DAYS ☑
RUSH 3 BUSINESS DAYS ☐
RUSH 2 BUSINESS DAYS ☐
URGENT 1 BUSINESS DAY ☐

OTHER BUSINESS DAYS ___

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

☐ CCME
☐ CSR
☐ ALBERTA TIER 1
☐ OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

SOIL JARS USED AND NOT SUBMITTED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C: 4.1 CS intact

DUE DATE:

LOG IN CHECK:

RELINQUISHED BY SAMPLER: CHRIS DOUGHTY	DATE: DD/MM/YY 09/08/09	TIME: 10:00 AM	RECEIVED BY:	
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:	
RELINQUISHED BY:	DATE: DD/MM/YY 12/08/09	TIME: 08:40	RECEIVED BY LABORATORY:	

COCFORM - BC - 09/08

ORIGINAL - MAXXAM YELLOW - CLIENT

Your Project #: 1CY001.034
Your C.O.C. #: F146381

Attention: Daniel Mackie
SRK CONSULTING
SRKCONSU-VAN
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2

Report Date: 2009/09/03

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A946127
Received: 2009/08/26, 12:25

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	5	N/A	2009/08/29	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	5	2009/08/28	2009/08/28	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	1	N/A	2009/08/28	BRN-SOP 00234 R3.0	Based on EPA 325.2
Chloride by Automated Colourimetry	4	N/A	2009/08/29	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	5	N/A	2009/08/28	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	5	N/A	2009/09/03		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2009/09/02	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by CRC ICPMS (dissolved) (1)	5	N/A	2009/09/02	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	5	N/A	2009/08/27	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	5	N/A	2009/08/28	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	5	N/A	2009/08/29	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	5	N/A	2009/08/28	BRN SOP-00277 R5.0	Based on SM - 2540 D

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A946127
Report Date: 2009/09/03

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q45266			Q45267		
Sampling Date		2009/08/23 16:00			2009/08/23 17:30		
COC Number		F146381			F146381		
	Units	**PO9-ETA-01**	**RDL**	**QC Batch**	**PO9-ETA-02**	**RDL**	**QC Batch**
Misc. Inorganics							
Acidity (pH 4.5)	mg/L	<0.5	0.5	3382970	<0.5	0.5	3382970
Acidity (pH 8.3)	mg/L	1.0	0.5	3382970	569	0.5	3382970
Preparation							
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	N/A	ONSITE
Misc. Inorganics							
Alkalinity (Total as CaCO3)	mg/L	180	0.5	3380274	170	0.5	3380274
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	3380274	<0.5	0.5	3380274
Bicarbonate (HCO3)	mg/L	220	0.5	3380274	210	0.5	3380274
Carbonate (CO3)	mg/L	<0.5	0.5	3380274	<0.5	0.5	3380274
Hydroxide (OH)	mg/L	<0.5	0.5	3380274	<0.5	0.5	3380274
Anions							
Dissolved Sulphate (SO4)	mg/L	39	0.5	3383445	4300	50	3383445
Dissolved Chloride (Cl)	mg/L	1.3	0.5	3383444	17	0.5	3382836
Physical Properties							
Conductivity	uS/cm	415	1	3380272	5200	1	3380272
pH	pH Units	8.1		3380246	6.7		3380246
Physical Properties							
Total Suspended Solids	mg/L	360	4	3380003	1300	4	3380003

RDL = Reportable Detection Limit

Maxxam Job #: A946127
Report Date: 2009/09/03

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q45268	Q45269	Q45270		
Sampling Date		2009/08/23 11:00	2009/08/23 10:30	2009/08/23 10:00		
COC Number		F146381	F146381	F146381		
	Units	**PO9-UN1**	**PO9-UN2**	**PO9-UN3**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	0.5	3382970
Acidity (pH 8.3)	mg/L	6.8	6.9	12.5	0.5	3382970
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	120	210	110	0.5	3380274
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	3380274
Bicarbonate (HCO3)	mg/L	140	250	130	0.5	3380274
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	3380274
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	3380274
Anions						
Dissolved Sulphate (SO4)	mg/L	8.7	16	8.2	0.5	3383445
Dissolved Chloride (Cl)	mg/L	<0.5	<0.5	0.6	0.5	3383444
Physical Properties						
Conductivity	uS/cm	233	415	215	1	3380272
pH	pH Units	7.8	7.8	7.5		3380246
Physical Properties						
Total Suspended Solids	mg/L	590	550	270	4	3380003

RDL = Reportable Detection Limit

Maxxam Job #: A946127
Report Date: 2009/09/03

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q45266		Q45267		
Sampling Date		2009/08/23 16:00		2009/08/23 17:30		
COC Number		F146381		F146381		
	Units	**PO9-ETA-01**	**RDL**	**PO9-ETA-02**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	164	0.5	3530	0.5	3377447
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	<3	3	12	6	3384592
Dissolved Antimony (Sb)	ug/L	<0.5	0.5	1	1	3384592
Dissolved Arsenic (As)	ug/L	0.4	0.1	46.5	0.2	3384592
Dissolved Barium (Ba)	ug/L	28	1	9	2	3384592
Dissolved Beryllium (Be)	ug/L	<0.1	0.1	0.4	0.2	3384592
Dissolved Bismuth (Bi)	ug/L	<1	1	<2	2	3384592
Dissolved Boron (B)	ug/L	<50	50	<100	100	3384592
Dissolved Cadmium (Cd)	ug/L	<0.01	0.01	<0.02	0.02	3384592
Dissolved Chromium (Cr)	ug/L	<1	1	<2	2	3384592
Dissolved Cobalt (Co)	ug/L	<0.5	0.5	212	1	3384592
Dissolved Copper (Cu)	ug/L	<0.2	0.2	1.6	0.4	3384592
Dissolved Iron (Fe)	ug/L	<5	5	291000	10	3384592
Dissolved Lead (Pb)	ug/L	1.9	0.2	2.4	0.4	3384592
Dissolved Lithium (Li)	ug/L	<5	5	81	10	3384592
Dissolved Manganese (Mn)	ug/L	22	1	39200	2	3384592
Dissolved Mercury (Hg)	ug/L	<0.02	0.02	0.08	0.04	3384592
Dissolved Molybdenum (Mo)	ug/L	4	1	<2	2	3384592
Dissolved Nickel (Ni)	ug/L	1	1	252	2	3384592
Dissolved Selenium (Se)	ug/L	0.1	0.1	0.2	0.2	3384592
Dissolved Silicon (Si)	ug/L	9200	100	11100	200	3384592
Dissolved Silver (Ag)	ug/L	<0.02	0.02	0.06	0.04	3384592
Dissolved Strontium (Sr)	ug/L	417	1	3150	2	3384592
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	<0.1	0.1	3384592
Dissolved Tin (Sn)	ug/L	<5	5	<10	10	3384592
Dissolved Titanium (Ti)	ug/L	<5	5	27	10	3384592
Dissolved Uranium (U)	ug/L	0.5	0.1	11.0	0.2	3384592
Dissolved Vanadium (V)	ug/L	<5	5	<10	10	3384592
Dissolved Zinc (Zn)	ug/L	<5	5	94500	10	3384592
Dissolved Zirconium (Zr)	ug/L	<0.5	0.5	<1	1	3384592
Dissolved Calcium (Ca)	mg/L	51.3	0.05	504	0.05	3392069

RDL = Reportable Detection Limit

Maxxam Job #: A946127
Report Date: 2009/09/03

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q45266		Q45267		
Sampling Date		2009/08/23 16:00		2009/08/23 17:30		
COC Number		F146381		F146381		
	Units	**PO9-ETA-01**	**RDL**	**PO9-ETA-02**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	8.69	0.05	551	0.05	3392069
Dissolved Potassium (K)	mg/L	0.68	0.05	8.51	0.05	3392069
Dissolved Sodium (Na)	mg/L	28.1	0.05	54.0	0.05	3392069
Dissolved Sulphur (S)	mg/L	17	3	1420	6	3392069

RDL = Reportable Detection Limit

Maxxam Job #: A946127
Report Date: 2009/09/03

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q45268	Q45269	Q45270		
Sampling Date		2009/08/23 11:00	2009/08/23 10:30	2009/08/23 10:00		
COC Number		F146381	F146381	F146381		
	Units	**PO9-UN1**	**PO9-UN2**	**PO9-UN3**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	114	218	98.9	0.5	3377447
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	16	8	22	3	3384592
Dissolved Antimony (Sb)	ug/L	<0.5	<0.5	<0.5	0.5	3384592
Dissolved Arsenic (As)	ug/L	1.0	1.7	0.8	0.1	3384592
Dissolved Barium (Ba)	ug/L	74	147	46	1	3384592
Dissolved Beryllium (Be)	ug/L	<0.1	<0.1	<0.1	0.1	3384592
Dissolved Bismuth (Bi)	ug/L	<1	<1	<1	1	3384592
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3384592
Dissolved Cadmium (Cd)	ug/L	0.02	0.11	0.15	0.01	3384592
Dissolved Chromium (Cr)	ug/L	<1	<1	<1	1	3384592
Dissolved Cobalt (Co)	ug/L	<0.5	0.6	0.8	0.5	3384592
Dissolved Copper (Cu)	ug/L	3.2	3.2	2.6	0.2	3384592
Dissolved Iron (Fe)	ug/L	19	102	57	5	3384592
Dissolved Lead (Pb)	ug/L	<0.2	<0.2	1.1	0.2	3384592
Dissolved Lithium (Li)	ug/L	11	17	10	5	3384592
Dissolved Manganese (Mn)	ug/L	3	75	50	1	3384592
Dissolved Mercury (Hg)	ug/L	<0.02	<0.02	<0.02	0.02	3384592
Dissolved Molybdenum (Mo)	ug/L	13	80	110	1	3384592
Dissolved Nickel (Ni)	ug/L	1	4	3	1	3384592
Dissolved Selenium (Se)	ug/L	1.3	2.5	1.0	0.1	3384592
Dissolved Silicon (Si)	ug/L	6580	6050	5950	100	3384592
Dissolved Silver (Ag)	ug/L	<0.02	<0.02	<0.02	0.02	3384592
Dissolved Strontium (Sr)	ug/L	165	313	134	1	3384592
Dissolved Thallium (Tl)	ug/L	<0.05	<0.05	<0.05	0.05	3384592
Dissolved Tin (Sn)	ug/L	<5	<5	<5	5	3384592
Dissolved Titanium (Ti)	ug/L	<5	<5	<5	5	3384592
Dissolved Uranium (U)	ug/L	2.7	14.3	2.3	0.1	3384592
Dissolved Vanadium (V)	ug/L	<5	<5	<5	5	3384592
Dissolved Zinc (Zn)	ug/L	<5	31	11	5	3384592
Dissolved Zirconium (Zr)	ug/L	<0.5	<0.5	<0.5	0.5	3384592
Dissolved Calcium (Ca)	mg/L	33.8	62.0	30.5	0.05	3392069

RDL = Reportable Detection Limit

Maxxam Job #: A946127
Report Date: 2009/09/03

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q45268	Q45269	Q45270		
Sampling Date		2009/08/23 11:00	2009/08/23 10:30	2009/08/23 10:00		
COC Number		F146381	F146381	F146381		
	Units	**PO9-UN1**	**PO9-UN2**	**PO9-UN3**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	7.27	15.3	5.55	0.05	3392069
Dissolved Potassium (K)	mg/L	1.40	2.66	1.72	0.05	3392069
Dissolved Sodium (Na)	mg/L	2.84	4.84	6.21	0.05	3392069
Dissolved Sulphur (S)	mg/L	4	8	5	3	3392069

RDL = Reportable Detection Limit

Maxxam Job #: A946127
Report Date: 2009/09/03

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER) Comments

Sample Q45267-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.

Sample Q45267-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.

Results relate only to the items tested.

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA946127

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3380003 TW2	Matrix Spike	Total Suspended Solids	2009/08/28		103	%	N/A
	Spiked Blank	Total Suspended Solids	2009/08/28		101	%	N/A
	Method Blank	Total Suspended Solids	2009/08/28	<4		mg/L	
	RPD	Total Suspended Solids	2009/08/28	NC		%	25
3380272 MM3	Spiked Blank	Conductivity	2009/08/28		103	%	80 - 120
	Method Blank	Conductivity	2009/08/28	<1		uS/cm	
	RPD	Conductivity	2009/08/28	0.9		%	20
3380274 MM3	Matrix Spike	Alkalinity (Total as CaCO3)	2009/08/28		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/08/28		96	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/08/28	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/08/28	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/08/28	<0.5		mg/L	
		Carbonate (CO3)	2009/08/28	<0.5		mg/L	
		Hydroxide (OH)	2009/08/28	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2009/08/28	2.1		%	20
3382836 SC2	Matrix Spike	Dissolved Chloride (Cl)	2009/08/28		100	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/08/28		90	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/08/28	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/08/28	0.4		%	20
3382970 MM3	Spiked Blank	Acidity (pH 8.3)	2009/08/29		99	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2009/08/29	<0.5		mg/L	
		Acidity (pH 8.3)	2009/08/29	0.6, RDL=0.5		mg/L	
	RPD [Q45266-02]	Acidity (pH 4.5)	2009/08/29	NC		%	20
		Acidity (pH 8.3)	2009/08/29	NC		%	20
3383444 SC2	Matrix Spike	Dissolved Chloride (Cl)	2009/08/29		NC	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/08/29		95	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/08/29	<0.5		mg/L	
	RPD [Q45266-02]	Dissolved Chloride (Cl)	2009/08/29	NC		%	20
3383445 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/08/29		97	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/08/29		91	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/08/29	<0.5		mg/L	
	RPD [Q45266-02]	Dissolved Sulphate (SO4)	2009/08/29	1.1		%	20
3384592 JT3	Matrix Spike	Dissolved Arsenic (As)	2009/09/02		98	%	80 - 120
		Dissolved Beryllium (Be)	2009/09/02		105	%	80 - 120
		Dissolved Cadmium (Cd)	2009/09/02		102	%	80 - 120
		Dissolved Chromium (Cr)	2009/09/02		100	%	80 - 120
		Dissolved Cobalt (Co)	2009/09/02		98	%	80 - 120
		Dissolved Copper (Cu)	2009/09/02		103	%	80 - 120
		Dissolved Lead (Pb)	2009/09/02		105	%	80 - 120
		Dissolved Lithium (Li)	2009/09/02		106	%	80 - 120
		Dissolved Nickel (Ni)	2009/09/02		98	%	80 - 120
		Dissolved Selenium (Se)	2009/09/02		103	%	80 - 120
		Dissolved Uranium (U)	2009/09/02		106	%	80 - 120
		Dissolved Vanadium (V)	2009/09/02		98	%	80 - 120
		Dissolved Zinc (Zn)	2009/09/02		102	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/09/02		98	%	80 - 120
		Dissolved Beryllium (Be)	2009/09/02		101	%	80 - 120
		Dissolved Cadmium (Cd)	2009/09/02		101	%	80 - 120
		Dissolved Chromium (Cr)	2009/09/02		100	%	80 - 120
		Dissolved Cobalt (Co)	2009/09/02		99	%	80 - 120
		Dissolved Copper (Cu)	2009/09/02		103	%	80 - 120
		Dissolved Lead (Pb)	2009/09/02		103	%	80 - 120
		Dissolved Lithium (Li)	2009/09/02		103	%	80 - 120
		Dissolved Nickel (Ni)	2009/09/02		99	%	80 - 120
		Dissolved Selenium (Se)	2009/09/02		101	%	80 - 120

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA946127

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3384592 JT3	Spiked Blank	Dissolved Uranium (U)	2009/09/02		104	%	80 - 120
		Dissolved Vanadium (V)	2009/09/02		98	%	80 - 120
		Dissolved Zinc (Zn)	2009/09/02		102	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/09/02	<3		ug/L	
		Dissolved Antimony (Sb)	2009/09/02	<0.5		ug/L	
		Dissolved Arsenic (As)	2009/09/02	<0.1		ug/L	
		Dissolved Barium (Ba)	2009/09/02	<1		ug/L	
		Dissolved Beryllium (Be)	2009/09/02	<0.1		ug/L	
		Dissolved Bismuth (Bi)	2009/09/02	<1		ug/L	
		Dissolved Boron (B)	2009/09/02	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/09/02	<0.01		ug/L	
		Dissolved Chromium (Cr)	2009/09/02	<1		ug/L	
		Dissolved Cobalt (Co)	2009/09/02	<0.5		ug/L	
		Dissolved Copper (Cu)	2009/09/02	<0.2		ug/L	
		Dissolved Iron (Fe)	2009/09/02	<5		ug/L	
		Dissolved Lead (Pb)	2009/09/02	<0.2		ug/L	
		Dissolved Lithium (Li)	2009/09/02	<5		ug/L	
		Dissolved Manganese (Mn)	2009/09/02	<1		ug/L	
		Dissolved Mercury (Hg)	2009/09/02	0.04, RDL=0.02		ug/L	
		Dissolved Molybdenum (Mo)	2009/09/02	<1		ug/L	
		Dissolved Nickel (Ni)	2009/09/02	<1		ug/L	
		Dissolved Selenium (Se)	2009/09/02	<0.1		ug/L	
		Dissolved Silicon (Si)	2009/09/02	<100		ug/L	
		Dissolved Silver (Ag)	2009/09/02	<0.02		ug/L	
		Dissolved Strontium (Sr)	2009/09/02	<1		ug/L	
		Dissolved Thallium (Tl)	2009/09/02	<0.05		ug/L	
		Dissolved Tin (Sn)	2009/09/02	<5		ug/L	
		Dissolved Titanium (Ti)	2009/09/02	<5		ug/L	
		Dissolved Uranium (U)	2009/09/02	<0.1		ug/L	
		Dissolved Vanadium (V)	2009/09/02	<5		ug/L	
		Dissolved Zinc (Zn)	2009/09/02	<5		ug/L	
		Dissolved Zirconium (Zr)	2009/09/02	<0.5		ug/L	
	RPD	Dissolved Aluminum (Al)	2009/09/02	NC		%	20
		Dissolved Antimony (Sb)	2009/09/02	NC		%	20
		Dissolved Arsenic (As)	2009/09/02	NC		%	20
		Dissolved Barium (Ba)	2009/09/02	NC		%	20
		Dissolved Beryllium (Be)	2009/09/02	NC		%	20
		Dissolved Bismuth (Bi)	2009/09/02	NC		%	20
		Dissolved Boron (B)	2009/09/02	NC		%	20
		Dissolved Cadmium (Cd)	2009/09/02	NC		%	20
		Dissolved Chromium (Cr)	2009/09/02	NC		%	20
		Dissolved Cobalt (Co)	2009/09/02	NC		%	20
		Dissolved Copper (Cu)	2009/09/02	NC		%	20
		Dissolved Iron (Fe)	2009/09/02	NC		%	20
		Dissolved Lead (Pb)	2009/09/02	NC		%	20
		Dissolved Manganese (Mn)	2009/09/02	NC		%	20
		Dissolved Mercury (Hg)	2009/09/02	NC		%	20
		Dissolved Molybdenum (Mo)	2009/09/02	NC		%	20
		Dissolved Nickel (Ni)	2009/09/02	NC		%	20
		Dissolved Selenium (Se)	2009/09/02	NC		%	20
		Dissolved Silicon (Si)	2009/09/02	NC		%	20
		Dissolved Silver (Ag)	2009/09/02	NC		%	20
		Dissolved Strontium (Sr)	2009/09/02	NC		%	20
		Dissolved Thallium (Tl)	2009/09/02	NC		%	20
		Dissolved Tin (Sn)	2009/09/02	NC		%	20

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA946127

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3384592 JT3	RPD	Dissolved Titanium (Ti)	2009/09/02	NC		%	20
		Dissolved Uranium (U)	2009/09/02	NC		%	20
		Dissolved Vanadium (V)	2009/09/02	NC		%	20
		Dissolved Zinc (Zn)	2009/09/02	NC		%	20
		Dissolved Zirconium (Zr)	2009/09/02	NC		%	20
3392069 JT3	Method Blank	Dissolved Calcium (Ca)	2009/09/02	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/09/02	<0.05		mg/L	
		Dissolved Potassium (K)	2009/09/02	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/09/02	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/09/02	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/09/02	NC		%	20
		Dissolved Magnesium (Mg)	2009/09/02	NC		%	20
		Dissolved Potassium (K)	2009/09/02	NC		%	20
		Dissolved Sodium (Na)	2009/09/02	0.9		%	20
		Dissolved Sulphur (S)	2009/09/02	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Sample Integrity Form

Invoice To:
SRK CONSULTING
SRKCONSU-VAN
ATTN: Daniel Mackie
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2
Client Contact:
Daniel Mackie

Maxxam Job #:	A946127
Date Received:	2009/08/26
Your C.O.C. #:	F146381
Your Project #:	1CY001.034
Maxxam Project Manager:	ASHLEY NIVISON
Quote #:	A80211

No discrepancies noted.

Report Comments

Received Date: 2009/08/26 **Time:** 12:25 **By:** _____

Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

Maxxam Analytics

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PAGE 1 OF 1

MAXXAM JOB # A946127 ANALYSIS REQUEST F 146381

COMPANY NAME:	PH. #: 604 681-4196
SRK CONSULTING	E-mail: dmackie@srk.com
COMPANY ADDRESS:	FAX #: 604 687.5532
1066 W HASTINGS SUITE 2200 VANCOUVER BC	CLIENT PROJECT ID: (#) 1CY001.034
SAMPLER NAME (PRINT): MARK STOREY	PROJECT MANAGER: DAN MACKIE

LAB USE ONLY

FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	DRINKING WATER	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	BTEX / LH	BTEX / VPH	MTBE	VOC's / VPH	EPH	TEH	PAH	LEPH/HEPH	CCME-PHC (FRACTIONS 1-4 PLUS BTEX)	CCME-PHCS (FRACTIONS 2-4)	CCME BTEX (FRACTION 1 PLUS BTEX)	PHENOLS BY 4AAP	PHENOLS BY GCMS	TOTAL O&G	MINERAL O&G	Dissolved Metals	Field Filtered? YES	NO	Field Preserved? YES	NO	Total Metals Field Preserved? YES	NO	NITRATE	NITRITE	AMMONIA	CHLORIDE	FLUORIDE	SULPHATE	TOTAL SUSPENDED SOLIDS (NFR)	CYANIDE SAD	WAD	LEACHABLE LEAD (AA)	(TCLP)	LEACHABLE BTEX (AA)	(TCLP)	ROUTINE PARAMETERS	HOLD
1 PO9-ETA-01		✓					3	23/08/09	4:00PM																1												1						1		
2 PO9-ETA-02		✓					3	23/08/09	5:30PM																1												1						1		
3 PO9-UN1		✓					3	23/08/09	11:00AM																1												1						1		
4 PO9 UN2		✓					3	24/08/09	10:30AM																1												1						1		
5 PO9 UN3		✓					3	24/08/09	10:00AM																1												1						1		
6																																															
7																																															
8																																															
9																																															
10																																															
11																																															
12																																															

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab.

