Annexe 7.6.1

Draft Hydrogeologic Investigation Report

Environment &
Sustainability

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Mine Arnaud

Draft Hydrogeologic Investigation Report

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Ausenco Vector

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Introduction

The objective of this report is to provide hydrogeologic studies in support of a Feasibility Study (FS) for the proposed open pit phosphate-titanium-iron mine at Sept Iles, Quebec. This study was conducted in conjunction with a pit wall slope stability investigation also performed by Ausenco Vector. The scope of work included reviewing a field investigation completed by AMEC that was comprised of geologic mapping, packer testing of coreholes, test well and observation well/corehole drilling, construction and development, and two aquifer pumping tests. The field investigation data were compiled and analysed to develop estimates of the potentiometric surface and hydraulic properties in the vicinity of the proposed mine. These data were used to develop a hydrogeologic conceptual model (HCM) and a rudimentary groundwater flow model to estimate groundwater inflow to the pit. A preliminary pit dewatering plan was developed based on the results of the field investigation and modeling results.

Hydrogeologic Setting

- The site gently slopes to the southeast towards the Sept Iles Bay. A small ridge north of the site (~120 m above sea level (asl)) forms a topographic divide separating the site from the lake to the north. Further north, the topographic relief is greater with rolling hills on the order of 375 m asl and several large lakes with lake stage elevations of approximately 160 m asl.
- Regionally, the Sept-Îles deposit of ilmenite, apatite and magnetite lies within the Grenville Geological Province of the Canadian Shield. This large complex is formed by gabbroic to granitic rocks, with the major units commonly layered. Within the gabbroic rocks, certain layers enriched in the minerals apatite, ilmenite and magnetite form the deposit under consideration.
- A large river is present west of the site, the Riviere Sainte-Marguerite-en-Bas Gallix which discharges to Sept Iles Bay (**Figure 2.2**). A relatively large lake, Lac Hall is present 4.2 km northwest of the proposed mine. Further north, beyond approximately 10 km two large lakes are present, Lac Hingan and Lac Curot.
- The Sept-Iles area and the north shore of the St. Laurence Bay are characterized by low permeability Precambrian bedrock of the Canadian Shield, overlain by thin glacial deposits. Generally, groundwater flow within the bedrock will be through secondary permeability associated with partings, fractures, faults and other geologic structures.

Hydrogeologic Field Investigation

- To evaluate groundwater elevations and hydraulic characteristics of the overburden, a test well (PW-1) and an observation well (OW-1) were drilled and constructed using dual air rotary drilling methods. An NQ diameter corehole was also drilled into the shallow bedrock close to PW-1, so that the interactions between the overburden aquifer and the shallow bedrock could be investigated. PW-1 was developed by air lifting upon completion for a period of 10-hours.
- To evaluate groundwater elevations and hydraulic characteristics of the bedrock, a test well (PW-2) and two coreholes were drilled (OW-3 and OW-4; to function as observation wells during testing) using dual air rotary and diamond drilling techniques, respectively. PW-2 was developed for a period of 4-hours upon completion of the well, until it was noted as being relatively free of sediment.
- Depth-to-groundwater is shallow (i.e. less than 10 m) and groundwater elevations (**Figure 3-1**) appear to mimic topography with flow generally to the southeast discharging in the direction of the Sept Iles Bay.
- Constant head (Lugeon) packer injection tests were performed on nine coreholes(ninety-eight tests total) during drilling to determine the permeability of the rock in the area of the planned

open-pit. The number of permeability tests completed in each core hole and their locations are presented in **Table 3.3**.

- Permeability estimates range from 8.9 x 10^{-6} m/d to 7.7 x 10^{-1} m/d. The arithmetic and geometric mean permeability measured from the packer testing is 1.8 x 10^{-2} m/d and 2.5 x 10^{-3} m/d, respectively.
- Data analysis sheets compiled for permeability testing are presented in **Appendix B**; results are summarized in **Table 3-3.**