STANDARD	5 BUSINESS DAYS	☑
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

☐ CCME
☐ CSR
☐ ALBERTA TIER 1
☐ OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

SOIL JARS USED AND NOT SUBMITTED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C:	DUE DATE:	LOG IN CHECK:
2, 2, 3		

RELINQUISHED BY SAMPLER: MARK STOREY	DATE: DD/MM/YY 25/08/09	TIME: 4:00	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY 26-08-09	TIME: 12:25	RECEIVED BY LABORATORY: MT

COCFORM - BC - 09/08

ORIGINAL - MAXXAM YELLOW - CLIENT

Your Project #: 1CY001.034
Your C.O.C. #: F116612

Attention: Daniel Mackie
SRK CONSULTING
SRKCONSU-VAN
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2

Report Date: 2009/09/04

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A947122
Received: 2009/08/28, 13:00

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	6	2009/09/03	2009/09/02	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	6	N/A	2009/09/02	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	6	N/A	2009/09/02	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	6	N/A	2009/09/04		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	6	N/A	2009/09/04	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by CRC ICPMS (dissolved) (1)	6	N/A	2009/09/04	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	6	N/A	2009/09/01	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	6	N/A	2009/09/02	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	2	N/A	2009/09/02	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	4	N/A	2009/09/04	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	6	N/A	2009/09/02	BRN SOP-00277 R5.0	Based on SM - 2540 D

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A947122
Report Date: 2009/09/04

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q53016	Q53017		
Sampling Date		2009/08/27 11:00	2009/08/27 11:15		
COC Number		F116612	F116612		
	Units	**P09-GS1B**	**P09-GS-SW**	**RDL**	**QC Batch**
Preparation					
Filter and HNO3 Preservation	N/A	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	230	79	0.5	3393435
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	0.5	3393435
Bicarbonate (HCO3)	mg/L	280	96	0.5	3393435
Carbonate (CO3)	mg/L	<0.5	<0.5	0.5	3393435
Hydroxide (OH)	mg/L	<0.5	<0.5	0.5	3393435
Anions					
Dissolved Sulphate (SO4)	mg/L	440	310	5	3395089
Dissolved Chloride (Cl)	mg/L	0.6	<0.5	0.5	3395023
Physical Properties					
Conductivity	uS/cm	1140	738	1	3393431
pH	pH Units	7.6	7.9		3393291
Physical Properties					
Total Suspended Solids	mg/L	13	5	4	3390080

RDL = Reportable Detection Limit

Maxxam Analytics - Partial/Rush Results

Maxxam Job #: A947122
Report Date: 2009/09/04

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q53018	Q53019	Q53020		
Sampling Date		2009/08/26 18:00	2009/08/26 15:00	2009/08/26 15:00		
COC Number		F116612	F116612	F116612		
	Units	**P09-SIS-04**	**P09-SIS-03D**	**P09-SIS-03**	**RDL**	**QC Batch**
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	180	180	170	0.5	3393435
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	3393435
Bicarbonate (HCO3)	mg/L	220	210	210	0.5	3393435
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	3393435
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	3393435
Anions						
Dissolved Sulphate (SO4)	mg/L	6000	6200	6000	50	3395681
Dissolved Chloride (Cl)	mg/L	6.3	6.0	6.5	0.5	3395023
Physical Properties						
Conductivity	uS/cm	6600	6930	7080	1	3393431
pH	pH Units	6.9	6.9	7.0		3393291
Physical Properties						
Total Suspended Solids	mg/L	3200	930	930	4	3390080

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/04

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q53021		
Sampling Date		2009/08/25 18:00		
COC Number		F116612		
	Units	**P09-SIS-02**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	1210	0.5	3396021
Dissolved Potassium (K)	mg/L	14.6	0.5	3396021
Dissolved Sodium (Na)	mg/L	58.3	0.5	3396021
Dissolved Sulphur (S)	mg/L	2420	30	3396021

RDL = Reportable Detection Limit

Maxxam Analytics - Reliable Results

Maxxam Job #: A947122
Report Date: 2009/09/04

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER) Comments

Sample	Q53018-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53019-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53020-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53021-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53018-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.
Sample	Q53019-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.
Sample	Q53020-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.
Sample	Q53021-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.

Results relate only to the items tested.

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA947122

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3390080 TW2	Matrix Spike						
	[Q53016-02]	Total Suspended Solids	2009/09/02		109	%	80 - 120
	Spiked Blank	Total Suspended Solids	2009/09/02		98	%	80 - 120
	Method Blank	Total Suspended Solids	2009/09/02	<4		mg/L	
	RPD	Total Suspended Solids	2009/09/02	NC		%	25
3392829 AA1	Matrix Spike	Dissolved Arsenic (As)	2009/09/04		102	%	80 - 120
		Dissolved Beryllium (Be)	2009/09/04		106	%	80 - 120
		Dissolved Cadmium (Cd)	2009/09/04		103	%	80 - 120
		Dissolved Chromium (Cr)	2009/09/04		104	%	80 - 120
		Dissolved Cobalt (Co)	2009/09/04		NC	%	80 - 120
		Dissolved Copper (Cu)	2009/09/04		102	%	80 - 120
		Dissolved Lead (Pb)	2009/09/04		104	%	80 - 120
		Dissolved Lithium (Li)	2009/09/04		106	%	80 - 120
		Dissolved Nickel (Ni)	2009/09/04		NC	%	80 - 120
		Dissolved Selenium (Se)	2009/09/04		106	%	80 - 120
		Dissolved Uranium (U)	2009/09/04		112	%	80 - 120
		Dissolved Vanadium (V)	2009/09/04		107	%	80 - 120
		Dissolved Zinc (Zn)	2009/09/04		NC	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/09/04		102	%	80 - 120
		Dissolved Beryllium (Be)	2009/09/04		100	%	80 - 120
		Dissolved Cadmium (Cd)	2009/09/04		99	%	80 - 120
		Dissolved Chromium (Cr)	2009/09/04		105	%	80 - 120
		Dissolved Cobalt (Co)	2009/09/04		104	%	80 - 120
		Dissolved Copper (Cu)	2009/09/04		106	%	80 - 120
		Dissolved Lead (Pb)	2009/09/04		107	%	80 - 120
		Dissolved Lithium (Li)	2009/09/04		102	%	80 - 120
		Dissolved Nickel (Ni)	2009/09/04		104	%	80 - 120
		Dissolved Selenium (Se)	2009/09/04		104	%	80 - 120
		Dissolved Uranium (U)	2009/09/04		109	%	80 - 120
		Dissolved Vanadium (V)	2009/09/04		103	%	80 - 120
		Dissolved Zinc (Zn)	2009/09/04		104	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/09/04	<3		ug/L	
		Dissolved Antimony (Sb)	2009/09/04	<0.5		ug/L	
		Dissolved Arsenic (As)	2009/09/04	<0.1		ug/L	
		Dissolved Barium (Ba)	2009/09/04	<1		ug/L	
		Dissolved Beryllium (Be)	2009/09/04	<0.1		ug/L	
		Dissolved Bismuth (Bi)	2009/09/04	<1		ug/L	
		Dissolved Boron (B)	2009/09/04	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/09/04	<0.01		ug/L	
		Dissolved Chromium (Cr)	2009/09/04	<1		ug/L	
		Dissolved Cobalt (Co)	2009/09/04	<0.5		ug/L	
		Dissolved Copper (Cu)	2009/09/04	<0.2		ug/L	
		Dissolved Iron (Fe)	2009/09/04	<5		ug/L	
		Dissolved Lead (Pb)	2009/09/04	<0.2		ug/L	
		Dissolved Lithium (Li)	2009/09/04	<5		ug/L	
		Dissolved Manganese (Mn)	2009/09/04	<1		ug/L	
		Dissolved Mercury (Hg)	2009/09/04	<0.02		ug/L	
		Dissolved Molybdenum (Mo)	2009/09/04	<1		ug/L	
		Dissolved Nickel (Ni)	2009/09/04	<1		ug/L	
		Dissolved Selenium (Se)	2009/09/04	<0.1		ug/L	
		Dissolved Silicon (Si)	2009/09/04	<100		ug/L	
		Dissolved Silver (Ag)	2009/09/04	<0.02		ug/L	
		Dissolved Strontium (Sr)	2009/09/04	<1		ug/L	
		Dissolved Thallium (Tl)	2009/09/04	<0.05		ug/L	
		Dissolved Tin (Sn)	2009/09/04	<5		ug/L	

Maxxam Analytics - Partner in Research

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA947122

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3392829 AA1	Method Blank	Dissolved Titanium (Ti)	2009/09/04	<5		ug/L	
		Dissolved Uranium (U)	2009/09/04	<0.1		ug/L	
		Dissolved Vanadium (V)	2009/09/04	<5		ug/L	
		Dissolved Zinc (Zn)	2009/09/04	<5		ug/L	
		Dissolved Zirconium (Zr)	2009/09/04	<0.5		ug/L	
	RPD	Dissolved Arsenic (As)	2009/09/04	3.1		%	20
		Dissolved Barium (Ba)	2009/09/04	1.4		%	20
		Dissolved Chromium (Cr)	2009/09/04	NC		%	20
		Dissolved Copper (Cu)	2009/09/04	5.1		%	20
		Dissolved Lead (Pb)	2009/09/04	0.2		%	20
		Dissolved Zinc (Zn)	2009/09/04	NC		%	20
3393431 MM3	Spiked Blank	Conductivity	2009/09/03		100	%	80 - 120
	Method Blank	Conductivity	2009/09/03	<1		uS/cm	
	RPD	Conductivity	2009/09/03	0		%	20
3393435 MM3	Matrix Spike	Alkalinity (Total as CaCO3)	2009/09/03		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/09/03		99	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/09/03	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/09/03	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/09/03	<0.5		mg/L	
		Carbonate (CO3)	2009/09/03	<0.5		mg/L	
		Hydroxide (OH)	2009/09/03	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2009/09/03	0.2		%	20
		Alkalinity (PP as CaCO3)	2009/09/03	NC		%	20
		Bicarbonate (HCO3)	2009/09/03	0.2		%	20
		Carbonate (CO3)	2009/09/03	NC		%	20
		Hydroxide (OH)	2009/09/03	NC		%	20
3395023 SC2	Matrix Spike	Dissolved Chloride (Cl)	2009/09/02		109	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/09/02		102	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/09/02	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/09/02	0.5		%	20
3395089 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/09/02		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/09/02		84	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/09/02	0.9, RDL=0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/09/02	1.6		%	20
3395681 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/09/04		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/09/03		91	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/09/03	<0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/09/03	1.3		%	20
3396021 AA1	Method Blank	Dissolved Calcium (Ca)	2009/09/04	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/09/04	<0.05		mg/L	
		Dissolved Potassium (K)	2009/09/04	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/09/04	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/09/04	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/09/04	0.3		%	20
		Dissolved Magnesium (Mg)	2009/09/04	1.4		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Sample Integrity Form

Invoice To:
SRK CONSULTING
SRKCONSU-VAN
ATTN: Daniel Mackie
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2
Client Contact:
Daniel Mackie

Maxxam Job #:	A947122
Date Received:	2009/08/28
Your C.O.C. #:	F116612
Your Project #:	1CY001.034
Maxxam Project Manager:	ASHLEY NIVISON
Quote #:	A80211

No discrepancies noted.

Report Comments

Received Date: 2009/08/28 **Time:** 13:00 **By:** _____

Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

Maxxam Analytics - Partial/Rush Results

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST PAGE 1 OF 1

MAXXAM JOB # A-947123 ANALYSIS REQUEST F 116612

COMPANY NAME: SRK Consulting
PH. #: 604 681-4196
E-mail: DMACKIE@SRK.COM
FAX #: 604 687-5532
COMPANY ADDRESS: 1066 W Hastings Suite 2200 Vancouver BC V6E 3X2
CLIENT PROJECT ID: (#) KY001.034
SAMPLER NAME (PRINT): Mark Storey
PROJECT MANAGER: DAN MACKIE

LAB USE ONLY

FIELD SAMPLE ID	MAXXAM LAB # (Lab Use Only)	MATRIX: GROUND WATER	SURFACE WATER	SOIL	DRINKING WATER	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	BTEX / LH	BTEX / VPH	MTBE	VOC's / VPH	EPH	TEH	PAH	LEPH/HEPH	CCME-PHC (FRACTIONS 1-4 PLUS BTEX)	CCME-PHCS (FRACTIONS 2-4)	CCME BTEX (FRACTION 1 PLUS BTEX)	PHENOLS BY 4AAP	PHENOLS BY GCMS	TOTAL O&G	MINERAL O&G	Dissolved Metals	Field Filtered? YES NO	Field Preserved? YES NO	Total Metals Field Preserved? YES NO	NITRATE	NITRITE	AMMONIA	CHLORIDE	FLUORIDE	SULPHATE	TOTAL SUSPENDED SOLIDS (NFR)	CYANIDE SAD	WAD	LEACHABLE LEAD (AA)	(TCLP)	LEACHABLE BTEX (AA)	(TCLP)	REST INCLUDED IN PRICE	HOLD
1 MW09-GS-1B		✓					3	27/8/09	11:00AM																	1								1								
2 MW09-GS-SW		✓					3	27/8/09	11:15AM																	1								1								
3 MW09-SIS-04		✓					3	26/8/09	6:00PM																	1								1								
4 MW09-SIS-05D		✓					3	26/8/09	3:20PM																	1								1								
5 MW09-SIS-03		✓					3	26/8/09	3:20PM																	1								1								
6 MW09-SIS-02		✓					3	25/8/09	6:00PM																	1								1								
7																																											
8																																											
9																																											
10																																											
11																																											
12																																											

TAT (Turnaround Time)
<5 DAY TAT MUST HAVE PRIOR APPROVAL
*some exceptions apply please contact lab
STANDARD 5 BUSINESS DAYS ☑
RUSH 3 BUSINESS DAYS ☐
RUSH 2 BUSINESS DAYS ☐
URGENT 1 BUSINESS DAY ☐
OTHER BUSINESS DAYS ____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:
SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:
☐ CCME ☐ CSR ☐ ALBERTA TIER 1 ☐ OTHER
ACCOUNTING CONTACT:
SPECIAL REPORTING OR BILLING INSTRUCTIONS:
JARS USED:

LAB USE ONLY
ARRIVAL TEMPERATURE °C: 1,1,3
DUE DATE:
LOG IN CHECK:

RELINQUISHED BY SAMPLER: Mark Storey	DATE: DD/MM/YY 27/08/09	TIME: 4:30 PM	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY 28/08/09	TIME: 13:00	RECEIVED BY LABORATORY: Jessica Daigle JD

COCFORM - BC - 05/08 ORIGINAL - MAXXAM YELLOW - MAXXAM

Your Project #: 1CY001.034
Your C.O.C. #: F116612

Attention: Daniel Mackie
SRK CONSULTING
SRKCONSU-VAN
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2

Report Date: 2009/09/08

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A947122
Received: 2009/08/28, 13:00

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	6	N/A	2009/09/05	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	6	2009/09/03	2009/09/02	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	6	N/A	2009/09/02	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	6	N/A	2009/09/02	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	6	N/A	2009/09/04		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	6	N/A	2009/09/04	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by CRC ICPMS (dissolved) (1)	6	N/A	2009/09/04	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	6	N/A	2009/09/01	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	6	N/A	2009/09/02	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	2	N/A	2009/09/02	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	4	N/A	2009/09/04	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids	6	N/A	2009/09/02	BRN SOP-00277 R5.0	Based on SM - 2540 D

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 1

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q53016	Q53017		
Sampling Date		2009/08/27 11:00	2009/08/27 11:15		
COC Number		F116612	F116612		
	Units	**P09-GS1B**	**P09-GS-SW**	**RDL**	**QC Batch**
Misc. Inorganics					
Acidity (pH 4.5)	mg/L	<0.5	<0.5	0.5	3399133
Acidity (pH 8.3)	mg/L	13.6	<0.5	0.5	3399133
Preparation					
Filter and HNO3 Preservation	N/A	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics					
Alkalinity (Total as CaCO3)	mg/L	230	79	0.5	3393435
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	0.5	3393435
Bicarbonate (HCO3)	mg/L	280	96	0.5	3393435
Carbonate (CO3)	mg/L	<0.5	<0.5	0.5	3393435
Hydroxide (OH)	mg/L	<0.5	<0.5	0.5	3393435
Anions					
Dissolved Sulphate (SO4)	mg/L	440	310	5	3395089
Dissolved Chloride (Cl)	mg/L	0.6	<0.5	0.5	3395023
Physical Properties					
Conductivity	uS/cm	1140	738	1	3393431
pH	pH Units	7.6	7.9		3393291
Physical Properties					
Total Suspended Solids	mg/L	13	5	4	3390080

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q53018	Q53019	Q53020		
Sampling Date		2009/08/26 18:00	2009/08/26 15:00	2009/08/26 15:00		
COC Number		F116612	F116612	F116612		
	Units	**P09-SIS-04**	**P09-SIS-03D**	**P09-SIS-03**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	0.5	3399133
Acidity (pH 8.3)	mg/L	409	553	526	0.5	3399133
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	180	180	170	0.5	3393435
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	3393435
Bicarbonate (HCO3)	mg/L	220	210	210	0.5	3393435
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	3393435
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	3393435
Anions						
Dissolved Sulphate (SO4)	mg/L	6000	6200	6000	50	3395681
Dissolved Chloride (Cl)	mg/L	6.3	6.0	6.5	0.5	3395023
Physical Properties						
Conductivity	uS/cm	6600	6930	7080	1	3393431
pH	pH Units	6.9	6.9	7.0		3393291
Physical Properties						
Total Suspended Solids	mg/L	3200	930	930	4	3390080

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		Q53021		
Sampling Date		2009/08/25 18:00		
COC Number		F116612		
	Units	**P09-SIS-02**	**RDL**	**QC Batch**
Misc. Inorganics				
Acidity (pH 4.5)	mg/L	<0.5	0.5	3399133
Acidity (pH 8.3)	mg/L	672	0.5	3399133
Preparation				
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE
Misc. Inorganics				
Alkalinity (Total as CaCO3)	mg/L	180	0.5	3393435
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	3393435
Bicarbonate (HCO3)	mg/L	220	0.5	3393435
Carbonate (CO3)	mg/L	<0.5	0.5	3393435
Hydroxide (OH)	mg/L	<0.5	0.5	3393435
Anions				
Dissolved Sulphate (SO4)	mg/L	6900	50	3395681
Dissolved Chloride (Cl)	mg/L	6.3	0.5	3395023
Physical Properties				
Conductivity	uS/cm	7650	1	3393431
pH	pH Units	7.0		3393291
Physical Properties				
Total Suspended Solids	mg/L	970	4	3390080

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q53016	Q53017		
Sampling Date		2009/08/27 11:00	2009/08/27 11:15		
COC Number		F116612	F116612		
	Units	**P09-GS1B**	**P09-GS-SW**	**RDL**	**QC Batch**
Misc. Inorganics					
Dissolved Hardness (CaCO3)	mg/L	660	391	0.5	3385515
Dissolved Metals by ICPMS					
Dissolved Aluminum (Al)	ug/L	4	12	3	3392829
Dissolved Antimony (Sb)	ug/L	19.2	0.8	0.5	3392829
Dissolved Arsenic (As)	ug/L	148	1.0	0.1	3392829
Dissolved Barium (Ba)	ug/L	18	41	1	3392829
Dissolved Beryllium (Be)	ug/L	<0.1	<0.1	0.1	3392829
Dissolved Bismuth (Bi)	ug/L	<1	<1	1	3392829
Dissolved Boron (B)	ug/L	<50	<50	50	3392829
Dissolved Cadmium (Cd)	ug/L	0.35	0.02	0.01	3392829
Dissolved Chromium (Cr)	ug/L	<1	<1	1	3392829
Dissolved Cobalt (Co)	ug/L	53.1	<0.5	0.5	3392829
Dissolved Copper (Cu)	ug/L	0.3	1.4	0.2	3392829
Dissolved Iron (Fe)	ug/L	1570	8	5	3392829
Dissolved Lead (Pb)	ug/L	4.8	0.3	0.2	3392829
Dissolved Lithium (Li)	ug/L	11	<5	5	3392829
Dissolved Manganese (Mn)	ug/L	1480	4	1	3392829
Dissolved Mercury (Hg)	ug/L	<0.02	<0.02	0.02	3392829
Dissolved Molybdenum (Mo)	ug/L	3	2	1	3392829
Dissolved Nickel (Ni)	ug/L	162	2	1	3392829
Dissolved Selenium (Se)	ug/L	<0.1	0.5	0.1	3392829
Dissolved Silicon (Si)	ug/L	1900	324	100	3392829
Dissolved Silver (Ag)	ug/L	<0.02	<0.02	0.02	3392829
Dissolved Strontium (Sr)	ug/L	594	358	1	3392829
Dissolved Thallium (Tl)	ug/L	2.68	<0.05	0.05	3392829
Dissolved Tin (Sn)	ug/L	<5	<5	5	3392829
Dissolved Titanium (Ti)	ug/L	<5	<5	5	3392829
Dissolved Uranium (U)	ug/L	14.4	14.1	0.1	3392829
Dissolved Vanadium (V)	ug/L	<5	<5	5	3392829
Dissolved Zinc (Zn)	ug/L	4710	10	5	3392829
Dissolved Zirconium (Zr)	ug/L	<0.5	<0.5	0.5	3392829
Dissolved Calcium (Ca)	mg/L	163	90.0	0.05	3396021

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q53016	Q53017		
Sampling Date		2009/08/27 11:00	2009/08/27 11:15		
COC Number		F116612	F116612		
	Units	**P09-GS1B**	**P09-GS-SW**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	61.8	40.4	0.05	3396021
Dissolved Potassium (K)	mg/L	4.11	2.59	0.05	3396021
Dissolved Sodium (Na)	mg/L	11.4	9.78	0.05	3396021
Dissolved Sulphur (S)	mg/L	179	116	3	3396021

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q53018	Q53019	Q53020		
Sampling Date		2009/08/26 18:00	2009/08/26 15:00	2009/08/26 15:00		
COC Number		F116612	F116612	F116612		
	Units	**P09-SIS-04**	**P09-SIS-03D**	**P09-SIS-03**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	5150	5550	5470	0.5	3385515
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	55	42	40	30	3392829
Dissolved Antimony (Sb)	ug/L	<5	<5	<5	5	3392829
Dissolved Arsenic (As)	ug/L	<1	1	<1	1	3392829
Dissolved Barium (Ba)	ug/L	26	23	24	10	3392829
Dissolved Beryllium (Be)	ug/L	<1	<1	<1	1	3392829
Dissolved Bismuth (Bi)	ug/L	<10	<10	<10	10	3392829
Dissolved Boron (B)	ug/L	<500	<500	<500	500	3392829
Dissolved Cadmium (Cd)	ug/L	72.2	89.8	89.5	0.1	3392829
Dissolved Chromium (Cr)	ug/L	<10	<10	<10	10	3392829
Dissolved Cobalt (Co)	ug/L	8	13	12	5	3392829
Dissolved Copper (Cu)	ug/L	25	26	25	2	3392829
Dissolved Iron (Fe)	ug/L	244	82	<50	50	3392829
Dissolved Lead (Pb)	ug/L	2	<2	<2	2	3392829
Dissolved Lithium (Li)	ug/L	157	179	180	50	3392829
Dissolved Manganese (Mn)	ug/L	58100	70500	69300	10	3392829
Dissolved Mercury (Hg)	ug/L	<0.2	<0.2	<0.2	0.2	3392829
Dissolved Molybdenum (Mo)	ug/L	<10	<10	<10	10	3392829
Dissolved Nickel (Ni)	ug/L	2080	2230	2230	10	3392829
Dissolved Selenium (Se)	ug/L	<1	<1	<1	1	3392829
Dissolved Silicon (Si)	ug/L	11900	11100	10900	1000	3392829
Dissolved Silver (Ag)	ug/L	0.3	0.3	0.2	0.2	3392829
Dissolved Strontium (Sr)	ug/L	2130	2000	2020	10	3392829
Dissolved Thallium (Tl)	ug/L	<0.5	<0.5	<0.5	0.5	3392829
Dissolved Tin (Sn)	ug/L	<50	<50	<50	50	3392829
Dissolved Titanium (Ti)	ug/L	<50	<50	<50	50	3392829
Dissolved Uranium (U)	ug/L	4	6	6	1	3392829
Dissolved Vanadium (V)	ug/L	<50	<50	<50	50	3392829
Dissolved Zinc (Zn)	ug/L	307000	362000	357000	50	3392829
Dissolved Zirconium (Zr)	ug/L	<5	<5	<5	5	3392829
Dissolved Calcium (Ca)	mg/L	462	457	454	0.5	3396021