- Two constant rate pumping tests were performed, one in the overburden (PW-1) and one in the bedrock (PW-2).
- The overburden in the area of the testing had low to moderate hydraulic conductivity, estimated to be 3 x 10^{-3} m/d. These values are more representative of glacial till rather than the mapped glacial outwash. The storativity of the aquifer was estimated to be 4.3 x 10^{-4} m/d.
- The average estimated hydraulic conductivity for the bedrock from the PW-2 pumping test is 1.3 x 10^{-2} m/d which is consistent with those determined at OW-2 completed in the uppermost bedrock in response to pumping the overburden at PW-1 (overburden).
- The storativity values for the bedrock are indicative of confined conditions and had a geometric mean of 5.9 x 10^{-5} (dimensionless), which results in an estimated specific storage of 1.2 x 10^{-6} m^{-1}. The storativity values for the uppermost bedrock determined at OW-2 are indicative of semi-confined conditions, whereas deeper bedrock storativity estimates from the PW-2 testing are confined, and likely more indicative of sub-regional scale conditions, appropriate for the groundwater inflow predictions.
- The bedrock hydraulic conductivity estimates from the pumping tests are consistent with the average from the packer testing data (1.3 x 10^{-2} m/d versus 1.8 x 10^{-2} m/d) but lower than the geometric mean packer test result (2.5 x 10^{-3} m/d).

Hydrogeologic Modeling

- Based on the results of the field investigation a Hydrogeologic Conceptual Model (HCM) was developed for the site. The key elements of the HCM are summarized below:
  - The depth to bedrock is predominantly shallow with many outcrops occurring throughout the mapped area. Glacial till forms a thin veneer typically 1 to 3 m thick.
  - A thicker overburden deposit (up to 40 m thick) is present on the southeast corner of the pit (**Figure 3-1**) and is mapped as glacial outwash but the hydraulic response in the area tested is more consistent with glacial till.
  - Assuming the permeability estimates for the overburden are representative of the bulk permeability of the deposit, the groundwater inflow to the pit will be governed by the permeability and storage properties of the bedrock. Based on low flow pumping tests the bulk hydraulic conductivity of the bedrock is estimated to 1.3 x 10^{-2} m/d and the specific storage is estimated to be 1.2 x 10^{-6} m^{-1}. The specific yield of the bedrock is estimated from professional experience to be 1-percent.
  - Lateral boundary conditions will be important to pit inflow estimates due to the close proximity of Sept Iles Bay – which is expected to result in higher long-term inflows as a result of sustained hydraulic gradients back to the pit.
- A rudimentary groundwater flow model of the proposed pit and surrounding areas was constructed to predict groundwater inflows to the pit and estimate drawdown associated with dewatering activities at the proposed mine.

  - The model complexity is reflective of the amount of existing hydrogeologic and mine planning data available to Ausenco Vector at the time of model development and the authorized scope of work and budget.
  - An equivalent porous media (EPM) approach was implemented, in which individual fractures are not explicitly treated in the model, but rather the heterogeneity of the fractured rock system is overly simplified and modelled as a single region or zone using the geometric mean hydraulic conductivity and specific storage values from the bedrock pumping test results.
- A baseline model was first constructed to simulate steady-state conditions in the area and a mining phase model was used to simulate the effects of the pit dewatering and predict groundwater inflow rates.
- The steady-state model is a 4-layer model developed in MODFLOW-SURFACT (Hydrogeologic Inc., 2010). Constant head boundary conditions are used as lateral boundary conditions at significant distances from the mine and to simulate surface water bodies throughout the model domain.
  - The model acceptably matches the limited number of available groundwater elevation estimates near the pit.
- The predictive model uses the MODFLOW drain (DRN) package to simulate pit dewatering. No detailed mine plans or phases were provided and thus the drain cells are set to the base of the proposed pit shell at 40 m and 80 m below sea level (Figure 2-4 and Figure 2-5)in the southwest and northeast, respectively.
  - The model predicts that the average dewatering rate over the 30-year mine life will be 55 Lps and that the steady-state inflows will be 27 Lps.
  - The rates are initially higher as water is removed from storage and rapidly decrease as storage is depleted and fluxes are governed by the transmissitivty of the aquifer.
  - The maximum predicted groundwater level drawdown (as estimated by the 2.5 m contour) is 2.4 km to the northwest (Figure 4.5).
  - Application of the geometric mean permeability from the packer testing in the model result in significantly lower inflows and a smaller cone of depression.