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q53018	Q53019	Q53020		
Sampling Date		2009/08/26 18:00	2009/08/26 15:00	2009/08/26 15:00		
COC Number		F116612	F116612	F116612		
	Units	**P09-SIS-04**	**P09-SIS-03D**	**P09-SIS-03**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	971	1070	1050	0.5	3396021
Dissolved Potassium (K)	mg/L	12.7	13.9	14.0	0.5	3396021
Dissolved Sodium (Na)	mg/L	63.2	46.4	45.2	0.5	3396021
Dissolved Sulphur (S)	mg/L	2020	2120	2210	30	3396021

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

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Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q53021		
Sampling Date		2009/08/25 18:00		
COC Number		F116612		
	Units	**P09-SIS-02**	**RDL**	**QC Batch**
Misc. Inorganics				
Dissolved Hardness (CaCO3)	mg/L	6260	0.5	3385515
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	33	30	3392829
Dissolved Antimony (Sb)	ug/L	<5	5	3392829
Dissolved Arsenic (As)	ug/L	2	1	3392829
Dissolved Barium (Ba)	ug/L	31	10	3392829
Dissolved Beryllium (Be)	ug/L	<1	1	3392829
Dissolved Bismuth (Bi)	ug/L	<10	10	3392829
Dissolved Boron (B)	ug/L	<500	500	3392829
Dissolved Cadmium (Cd)	ug/L	89.2	0.1	3392829
Dissolved Chromium (Cr)	ug/L	<10	10	3392829
Dissolved Cobalt (Co)	ug/L	110	5	3392829
Dissolved Copper (Cu)	ug/L	15	2	3392829
Dissolved Iron (Fe)	ug/L	642	50	3392829
Dissolved Lead (Pb)	ug/L	<2	2	3392829
Dissolved Lithium (Li)	ug/L	184	50	3392829
Dissolved Manganese (Mn)	ug/L	85000	10	3392829
Dissolved Mercury (Hg)	ug/L	<0.2	0.2	3392829
Dissolved Molybdenum (Mo)	ug/L	<10	10	3392829
Dissolved Nickel (Ni)	ug/L	2310	10	3392829
Dissolved Selenium (Se)	ug/L	<1	1	3392829
Dissolved Silicon (Si)	ug/L	10000	1000	3392829
Dissolved Silver (Ag)	ug/L	0.3	0.2	3392829
Dissolved Strontium (Sr)	ug/L	2140	10	3392829
Dissolved Thallium (Tl)	ug/L	<0.5	0.5	3392829
Dissolved Tin (Sn)	ug/L	<50	50	3392829
Dissolved Titanium (Ti)	ug/L	<50	50	3392829
Dissolved Uranium (U)	ug/L	4	1	3392829
Dissolved Vanadium (V)	ug/L	<50	50	3392829
Dissolved Zinc (Zn)	ug/L	396000	50	3392829
Dissolved Zirconium (Zr)	ug/L	<5	5	3392829
Dissolved Calcium (Ca)	mg/L	509	0.5	3396021

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER)

Maxxam ID		Q53021		
Sampling Date		2009/08/25 18:00		
COC Number		F116612		
	Units	**P09-SIS-02**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	1210	0.5	3396021
Dissolved Potassium (K)	mg/L	14.6	0.5	3396021
Dissolved Sodium (Na)	mg/L	58.3	0.5	3396021
Dissolved Sulphur (S)	mg/L	2420	30	3396021

RDL = Reportable Detection Limit

Maxxam Job #: A947122
Report Date: 2009/09/08

SRK CONSULTING
Client Project #: 1CY001.034

Sampler Initials: MS

CSR DISSOLVED METALS - WATER (WATER) Comments

Sample	Q53018-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53019-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53020-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53021-03 Elements by CRC ICPMS (dissolved): RDL raised due to sample matrix interference.
Sample	Q53018-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.
Sample	Q53019-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.
Sample	Q53020-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.
Sample	Q53021-03 Na, K, Ca, Mg, S by CRC ICPMS (diss.): RDL raised due to sample matrix interference.

Results relate only to the items tested.

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA947122

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3390080 TW2	Matrix Spike [Q53016-02]	Total Suspended Solids	2009/09/02		109	%	80 - 120
	Spiked Blank	Total Suspended Solids	2009/09/02		98	%	80 - 120
	Method Blank	Total Suspended Solids	2009/09/02	<4		mg/L	
	RPD	Total Suspended Solids	2009/09/02	NC		%	25
3392829 AA1	Matrix Spike	Dissolved Arsenic (As)	2009/09/04		102	%	80 - 120
		Dissolved Beryllium (Be)	2009/09/04		106	%	80 - 120
		Dissolved Cadmium (Cd)	2009/09/04		103	%	80 - 120
		Dissolved Chromium (Cr)	2009/09/04		104	%	80 - 120
		Dissolved Cobalt (Co)	2009/09/04		NC	%	80 - 120
		Dissolved Copper (Cu)	2009/09/04		102	%	80 - 120
		Dissolved Lead (Pb)	2009/09/04		104	%	80 - 120
		Dissolved Lithium (Li)	2009/09/04		106	%	80 - 120
		Dissolved Nickel (Ni)	2009/09/04		NC	%	80 - 120
		Dissolved Selenium (Se)	2009/09/04		106	%	80 - 120
		Dissolved Uranium (U)	2009/09/04		112	%	80 - 120
		Dissolved Vanadium (V)	2009/09/04		107	%	80 - 120
		Dissolved Zinc (Zn)	2009/09/04		NC	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/09/04		102	%	80 - 120
		Dissolved Beryllium (Be)	2009/09/04		100	%	80 - 120
		Dissolved Cadmium (Cd)	2009/09/04		99	%	80 - 120
		Dissolved Chromium (Cr)	2009/09/04		105	%	80 - 120
		Dissolved Cobalt (Co)	2009/09/04		104	%	80 - 120
		Dissolved Copper (Cu)	2009/09/04		106	%	80 - 120
		Dissolved Lead (Pb)	2009/09/04		107	%	80 - 120
		Dissolved Lithium (Li)	2009/09/04		102	%	80 - 120
		Dissolved Nickel (Ni)	2009/09/04		104	%	80 - 120
		Dissolved Selenium (Se)	2009/09/04		104	%	80 - 120
		Dissolved Uranium (U)	2009/09/04		109	%	80 - 120
		Dissolved Vanadium (V)	2009/09/04		103	%	80 - 120
		Dissolved Zinc (Zn)	2009/09/04		104	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/09/04	<3		ug/L	
		Dissolved Antimony (Sb)	2009/09/04	<0.5		ug/L	
		Dissolved Arsenic (As)	2009/09/04	<0.1		ug/L	
		Dissolved Barium (Ba)	2009/09/04	<1		ug/L	
		Dissolved Beryllium (Be)	2009/09/04	<0.1		ug/L	
		Dissolved Bismuth (Bi)	2009/09/04	<1		ug/L	
		Dissolved Boron (B)	2009/09/04	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/09/04	<0.01		ug/L	
		Dissolved Chromium (Cr)	2009/09/04	<1		ug/L	
		Dissolved Cobalt (Co)	2009/09/04	<0.5		ug/L	
		Dissolved Copper (Cu)	2009/09/04	<0.2		ug/L	
		Dissolved Iron (Fe)	2009/09/04	<5		ug/L	
		Dissolved Lead (Pb)	2009/09/04	<0.2		ug/L	
		Dissolved Lithium (Li)	2009/09/04	<5		ug/L	
		Dissolved Manganese (Mn)	2009/09/04	<1		ug/L	
		Dissolved Mercury (Hg)	2009/09/04	<0.02		ug/L	
		Dissolved Molybdenum (Mo)	2009/09/04	<1		ug/L	
		Dissolved Nickel (Ni)	2009/09/04	<1		ug/L	
		Dissolved Selenium (Se)	2009/09/04	<0.1		ug/L	
		Dissolved Silicon (Si)	2009/09/04	<100		ug/L	
		Dissolved Silver (Ag)	2009/09/04	<0.02		ug/L	
		Dissolved Strontium (Sr)	2009/09/04	<1		ug/L	
		Dissolved Thallium (Tl)	2009/09/04	<0.05		ug/L	
		Dissolved Tin (Sn)	2009/09/04	<5		ug/L	

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA947122

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3392829 AA1	Method Blank	Dissolved Titanium (Ti)	2009/09/04	<5		ug/L	
		Dissolved Uranium (U)	2009/09/04	<0.1		ug/L	
		Dissolved Vanadium (V)	2009/09/04	<5		ug/L	
		Dissolved Zinc (Zn)	2009/09/04	<5		ug/L	
		Dissolved Zirconium (Zr)	2009/09/04	<0.5		ug/L	
	RPD	Dissolved Arsenic (As)	2009/09/04	3.1		%	20
		Dissolved Barium (Ba)	2009/09/04	1.4		%	20
		Dissolved Chromium (Cr)	2009/09/04	NC		%	20
		Dissolved Copper (Cu)	2009/09/04	5.1		%	20
		Dissolved Lead (Pb)	2009/09/04	0.2		%	20
		Dissolved Zinc (Zn)	2009/09/04	NC		%	20
3393431 MM3	Spiked Blank	Conductivity	2009/09/03		100	%	80 - 120
	Method Blank	Conductivity	2009/09/03	<1		uS/cm	
	RPD	Conductivity	2009/09/03	0		%	20
3393435 MM3	Matrix Spike	Alkalinity (Total as CaCO3)	2009/09/03		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/09/03		99	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/09/03	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/09/03	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/09/03	<0.5		mg/L	
		Carbonate (CO3)	2009/09/03	<0.5		mg/L	
		Hydroxide (OH)	2009/09/03	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2009/09/03	0.2		%	20
		Alkalinity (PP as CaCO3)	2009/09/03	NC		%	20
		Bicarbonate (HCO3)	2009/09/03	0.2		%	20
		Carbonate (CO3)	2009/09/03	NC		%	20
		Hydroxide (OH)	2009/09/03	NC		%	20
3395023 SC2	Matrix Spike	Dissolved Chloride (Cl)	2009/09/02		109	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/09/02		102	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/09/02	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/09/02	0.5		%	20
3395089 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/09/02		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/09/02		84	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/09/02	0.9, RDL=0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/09/02	1.6		%	20
3395681 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/09/04		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/09/03		91	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/09/03	<0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/09/03	1.3		%	20
3396021 AA1	Method Blank	Dissolved Calcium (Ca)	2009/09/04	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/09/04	<0.05		mg/L	
		Dissolved Potassium (K)	2009/09/04	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/09/04	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/09/04	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/09/04	0.3		%	20
		Dissolved Magnesium (Mg)	2009/09/04	1.4		%	20
3399133 MM3	Spiked Blank	Acidity (pH 8.3)	2009/09/05		97	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2009/09/05	<0.5		mg/L	
		Acidity (pH 8.3)	2009/09/05	<0.5		mg/L	
	RPD	Acidity (pH 4.5)	2009/09/05	NC		%	20
		Acidity (pH 8.3)	2009/09/05	2.8		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the

SRK CONSULTING
Attention: Daniel Mackie
Client Project #: 1CY001.034
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA947122

spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Sample Integrity Form

Invoice To:
SRK CONSULTING
SRKCONSU-VAN
ATTN: Daniel Mackie
SUITE 2200
1066 W. HASTINGS ST.
VANCOUVER, BC
Canada V6E 3X2
Client Contact:
Daniel Mackie

Maxxam Job #:	A947122
Date Received:	2009/08/28
Your C.O.C. #:	F116612
Your Project #:	1CY001.034
Maxxam Project Manager:	ASHLEY NIVISON
Quote #:	A80211

No discrepancies noted.

Report Comments

Received Date: 2009/08/28 **Time:** 13:00 **By:** _____

Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

MaxXam Analytics inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax: (604) 444-4511
Toll Free: 1-800-440-4808

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

PAGE 1 OF 1

MAXXAM JOB #: A-947125 ANALYSIS REQUEST F 116612

COMPANY NAME: SRK Consulting	PH. #: 604 681-4196 E-mail: DMACKIE@SRK.COM FAX #: 604 687-5532
COMPANY ADDRESS: 1066 W Hastings Suite 2200 Vancouver BC V6E 3X2	CLIENT PROJECT ID: (#) KY001.034
SAMPLER NAME (PRINT): MARK STOREY	PROJECT MANAGER: DAN MACKIE

LAB USE ONLY

FIELD SAMPLE ID	MAXXAM LABS (Lab use Only)	MATRIX: GROUND WATER / SURFACE WATER	SOIL	DRINKING WATER	OTHER	# CONTAINERS	SAMPLING: DATE DD/MM/YY	TIME	HEADSPACE VAPOUR	BTEX / LH	MTBE	BTEX / VPH	VOC's / VPH	TEH	EPH	LEPH/HEPH	PAH	CCME-PHC (FRACTIONS 1-4 PLUS BTEX)	CCME-PHCs (FRACTIONS 2-4)	CCME BTEX (FRACTION 1 PLUS BTEX)	PHENOLS BY 4AAP	PHENOLS BY GCMS	TOTAL O&G	MINERAL O&G	Dissolved Metals: Field Filtered? YES / NO	Dissolved Metals: Field Preserved? YES / NO	Total Metals Field Preserved? YES / NO	NITRATE	AMMONIA	CHLORIDE	FLUORIDE	SULPHATE	TOTAL SUSPENDED SOLIDS (NFR)	CYANIDE SAD	WAD	LEACHABLE LEAD (AA)	(TCLP)	LEACHABLE BTEX (AA)	(TCLP)	BOLSTING/HARDNESS	HOLD
1						3	27/8/09	11:00AM																																	
2						3	27/8/09	11:15AM																																	
3						3	26/8/09	1:00PM																																	
4						3	26/8/09	3:00PM																																	
5						3	26/8/09	3:00PM																																	
6						3	27/8/09	6:00PM																																	
7																																									
8																																									
9																																									
10																																									
11																																									
12																																									

TAT (Turnaround Time)

<5 DAY TAT MUST HAVE PRIOR APPROVAL

*some exceptions apply please contact lab

STANDARD	5 BUSINESS DAYS	☐
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS: _____

CUSTODY RECORD

P.O. NUMBER / QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

☐ CCME ☐ CSR ☐ ALBERTA TIER 1 ☐ OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

JARS USED:

LAB USE ONLY

ARRIVAL TEMPERATURE °C: 1,1,3

DUE DATE:

LOG IN CHECK:

RELINQUISHED BY SAMPLER: MARK STOREY	DATE: DD/MM/YY 27/08/09	TIME: 7:30 PM	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY 28/08/09	TIME: 13:00	RECEIVED BY LABORATORY: Jessica Daigle JD

COCFORM - BC - 05/08

ORIGINAL - MAXXAM YELLOW - MAXXAM

Your Project #: VANGORDA-GRUM SURFACE WATER
Your C.O.C. #: 08304779

Attention: Ken Nordin
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2009/10/14

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A956077
Received: 2009/10/05, 12:10

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	9	N/A	2009/10/10	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	9	2009/10/13	2009/10/14	BRN SOP-00264 R4.0	Based on SM2320B
Bromide (ISE)	9	N/A	2009/10/13	BRN SOP-00245 R1.0	EPA 9211
Chloride by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00234 R3.0	Based on EPA 325.2
Chloride by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	9	N/A	2009/10/14	BRN SOP-00264 R2.0	Based on SM-2510B
Fluoride - Mining Clients	9	N/A	2009/10/08	BRN SOP-00225 R1.0	Based SM - 4500 F C
Hardness Total (calculated as CaCO3)	9	N/A	2009/10/11		
Hardness (calculated as CaCO3)	9	N/A	2009/10/13		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	9	N/A	2009/10/11	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	9	N/A	2009/10/11	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (total) (1)	9	2009/10/09	2009/10/10	BRN SOP-00206 R7.0	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	9	2009/10/09	2009/10/10	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	9	N/A	2009/10/08	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	9	N/A	2009/10/14	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00243 R1.0	Based on EPA 375.4

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

Your Project #: VANGORDA-GRUM SURFACE WATER
Your C.O.C. #: 08304779

Attention: Ken Nordin
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2009/10/14

CERTIFICATE OF ANALYSIS

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 2

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13373		R13374		
Sampling Date		2009/10/01 14:00		2009/10/01 14:30		
COC Number		08304779		08304779		
	Units	**VANGORDA CREEK A**	**QC Batch**	**VANGORDA CREEK B**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	3482975	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	0.6	3482975	1.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	3485735	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.02	3480002	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	26	3486943	26	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	31	3486943	32	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	26	3485948	28	0.5	3482653
Dissolved Chloride (Cl)	mg/L	0.5	3485847	1.2	0.5	3482132
Physical Properties						
Conductivity	uS/cm	114	3486941	119	1	3486941
pH	pH Units	7.6	3486939	7.6		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13375	R13376	R13377		
Sampling Date		2009/10/01 13:15	2009/10/01 16:45	2009/10/01 16:00		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK C**	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.5	2.0	1.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	<0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.07	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	28	35	37	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	34	43	45	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	31	55	59	0.5	3482653
Dissolved Chloride (Cl)	mg/L	<0.5	<0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	127	197	209	1	3486941
pH	pH Units	7.6	7.7	7.8		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13378		R13379		
Sampling Date		2009/10/01 15:30		2009/10/01 18:00		
COC Number		08304779		08304779		
	Units	**VANGORDA CREEK F**	**RDL**	**GRUM WEST DUMP FLOW G-1**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.4	0.5	15.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.01	0.12	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	41	0.5	330	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	50	0.5	400	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	67	0.5	680	5	3482653
Dissolved Chloride (Cl)	mg/L	<0.5	0.5	1.0	0.5	3482132
Physical Properties						
Conductivity	uS/cm	271	1	1760	1	3486941
pH	pH Units	7.8		8.0		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13380		R13381		
Sampling Date		2009/10/01 18:30				
COC Number		08304779		08304779		
	Units	**GRUM WEST DUMP FLOW G-2**	**RDL**	**FIELD BLANK**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	5.2	0.5	<0.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.12	0.01	<0.01	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	270	0.5	1.7	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	330	0.5	2.0	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	460	5	<0.5	0.5	3482653
Dissolved Chloride (Cl)	mg/L	1.2	0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	1290	1	1	1	3486941
pH	pH Units	8.1		6.2		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	50.8	53.9	55.3	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	16.9	16.1	14.1	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.04	0.04	0.04	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.17	0.26	0.23	0.02	3482652
Dissolved Barium (Ba)	ug/L	24.8	25.5	25.0	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	<0.005	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.044 (1)	0.033	0.044	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.047	0.049	0.042	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.50	0.55	0.47	0.05	3482652
Dissolved Iron (Fe)	ug/L	30	49	37	1	3482652
Dissolved Lead (Pb)	ug/L	0.215	0.248	0.157	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.1	1.3	1.3	0.5	3482652
Dissolved Manganese (Mn)	ug/L	1.95	12.1	10.0	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.20	0.20	0.20	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.36	0.40	0.46	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.08	0.09	0.10	0.04	3482652
Dissolved Silicon (Si)	ug/L	4610	4820	4590	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	69.1	72.2	73.5	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.005	0.006	0.007	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	0.376	0.392	0.405	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	17.2	18.0	22.5	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	16.2	17.1	17.6	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	2.52	2.70	2.77	0.05	3483676
Dissolved Potassium (K)	mg/L	0.37	0.38	0.38	0.05	3483676
Dissolved Sodium (Na)	mg/L	1.70	1.73	1.67	0.05	3483676
Dissolved Sulphur (S)	mg/L	11	12	12	3	3483676

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	91.0	99.4	129	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	13.6	13.3	12.5	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.05	0.05	0.05	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.26	0.26	0.25	0.02	3482652
Dissolved Barium (Ba)	ug/L	26.2	27.0	26.9	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	0.038 (1)	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.059	0.054	0.048	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.046	0.046	0.037	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.52	0.54	0.53	0.05	3482652
Dissolved Iron (Fe)	ug/L	29	32	30	1	3482652
Dissolved Lead (Pb)	ug/L	0.155	0.206	0.181	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.5	1.6	1.8	0.5	3482652
Dissolved Manganese (Mn)	ug/L	9.44	9.28	7.87	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.25	0.25	0.28	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.48	0.48	0.47	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.09	0.10	0.12	0.04	3482652
Dissolved Silicon (Si)	ug/L	4460	4760	5000	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	94.3	101	120	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.009	0.010	0.012	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	1.22	1.36	1.97	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	22.9	21.8	21.2	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	24.7	26.7	32.7	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	7.11	7.98	11.4	0.05	3483676
Dissolved Potassium (K)	mg/L	0.46	0.47	0.51	0.05	3483676
Dissolved Sodium (Na)	mg/L	1.87	1.95	2.09	0.05	3483676
Dissolved Sulphur (S)	mg/L	23	24	33	3	3483676

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	1120	772	<0.5	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	1.6	2.6 (1)	1.0	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.06	0.15	<0.02	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.08	0.50	<0.02	0.02	3482652
Dissolved Barium (Ba)	ug/L	98.4	84.4	0.13	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	0.010	<0.005	0.006	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.024	0.027 (1)	<0.005	0.005	3482652
Dissolved Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.039	0.029	0.006	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.27	1.04 (1)	0.13	0.05	3482652
Dissolved Iron (Fe)	ug/L	12	11	5	1	3482652
Dissolved Lead (Pb)	ug/L	0.059	0.060	0.069	0.005	3482652
Dissolved Lithium (Li)	ug/L	7.8	4.5	<0.5	0.5	3482652
Dissolved Manganese (Mn)	ug/L	0.10	0.32 (1)	0.60 (1)	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.97	0.91	<0.05	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.50	0.53	0.04	0.02	3482652
Dissolved Selenium (Se)	ug/L	3.52	0.53	<0.04	0.04	3482652
Dissolved Silicon (Si)	ug/L	5150	5410	<100	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	1090	772	0.05	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.003	<0.002	<0.002	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	17.6	12.8	<0.002	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	0.9	1.5	3.4 (1)	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Dissolved Calcium (Ca)	mg/L	248	176	0.06	0.05	3483676
Dissolved Magnesium (Mg)	mg/L	122	80.6	<0.05	0.05	3483676
Dissolved Potassium (K)	mg/L	1.51	1.38	<0.05	0.05	3483676
Dissolved Sodium (Na)	mg/L	4.80	3.77	<0.05	0.05	3483676
Dissolved Sulphur (S)	mg/L	280	187	<3	3	3483676