Preliminary Dewatering Plan

- The current study suggests that groundwater flow into the pit will be manageable but higher than what the test well pumping rates would initially suggest. However, some of the data gaps related to preferential flow along faults or the presence of highly permeable glacial outwash could result in higher than predicted inflows that would require additional infrastructure to manage these conditions.
- Vertical dewatering wells both in-pit and outside the pit boundaries will be necessary to initiate operations and maintain optimal operating conditions.
  - The in-pit wells should be used to remove groundwater occupying the pores and fractures in the rock mass within and surrounding the pit shell.
  - Pit perimeter wells on southwest corner of the pit between the pit and Sept Iles Bay and up-gradient of the pit (north) will likely be needed to intercept water flowing to the pit from the surrounding groundwater system and lower the water table in these areas.

  - Dewatering saturated overburden could also be supplemented with pumping from shallow excavations (drains) in the areas where the depth to groundwater is shallow.
  - In-pit sumps should be used to collect pit-wall runoff and direct precipitation, which will likely be substantial given the climate conditions at the site.

- While there are many factors that must be considered for wellfield design, a very crude estimate based on the predicted dewatering rates can be developed based on the limited available data.
  - Based on the depth of the wells, available drawdown and hydraulic parameter estimates it is reasonable to assume that a discharge rate of approximately 1.5 Lps could be supported by an average properly designed dewatering well that has on the order of 125 to 150 m of available drawdown.
  - Using steady-state inflow values of approximately 30 Lps and the average inflow rate of approximately 55 Lps, would lead to an estimate of between 20 and 38 dewatering wells.
- Geochemical characterization of pit area bedrock and water quality studies have not been performed at the site.
- The development of a comprehensive dewatering plan will require additional hydrogeologic characterization and a mine water balance.
  - Additional hydrogeologic test wells (designed and constructed as interceptor dewatering wells) should be installed and tested to refine the hydraulic parameter estimates for the bulk bedrock characteristics, glacial outwash deposits (if present) and the principal fault(s).
  - Water quality and geochemical data is necessary to advance the understanding of potential water quality issues associated with mine development.

Conclusions and Recommendations

The hydrogeologic data and analysis completed to-date suggests that the overburden and bedrock properties are of moderate permeability. Preliminary hydrogeologic modeling based on these parameters suggests that flow rates are anticipated to be on the order of 27 Lps to 55 Lps and require between 20 and 38 dewatering wells and associated works.

Additional hydrogeologic studies would significantly reduce the uncertainty in the predicted dewatering requirements and hydraulic head distribution during mining activities. This would allow for operational and environmental risks associated with dewatering to be defined and a more efficient and cost-effective dewatering system design with lower capital and operating costs. These studies should at a minimum include:

- Water quality samples should be collected from existing test wells and observation wells to evaluate water quality from the overburden and bedrock aquifers.
- Inclined coreholes should be drilled to intersect the primary faults (or at least the northwest trending fault through the centre of the pit) that intersect the pit to determine the hydraulic characteristics and potential for yielding significant flows to the pit.
  - If the faults are highly permeable, a test well should be installed within the fault to evaluate the hydraulic response to sustained pumping and potentially a hydraulic connection to Sept Iles Bay.
- The nature of the thicker sequence of overburden on the southeast corner of the pit should be explored. A southwest-northeast trending transect of the deposit should be completed either

using a sonic drilling program or geophysical techniques to identify glacial outwash deposits, if present.

- Nested standpipe or vibrating wire piezometers should be installed so that vertical hydraulic gradients can be determined and a broader spatial distribution of heads can be developed. Some of these piezometers should be located outside of the proposed pit shell for incorporation into a water-level and water quality monitoring program.
- Additional test wells should be installed and tested to improve the bulk permeability and storativity estimates of the bedrock adjacent to the proposed pit. These wells should be designed as dewatering wells so that they can be incorporated into future dewatering systems.
- A more robust three-dimensional groundwater flow model should be developed based on a more robust geologic framework model that incorporates the results of the additional field work and detailed mine plans to more accurately predict mine inflows and hydraulic heads.

1 Introduction

1.1 Background

Mine Arnaud Inc. proposes the development of an apatite mine with a production capacity of 23,000 tonnes per day approximately 15 km west of Sept-Îles, Quebec (**Figure1-1**). The project consists of an open pit mine, crushing plants, a processing facility, a loading system with transport by train to the port of Sept-Îles, infrastructure for hauling minerals, an electricity generating system, a tailings pond, wastewater management, and an explosives storage facility.