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	46.9	49.8	51.2	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	19.8	18.7	18.1	0.2	3482654
Total Antimony (Sb)	ug/L	0.04	0.04	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.27	0.28	0.30	0.02	3482654
Total Barium (Ba)	ug/L	23.1	23.1	23.2	0.02	3482654
Total Beryllium (Be)	ug/L	0.02	<0.01	0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.036	0.035	0.052	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.051	0.061	0.057	0.005	3482654
Total Copper (Cu)	ug/L	0.43	0.46	0.65	0.05	3482654
Total Iron (Fe)	ug/L	57	65	66	1	3482654
Total Lead (Pb)	ug/L	0.377	0.357	0.471	0.005	3482654
Total Lithium (Li)	ug/L	1.5	1.5	1.6	0.5	3482654
Total Manganese (Mn)	ug/L	2.73	12.7	11.3	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.19	0.20	0.20	0.05	3482654
Total Nickel (Ni)	ug/L	0.41	0.35	0.54	0.02	3482654
Total Selenium (Se)	ug/L	0.09	0.08	0.09	0.04	3482654
Total Silicon (Si)	ug/L	4640	4310	4500	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	65.1	65.4	69.1	0.05	3482654
Total Thallium (Tl)	ug/L	0.007	0.007	0.008	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482654
Total Uranium (U)	ug/L	0.371	0.370	0.380	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	17.0	17.4	25.0	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	14.9	15.8	16.1	0.05	3482725
Total Magnesium (Mg)	mg/L	2.33	2.52	2.67	0.05	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.33	0.34	0.35	0.05	3482725
Total Sodium (Na)	mg/L	1.65	1.67	1.65	0.05	3482725
Total Sulphur (S)	mg/L	11	12	10	3	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	89.5	90.0	125	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	21.3	16.9	17.8	0.2	3482654
Total Antimony (Sb)	ug/L	0.05	0.07	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.36	0.35	0.32	0.02	3482654
Total Barium (Ba)	ug/L	24.8	24.5	25.3	0.02	3482654
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	0.006	0.020	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.059	0.052	0.049	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.084	0.067	0.049	0.005	3482654
Total Copper (Cu)	ug/L	0.66	0.71	0.59	0.05	3482654
Total Iron (Fe)	ug/L	80	61	59	1	3482654
Total Lead (Pb)	ug/L	0.842	0.678	0.433	0.005	3482654
Total Lithium (Li)	ug/L	1.8	1.8	2.0	0.5	3482654
Total Manganese (Mn)	ug/L	13.9	11.1	9.16	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.23	0.25	0.28	0.05	3482654
Total Nickel (Ni)	ug/L	0.55	0.54	0.56	0.02	3482654
Total Selenium (Se)	ug/L	0.10	0.11	0.12	0.04	3482654
Total Silicon (Si)	ug/L	4370	4370	4420	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	89.2	90.7	111	0.05	3482654
Total Thallium (Tl)	ug/L	0.009	0.010	0.011	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	0.8	0.5	3482654
Total Uranium (U)	ug/L	1.20	1.25	1.86	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	25.9	27.3	24.7	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	23.8	23.8	31.3	0.05	3482725
Total Magnesium (Mg)	mg/L	7.28	7.44	11.5	0.05	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.42	0.43	0.49	0.05	3482725
Total Sodium (Na)	mg/L	1.88	1.91	2.13	0.05	3482725
Total Sulphur (S)	mg/L	22	24	33	3	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	1090	747	<0.5	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	13.8	2.1	0.5	0.2	3482654
Total Antimony (Sb)	ug/L	0.05	0.15	<0.02	0.02	3482654
Total Arsenic (As)	ug/L	0.12	0.57	<0.02	0.02	3482654
Total Barium (Ba)	ug/L	89.8	77.2	0.34	0.02	3482654
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.021	0.019	<0.005	0.005	3482654
Total Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.057	0.035	<0.005	0.005	3482654
Total Copper (Cu)	ug/L	0.31	0.61	0.11	0.05	3482654
Total Iron (Fe)	ug/L	57	13	<1	1	3482654
Total Lead (Pb)	ug/L	0.221	0.068	0.165	0.005	3482654
Total Lithium (Li)	ug/L	8.0	4.8	<0.5	0.5	3482654
Total Manganese (Mn)	ug/L	0.56	0.23	<0.05	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.88	0.87	<0.05	0.05	3482654
Total Nickel (Ni)	ug/L	0.50	0.55	<0.02	0.02	3482654
Total Selenium (Se)	ug/L	3.68	0.50	<0.04	0.04	3482654
Total Silicon (Si)	ug/L	5230	5230	<100	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	995	718	<0.05	0.05	3482654
Total Thallium (Tl)	ug/L	0.004	<0.002	<0.002	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482654
Total Uranium (U)	ug/L	17.9	12.5	<0.002	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	1.8	1.4	0.2	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	244	171	<0.05	0.05	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Total Magnesium (Mg)	mg/L	117	77.8	<0.05	0.05	3482725
Total Potassium (K)	mg/L	1.36	1.24	<0.05	0.05	3482725
Total Sodium (Na)	mg/L	5.00	3.88	<0.05	0.05	3482725
Total Sulphur (S)	mg/L	275	175	<3	3	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

General Comments

Results relate only to the items tested.

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3480002 MM3	Matrix Spike	Fluoride (F)	2009/10/08		92	%	80 - 120
	Spiked Blank	Fluoride (F)	2009/10/08		100	%	80 - 120
	Method Blank	Fluoride (F)	2009/10/08	<0.01		mg/L	
	RPD [R13379-02]	Fluoride (F)	2009/10/08	0		%	20
3482132 RL2	Matrix Spike	Dissolved Chloride (Cl)	2009/10/09		NC	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/10/09		106	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/10/09	<0.5		mg/L	
	RPD [R13380-03]	Dissolved Chloride (Cl)	2009/10/09	NC		%	20
	RPD [R13381-02]	Dissolved Chloride (Cl)	2009/10/09	NC		%	20
3482652 AA1	Matrix Spike	Dissolved Arsenic (As)	2009/10/11		98	%	80 - 120
		Dissolved Beryllium (Be)	2009/10/11		109	%	80 - 120
		Dissolved Cadmium (Cd)	2009/10/11		111	%	80 - 120
		Dissolved Chromium (Cr)	2009/10/11		97	%	80 - 120
		Dissolved Cobalt (Co)	2009/10/11		93	%	80 - 120
		Dissolved Copper (Cu)	2009/10/11		NC	%	80 - 120
		Dissolved Lead (Pb)	2009/10/11		108	%	80 - 120
		Dissolved Lithium (Li)	2009/10/11		108	%	80 - 120
		Dissolved Nickel (Ni)	2009/10/11		90	%	80 - 120
		Dissolved Selenium (Se)	2009/10/11		104	%	80 - 120
		Dissolved Uranium (U)	2009/10/11		117	%	80 - 120
		Dissolved Vanadium (V)	2009/10/11		102	%	80 - 120
		Dissolved Zinc (Zn)	2009/10/11		NC	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/10/11		92	%	80 - 120
		Dissolved Beryllium (Be)	2009/10/11		98	%	80 - 120
		Dissolved Cadmium (Cd)	2009/10/11		100	%	80 - 120
		Dissolved Chromium (Cr)	2009/10/11		91	%	80 - 120
		Dissolved Cobalt (Co)	2009/10/11		90	%	80 - 120
		Dissolved Copper (Cu)	2009/10/11		88	%	80 - 120
		Dissolved Lead (Pb)	2009/10/11		104	%	80 - 120
		Dissolved Lithium (Li)	2009/10/11		100	%	80 - 120
		Dissolved Nickel (Ni)	2009/10/11		87	%	80 - 120
		Dissolved Selenium (Se)	2009/10/11		97	%	80 - 120
		Dissolved Uranium (U)	2009/10/11		108	%	80 - 120
		Dissolved Vanadium (V)	2009/10/11		96	%	80 - 120
		Dissolved Zinc (Zn)	2009/10/11		91	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/10/11	<0.2		ug/L	
		Dissolved Antimony (Sb)	2009/10/11	<0.02		ug/L	
		Dissolved Arsenic (As)	2009/10/11	<0.02		ug/L	
		Dissolved Barium (Ba)	2009/10/11	<0.02		ug/L	
		Dissolved Beryllium (Be)	2009/10/11	<0.01		ug/L	
		Dissolved Bismuth (Bi)	2009/10/11	<0.005		ug/L	
		Dissolved Boron (B)	2009/10/11	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/10/11	<0.005		ug/L	
		Dissolved Chromium (Cr)	2009/10/11	<0.1		ug/L	
		Dissolved Cobalt (Co)	2009/10/11	<0.005		ug/L	
		Dissolved Copper (Cu)	2009/10/11	<0.05		ug/L	
		Dissolved Iron (Fe)	2009/10/11	<1		ug/L	
		Dissolved Lead (Pb)	2009/10/11	<0.005		ug/L	
		Dissolved Lithium (Li)	2009/10/11	<0.5		ug/L	
		Dissolved Manganese (Mn)	2009/10/11	<0.05		ug/L	
		Dissolved Molybdenum (Mo)	2009/10/11	<0.05		ug/L	
		Dissolved Nickel (Ni)	2009/10/11	<0.02		ug/L	
		Dissolved Selenium (Se)	2009/10/11	<0.04		ug/L	
		Dissolved Silicon (Si)	2009/10/11	<100		ug/L	
		Dissolved Silver (Ag)	2009/10/11	<0.005		ug/L	

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3482652 AA1	Method Blank	Dissolved Strontium (Sr)	2009/10/11	<0.05		ug/L	
		Dissolved Thallium (Tl)	2009/10/11	<0.002		ug/L	
		Dissolved Tin (Sn)	2009/10/11	<0.01		ug/L	
		Dissolved Titanium (Ti)	2009/10/11	<0.5		ug/L	
		Dissolved Uranium (U)	2009/10/11	<0.002		ug/L	
		Dissolved Vanadium (V)	2009/10/11	<0.2		ug/L	
		Dissolved Zinc (Zn)	2009/10/11	<0.1		ug/L	
		Dissolved Zirconium (Zr)	2009/10/11	<0.1		ug/L	
	RPD	Dissolved Aluminum (Al)	2009/10/11	NC		%	20
		Dissolved Antimony (Sb)	2009/10/11	NC		%	20
		Dissolved Arsenic (As)	2009/10/11	4.8		%	20
		Dissolved Barium (Ba)	2009/10/11	0.6		%	20
		Dissolved Beryllium (Be)	2009/10/11	NC		%	20
		Dissolved Bismuth (Bi)	2009/10/11	NC		%	20
		Dissolved Boron (B)	2009/10/11	NC		%	20
		Dissolved Cadmium (Cd)	2009/10/11	0.8		%	20
		Dissolved Chromium (Cr)	2009/10/11	NC		%	20
		Dissolved Cobalt (Co)	2009/10/11	NC		%	20
		Dissolved Copper (Cu)	2009/10/11	0.2		%	20
		Dissolved Iron (Fe)	2009/10/11	0.8		%	20
		Dissolved Lead (Pb)	2009/10/11	0.05		%	20
		Dissolved Lithium (Li)	2009/10/11	NC		%	20
		Dissolved Manganese (Mn)	2009/10/11	3.2		%	20
		Dissolved Molybdenum (Mo)	2009/10/11	NC		%	20
		Dissolved Nickel (Ni)	2009/10/11	4.8		%	20
		Dissolved Selenium (Se)	2009/10/11	NC		%	20
		Dissolved Silicon (Si)	2009/10/11	0.6		%	20
		Dissolved Silver (Ag)	2009/10/11	NC		%	20
		Dissolved Strontium (Sr)	2009/10/11	1.3		%	20
		Dissolved Thallium (Tl)	2009/10/11	NC		%	20
		Dissolved Tin (Sn)	2009/10/11	NC		%	20
		Dissolved Titanium (Ti)	2009/10/11	NC		%	20
		Dissolved Uranium (U)	2009/10/11	3.1		%	20
		Dissolved Vanadium (V)	2009/10/11	NC		%	20
		Dissolved Zinc (Zn)	2009/10/11	2.6		%	20
		Dissolved Zirconium (Zr)	2009/10/11	NC		%	20
3482653 RL2	Matrix Spike	Dissolved Sulphate (SO4)	2009/10/09		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/10/09		99	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/10/09	<0.5		mg/L	
	RPD [R13380-03]	Dissolved Sulphate (SO4)	2009/10/09	3.1		%	20
	RPD [R13381-02]	Dissolved Sulphate (SO4)	2009/10/09	NC		%	20
3482654 AA1	Matrix Spike	Total Arsenic (As)	2009/10/10		98	%	80 - 120
		Total Beryllium (Be)	2009/10/10		109	%	80 - 120
		Total Cadmium (Cd)	2009/10/10		103	%	80 - 120
		Total Chromium (Cr)	2009/10/10		100	%	80 - 120
		Total Cobalt (Co)	2009/10/10		97	%	80 - 120
		Total Copper (Cu)	2009/10/10		95	%	80 - 120
		Total Lead (Pb)	2009/10/10		102	%	80 - 120
		Total Lithium (Li)	2009/10/10		NC	%	80 - 120
		Total Nickel (Ni)	2009/10/10		96	%	80 - 120
		Total Selenium (Se)	2009/10/10		103	%	80 - 120
		Total Uranium (U)	2009/10/10		109	%	80 - 120
		Total Vanadium (V)	2009/10/10		NC	%	80 - 120
		Total Zinc (Zn)	2009/10/10		96	%	80 - 120
	Spiked Blank	Total Arsenic (As)	2009/10/10		97	%	80 - 120

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3482654 AA1	Spiked Blank	Total Beryllium (Be)	2009/10/10		108	%	80 - 120
		Total Cadmium (Cd)	2009/10/10		97	%	80 - 120
		Total Chromium (Cr)	2009/10/10		101	%	80 - 120
		Total Cobalt (Co)	2009/10/10		99	%	80 - 120
		Total Copper (Cu)	2009/10/10		102	%	80 - 120
		Total Lead (Pb)	2009/10/10		103	%	80 - 120
		Total Lithium (Li)	2009/10/10		108	%	80 - 120
		Total Nickel (Ni)	2009/10/10		99	%	80 - 120
		Total Selenium (Se)	2009/10/10		97	%	80 - 120
		Total Uranium (U)	2009/10/10		105	%	80 - 120
		Total Vanadium (V)	2009/10/10		99	%	80 - 120
		Total Zinc (Zn)	2009/10/10		101	%	80 - 120
	Method Blank	Total Aluminum (Al)	2009/10/10	<0.2		ug/L	
		Total Antimony (Sb)	2009/10/10	<0.02		ug/L	
		Total Arsenic (As)	2009/10/10	<0.02		ug/L	
		Total Barium (Ba)	2009/10/10	<0.02		ug/L	
		Total Beryllium (Be)	2009/10/10	<0.01		ug/L	
		Total Bismuth (Bi)	2009/10/10	<0.005		ug/L	
		Total Boron (B)	2009/10/10	<50		ug/L	
		Total Cadmium (Cd)	2009/10/10	<0.005		ug/L	
		Total Chromium (Cr)	2009/10/10	<0.1		ug/L	
		Total Cobalt (Co)	2009/10/10	<0.005		ug/L	
		Total Copper (Cu)	2009/10/10	<0.05		ug/L	
		Total Iron (Fe)	2009/10/10	<1		ug/L	
		Total Lead (Pb)	2009/10/10	<0.005		ug/L	
		Total Lithium (Li)	2009/10/10	<0.5		ug/L	
		Total Manganese (Mn)	2009/10/10	<0.05		ug/L	
		Total Molybdenum (Mo)	2009/10/10	<0.05		ug/L	
		Total Nickel (Ni)	2009/10/10	<0.02		ug/L	
		Total Selenium (Se)	2009/10/10	<0.04		ug/L	
		Total Silicon (Si)	2009/10/10	<100		ug/L	
		Total Silver (Ag)	2009/10/10	<0.005		ug/L	
		Total Strontium (Sr)	2009/10/10	<0.05		ug/L	
		Total Thallium (Tl)	2009/10/10	<0.002		ug/L	
		Total Tin (Sn)	2009/10/10	<0.01		ug/L	
		Total Titanium (Ti)	2009/10/10	<0.5		ug/L	
		Total Uranium (U)	2009/10/10	<0.002		ug/L	
		Total Vanadium (V)	2009/10/10	<0.2		ug/L	
		Total Zinc (Zn)	2009/10/10	<0.1		ug/L	
		Total Zirconium (Zr)	2009/10/10	<0.1		ug/L	
	RPD	Total Aluminum (Al)	2009/10/10	0.2		%	20
		Total Antimony (Sb)	2009/10/10	8.8		%	20
		Total Arsenic (As)	2009/10/10	2.3		%	20
		Total Barium (Ba)	2009/10/10	0.5		%	20
		Total Beryllium (Be)	2009/10/10	NC		%	20
		Total Bismuth (Bi)	2009/10/10	NC		%	20
		Total Boron (B)	2009/10/10	NC		%	20
		Total Cadmium (Cd)	2009/10/10	NC		%	20
		Total Chromium (Cr)	2009/10/10	NC		%	20
		Total Cobalt (Co)	2009/10/10	3.7		%	20
		Total Copper (Cu)	2009/10/10	1.0		%	20
		Total Lead (Pb)	2009/10/10	3.0		%	20
		Total Lithium (Li)	2009/10/10	0.1		%	20
		Total Manganese (Mn)	2009/10/10	1.1		%	20
		Total Molybdenum (Mo)	2009/10/10	3.4		%	20

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3482654 AA1	RPD	Total Nickel (Ni)	2009/10/10	6.5		%	20
		Total Selenium (Se)	2009/10/10	13.0		%	20
		Total Silver (Ag)	2009/10/10	NC		%	20
		Total Strontium (Sr)	2009/10/10	0.03		%	20
		Total Thallium (Tl)	2009/10/10	NC		%	20
		Total Tin (Sn)	2009/10/10	NC		%	20
		Total Uranium (U)	2009/10/10	0.6		%	20
		Total Vanadium (V)	2009/10/10	1.5		%	20
		Total Zinc (Zn)	2009/10/10	19.9		%	20
3482725 AA1	Method Blank	Total Calcium (Ca)	2009/10/10	<0.05		mg/L	
		Total Magnesium (Mg)	2009/10/10	<0.05		mg/L	
		Total Potassium (K)	2009/10/10	<0.05		mg/L	
		Total Sodium (Na)	2009/10/10	<0.05		mg/L	
		Total Sulphur (S)	2009/10/10	<3		mg/L	
	RPD	Total Magnesium (Mg)	2009/10/10	0.8		%	20
3482975 AL8	Spiked Blank	Acidity (pH 8.3)	2009/10/10		107	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2009/10/10	<0.5		mg/L	
		Acidity (pH 8.3)	2009/10/10	<0.5		mg/L	
	RPD [R13380-02]	Acidity (pH 4.5)	2009/10/10	NC		%	20
		Acidity (pH 8.3)	2009/10/10	19.0		%	20
3483676 AA1	Method Blank	Dissolved Calcium (Ca)	2009/10/11	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/10/11	<0.05		mg/L	
		Dissolved Potassium (K)	2009/10/11	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/10/11	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/10/11	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/10/11	0.3		%	20
		Dissolved Magnesium (Mg)	2009/10/11	0.08		%	20
		Dissolved Potassium (K)	2009/10/11	0		%	20
		Dissolved Sodium (Na)	2009/10/11	0.4		%	20
		Dissolved Sulphur (S)	2009/10/11	NC		%	20
3485735 NS6	Matrix Spike	Bromide (Br)	2009/10/13		113	%	80 - 120
	Spiked Blank	Bromide (Br)	2009/10/13		97	%	80 - 120
	Method Blank	Bromide (Br)	2009/10/13	<0.4		mg/L	
	RPD [R13374-01]	Bromide (Br)	2009/10/13	NC		%	20
3485847 SC2	Matrix Spike	Dissolved Chloride (Cl)	2009/10/10		108	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/10/10		105	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/10/10	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/10/10	4.7		%	20
3485948 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/10/10		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/10/10		97	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/10/10	0.5, RDL=0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/10/10	4.7		%	20
3486941 AL8	Spiked Blank	Conductivity	2009/10/13		102	%	80 - 120
	Method Blank	Conductivity	2009/10/13	<1		uS/cm	
	RPD [R13381-01]	Conductivity	2009/10/14	NC		%	20
3486943 AL8	Matrix Spike	Alkalinity (Total as CaCO3)	2009/10/14		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/10/14		100	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/10/14	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/10/14	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/10/14	<0.5		mg/L	
		Carbonate (CO3)	2009/10/14	<0.5		mg/L	
		Hydroxide (OH)	2009/10/14	<0.5		mg/L	
	RPD [R13381-01]	Alkalinity (Total as CaCO3)	2009/10/14	NC		%	20
		Alkalinity (PP as CaCO3)	2009/10/14	NC		%	20
		Bicarbonate (HCO3)	2009/10/14	NC		%	20

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3486943 AL8	RPD [R13381-01]	Carbonate (CO3)	2009/10/14	NC		%	20
		Hydroxide (OH)	2009/10/14	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Maxxam Analytics Inc
8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com
Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

08304779

MAXXAM JOB #: A956077

ANALYSIS REQUEST

COC #:

COMPANY NAME: Laberge Environmental Services

CLIENT PROJECT NO.: Vangorda-Grum Surface Water Assessments

COMPANY ADDRESS: Physical Address 405 Ogilvie Street, Whitehorse YT Y
Mailing Address Box 21072
Whitehorse YT
Y1A 6P7

TEL: 1-867-668-6838

E-MAIL: Laberge@northwestel.net dmackie@srk.com

FAX:

SAMPLER NAME (PRINT): Ken Nordin, Dylan Nordin

PROJECT MANAGER: Daniel Mackie

LABORATORY CONTACT: Ashley Nivison

	FIELD SAMPLE ID	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	pH, Conductivity	Alkalinity	Majorions (SO4, Cl, F, Br)	Acidity	Low Level Total Metals ICPOES	Low Level Dissolved Metals ICPOES
1	Vangorda Creek A		x				01/10/2009	14:00	4	x	x	x	x	x	x
2	Vangorda Creek B		x				01/10/2009	14:30	4	x	x	x	x	x	x
3	Vangorda Creek C		x				01/10/2009	13:15	4	x	x	x	x	x	x
4	Vangorda Creek D		x				01/10/2009	16:45	4	x	x	x	x	x	x
5	Vangorda Creek E		x				01/10/2009	16:00	4	x	x	x	x	x	x
6	Vangorda Creek F		x				01/10/2009	15:30	4	x	x	x	x	x	x
7	Grum West Dump flow G-1		x				01/10/2009	18:00	4	x	x	x	x	x	x
8	Grum West Dump flow G-2		x				01/10/2009	18:30	4	x	x	x	x	x	x
9	Field Blank														
10															
11															
12															

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL

* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	x
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS

CUSTODY RECORD

ACCOUNTING CONTACT:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE: Surface Water Flows Adjacent to Mine Waste Dumps

SPECIAL REPORTING OR BILLING INSTRUCTIONS: Bill to Laberge Environmental Services

CCME
CSR
AB TIER 1
OTHER

JARS USED:

ARRIVAL TEMPERATURE °C: 9.1, 6.1

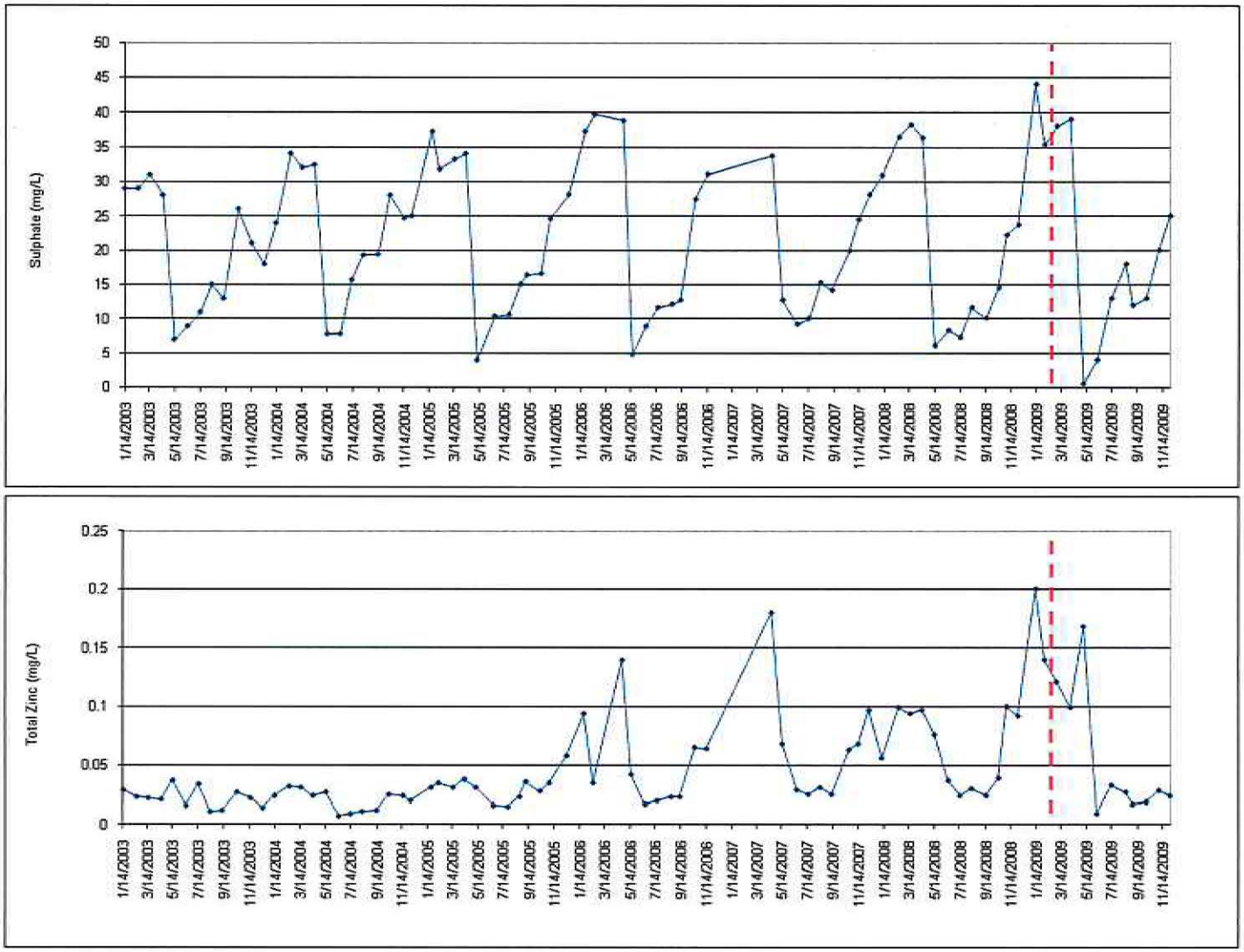
DUE DATE:

LOG IN CHECK:

RELINQUISHED BY SAMPLER:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
Ken Nordin	03/10/2009	15:00	
RELINQUISHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUISHED BY:	DATE: DD/MM/YY 05/10/09	TIME: 12:10	RECEIVED BY LABORATORY: AmD

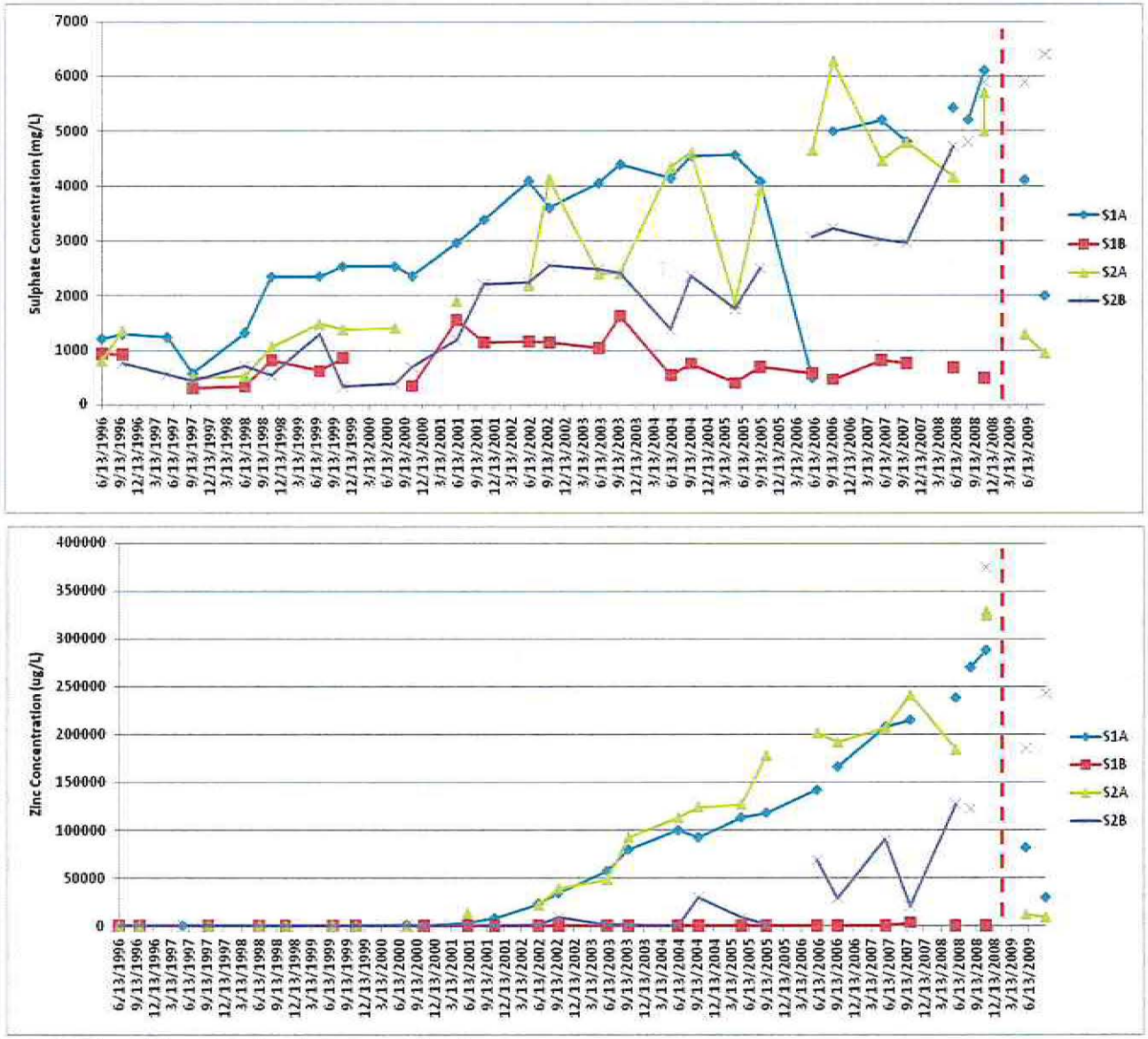
COCFORM - BC - 20070922

Appendix D
S-wells Performance Data



Red dashed line indicates installation of s-wells SIS

D-1 X2 Zn and SO4 Concentration Data



Red dashed line indicates installation of s-wells SIS

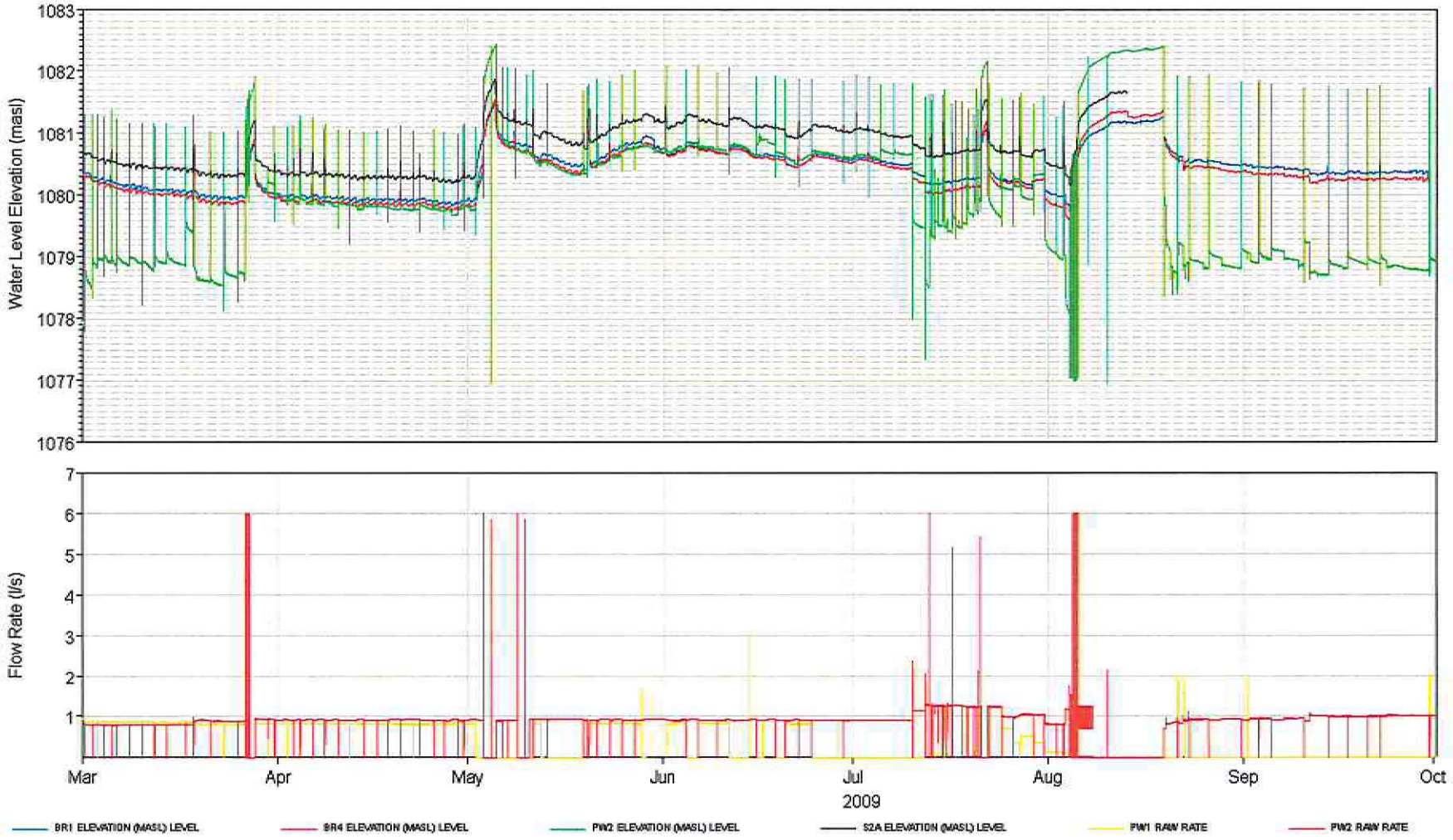
D-2 S1 & S2 Zn and SO4 Concentration Data

SO4 (mg/L)	6/5/2006	6/6/2006	9/20/2006	5/28/2007	5/29/2007	10/3/2007	5/28/2008	8/13/2008	8/30/2008	11/3/2008	5/30/2009	8/4/2009	9/10/2009	9/11/2009
SRK05-SP1A		446	457		558	460	629							650
SRK05-SP1B		276	217		280	249	277							280
SRK05-SP2		40	45		42	34	35							38
SRK05-SP3A		268	239	327		295	362							470
SRK05-SP3B		263	257	277		285	283							380
SRK05-SP4A		179	173	292		296	555			190		3,900	450	
SRK05-SP4B		4,790	5,080	4,760		4,730	5,820	5,000		5,600		4,800	5,900	
SRK05-SP5	480		4,360	5,180		4,800	5,290	4,700		6,100		4,600		5,700
SRK08-SP7a									2,140	2,300	1,900			1,800
SRK08-SP7b									5,680	11,100	4,500			1,400
SRK08-SP8a									1,470					
SRK08-SP8b									481					

Zn-d (ug/L)	6/5/2006	6/6/2006	9/20/2006	5/28/2007	5/29/2007	10/3/2007	5/28/2008	8/13/2008	8/30/2008	11/3/2008	5/30/2009	8/4/2009	9/10/2009	9/11/2009
SRK05-SP1A		1,590	1,410		983	1,460	1,780							1,820
SRK05-SP1B		243	272		295	218	254							167
SRK05-SP2		129	126		128	105	172							107
SRK05-SP3A		1,020	1,020	1,070		1,000	1,220							1,400
SRK05-SP3B		757	750	783		744	692							1,550
SRK05-SP4A		1,040	995	1,050		1,160	16,500			1,030		190,000	18,100	
SRK05-SP4B		362,000	373,000	318,000		447,000	407,000	452,000		368,000		255,000	371,000	
SRK05-SP5	211,000		218,000	234,000		324,000	294,000	326,000		367,000		276,000		346,000
SRK08-SP7a									1,640	2,560	1,820			2,580
SRK08-SP7b									96,800	248,000	49,400			21,000
SRK08-SP8a									444					
SRK08-SP8b									359					

D-3 Zn and SO4 Concentration Data for Selected Monitoring Wells

D-4 Shallow Aquifer Performance Data



D-5 Deep Aquifer PW2 Performance Data

Appendix E

Laberge 2009 Vangorda Creek and Grum Dump West Lobe Surface Water Survey Report

Vangorda Creek / Grum Dump West Lobe
Surface Water Surveys 2009

Submitted to:

Daniel Mackie Senior Hydrogeologist

SRK Consulting Inc.

Vancouver, BC Canada

Submitted By:

Laberge
ENVIRONMENTAL SERVICES

October 26, 2009

Background

The following is the result of an assignment from Dan Mackie and Leslie Gomm. The investigators wanted to do two surface water surveys; one along Vangorda Creek below the Vangorda Pit and a second on the west side of the Grum Dump. On October 1, 2009 the surface water surveys were conducted at both flow pathways. Water quality results for the suite of parameters including low-level metals, major ions and physical parameters are included below and digital copies have been forwarded to Dan Mackie and Leslie Gomm. A slight increase in zinc and S04 was detected along the Vangorda Creek pathway. Below the west lobe of the Grum Dump very low zinc values were detected although there was presentation of S04 and elevated conductivity. All waters were slightly alkaline.
L.E.S. handled all shipping and receiving; all samples were analyzed and reported by Maxxam Analytics Inc. in Maxxam A956077.

Task One – Reconnaissance

In August 2009 a brief reconnaissance was done below the toe of the Grum West Dump. The result was that the drainages indicated on the map were dry as far as we walked (about 300 m downstream of the Grum West Dump). On the same day a brief reconnaissance of potential sample sites along Vangorda Creek was conducted to plan access to the proposed sample sites. There were no obstacles observed to collection of any of the proposed samples, although the area below the west lobe of the Grum Dump looked very dry.

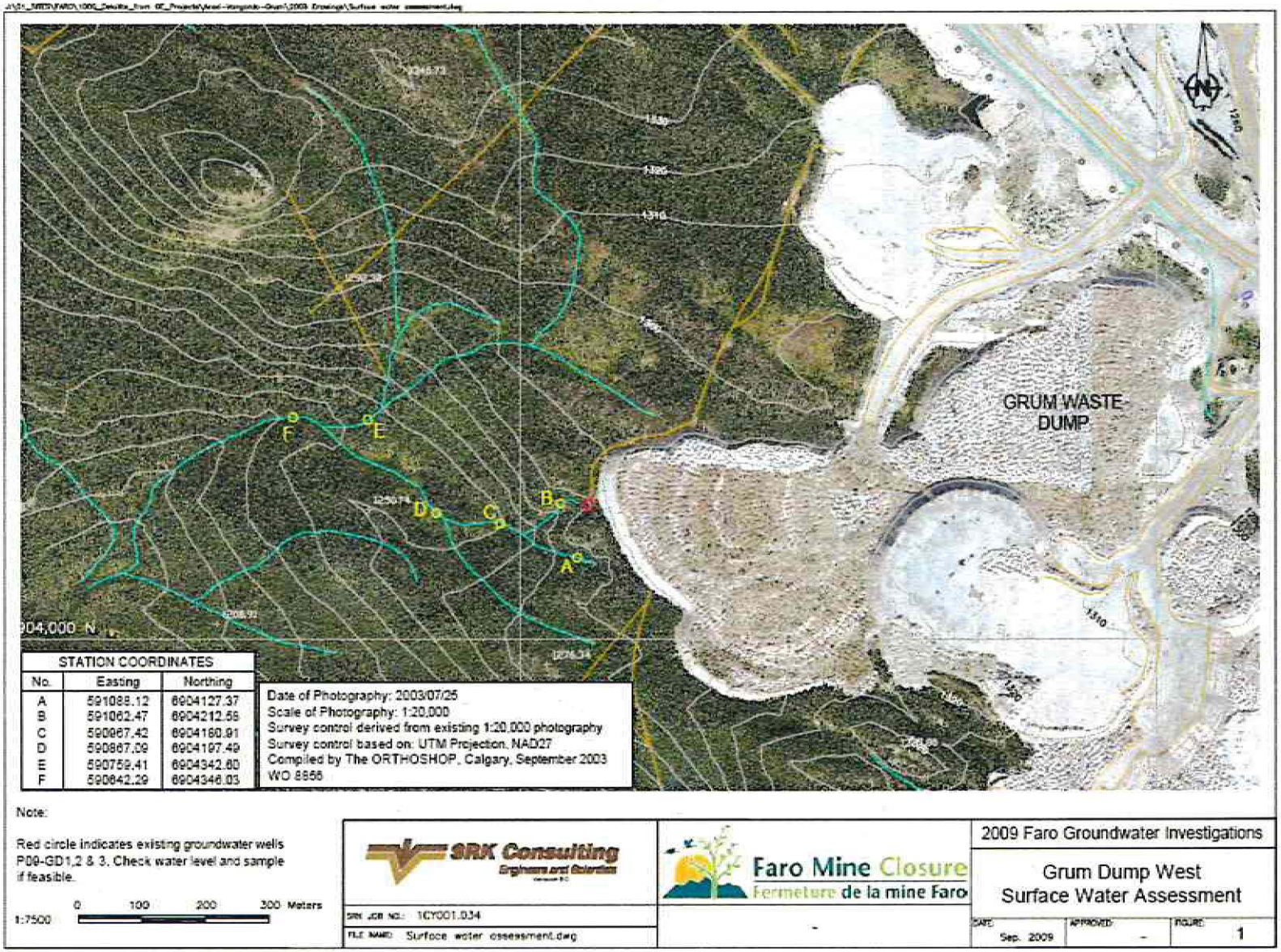
Task Two - Survey

Grum West

The area downstream of the West lobe of the Grum Dump was surveyed on October 1, 2009. We walked to all of the proposed sample sites along all of the indicated pathway. Starting at SRK 2009 wells (GD1301) we walked past site B, which was dry with no sign of flowing water this season. The confluence of A and B was dry with no sign of any flowing water or seasonal flowing water in either A or B channels (these are better described as topographic lows which may contain spring run-off and possibly extreme rainfall event flows only). The site C was found to be dry, and there was no sign of any tributary entering from the south at D. A significant seep was encountered near site D. The seep, sampled as G-1, was just upstream of a marshy pond which flowed into a confined channel through thick willow/sedges flowing towards site F. This area contained two open grassy areas with the channel flowing in a band of willows. The site E was inspected and found to be dry with no sign of channelized flow, although there was a topographic low to the west. The second sample G-2 was collected downstream of site E; in fact the site was close to the proposed site F. The channel began to display signs of continuously flowing water and the gradient increased. There were no other contributing surface water flows along the west Grum Dump pathway. In-situ measurements of pH, Conductivity and temperature were taken along with water samples.

Vangorda Creek

All of the proposed sample sites A through F were visited more or less where indicated on Figure 1 below. Discharge was measured at four of the sites using a Price mini meter meter. In-situ measurements of pH, Conductivity and Temperature were taken with freshly calibrated instruments. Every station was sampled in accordance with standard operating procedure including field filtration for dissolved metals. QA/QC included one field blank for the sampling event.
Site A was situated near the corrugated metal pipe under the haul road. Discharge measurement not possible due to steep grade and rapids.
Site B was about 100 m downstream of A and due north of the Little Creek pond.
Site C was in between the Moose pond and Little Creek pond.
Site D was downstream of the SRK06-08 and 09 wells downstream of Moose Pond and just upstream of the confluence of Tributary A.
Site E was just downstream of Tributary A
Site F was accessed from SRK05-07 and was taken downstream of Sweet Creek.