1.2 Project Objectives

The objective of this report is to provide a Hydrogeological Study in support of a Feasibility Study (FS) for a proposed open pit apatite mine in Sept Iles, Quebec. It is envisioned that this report will be used as the foundation for additional studies and a comprehensive pit dewatering and water management plan for the mine. The Hydrogeologic Studies are part of a larger Ausenco Vector project to complete an Open Pit Slope Stability Assessment (Ausenco Vector, 2010).

The specific objective of this project is to complete hydrogeologic studies to acquire the necessary data and supporting analysis required so that initial designs and costs associated with it pit dewatering can be developed as part of the FS. The project includes a review of existing climate and geologic data and a field characterization program focused on defining hydraulic parameters of the geologic media in and around the proposed pit. These field data is then used to predict groundwater inflow into the proposed pit. Predicting pit dewatering requirements involves an integrated assessment and quantification of geology, geologic structure, rock mass hydraulics, rock mechanics, surface hydrology and climate. A preliminary site-specific dewatering plan is initiated in this study, enabling some potential dewatering issues to be identified and predicted.

1.3 Description of the Scope of Work

The scope of the work, encompassing the Hydrogeologic Studies is part of the Geotechnical Studies Proposal (Ausenco Vector, 2010). As such, the hydrogeologic investigation was conducted by AMEC between November 2010 and March 2011 which also included geotechnical borings for overburden characterization and oriented core holes for preliminary pit wall stability design.

Per Ausenco's 2010 Proposal, the hydrogeologic investigation included the following:

- A review and analysis of existing geologic, climatological and hydrologic data at the site;
- Complete packer testing and analysis on at least three coreholes to define the localized hydraulic conductivity of the bedrock at various depths.
- Drill, construct and develop two test wells; one in the overburden and one in the bedrock;
- Drill and construct an overburden observation piezometer and three open holes for monitoring piezometreic levels during hydraulic testing;
- Complete constant-rate pumping tests in each test well and monitor water-levels in both the test well and nearby observation wells;
- Analyze the pumping test data to estimate hydraulic properties including transmissivity, hydraulic conductivity, and storage properties of the overburden and bedrock in the proposed pit area;
- Determine the horizontal hydraulic gradient in area of the proposed pit; and
- Development of a Hydrogeologic Conceptual Model (HCM) and a preliminary groundwater flow model for characterization of pit hydrogeology and preliminary dewatering requirements.

AMEC was contracted by Mine Arnaud to complete the field portion of the scope of work including drilling and construction oversight, well development, well testing and packer testing. An Ausenco Vector geologist visited the site between November 29 and December 9, 2010 to assist with the early data collecting field work and to construct a geologic map of the site. The data analysis, modelling and reporting were completed by Ausenco Vector.

1.4 Prior Studies

Previous to this investigation, no site specific hydrogeologic investigations have been performed for the proposed Arnaud Mine development. Several geologic and resource investigations have been conducted which provide background information on the geology of the deposit and surrounding areas, including:

- Technical Report, Mineral Resources Estimate Sept-Iles Deposit, Arnaud Township, Quebec, Canada (Genivar LP, 2008);
- Summary of Interpreted Faults, Mine Arnaud Project (RPA, 2011).

No additional studies were made available to Ausenco Vector as part of this study.

2 Hydrogeologic Setting

2.1 Site Description

The site is located approximately 9 kilometres (km) west of the City of Sept-Iles on the North Side of Sept Iles Bay. The shape of the proposed pit is an elongated oval approximately 2 km long in the northeast/southwest orientation and about 0.5 km wide. The maximum depth of the proposed pit is approximately 140 m below ground surface (bgs). The shoreline of the Bay and highway 138 are located about 1 km southeast of the site. Railroad tracks cross the eastern portion of the site and high voltage power lines occur about 150 m from the north western edge of the proposed pit. The area is heavily forested but most of the site had been deforested at the time of our investigation. The site slopes downward to the southeast towards the bay with elevations ranging between about 94m and 36m above mean sea level.