GRUM WASTE DUMP
A
B
C
D
E
F
1310
1320
1330
1340
1350
1360
1370
1380
1390
1400
1410
1420
1430
1440
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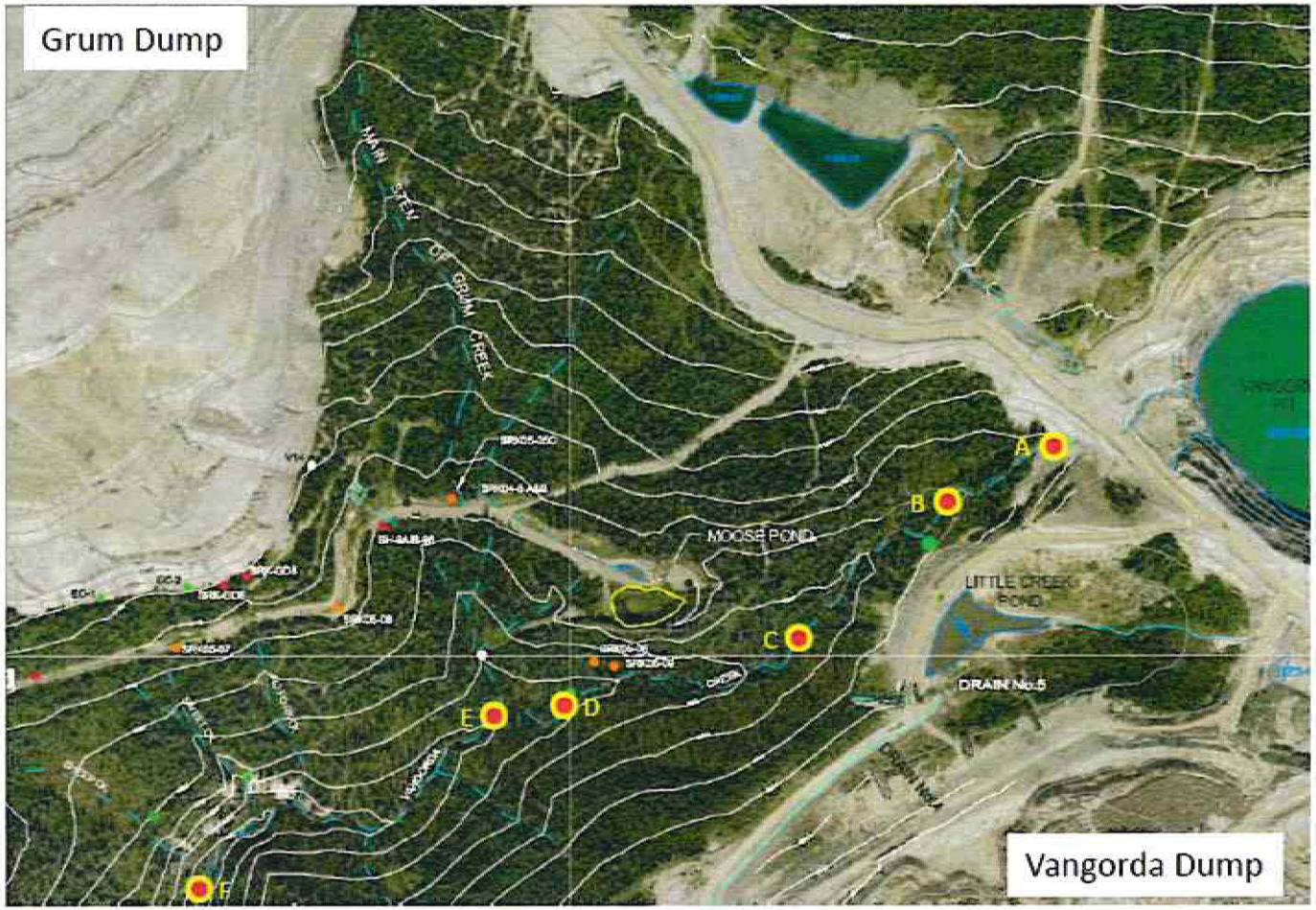

Water Quality and Flow

SRK Consulting
Engineers and Scientists

2009 Faro Groundwater Investigations

Vangorda Creek Surface Water Assessment

PROJECT:	DATE:	APPROVED:	FIGURE:
n/a	May 2009		2

Table 1 – summary of in-situ measurements

Time	Station	UTM mN Nad 27	UTM mE	Field pH	T°C	Cond	Q m³/s	
14:00	Vangorda A	593634	6903253	7.52	2.4	111	nm	Near outlet of cmp, no Q possible.
14:30	Vangorda B	593345	6903098	7.46	2.5	118	0.398	Site is north of Little Creek pond
13:15	Vangorda C	593301	6903030	7.48	2.6	120	0.403	Site is between little creek and moose ponds
16:45	Vangorda D	na		7.58	2.9	197	0.399	Site is just upstream of Grum Creek/Tributary A
16:00	Vangorda E	592912	6902309	7.68	2.9	207	nm	Site is just downstream of confluence Tributary A
15:30	Vangorda F	592558	6902247	7.70	2.7	267	0.443	Accessed from SRK05-07. site is downstream of Sweet Ck.
18:00	Grum West G-1	590928	6904219	7.68	1.6	1750	1.5 L/sec	Seep daylights here, forms confined channel
19:00	Grum West G-2	590692	6904332	7.75	1.9	1280	2 L/sec	Channel starts to show signs of continuously flowing water

Vangorda Site A

Vangorda Site B

Vangorda Site C

Vangorda Site F

Grum west site G-1 near Site D

Grum west pond downstream G-1

Grum west typical terrain near E

Grum west channel near E

Grum west site G-2 near Site F

MaxXam Analytics

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Your Project #: VANGORDA-GRUM SURFACE WATER
Your C.O.C. #: 08304779

Attention: Ken Nordin
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2009/10/14

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A956077
Received: 2009/10/05, 12:10

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 d	9	N/A	2009/10/10	BRN SOP-00261 R3.0	Based on SM-2310
Alkalinity - Water	9	2009/10/13	2009/10/14	BRN SOP-00264 R4.0	Based on SM2320B
Bromide (ISE)	9	N/A	2009/10/13	BRN SOP-00245 R1.0	EPA 9211
Chloride by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00234 R3.0	Based on EPA 325.2
Chloride by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	9	N/A	2009/10/14	BRN SOP-00264 R2.0	Based on SM-2510B
Fluoride - Mining Clients	9	N/A	2009/10/08	BRN SOP-00225 R1.0	Based SM - 4500 F C
Hardness Total (calculated as CaCO3)	9	N/A	2009/10/11		
Hardness (calculated as CaCO3)	9	N/A	2009/10/13		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	9	N/A	2009/10/11	BRN SOP-00205 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) d	9	N/A	2009/10/11	BRN SOP-00205 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (total) d	9	2009/10/09	2009/10/10	BRN SOP-00205 R7.0	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	9	2009/10/09	2009/10/10	BRN SOP-00205 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	9	N/A	2009/10/08	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	9	N/A	2009/10/14	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00243 R1.0	Based on EPA 375.4

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

Ashley Nivison
14 Oct 2009 14:24:18 -07:00

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

ASHLEY NIVISON, BSY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13373		R13374		
Sampling Date		2009/10/01 14:00		2009/10/01 14:30		
COC Number		08304779		08304779		
	Units	**VANGORDA CREEK A**	**QC Batch**	**VANGORDA CREEK B**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	3482975	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	0.6	3482975	1.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	3485735	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.02	3480002	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	25	3486943	26	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	31	3486943	32	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	25	3485946	28	0.5	3482553
Dissolved Chloride (Cl)	mg/L	0.5	3485647	1.2	0.5	3482132
Physical Properties						
Conductivity	uS/cm	114	3486941	119	1	3486941
pH	pH Units	7.6	3486939	7.6		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13375	R13376	R13377		
Sampling Date		2009/10/01 13:15	2009/10/01 16:45	2009/10/01 16:00		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK C**	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.5	2.0	1.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	<0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.07	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	28	35	37	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	34	43	45	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	31	55	59	0.5	3482553
Dissolved Chloride (Cl)	mg/L	<0.5	<0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	127	197	209	1	3486941
pH	pH Units	7.5	7.7	7.6		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13378		R13379		
Sampling Date		2009/10/01 15:30		2009/10/01 16:00		
COC Number		08304779		08304779		
	Units	VANGORDA CREEK F	RDL	GRUM WEST DUMP FLOW G-1	RDL	QC Batch
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.4	0.5	15.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.01	0.12	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	41	0.5	330	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	50	0.5	400	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	67	0.5	660	5	3482663
Dissolved Chloride (Cl)	mg/L	<0.5	0.5	1.0	0.5	3482132
Physical Properties						
Conductivity	uS/cm	271	1	1760	1	3486941
pH	pH Units	7.6		8.0		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13380		R13381		
Sampling Date		2009/10/01 16:30				
COC Number		08304779		08304779		
	Units	GRUM WEST DUMP FLOW G-2	RDL	FIELD BLANK	RDL	QC Batch
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	5.2	0.5	<0.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.12	0.01	<0.01	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	270	0.5	1.7	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	330	0.5	2.0	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	460	5	<0.5	0.5	3482663
Dissolved Chloride (Cl)	mg/L	1.2	0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	1290	1	1	1	3486941
pH	pH Units	8.1		5.2		3486939
RDL = Reportable Detection Limit						

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	50.8	53.9	55.3	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	16.9	16.1	14.1	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.04	0.04	0.04	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.17	0.26	0.23	0.02	3482652
Dissolved Barium (Ba)	ug/L	24.8	25.6	25.0	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	<0.005	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.044 (1)	0.033	0.044	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.047	0.049	0.042	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.50	0.55	0.47	0.05	3482652
Dissolved Iron (Fe)	ug/L	30	49	37	1	3482652
Dissolved Lead (Pb)	ug/L	0.215	0.248	0.157	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.1	1.3	1.3	0.5	3482652
Dissolved Manganese (Mn)	ug/L	1.95	12.1	10.0	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.20	0.20	0.20	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.36	0.40	0.46	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.09	0.09	0.10	0.04	3482652
Dissolved Silicon (Si)	ug/L	4610	4820	4590	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	69.1	72.2	73.5	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.005	0.006	0.007	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	0.376	0.392	0.405	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	17.2	18.0	22.5	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	16.2	17.1	17.6	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	2.62	2.70	2.77	0.05	3483676
Dissolved Potassium (K)	mg/L	0.37	0.36	0.38	0.05	3483676
Dissolved Sodium (Na)	mg/L	1.70	1.73	1.67	0.05	3483676
Dissolved Sulphur (S)	mg/L	11	12	12	3	3483676

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 15:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK D	VANGORDA CREEK E	VANGORDA CREEK F	RDL	QC Batch
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	91.0	99.4	129	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	13.6	13.3	12.5	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.05	0.05	0.05	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.26	0.26	0.25	0.02	3482652
Dissolved Barium (Ba)	ug/L	26.2	27.0	26.9	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	0.036 (1)	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.059	0.054	0.048	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.046	0.046	0.037	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.52	0.54	0.53	0.05	3482652
Dissolved Iron (Fe)	ug/L	29	32	30	1	3482652
Dissolved Lead (Pb)	ug/L	0.155	0.206	0.161	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.5	1.6	1.8	0.5	3482652
Dissolved Manganese (Mn)	ug/L	9.44	9.28	7.67	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.25	0.25	0.28	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.48	0.48	0.47	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.09	0.10	0.12	0.04	3482652
Dissolved Silicon (Si)	ug/L	4460	4760	5200	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	94.3	101	120	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.009	0.010	0.012	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	1.22	1.36	1.97	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	22.9	21.8	21.2	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	24.7	26.7	32.7	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK D	VANGORDA CREEK E	VANGORDA CREEK F	RDL	QC Batch
Dissolved Magnesium (Mg)	mg/L	7.11	7.98	11.4	0.05	3493676
Dissolved Potassium (K)	mg/L	0.46	0.47	0.61	0.05	3493676
Dissolved Sodium (Na)	mg/L	1.67	1.95	2.09	0.05	3493676
Dissolved Sulphur (S)	mg/L	23	24	33	3	3493676

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 16:00	2009/10/01 16:30			
COC Number		08304779	08304779	08304779		
	Units	GRUM WEST DUMP FLOW G-1	GRUM WEST DUMP FLOW G-2	FIELD BLANK	RDL	QC Batch
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	1120	772	<0.5	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	1.6	2.6 (1)	1.0	0.2	3492652
Dissolved Antimony (Sb)	ug/L	0.06	0.15	<0.02	0.02	3492652
Dissolved Arsenic (As)	ug/L	0.08	0.50	<0.02	0.02	3492652
Dissolved Barium (Ba)	ug/L	98.4	84.4	0.13	0.02	3492652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3492652
Dissolved Bismuth (Bi)	ug/L	0.010	<0.005	0.005	0.005	3492652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3492652
Dissolved Cadmium (Cd)	ug/L	0.024	0.027 (1)	<0.005	0.005	3492652
Dissolved Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3492652
Dissolved Cobalt (Co)	ug/L	0.039	0.029	0.005	0.005	3492652
Dissolved Copper (Cu)	ug/L	0.27	1.04 (1)	0.13	0.05	3492652
Dissolved Iron (Fe)	ug/L	12	11	5	1	3492652
Dissolved Lead (Pb)	ug/L	0.059	0.060	0.069	0.005	3492652
Dissolved Lithium (Li)	ug/L	7.6	4.5	<0.5	0.5	3492652
Dissolved Manganese (Mn)	ug/L	0.10	0.32 (1)	0.60 (1)	0.05	3492652
Dissolved Molybdenum (Mo)	ug/L	0.97	0.91	<0.05	0.05	3492652
Dissolved Nickel (Ni)	ug/L	0.50	0.53	0.04	0.02	3492652
Dissolved Selenium (Se)	ug/L	3.52	0.53	<0.04	0.04	3492652
Dissolved Silicon (Si)	ug/L	5150	5410	<100	100	3492652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3492652
Dissolved Strontium (Sr)	ug/L	1090	772	0.05	0.05	3492652
Dissolved Thallium (Tl)	ug/L	0.003	<0.002	<0.002	0.002	3492652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3492652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3492652
Dissolved Uranium (U)	ug/L	17.6	12.8	<0.002	0.002	3492652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	0.2	0.2	3492652
Dissolved Zinc (Zn)	ug/L	0.9	1.5	3.4 (1)	0.1	3492652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3492652

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	GRUM WEST DUMP FLOW G-1	GRUM WEST DUMP FLOW G-2	FIELD BLANK	RDL	QC Batch
Dissolved Calcium (Ca)	mg/L	248	176	0.05	0.05	3483676
Dissolved Magnesium (Mg)	mg/L	122	80.6	<0.05	0.05	3483676
Dissolved Potassium (K)	mg/L	1.51	1.36	<0.05	0.05	3483676
Dissolved Sodium (Na)	mg/L	4.60	3.77	<0.05	0.05	3483676
Dissolved Sulphur (S)	mg/L	260	167	<3	3	3483676

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	46.9	49.8	51.2	0.5	3472865
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	19.8	18.7	18.1	0.2	3482654
Total Antimony (Sb)	ug/L	0.04	0.04	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.27	0.28	0.30	0.02	3482654
Total Barium (Ba)	ug/L	23.1	23.1	23.2	0.02	3482654
Total Beryllium (Be)	ug/L	0.02	<0.01	0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.036	0.035	0.052	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.051	0.051	0.057	0.005	3482654
Total Copper (Cu)	ug/L	0.43	0.46	0.65	0.05	3482654
Total Iron (Fe)	ug/L	57	65	66	1	3482654
Total Lead (Pb)	ug/L	0.377	0.357	0.471	0.005	3482654
Total Lithium (Li)	ug/L	1.5	1.5	1.6	0.5	3482654
Total Manganese (Mn)	ug/L	2.73	12.7	11.3	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.19	0.20	0.20	0.05	3482654
Total Nickel (Ni)	ug/L	0.41	0.35	0.54	0.02	3482654
Total Selenium (Se)	ug/L	0.09	0.08	0.09	0.04	3482654
Total Silicon (Si)	ug/L	4640	4310	4500	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	65.1	65.4	69.1	0.05	3482654
Total Thallium (Tl)	ug/L	0.007	0.007	0.009	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482654
Total Uranium (U)	ug/L	0.371	0.370	0.380	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	17.0	17.4	25.0	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	14.9	15.8	16.1	0.05	3482725
Total Magnesium (Mg)	mg/L	2.33	2.52	2.67	0.05	3482725

RDL = Reportable Detection Limit

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK A	VANGORDA CREEK B	VANGORDA CREEK C	RDL	QC Batch
Total Potassium (K)	mg/L	0.33	0.34	0.35	0.05	3482725
Total Sodium (Na)	mg/L	1.65	1.67	1.65	0.05	3482725
Total Sulphur (S)	mg/L	11	12	10	3	3482725
RDL = Reportable Detection Limit						

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 15:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	VANGORDA CREEK D	VANGORDA CREEK E	VANGORDA CREEK F	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	89.5	90.0	125	0.5	3472865
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	21.3	16.9	17.8	0.2	3482654
Total Antimony (Sb)	ug/L	0.05	0.07	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.36	0.35	0.32	0.02	3482654
Total Barium (Ba)	ug/L	24.8	24.5	25.3	0.02	3482654
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	0.005	0.020	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.059	0.052	0.049	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.084	0.067	0.049	0.005	3482654
Total Copper (Cu)	ug/L	0.66	0.71	0.59	0.05	3482654
Total Iron (Fe)	ug/L	80	61	59	1	3482654
Total Lead (Pb)	ug/L	0.842	0.676	0.433	0.005	3482654
Total Lithium (Li)	ug/L	1.8	1.8	2.0	0.5	3482654
Total Manganese (Mn)	ug/L	13.9	11.1	9.16	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.23	0.25	0.28	0.05	3482654
Total Nickel (Ni)	ug/L	0.55	0.54	0.56	0.02	3482654
Total Selenium (Se)	ug/L	0.10	0.11	0.12	0.04	3482654
Total Silicon (Si)	ug/L	4370	4370	4420	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	89.2	90.7	111	0.05	3482654
Total Thallium (Tl)	ug/L	0.009	0.010	0.011	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	0.6	0.5	3482654
Total Uranium (U)	ug/L	1.20	1.25	1.66	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	25.9	27.3	24.7	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	23.8	23.6	31.3	0.05	3482725
Total Magnesium (Mg)	mg/L	7.28	7.44	11.5	0.05	3482725
RDL = Reportable Detection Limit						

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 15:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.42	0.43	0.49	0.05	3482725
Total Sodium (Na)	mg/L	1.68	1.91	2.13	0.05	3482725
Total Sulphur (S)	mg/L	22	24	33	3	3482725
RDL = Reportable Detection Limit						

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	1090	747	<0.5	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	13.8	2.1	0.5	0.2	3482554
Total Antimony (Sb)	ug/L	0.05	0.15	<0.02	0.02	3482554
Total Arsenic (As)	ug/L	0.12	0.57	<0.02	0.02	3482554
Total Barium (Ba)	ug/L	69.8	77.2	0.34	0.02	3482554
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482554
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482554
Total Boron (B)	ug/L	<50	<50	<50	50	3482554
Total Cadmium (Cd)	ug/L	0.021	0.019	<0.005	0.005	3482554
Total Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3482554
Total Cobalt (Co)	ug/L	0.057	0.035	<0.005	0.005	3482554
Total Copper (Cu)	ug/L	0.31	0.61	0.11	0.05	3482554
Total Iron (Fe)	ug/L	57	13	<1	1	3482554
Total Lead (Pb)	ug/L	0.221	0.058	0.165	0.005	3482554
Total Lithium (Li)	ug/L	8.0	4.8	<0.5	0.5	3482554
Total Manganese (Mn)	ug/L	0.56	0.23	<0.05	0.05	3482554
Total Molybdenum (Mo)	ug/L	0.88	0.87	<0.05	0.05	3482554
Total Nickel (Ni)	ug/L	0.50	0.55	<0.02	0.02	3482554
Total Selenium (Se)	ug/L	3.68	0.50	<0.04	0.04	3482554
Total Silicon (Si)	ug/L	5230	5230	<100	100	3482554
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482554
Total Strontium (Sr)	ug/L	956	718	<0.05	0.05	3482554
Total Thallium (Tl)	ug/L	0.004	<0.002	<0.002	0.002	3482554
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482554
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482554
Total Uranium (U)	ug/L	17.9	12.5	<0.002	0.002	3482554
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482554
Total Zinc (Zn)	ug/L	1.6	1.4	0.2	0.1	3482554
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482554
Total Calcium (Ca)	mg/L	244	171	<0.05	0.05	3482725
RDL = Reportable Detection Limit						

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 16:30			
COC Number		08304779	08304779	08304779		
	Units	GRUM WEST DUMP FLOW G-1	GRUM WEST DUMP FLOW G-2	FIELD BLANK	RDL	QC Batch
Total Magnesium (Mg)	mg/L	117	77.6	<0.05	0.05	3492725
Total Potassium (K)	mg/L	1.36	1.24	<0.05	0.05	3492725
Total Sodium (Na)	mg/L	5.00	3.66	<0.05	0.05	3492725
Total Sulphur (S)	mg/L	275	175	<3	3	3492725

RDL = Reportable Detection Limit

Maxxam Analytics Inc

8577 Commerce Court, Burnaby, BC V5A 4N5 · Phone: (604) 444-4808 · Fax: (604) 444-4811 · www.maxxamanalytics.com · Toll-Free: 1-800-440-4808

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

PAGE 1 OF 1

08304779

MAXXAM JOB #: A956077

ANALYSIS REQUEST

COC #

COMPANY NAME: Laberge Environmental Services

CLIENT PROJECT NO: Vangorda-Grum Surface Water Assessments

COMPANY ADDRESS: Physical Address 405 Ogilvie Street, Whitehorse YT Y
Mailing Address Box 21072
Whitehorse YT
Y1A 6P7

TEL: 1-867-668-6638

E MAIL: Laberge@northwestel.net dmackie@srk.com

FAX:

SAMPLER NAME (PRINT): Ken Nordin, Dylan Nordin

PROJECT MANAGER: Daniel Mackie

LABORATORY CONTACT: Ashley Nivison

	FIELD SAMPLE ID	MATRIX	SAMPLING DATE (DD/MM/YY)	SAMPLING TIME	# CONTAINERS	pH, Conductivity	Alkalinity	Magnesium (SO4, Cl, F, Br)	Acidity	Low Level Total Metals ICP/OES	Low Level Dissolved Metals ICP/OES
1	Vangorda Creek A	GROUNDWATER / SURFACE WATER	01/10/2009	14:00	4	x	x	x	x	x	x
2	Vangorda Creek B		01/10/2009	14:30	4	x	x	x	x	x	x
3	Vangorda Creek C		01/10/2009	13:15	4	x	x	x	x	x	x
4	Vangorda Creek D		01/10/2009	16:45	4	x	x	x	x	x	x
5	Vangorda Creek E		01/10/2009	16:00	4	x	x	x	x	x	x
6	Vangorda Creek F		01/10/2009	15:30	4	x	x	x	x	x	x
7	Grum West Dump flow G-1		01/10/2009	18:00	4	x	x	x	x	x	x
8	Grum West Dump flow G-2		01/10/2009	18:30	4	x	x	x	x	x	x
9	Field Blank										
10											
11											
12											

TAT (Turnaround Time) LESS THAN 5 DAY RUSH MAY HAVE PRIOR APPROVAL

* Some exceptions apply - please contact laboratory

STANDARD 5 BUSINESS DAYS [x]
RUSH 3 BUSINESS DAYS [ ]
RUSH 2 BUSINESS DAYS [ ]
URGENT 1 BUSINESS DAY [ ]
OTHER BUSINESS DAYS [ ]

ACCOUNTING CONTACT:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE: Surface Water Flows Adjacent to Mine Waste Dumps

SPECIAL REPORTING OR BILLING INSTRUCTIONS: Bill to Laberge Environmental Services

DOW [ ] CDR [ ] AS TER 1 [ ] OTHER [ ]

JARS USED

LABORATORY USE ONLY

ARRIVAL TEMPERATURE °C: 9.0, 6.0

DUE DATE:

LOG IN CHECK:

	RELINQUISHED BY SAMPLER	DATE DD/MM/YY	TIME	RECEIVED BY
	Ken Nordin	03/10/2009	15:00	
	RELINQUISHED BY	DATE DD/MM/YY	TIME	RECEIVED BY
	RELINQUISHED BY	DATE DD/MM/YY 05/10/09	TIME 12:10	RECEIVED BY LABORATORY: AmO

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CUSTODY RECORD

Your Project #: VANGORDA-GRUM SURFACE WATER
Your C.O.C. #: 08304779

Attention: Ken Nordin
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2009/10/14

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A956077
Received: 2009/10/05, 12:10