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2.2 Climate

According to Environment Canada (1990) the climate in this part of Quebec (on the north shore of the Gulf of St. Lawrence) has a marine climate, with wet stormy winters and cool summers, heavy snow and frequent fog. Sea ice clogs the waters of the estuary and Gulf for up to four months a year. The day-by-day alteration of high and low pressure systems, especially in winter, brings a great variety of weather to the region. Winter lows originating in the south or west of the United States usually cross the continent via the Great Lakes and the St. Laurence corridor. This results in a mix of snow, freezing rain, or rain and periods of mild weather accompanying these lows. In summer, these systems are weak and usually interrupt the sequence of warm humid, hazy weather and cool, dry, clear weather with a spell of showers and unsettled conditions. Storms that travel northward east of the Appalachian Mountains often affect Quebec. Depending on their track and intensity, the may bring heavy of light snows, a soaking, or a glazing. Another source region for storms affecting Quebec is western and northern Alberta. While these systems cross Hudson Bay and Davis Strait, they draw a very warm, humid air into Quebec from the American south.

Precipitation in Quebec is reliable, adequate, and remarkably well distributed throughout the year. In the Sept Iles area, frontal showers and thunderstorms in summer, tropical storms in late summer and early fall, and snowstorms in the winter combine to ensure monthly precipitation totals of 60 to 100 mm.

A review of the weather station in Sept-Iles shows that there is an average annual precipitation of 757.4mm and an average annual snowfall of 412cm (**Figure 2-1**). Sept-Iles has an average of 155 day a year with precipitation and an average of 168 days per year of persistent snow cover (above 2cm) (Environment Canada, 1990). The average daily temperature has a high of 5.4C and a low of -3.8C and shows absolute range of -20.9C to 19.6C. The warmest month is July and the coolest month is January. Generally the soil temperature lags a few degrees behind the air temperature.

Table 2.1 – Temperature and Precipitation Extremes in Sept Iles, Quebec

Period of record : **1971 – 2000**

	Temperature, °C		**Precipitation**		
Months	**Maximum Temperature**	**Minimum Temperature**	**Average Rainfall, mm**	**Average Snowfall, cm**	**Maximum Precipitation in 24 hrs., mm**
January	-9.8	-20.9	9.3	87.3	52
February	-7.8	-19	10.9	67.2	94
March	-2.1	-12.1	26	64.7	50.8
April	3.8	-3.8	61	37.5	74.9
May	10.3	1.5	83.1	9.1	69.6
June	16.4	7	99.3	0	68.1
July	19.6	10.9	99.8	0	84.8
August	18.8	9.6	91.1	0	76.5
September	13.6	4.8	113.2	0	98.6

October	7.4	-0.6	97.5	7.9	67
November	0.7	-7	48.3	49	114.6
December	-6.5	-16.1	18	96.6	69.8
Annual	**5.4**	**-3.8**	**757.4**	**412**	**114.6**

2.3 Physiography

The site is located about 1 km from the Sept-Iles Bay which is small extension of the St. Laurence Gulf. The Laurentian Plateau is part of the Canadian Shield, an enormous, rather monotonous expanse of rounded hills with thousands of lakes. The shield covers 80% of the province. Its highest summits rise to over 900 m. Along the north shore of the St. Lawrence, the southern edge of the Laurentians rise abruptly and spectacularly from the river valley. During the last Pleistocene ice age, the site was covered by the massive Laurentian Ice Sheet which extended south into present day New York. The ice was up to 1km thick and slowly moved from towards the south eroding surficial rocks and soil leaving behind fresh bedrock and a thin veneer of glacial till. The weight of the ice sheet depressed the Earth's crust 100's of meters and once the glaciers retreated approximately 20,000 years ago, the crust has slowly risen back up due to the isostatic rebound phenomenon.

The site gently slopes to the southeast towards the Sept Iles Bay. There are rivers close to the site both to the northeast and southwest. The course of these rivers and tributary streams are strongly influenced by the regional joint patterns (**Figure 2.2**). A small ridge north of the site (~120 m asl) forms a weak topographic divide separating the site from the lake to the north. Further north, the topographic relief is greater with rolling hills on the order of 375 m asl and several large lakes with lake stage elevations of approximately 160 m asl.

2.4 Geology

The geologic understanding at the project site is primarily based on work that was completed on the geology of the St-Lawrence Valley, which is a rift zone similar to the East African rift. Its formation some 560 million years ago was accompanied by volcanic and magmatic activity which resulted in the emplacement of carbonatites, located along the Saguenay and the Ottawa grabens and the Sept-Îles complex, a layered, unmetamorphosed, mafic intrusive suite of Cambrian age located on the north shore of the St-Lawrence River.

Regionally, the Sept-Îles deposit of ilmenite, apatite and magnetite lies within the Grenville Geological Province of the Canadian Shield. In early Cambrian time, some 564 million years ago, an important magmatic event led to the emplacement, crystallisation and cooling of the Sept-Îles gabbroic complex. This large complex is formed by gabbroic to granitic rocks, with the major units commonly layered. Within the gabbroic rocks, certain layers enriched in the minerals apatite, ilmenite and magnetite form the deposit under consideration.

The Sept-Îles complex is funnel shaped, with a diameter of 80 km. Its center is located about 35 km south south-east of the municipality of Sept-Îles. More than 85% of the complex is underwater, while only 5% of its total area outcrops on the Sept-Îles archipelago and west of the municipality of Sept-Îles, from the shoreline of the Baie des Sept-Îles up to Hall Lake. Between 1977 and 1981, work by Higgins and Doig revealed the truly igneous nature of the rocks of the Sept-Îles area. Successive mapping by Feininger in 1986, followed by Cimon in 1993, interpreted the rocks to form an orderly suite of successive members of a large layered mafic intrusion.

As indicated in Figure 2-3 the Sept-Îles layered complex is composed of four series of rocks: the border series, the layered series, the transitional series and the upper series. Within the upper stratigraphic portion of the complex, a transition from normal gabbroic rocks to iron-titanium-phosphorous-enriched units has been named the critical zone. The border series, at the contact with the Grenvillian gneisses, consists of an olivine microgabbro which is sometimes subdivided into two zones: an olivine leucogabbro as the interior envelope, and an olivine homblend biotite leucogabbro as the exterior envelope. This series is massive, unstratified and often contains breccia.

The layered series consists of alternating sequences dominated by troctolites or gabbros interstratified with magnetitites. Towards the top of the layered series and over about 30 m of overall thickness are layers of titanomagnetite (magnetitite), each of which can be up to a few meters thick. These layers alternate with troctolite and olivine gabbros, followed by a 75 m thick unit, rich in apatite, consisting of nelsonite and mafic rocks enriched in a nelsonite assemblage consisting of apatite, ilmenite and magnetite. This unit is truncated by finer grained microtroctolites. The layers dip at 20° to 25° to the SE.

The transitional series consists of a massive sequence of gabbro and black anorthosite with a coarse to very coarse grain size. A corona texture (reaction rim) is observed around the olivine and magnetite grains. The upper series, which outcrops only on the Sept-Îles archipelago, consists of monzonite, syenite and granite. The transitional and the superior series are both cut by diabase and syenite dykes.

The Sept-Îles deposit lies at the base of the series of rock units called the 'critical zone' of the complex by Cimon (1998). Although these rocks show regular igneous layering, lack of outcrop exposure makes it impossible at present to evaluate the lateral continuity of individual layers or of mineralized zones. What mapping is available also suggests that a number, currently not quantified, of gabbroic dykes are present within the deposit area (Nabil 2003). These dykes might be a component leading to dilution of ore zones, and consequently reduced grade.

The deposit lies within the uppermost members of the layered series, close to the Baie des Sept-Îles shoreline. This series consists of five main units with an average strike and dip of 60°/25°. The most prominent unit is composed of a gabbro to olivine bearing leucogabbro with a grain size varying from very fine to coarse. The second unit consists of a leucotroctolite and troctolite with a grain size varying again from very fine to coarse. The nelsonite unit (rock type consisting mainly of iron and titanium oxides and apatite) with a medium grain size holds the highest P205 grade. This unit is identified as the critical zone on the simplified geology map of the Sept-Îles complex (**Figure 2-2**). The magnetitite unit, with a medium to coarse grain size, is almost free of P205. Anorthosite and anorthositic gabbro, with coarse to very coarse grain size and highly brittle when outcroping, are closely associated to the magnetitite unit, with only traces of P205. Locally, syenite and monzonite dykes are found.

The deposit-scale geology is illustrated in **Figure 2-4** and on geological cross-sections in **Figure 2-5**.