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3 (1)	9	N/A	2009/10/10	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	9	2009/10/13	2009/10/14	BRN SOP-00264 R4.0	Based on SM2320B
Bromide (ISE)	9	N/A	2009/10/13	BRN SOP-00245 R1.0	EPA 9211
Chloride by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00234 R3.0	Based on EPA 325.2
Chloride by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	9	N/A	2009/10/14	BRN SOP-00264 R2.0	Based on SM-2510B
Fluoride - Mining Clients	9	N/A	2009/10/08	BRN SOP-00225 R1.0	Based SM - 4500 F C
Hardness Total (calculated as CaCO3)	9	N/A	2009/10/11		
Hardness (calculated as CaCO3)	9	N/A	2009/10/13		
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	9	N/A	2009/10/11	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved) (1)	9	N/A	2009/10/11	BRN SOP-00206 R7.0	Based on EPA 200.8
Elements by ICPMS Low Level (total) (1)	9	2009/10/09	2009/10/10	BRN SOP-00206 R7.0	Based on EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	9	2009/10/09	2009/10/10	BRN SOP-00206 R7.0	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	9	N/A	2009/10/08	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	9	N/A	2009/10/14	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	8	N/A	2009/10/09	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	1	N/A	2009/10/10	BRN-SOP 00243 R1.0	Based on EPA 375.4

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) SCC/CAEAL

Encryption Key

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

ASHLEY NIVISON, BBY Customer Service
Email: ashley.nivison@maxxamanalytics.com
Phone# (604) 444-4808

Your Project #: VANGORDA-GRUM SURFACE WATER
Your C.O.C. #: 08304779

Attention: Ken Nordin
LABERGE ENVIRONMENTAL SERVICES
WHITEHORSE
405 Ogilvie Street
PO Box 21072
Whitehorse, YT
CANADA Y1A 6P7

Report Date: 2009/10/14

CERTIFICATE OF ANALYSIS

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Total cover pages: 2

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13373		R13374		
Sampling Date		2009/10/01 14:00		2009/10/01 14:30		
COC Number		08304779		08304779		
	Units	**VANGORDA CREEK A**	**QC Batch**	**VANGORDA CREEK B**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	3482975	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	0.6	3482975	1.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	3485735	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.02	3480002	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	26	3486943	26	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	31	3486943	32	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	3486943	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	26	3485948	28	0.5	3482653
Dissolved Chloride (Cl)	mg/L	0.5	3485847	1.2	0.5	3482132
Physical Properties						
Conductivity	uS/cm	114	3486941	119	1	3486941
pH	pH Units	7.6	3486939	7.6		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13375	R13376	R13377		
Sampling Date		2009/10/01 13:15	2009/10/01 16:45	2009/10/01 16:00		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK C**	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	<0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.5	2.0	1.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	<0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.07	0.07	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	FIELD	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	28	35	37	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	34	43	45	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	<0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	31	55	59	0.5	3482653
Dissolved Chloride (Cl)	mg/L	<0.5	<0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	127	197	209	1	3486941
pH	pH Units	7.6	7.7	7.8		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13378		R13379		
Sampling Date		2009/10/01 15:30		2009/10/01 18:00		
COC Number		08304779		08304779		
	Units	**VANGORDA CREEK F**	**RDL**	**GRUM WEST DUMP FLOW G-1**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	1.4	0.5	15.4	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.07	0.01	0.12	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	41	0.5	330	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	50	0.5	400	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	67	0.5	680	5	3482653
Dissolved Chloride (Cl)	mg/L	<0.5	0.5	1.0	0.5	3482132
Physical Properties						
Conductivity	uS/cm	271	1	1760	1	3486941
pH	pH Units	7.8		8.0		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		R13380		R13381		
Sampling Date		2009/10/01 18:30				
COC Number		08304779		08304779		
	Units	**GRUM WEST DUMP FLOW G-2**	**RDL**	**FIELD BLANK**	**RDL**	**QC Batch**
Misc. Inorganics						
Acidity (pH 4.5)	mg/L	<0.5	0.5	<0.5	0.5	3482975
Acidity (pH 8.3)	mg/L	5.2	0.5	<0.5	0.5	3482975
Bromide (Br)	mg/L	<0.4	0.4	<0.4	0.4	3485735
Fluoride (F)	mg/L	0.12	0.01	<0.01	0.01	3480002
Preparation						
Filter and HNO3 Preservation	N/A	FIELD	N/A	FIELD	N/A	ONSITE
Misc. Inorganics						
Alkalinity (Total as CaCO3)	mg/L	270	0.5	1.7	0.5	3486943
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Bicarbonate (HCO3)	mg/L	330	0.5	2.0	0.5	3486943
Carbonate (CO3)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Hydroxide (OH)	mg/L	<0.5	0.5	<0.5	0.5	3486943
Anions						
Dissolved Sulphate (SO4)	mg/L	460	5	<0.5	0.5	3482653
Dissolved Chloride (Cl)	mg/L	1.2	0.5	<0.5	0.5	3482132
Physical Properties						
Conductivity	uS/cm	1290	1	1	1	3486941
pH	pH Units	8.1		6.2		3486939

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	50.8	53.9	55.3	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	16.9	16.1	14.1	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.04	0.04	0.04	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.17	0.26	0.23	0.02	3482652
Dissolved Barium (Ba)	ug/L	24.8	25.5	25.0	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	<0.005	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.044 (1)	0.033	0.044	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.047	0.049	0.042	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.50	0.55	0.47	0.05	3482652
Dissolved Iron (Fe)	ug/L	30	49	37	1	3482652
Dissolved Lead (Pb)	ug/L	0.215	0.248	0.157	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.1	1.3	1.3	0.5	3482652
Dissolved Manganese (Mn)	ug/L	1.95	12.1	10.0	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.20	0.20	0.20	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.36	0.40	0.46	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.08	0.09	0.10	0.04	3482652
Dissolved Silicon (Si)	ug/L	4610	4820	4590	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	69.1	72.2	73.5	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.005	0.006	0.007	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	0.376	0.392	0.405	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	17.2	18.0	22.5	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	16.2	17.1	17.6	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	2.52	2.70	2.77	0.05	3483676
Dissolved Potassium (K)	mg/L	0.37	0.38	0.38	0.05	3483676
Dissolved Sodium (Na)	mg/L	1.70	1.73	1.67	0.05	3483676
Dissolved Sulphur (S)	mg/L	11	12	12	3	3483676

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	91.0	99.4	129	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	13.6	13.3	12.5	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.05	0.05	0.05	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.26	0.26	0.25	0.02	3482652
Dissolved Barium (Ba)	ug/L	26.2	27.0	26.9	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	0.038 (1)	0.006	<0.005	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.059	0.054	0.048	0.005	3482652
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.046	0.046	0.037	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.52	0.54	0.53	0.05	3482652
Dissolved Iron (Fe)	ug/L	29	32	30	1	3482652
Dissolved Lead (Pb)	ug/L	0.155	0.206	0.181	0.005	3482652
Dissolved Lithium (Li)	ug/L	1.5	1.6	1.8	0.5	3482652
Dissolved Manganese (Mn)	ug/L	9.44	9.28	7.87	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.25	0.25	0.28	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.48	0.48	0.47	0.02	3482652
Dissolved Selenium (Se)	ug/L	0.09	0.10	0.12	0.04	3482652
Dissolved Silicon (Si)	ug/L	4460	4760	5000	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	94.3	101	120	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.009	0.010	0.012	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	1.22	1.36	1.97	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	22.9	21.8	21.2	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652
Dissolved Calcium (Ca)	mg/L	24.7	26.7	32.7	0.05	3483676

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	7.11	7.98	11.4	0.05	3483676
Dissolved Potassium (K)	mg/L	0.46	0.47	0.51	0.05	3483676
Dissolved Sodium (Na)	mg/L	1.87	1.95	2.09	0.05	3483676
Dissolved Sulphur (S)	mg/L	23	24	33	3	3483676

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	1120	772	<0.5	0.5	3473076
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	1.6	2.6 (1)	1.0	0.2	3482652
Dissolved Antimony (Sb)	ug/L	0.06	0.15	<0.02	0.02	3482652
Dissolved Arsenic (As)	ug/L	0.08	0.50	<0.02	0.02	3482652
Dissolved Barium (Ba)	ug/L	98.4	84.4	0.13	0.02	3482652
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Bismuth (Bi)	ug/L	0.010	<0.005	0.006	0.005	3482652
Dissolved Boron (B)	ug/L	<50	<50	<50	50	3482652
Dissolved Cadmium (Cd)	ug/L	0.024	0.027 (1)	<0.005	0.005	3482652
Dissolved Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3482652
Dissolved Cobalt (Co)	ug/L	0.039	0.029	0.006	0.005	3482652
Dissolved Copper (Cu)	ug/L	0.27	1.04 (1)	0.13	0.05	3482652
Dissolved Iron (Fe)	ug/L	12	11	5	1	3482652
Dissolved Lead (Pb)	ug/L	0.059	0.060	0.069	0.005	3482652
Dissolved Lithium (Li)	ug/L	7.8	4.5	<0.5	0.5	3482652
Dissolved Manganese (Mn)	ug/L	0.10	0.32 (1)	0.60 (1)	0.05	3482652
Dissolved Molybdenum (Mo)	ug/L	0.97	0.91	<0.05	0.05	3482652
Dissolved Nickel (Ni)	ug/L	0.50	0.53	0.04	0.02	3482652
Dissolved Selenium (Se)	ug/L	3.52	0.53	<0.04	0.04	3482652
Dissolved Silicon (Si)	ug/L	5150	5410	<100	100	3482652
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482652
Dissolved Strontium (Sr)	ug/L	1090	772	0.05	0.05	3482652
Dissolved Thallium (Tl)	ug/L	0.003	<0.002	<0.002	0.002	3482652
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482652
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482652
Dissolved Uranium (U)	ug/L	17.6	12.8	<0.002	0.002	3482652
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	0.2	0.2	3482652
Dissolved Zinc (Zn)	ug/L	0.9	1.5	3.4 (1)	0.1	3482652
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482652

RDL = Reportable Detection Limit
(1) Dissolved greater than total. Reanalysis yields similar results

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Dissolved Calcium (Ca)	mg/L	248	176	0.06	0.05	3483676
Dissolved Magnesium (Mg)	mg/L	122	80.6	<0.05	0.05	3483676
Dissolved Potassium (K)	mg/L	1.51	1.38	<0.05	0.05	3483676
Dissolved Sodium (Na)	mg/L	4.80	3.77	<0.05	0.05	3483676
Dissolved Sulphur (S)	mg/L	280	187	<3	3	3483676

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	46.9	49.8	51.2	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	19.8	18.7	18.1	0.2	3482654
Total Antimony (Sb)	ug/L	0.04	0.04	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.27	0.28	0.30	0.02	3482654
Total Barium (Ba)	ug/L	23.1	23.1	23.2	0.02	3482654
Total Beryllium (Be)	ug/L	0.02	<0.01	0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.036	0.035	0.052	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.051	0.061	0.057	0.005	3482654
Total Copper (Cu)	ug/L	0.43	0.46	0.65	0.05	3482654
Total Iron (Fe)	ug/L	57	65	66	1	3482654
Total Lead (Pb)	ug/L	0.377	0.357	0.471	0.005	3482654
Total Lithium (Li)	ug/L	1.5	1.5	1.6	0.5	3482654
Total Manganese (Mn)	ug/L	2.73	12.7	11.3	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.19	0.20	0.20	0.05	3482654
Total Nickel (Ni)	ug/L	0.41	0.35	0.54	0.02	3482654
Total Selenium (Se)	ug/L	0.09	0.08	0.09	0.04	3482654
Total Silicon (Si)	ug/L	4640	4310	4500	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	65.1	65.4	69.1	0.05	3482654
Total Thallium (Tl)	ug/L	0.007	0.007	0.008	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482654
Total Uranium (U)	ug/L	0.371	0.370	0.380	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	17.0	17.4	25.0	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	14.9	15.8	16.1	0.05	3482725
Total Magnesium (Mg)	mg/L	2.33	2.52	2.67	0.05	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13373	R13374	R13375		
Sampling Date		2009/10/01 14:00	2009/10/01 14:30	2009/10/01 13:15		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK A**	**VANGORDA CREEK B**	**VANGORDA CREEK C**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.33	0.34	0.35	0.05	3482725
Total Sodium (Na)	mg/L	1.65	1.67	1.65	0.05	3482725
Total Sulphur (S)	mg/L	11	12	10	3	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	89.5	90.0	125	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	21.3	16.9	17.8	0.2	3482654
Total Antimony (Sb)	ug/L	0.05	0.07	0.05	0.02	3482654
Total Arsenic (As)	ug/L	0.36	0.35	0.32	0.02	3482654
Total Barium (Ba)	ug/L	24.8	24.5	25.3	0.02	3482654
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	0.006	0.020	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.059	0.052	0.049	0.005	3482654
Total Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.084	0.067	0.049	0.005	3482654
Total Copper (Cu)	ug/L	0.66	0.71	0.59	0.05	3482654
Total Iron (Fe)	ug/L	80	61	59	1	3482654
Total Lead (Pb)	ug/L	0.842	0.678	0.433	0.005	3482654
Total Lithium (Li)	ug/L	1.8	1.8	2.0	0.5	3482654
Total Manganese (Mn)	ug/L	13.9	11.1	9.16	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.23	0.25	0.28	0.05	3482654
Total Nickel (Ni)	ug/L	0.55	0.54	0.56	0.02	3482654
Total Selenium (Se)	ug/L	0.10	0.11	0.12	0.04	3482654
Total Silicon (Si)	ug/L	4370	4370	4420	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	89.2	90.7	111	0.05	3482654
Total Thallium (Tl)	ug/L	0.009	0.010	0.011	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	0.8	0.5	3482654
Total Uranium (U)	ug/L	1.20	1.25	1.86	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	25.9	27.3	24.7	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	23.8	23.8	31.3	0.05	3482725
Total Magnesium (Mg)	mg/L	7.28	7.44	11.5	0.05	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13376	R13377	R13378		
Sampling Date		2009/10/01 16:45	2009/10/01 16:00	2009/10/01 15:30		
COC Number		08304779	08304779	08304779		
	Units	**VANGORDA CREEK D**	**VANGORDA CREEK E**	**VANGORDA CREEK F**	**RDL**	**QC Batch**
Total Potassium (K)	mg/L	0.42	0.43	0.49	0.05	3482725
Total Sodium (Na)	mg/L	1.88	1.91	2.13	0.05	3482725
Total Sulphur (S)	mg/L	22	24	33	3	3482725

RDL = Reportable Detection Limit

Maxxam Job #: A956077
Report Date: 2009/10/14

LABERGE ENVIRONMENTAL SERVICES
Client Project #: VANGORDA-GRUM SURFACE WATER

Sampler Initials: KN

LOW LEVEL TOTAL METALS - WATER (WATER)

Maxxam ID		R13379	R13380	R13381		
Sampling Date		2009/10/01 18:00	2009/10/01 18:30			
COC Number		08304779	08304779	08304779		
	Units	**GRUM WEST DUMP FLOW G-1**	**GRUM WEST DUMP FLOW G-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	1090	747	<0.5	0.5	3472885
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	13.8	2.1	0.5	0.2	3482654
Total Antimony (Sb)	ug/L	0.05	0.15	<0.02	0.02	3482654
Total Arsenic (As)	ug/L	0.12	0.57	<0.02	0.02	3482654
Total Barium (Ba)	ug/L	89.8	77.2	0.34	0.02	3482654
Total Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Boron (B)	ug/L	<50	<50	<50	50	3482654
Total Cadmium (Cd)	ug/L	0.021	0.019	<0.005	0.005	3482654
Total Chromium (Cr)	ug/L	0.2	<0.1	<0.1	0.1	3482654
Total Cobalt (Co)	ug/L	0.057	0.035	<0.005	0.005	3482654
Total Copper (Cu)	ug/L	0.31	0.61	0.11	0.05	3482654
Total Iron (Fe)	ug/L	57	13	<1	1	3482654
Total Lead (Pb)	ug/L	0.221	0.068	0.165	0.005	3482654
Total Lithium (Li)	ug/L	8.0	4.8	<0.5	0.5	3482654
Total Manganese (Mn)	ug/L	0.56	0.23	<0.05	0.05	3482654
Total Molybdenum (Mo)	ug/L	0.88	0.87	<0.05	0.05	3482654
Total Nickel (Ni)	ug/L	0.50	0.55	<0.02	0.02	3482654
Total Selenium (Se)	ug/L	3.68	0.50	<0.04	0.04	3482654
Total Silicon (Si)	ug/L	5230	5230	<100	100	3482654
Total Silver (Ag)	ug/L	<0.005	<0.005	<0.005	0.005	3482654
Total Strontium (Sr)	ug/L	995	718	<0.05	0.05	3482654
Total Thallium (Tl)	ug/L	0.004	<0.002	<0.002	0.002	3482654
Total Tin (Sn)	ug/L	<0.01	<0.01	<0.01	0.01	3482654
Total Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	0.5	3482654
Total Uranium (U)	ug/L	17.9	12.5	<0.002	0.002	3482654
Total Vanadium (V)	ug/L	<0.2	<0.2	<0.2	0.2	3482654
Total Zinc (Zn)	ug/L	1.8	1.4	0.2	0.1	3482654
Total Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	0.1	3482654
Total Calcium (Ca)	mg/L	244	171	<0.05	0.05	3482725

RDL = Reportable Detection Limit

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
P.O. #:
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Quality Assurance Report

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3480002 MM3	Matrix Spike	Fluoride (F)	2009/10/08		92	%	80 - 120
	Spiked Blank	Fluoride (F)	2009/10/08		100	%	80 - 120
	Method Blank	Fluoride (F)	2009/10/08	<0.01		mg/L	
	RPD [R13379-02]	Fluoride (F)	2009/10/08	0		%	20
3482132 RL2	Matrix Spike	Dissolved Chloride (Cl)	2009/10/09		NC	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/10/09		106	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/10/09	<0.5		mg/L	
	RPD [R13380-03]	Dissolved Chloride (Cl)	2009/10/09	NC		%	20
	RPD [R13381-02]	Dissolved Chloride (Cl)	2009/10/09	NC		%	20
3482652 AA1	Matrix Spike	Dissolved Arsenic (As)	2009/10/11		98	%	80 - 120
		Dissolved Beryllium (Be)	2009/10/11		109	%	80 - 120
		Dissolved Cadmium (Cd)	2009/10/11		111	%	80 - 120
		Dissolved Chromium (Cr)	2009/10/11		97	%	80 - 120
		Dissolved Cobalt (Co)	2009/10/11		93	%	80 - 120
		Dissolved Copper (Cu)	2009/10/11		NC	%	80 - 120
		Dissolved Lead (Pb)	2009/10/11		108	%	80 - 120
		Dissolved Lithium (Li)	2009/10/11		108	%	80 - 120
		Dissolved Nickel (Ni)	2009/10/11		90	%	80 - 120
		Dissolved Selenium (Se)	2009/10/11		104	%	80 - 120
		Dissolved Uranium (U)	2009/10/11		117	%	80 - 120
		Dissolved Vanadium (V)	2009/10/11		102	%	80 - 120
		Dissolved Zinc (Zn)	2009/10/11		NC	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2009/10/11		92	%	80 - 120
		Dissolved Beryllium (Be)	2009/10/11		98	%	80 - 120
		Dissolved Cadmium (Cd)	2009/10/11		100	%	80 - 120
		Dissolved Chromium (Cr)	2009/10/11		91	%	80 - 120
		Dissolved Cobalt (Co)	2009/10/11		90	%	80 - 120
		Dissolved Copper (Cu)	2009/10/11		88	%	80 - 120
		Dissolved Lead (Pb)	2009/10/11		104	%	80 - 120
		Dissolved Lithium (Li)	2009/10/11		100	%	80 - 120
		Dissolved Nickel (Ni)	2009/10/11		87	%	80 - 120
		Dissolved Selenium (Se)	2009/10/11		97	%	80 - 120
		Dissolved Uranium (U)	2009/10/11		108	%	80 - 120
		Dissolved Vanadium (V)	2009/10/11		96	%	80 - 120
		Dissolved Zinc (Zn)	2009/10/11		91	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2009/10/11	<0.2		ug/L	
		Dissolved Antimony (Sb)	2009/10/11	<0.02		ug/L	
		Dissolved Arsenic (As)	2009/10/11	<0.02		ug/L	
		Dissolved Barium (Ba)	2009/10/11	<0.02		ug/L	
		Dissolved Beryllium (Be)	2009/10/11	<0.01		ug/L	
		Dissolved Bismuth (Bi)	2009/10/11	<0.005		ug/L	
		Dissolved Boron (B)	2009/10/11	<50		ug/L	
		Dissolved Cadmium (Cd)	2009/10/11	<0.005		ug/L	
		Dissolved Chromium (Cr)	2009/10/11	<0.1		ug/L	
		Dissolved Cobalt (Co)	2009/10/11	<0.005		ug/L	
		Dissolved Copper (Cu)	2009/10/11	<0.05		ug/L	
		Dissolved Iron (Fe)	2009/10/11	<1		ug/L	
		Dissolved Lead (Pb)	2009/10/11	<0.005		ug/L	
		Dissolved Lithium (Li)	2009/10/11	<0.5		ug/L	
		Dissolved Manganese (Mn)	2009/10/11	<0.05		ug/L	
		Dissolved Molybdenum (Mo)	2009/10/11	<0.05		ug/L	
		Dissolved Nickel (Ni)	2009/10/11	<0.02		ug/L	
		Dissolved Selenium (Se)	2009/10/11	<0.04		ug/L	
		Dissolved Silicon (Si)	2009/10/11	<100		ug/L	
		Dissolved Silver (Ag)	2009/10/11	<0.005		ug/L	

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
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Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3482652 AA1	Method Blank	Dissolved Strontium (Sr)	2009/10/11	<0.05		ug/L	
		Dissolved Thallium (Tl)	2009/10/11	<0.002		ug/L	
		Dissolved Tin (Sn)	2009/10/11	<0.01		ug/L	
		Dissolved Titanium (Ti)	2009/10/11	<0.5		ug/L	
		Dissolved Uranium (U)	2009/10/11	<0.002		ug/L	
		Dissolved Vanadium (V)	2009/10/11	<0.2		ug/L	
		Dissolved Zinc (Zn)	2009/10/11	<0.1		ug/L	
		Dissolved Zirconium (Zr)	2009/10/11	<0.1		ug/L	
	RPD	Dissolved Aluminum (Al)	2009/10/11	NC		%	20
		Dissolved Antimony (Sb)	2009/10/11	NC		%	20
		Dissolved Arsenic (As)	2009/10/11	4.8		%	20
		Dissolved Barium (Ba)	2009/10/11	0.6		%	20
		Dissolved Beryllium (Be)	2009/10/11	NC		%	20
		Dissolved Bismuth (Bi)	2009/10/11	NC		%	20
		Dissolved Boron (B)	2009/10/11	NC		%	20
		Dissolved Cadmium (Cd)	2009/10/11	0.8		%	20
		Dissolved Chromium (Cr)	2009/10/11	NC		%	20
		Dissolved Cobalt (Co)	2009/10/11	NC		%	20
		Dissolved Copper (Cu)	2009/10/11	0.2		%	20
		Dissolved Iron (Fe)	2009/10/11	0.8		%	20
		Dissolved Lead (Pb)	2009/10/11	0.05		%	20
		Dissolved Lithium (Li)	2009/10/11	NC		%	20
		Dissolved Manganese (Mn)	2009/10/11	3.2		%	20
		Dissolved Molybdenum (Mo)	2009/10/11	NC		%	20
		Dissolved Nickel (Ni)	2009/10/11	4.8		%	20
		Dissolved Selenium (Se)	2009/10/11	NC		%	20
		Dissolved Silicon (Si)	2009/10/11	0.6		%	20
		Dissolved Silver (Ag)	2009/10/11	NC		%	20
		Dissolved Strontium (Sr)	2009/10/11	1.3		%	20
		Dissolved Thallium (Tl)	2009/10/11	NC		%	20
		Dissolved Tin (Sn)	2009/10/11	NC		%	20
		Dissolved Titanium (Ti)	2009/10/11	NC		%	20
		Dissolved Uranium (U)	2009/10/11	3.1		%	20
		Dissolved Vanadium (V)	2009/10/11	NC		%	20
		Dissolved Zinc (Zn)	2009/10/11	2.6		%	20
		Dissolved Zirconium (Zr)	2009/10/11	NC		%	20
3482653 RL2	Matrix Spike	Dissolved Sulphate (SO4)	2009/10/09		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/10/09		99	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/10/09	<0.5		mg/L	
	RPD [R13380-03]	Dissolved Sulphate (SO4)	2009/10/09	3.1		%	20
	RPD [R13381-02]	Dissolved Sulphate (SO4)	2009/10/09	NC		%	20
3482654 AA1	Matrix Spike	Total Arsenic (As)	2009/10/10		98	%	80 - 120
		Total Beryllium (Be)	2009/10/10		109	%	80 - 120
		Total Cadmium (Cd)	2009/10/10		103	%	80 - 120
		Total Chromium (Cr)	2009/10/10		100	%	80 - 120
		Total Cobalt (Co)	2009/10/10		97	%	80 - 120
		Total Copper (Cu)	2009/10/10		95	%	80 - 120
		Total Lead (Pb)	2009/10/10		102	%	80 - 120
		Total Lithium (Li)	2009/10/10		NC	%	80 - 120
		Total Nickel (Ni)	2009/10/10		96	%	80 - 120
		Total Selenium (Se)	2009/10/10		103	%	80 - 120
		Total Uranium (U)	2009/10/10		109	%	80 - 120
		Total Vanadium (V)	2009/10/10		NC	%	80 - 120
		Total Zinc (Zn)	2009/10/10		96	%	80 - 120
	Spiked Blank	Total Arsenic (As)	2009/10/10		97	%	80 - 120

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Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3482654 AA1	Spiked Blank	Total Beryllium (Be)	2009/10/10		108	%	80 - 120
		Total Cadmium (Cd)	2009/10/10		97	%	80 - 120
		Total Chromium (Cr)	2009/10/10		101	%	80 - 120
		Total Cobalt (Co)	2009/10/10		99	%	80 - 120
		Total Copper (Cu)	2009/10/10		102	%	80 - 120
		Total Lead (Pb)	2009/10/10		103	%	80 - 120
		Total Lithium (Li)	2009/10/10		108	%	80 - 120
		Total Nickel (Ni)	2009/10/10		99	%	80 - 120
		Total Selenium (Se)	2009/10/10		97	%	80 - 120
		Total Uranium (U)	2009/10/10		105	%	80 - 120
		Total Vanadium (V)	2009/10/10		99	%	80 - 120
		Total Zinc (Zn)	2009/10/10		101	%	80 - 120
	Method Blank	Total Aluminum (Al)	2009/10/10	<0.2		ug/L	
		Total Antimony (Sb)	2009/10/10	<0.02		ug/L	
		Total Arsenic (As)	2009/10/10	<0.02		ug/L	
		Total Barium (Ba)	2009/10/10	<0.02		ug/L	
		Total Beryllium (Be)	2009/10/10	<0.01		ug/L	
		Total Bismuth (Bi)	2009/10/10	<0.005		ug/L	
		Total Boron (B)	2009/10/10	<50		ug/L	
		Total Cadmium (Cd)	2009/10/10	<0.005		ug/L	
		Total Chromium (Cr)	2009/10/10	<0.1		ug/L	
		Total Cobalt (Co)	2009/10/10	<0.005		ug/L	
		Total Copper (Cu)	2009/10/10	<0.05		ug/L	
		Total Iron (Fe)	2009/10/10	<1		ug/L	
		Total Lead (Pb)	2009/10/10	<0.005		ug/L	
		Total Lithium (Li)	2009/10/10	<0.5		ug/L	
		Total Manganese (Mn)	2009/10/10	<0.05		ug/L	
		Total Molybdenum (Mo)	2009/10/10	<0.05		ug/L	
		Total Nickel (Ni)	2009/10/10	<0.02		ug/L	
		Total Selenium (Se)	2009/10/10	<0.04		ug/L	
		Total Silicon (Si)	2009/10/10	<100		ug/L	
		Total Silver (Ag)	2009/10/10	<0.005		ug/L	
		Total Strontium (Sr)	2009/10/10	<0.05		ug/L	
		Total Thallium (Tl)	2009/10/10	<0.002		ug/L	
		Total Tin (Sn)	2009/10/10	<0.01		ug/L	
		Total Titanium (Ti)	2009/10/10	<0.5		ug/L	
		Total Uranium (U)	2009/10/10	<0.002		ug/L	
		Total Vanadium (V)	2009/10/10	<0.2		ug/L	
		Total Zinc (Zn)	2009/10/10	<0.1		ug/L	
		Total Zirconium (Zr)	2009/10/10	<0.1		ug/L	
	RPD	Total Aluminum (Al)	2009/10/10	0.2		%	20
		Total Antimony (Sb)	2009/10/10	8.8		%	20
		Total Arsenic (As)	2009/10/10	2.3		%	20
		Total Barium (Ba)	2009/10/10	0.5		%	20
		Total Beryllium (Be)	2009/10/10	NC		%	20
		Total Bismuth (Bi)	2009/10/10	NC		%	20
		Total Boron (B)	2009/10/10	NC		%	20
		Total Cadmium (Cd)	2009/10/10	NC		%	20
		Total Chromium (Cr)	2009/10/10	NC		%	20
		Total Cobalt (Co)	2009/10/10	3.7		%	20
		Total Copper (Cu)	2009/10/10	1.0		%	20
		Total Lead (Pb)	2009/10/10	3.0		%	20
		Total Lithium (Li)	2009/10/10	0.1		%	20
		Total Manganese (Mn)	2009/10/10	1.1		%	20
		Total Molybdenum (Mo)	2009/10/10	3.4		%	20

LABERGE ENVIRONMENTAL SERVICES
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Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3482654 AA1	RPD	Total Nickel (Ni)	2009/10/10	6.5		%	20
		Total Selenium (Se)	2009/10/10	13.0		%	20
		Total Silver (Ag)	2009/10/10	NC		%	20
		Total Strontium (Sr)	2009/10/10	0.03		%	20
		Total Thallium (Tl)	2009/10/10	NC		%	20
		Total Tin (Sn)	2009/10/10	NC		%	20
		Total Uranium (U)	2009/10/10	0.6		%	20
		Total Vanadium (V)	2009/10/10	1.5		%	20
		Total Zinc (Zn)	2009/10/10	19.9		%	20
3482725 AA1	Method Blank	Total Calcium (Ca)	2009/10/10	<0.05		mg/L	
		Total Magnesium (Mg)	2009/10/10	<0.05		mg/L	
		Total Potassium (K)	2009/10/10	<0.05		mg/L	
		Total Sodium (Na)	2009/10/10	<0.05		mg/L	
		Total Sulphur (S)	2009/10/10	<3		mg/L	
	RPD	Total Magnesium (Mg)	2009/10/10	0.8		%	20
3482975 AL8	Spiked Blank	Acidity (pH 8.3)	2009/10/10		107	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2009/10/10	<0.5		mg/L	
		Acidity (pH 8.3)	2009/10/10	<0.5		mg/L	
	RPD [R13380-02]	Acidity (pH 4.5)	2009/10/10	NC		%	20
		Acidity (pH 8.3)	2009/10/10	19.0		%	20
3483676 AA1	Method Blank	Dissolved Calcium (Ca)	2009/10/11	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2009/10/11	<0.05		mg/L	
		Dissolved Potassium (K)	2009/10/11	<0.05		mg/L	
		Dissolved Sodium (Na)	2009/10/11	<0.05		mg/L	
		Dissolved Sulphur (S)	2009/10/11	<3		mg/L	
	RPD	Dissolved Calcium (Ca)	2009/10/11	0.3		%	20
		Dissolved Magnesium (Mg)	2009/10/11	0.08		%	20
		Dissolved Potassium (K)	2009/10/11	0		%	20
		Dissolved Sodium (Na)	2009/10/11	0.4		%	20
		Dissolved Sulphur (S)	2009/10/11	NC		%	20
3485735 NS6	Matrix Spike	Bromide (Br)	2009/10/13		113	%	80 - 120
	Spiked Blank	Bromide (Br)	2009/10/13		97	%	80 - 120
	Method Blank	Bromide (Br)	2009/10/13	<0.4		mg/L	
	RPD [R13374-01]	Bromide (Br)	2009/10/13	NC		%	20
3485847 SC2	Matrix Spike	Dissolved Chloride (Cl)	2009/10/10		108	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2009/10/10		105	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2009/10/10	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2009/10/10	4.7		%	20
3485948 SC2	Matrix Spike	Dissolved Sulphate (SO4)	2009/10/10		NC	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2009/10/10		97	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2009/10/10	0.5, RDL=0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2009/10/10	4.7		%	20
3486941 AL8	Spiked Blank	Conductivity	2009/10/13		102	%	80 - 120
	Method Blank	Conductivity	2009/10/13	<1		uS/cm	
	RPD [R13381-01]	Conductivity	2009/10/14	NC		%	20
3486943 AL8	Matrix Spike	Alkalinity (Total as CaCO3)	2009/10/14		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2009/10/14		100	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2009/10/14	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2009/10/14	<0.5		mg/L	
		Bicarbonate (HCO3)	2009/10/14	<0.5		mg/L	
		Carbonate (CO3)	2009/10/14	<0.5		mg/L	
		Hydroxide (OH)	2009/10/14	<0.5		mg/L	
	RPD [R13381-01]	Alkalinity (Total as CaCO3)	2009/10/14	NC		%	20
		Alkalinity (PP as CaCO3)	2009/10/14	NC		%	20
		Bicarbonate (HCO3)	2009/10/14	NC		%	20

LABERGE ENVIRONMENTAL SERVICES
Attention: Ken Nordin
Client Project #: VANGORDA-GRUM SURFACE WATER
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: VA956077

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3486943 AL8	RPD [R13381-01]	Carbonate (CO3)	2009/10/14	NC		%	20
		Hydroxide (OH)	2009/10/14	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Maxxam Analytics Inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

08304779

CHAIN-OF CUSTODY RECORD AND ANALYSIS REQUEST

LAB ONLY — MAXXAM JOB #: A956077

ANALYSIS REQUEST

COC #:

COMPANY NAME:	Laberge Environmental Services
CLIENT PROJECT NO.:	Vangorda-Grum Surface Water Assessments
COMPANY ADDRESS:	Physical Address 405 Ogilvie Street, Whitehorse YT Y Mailing Address Box 21072 Whitehorse YT Y1A 6P7
TEL:	1-867-668-6838
E-MAIL:	Laberge@northwestel.net dmackie@srk.com
FAX:	
SAMPLER NAME (PRINT):	Ken Nordin, Dylan Nordin
PROJECT MANAGER:	Daniel Mackie
LABORATORY CONTACT:	Ashley Nivison

	FIELD SAMPLE ID	SAMPLE TYPE	MATRIX: GROUNDWATER	SURFACE WATER	DRINKING WATER	SOIL	OTHER	SAMPLING: DATE DD/MM/YY	TIME	# CONTAINERS	pH, Condutivity	Alkalinity	Majorlons (SO4, Cl, F, Br)	Acidity	Low Level Total Metals ICPOES	Low Level Dissolved Metals ICPOES
1	Vangorda Creek A			x				01/10/2009	14:00	4	x	x	x	x	x	x
2	Vangorda Creek B			x				01/10/2009	14:30	4	x	x	x	x	x	x
3	Vangorda Creek C			x				01/10/2009	13:15	4	x	x	x	x	x	x
4	Vangorda Creek D			x				01/10/2009	16:45	4	x	x	x	x	x	x
5	Vangorda Creek E			x				01/10/2009	16:00	4	x	x	x	x	x	x
6	Vangorda Creek F			x				01/10/2009	15:30	4	x	x	x	x	x	x
7	Grum West Dump flow G-1			x				01/10/2009	18:00	4	x	x	x	x	x	x
8	Grum West Dump flow G-2			x				01/10/2009	18:30	4	x	x	x	x	x	x
9	Field Blank															
10																
11																
12																

TAT (Turnaround Time)
LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL

* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	x
RUSH	3 BUSINESS DAYS	
RUSH	2 BUSINESS DAYS	
URGENT	1 BUSINESS DAY	

OTHER BUSINESS DAYS _____

CUSTODY RECORD

ACCOUNTING CONTACT:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:
Surface Water Flows Adjacent to Mine Waste Dumps

SPECIAL REPORTING OR BILLING INSTRUCTIONS:
Bill to Laberge Environmental Services

CCME
CSR
AB TIER 1
OTHER

JARS USED:

ARRIVAL TEMPERATURE °C: 9, 6, 6

DUE DATE:

LOG IN CHECK:

RELINQUINSHED BY SAMPLER:	DATE: DD/MM/YY 03/10/2009	TIME: 15:00	RECEIVED BY:
Ken Nordin			
RELINQUINSHED BY:	DATE: DD/MM/YY	TIME:	RECEIVED BY:
RELINQUINSHED BY:	DATE: DD/MM/YY 05/10/09	TIME 12:10	RECEIVED BY LABORATORY: AmD

COCFORM - BC - 20070823

Appendix F
Grum Slot Planning Assessment Technical Memorandum

SRK Consulting
Engineers and Scientists

SRK Consulting (Canada) Inc.
Suite 2200 – 1066 West Hastings Street
Vancouver, B.C. V6E 3X2
Canada

vancouver@srk.com
www.srk.com

Tel: 604.681.4196
Fax: 604.687.5532

Technical Memo

To:	Stephen Mead, Deb Pitt (YG)	**Date:**	July 13, 2009
cc:	TAT (John Brodie, Leslie Gomm, Bill Slater, Daryl Hockley, Peter Healey, Cam Scott)	**From:**	D.Mackie
Subject:	Grum Slot Planning Assessment	**Project #:**	1CY001.034.0210

1 Introduction

Long-term management of the Grum Pit water level is required to avoid discharge of poor quality pit water to the environment. The maximum allowable elevation that has been determined for the pit lake level is based on the assumption that the overburden-bedrock (OB-BR) contact is a permeable zone and, therefore, could allow short-circuiting of pit water if the water level reached this elevation. Thus, the maximum pit lake level was set below the elevation of the OB-BR contact in the vicinity of the Grum Slot, the area of lowest topographic elevation in the vicinity of the former pit ramp, the topographic "spill point".

In the vicinity of the Grum Slot, bedrock is overlain by a thick sequence of fine grained, relatively impermeable till. If the OB-BR contact is not permeable, the Grum Pit water level could potentially be allowed to rise to an elevation higher than previously assumed, providing additional time before active water level management could be required. Existing reports were reviewed and reconnaissance of the Grum Slot area was completed to provide a summary of hydrogeologic conditions and act as a basis for planning of a drilling and hydraulic testing program.

2 Data Review

There are four factors influencing determination of the maximum pit lake level:

1. The topographic spill point elevation.
2. The elevation and permeability of the OB-BR contact.
3. Permeability of the till overlying bedrock.
4. The elevations of the "thalweg aquifer" and aquifer water levels.

Figure 1 shows the layout of the Grum Pit and other pertinent information.

The Grum Slot spill point and OB-BR elevations were determined by Gartner Lee Ltd as 1232.3 and 1216 masl (meters above sea level), respectively, and the maximum recommended water level elevation as 1213.4 masl (Gartner Lee Ltd, 2003). The maximum recommended water level elevation was calculated to allow sufficient freeboard in the pit in the event of a 7-day probable maximum flood (PMF) event, plus complete breach of the Grum interceptor ditch (GID), without the pit water level reaching the OB-BR contact elevation. This approach assumes the OB-BR contact is permeable, though it is noted in the 2003 study that previous studies by Piteau Associates (Piteau) and the ICAP (which referred back to these Piteau reports) suggested that seepage via this pathway would be expected to be relatively small. The ICAP recommended this be investigated further prior to implementation of the closure plan.

During the 1990's, Piteau completed studies to assess hydrogeological conditions on the northeast side of the Grum Pit and installed and tested a series of dewatering wells (Piteau, 1991, 1995). Groundwater seepage from overburden on the northeast side of the pit was emanating from a "major aquifer" with artesian conditions. This aquifer is referred to herein as the "thalweg aquifer." The pit perimeter dewatering system was operated to reduce artesian pressures in this aquifer and thereby improve slope stability. When this dewatering system was turned off, slumping occurred in the overburden on the northeast side of the pit.

Data and interpretations from the Piteau reports indicate the following:

- The majority of sediments overlying bedrock are low permeability till and were considered of "little concern" to mining operations (Piteau, 1991).
- 1995 water level elevations measured in pit perimeter pumping and monitoring wells ranged between approximately 1240 and 1260 masl.
- The thalweg aquifer originally discharged to the area of standing water currently in the Grum Slot.
- The elevation of the base of the thalweg aquifer is as low as approximately 1180 masl and may drop in elevation towards the Grum Slot.
- Based on Grum Pit contour data from 1995, the thalweg aquifer itself is in reasonably close proximity to that pit shell.

While earlier reports include comments about visible seeps into the area of standing water currently in the Grum Slot, nothing can be observed at the current time. As the slump within the east wall has likely affected water levels and pressures in the Thalweg aquifer, it is difficult to make any conclusions about current conditions without having water level data. Unfortunately, no monitoring wells are known to exist from which these data could be obtained.

3 Conclusions

Available data suggests that:

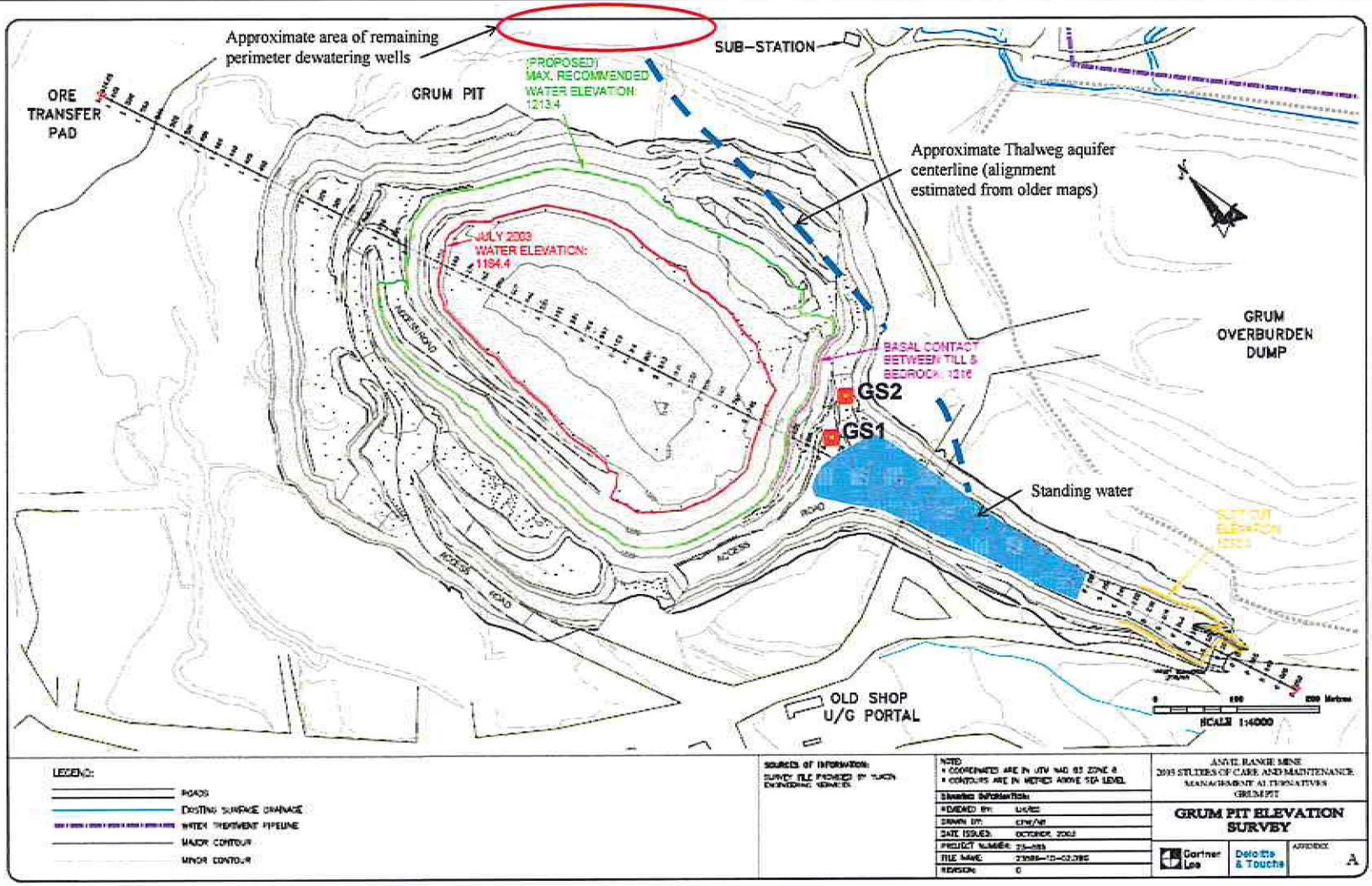
- Till permeability is not likely to be an issue with regard to seepage, i.e. the till has a low permeability.
- There remains no data on the permeability of the OB-BR contact.
- Effects of or on the thalweg aquifer are uncertain, but are not expected to have significance relative to the pit water level unless the slump has exposed the aquifer. This cannot be verified at this time.

4 Recommendations

The following recommendations are provided in relation to the upcoming drilling program at the Grum Slot:

- The 2009 groundwater program should include one or two drillholes to test the OB-BR contact permeability. The proposed locations are shown on Figure 1. If the first hole, GS1, has high permeability at the contact, the second hole will not be completed. If GS1 shows low permeability of the contact, GS2 will be completed for verification.
- Hydraulic testing of bedrock should be completed to a depth of at least 20m. If high permeability bedrock is encountered, drilling will continue to 35m, or until low permeability is encountered.
- Hydraulic testing of the OB-BR contact will use falling head or airlift methods.
- Field reconnaissance of proposed drillhole locations indicates that location options are limited. GS2 cannot be moved further along the access road as the inclination becomes significant and the drill must stay a significant distance from the edge of slumping ground.

We would be pleased to respond to any comments or suggestions you have concerning this memorandum.



Map modified from Gartner Lee (2003)

Proposed Drilling Location

SRK Consulting Engineers and Scientists VANCOUVER	Faro Mine Closure Planning Office	Grum Pit Elevations and Proposed Drilling Locations
Job No: 1CY001.034	2009 Faro Groundwater Program	Date: July 2009
Filename: Map for GS Writeup.ppt		Approved: DM
		Figure: 1