During the site visit an Ausenco Vector geologist mapped four geologic units (**Figure 2-4**). These included the Precambrian Sept-Iles Compex bedrock and three overburden units; boulder till, unconsolidated outwash deposits, and artificial fill along the railroad embankment. The bedrock is fresh, very strong, black to gray nelsonite, gabbro and peridotite. Good outcrops occur mostly on the central portion and east side of the site. It is also well exposed in railroad cuts on north side of the site. The bolder till unit is usually no more than 3 meters thick and occurs though out most of the site. The boulders are subangular to rounded and are composed of granitic rocks which contrast with the underlying bedrock and are probably from sources further north in the Canadian Shield. The outwash deposits are an interbedded mixture of silts, sands, gravels and boulders up to 2 m thick based on the geotechnical borings.

2.5 Hydrology

The drainage system in the vicinity of the project is characterized by streams and rivers that flow southward into Sept-Iles Bay. The drainage patters are controlled by a regional facture system that has a dominant northeast orientation. A secondary fracture set is orthogonal to the main fracture set and also influences the drainage pattern. A large river is present west of the site, the Riviere Sainte-Marguerite-en-Bas Gallix which discharges to Sept Iles Bay. A relatively large lake, Lac Hall is present 4.2 km northwest of the proposed mine. Further north, beyond approximately 10 km two large lakes are present, Lac Hingan and Lac Curot. These lakes are expected to be surface expressions of the water table and likely hydraulically connected to the shallow groundwater regime in the project area.

2.6 Hydrogeology

The Sept-Iles area and the north shore of the St. Laurence Bay is characterized by low permeability Precambrian bedrock of the Canadian Shield, overlain by thin glacial deposits. The area has high precipitation and moderate to low relief and as such the depth-to-groundwater is often shallow. Groundwater flow in glacial deposits is typically variable as a result of the highly heterogeneous nature of the material. The Paleozoic and Precambrian bedrock units will generally inhibit significant groundwater flow due to the interlocking and recrystallized nature of minerals and grains as well as the absence of a weathered soil mantle towards near the surface. Water will instead tend to flow through fractures, joints, faults and shear zones.

3 Hydrogeologic Field Investigation

The hydrogeologic investigation was conducted as part of a larger AMEC investigation between November 2010 and March 2011 which also included geotechnical borings for overburden characterization and oriented core holes for preliminary pit wall stability design. The field hydrogeologic characterization activities were performed by the AMEC. An Ausenco Vector geologist visited the site between November 29 and December 9, 2010 to assist with the early data collecting field work and to construct a geologic map of the site.

3.1 Test Well and Observation Well Installations

3.1.1 General

As part of the field investigation, 2 pumping wells and 4 observation piezometer/coreholes were drilled and completed by AMEC in February and March 2011. An additional eight oriented core holes and 10 geotechnical borings were drilled between November 2010 and February 2011. **Figure 3-1** shows the well, corehole and boring locations. Based on review of available geologic and hydrologic information and knowledge gained as the field investigation progressed it was noted that there were two water bearing units that could impact the development of the site, the Precambrian bedrock and the Quaternary overburden. As a result, one pumping well and two observation coreholes were placed entirely within the Precambrian bedrock, while the other pumping well and a single observation well was located within the overburden. Additionally, to investigate the connection between the two aquifers, a second observation corehole was drilled and installed in the shallow bedrock. The different completion depths were designed to characterize groundwater hydrology in the shallow and deep water-bearing formations and to evaluate the degree of vertical hydraulic connection in the study area. The well locations were located in the future footprint of the pit and not selected to provide for long-term monitoring of the area, before, during, and after mining activities.

The wells were installed using a truck mounted Foremost DR-24 drilling rig supplied by AMEC of Montreal, Quebec under the full-time supervision of a member of the AMEC team. The design and installation of the monitor wells was guided based on the most up-to-date geological information accumulated during previous exploration work and the samples collected during exploration drilling. Originally, the wells were located in areas that were almost entirely underlain by bedrock. As the mapping and geotechnical drilling progressed it was decided to place the pumping well/observation well set PW-1, OW-1 and OW-2 at a location that would incorporate the thick unconsolidated overburden in the eastern portion of the site. The overburden thickened substantially over a short horizontal area going from absent near outcroppings around OW-2 to 29 meters (m) thick at exploration hole 96-28 to 20 meters to the south of the outcrops (**Figure 3-1**).

The drilling was advanced with dual air rotary (DR) drilling method. This method features a unique lower rotary drive that is used to advance steel casing through unconsolidated overburden, such as sand, glacial till and boulders. Pullback, pulldown, and rotational forces are effectively transmitted to the casing via power-operated jaws. An independent rotary top drive simultaneously handles a drill string equipped with a down-the-hole hammer or rolling cone bit. The cuttings were evacuated with pumps and reverse circulation. According to AMEC, no polymers or fluid additives were used during drilling. Due to the drilling technique the logging of the soil and rock encountered does not allow for the logging of soil and rock encountered.

3.1.2 Well Construction and Development

3.1.2.1 Test Wells

Pumping well PW-1 was drilled in overburden down to 28.3 m to the top of the overburden- bedrock contact. A 200-mm (8-inch) diameter section of screened casing was installed in the bottom 25 m with a sand filter pack. A three meter bentonite seal was emplaced on top of the filter sand. Upon completion, the well screen was developed by air lifting for period of 10-hours. Pumping well PW-2 was drilled to a depth of 56.25 m with a 150-mm (6-inch) diameter surface casing to a depth of 5 m. No screen was installed because the borehole was drilled within tight bedrock. PW-2 was developed by air lifting for a period of 4-hours until water was free of sediment.

Table 3.1 - Well Construction Summary

Well ID	Total Well Depth [m bgs]	Depth to Bedrock	Casing/Hole diameter [m]	Screen Interval [m bgs]
PW-1	29.0	28.3	0.200	28.3 – 3.9
PW-2	55.0	5.0	0.150	openhole
OW-1	40.9	40.9	0.050	40.3 – 3.0
OW-2	161.3	161.3	0.10	openhole
OW-3	55.0	56.4	0.10	openhole
OW-4	55.0	56.4	0.10	openhole

A single observation piezometer was installed and three small diameter (NQ) coreholes were drilled for monitoring water-levels during the hydraulic testing of PW-1 and PW-2. OW-1 is a fully penetrating overburden well, with 50-mm diameter well casing and screen. The screen and sand filter pack extend to just above the water table and a 3-m bentonite seal was emplaced above the filter pack. Observation wells OW-2 through OW-4 are open NQ (3.78-inch or ~100-mm diameter) coreholes and are completed in areas where the overburden is thin or absent.

3.13 Depth to Groundwater Measurements

The depth to groundwater was measured in the wells by the AMEC on separate occasions before during and after the pumping tests. The measurements were obtained using an electronic water-level metre from an established mark on the top of casing at each well. The measurements and groundwater elevations are shown in Tables 3-2. The top of casing was not surveyed and the elevation of the wells (and associated groundwater elevations) were estimated from the location of the well with respect to the site topographic map, therefore the groundwater elevations are estimates and should be interpreted accordingly.

In general, the water levels were deeper in the eastern wells (PW-1, OW-1 and OW-2) and were typically about 4 to 7 meters below top of casing. The western wells (PW-2, OW-3 and OW-4) were typically about 3 to 4 meters below top of casing.

Based on the groundwater elevation data collected on in March 2011, a potentiometric surface map was developed (**Figure 3-1**). Groundwater elevations appear to mimic topography with flow generally to the southeast discharging in the direction of the Sept Iles Bay, as would be expected.

Table 3.2 – Groundwater Elevations

Well ID	Date	Easting	Northing	Top of Casing Elevation, m AMSL	Depth to Water, m	Groundwater Elevation, m AMSL
PW-1	28/02/11	678452	5570464	37	6.01	31
OW-1	21/02/11	678481	5570510	37	5.75	31
	28/02/11				6.50	30
	08/03/11				7.03	30
OW-2	21/02/11	678401	5570491	43	4.05	39
	28/02/11				4.31	39
	08/03/11				4.56	38
PW-2	28/02/11	677544	5570191	83	7.72	75
	08/03/11				3.90	79
OW-3	21/02/11	677510	5570130	80	2.37	78
	28/02/11				2.53	77
	08/03/11				2.64	77
OW-4	21/02/11	677554	5570213	84	3.69	80
	28/02/11				3.82	80
	08/03/11				3.83	80

3.2 Aquifer Testing

The aquifer testing program consisted of both packer tests and pumping tests to provide permeability estimates for the formations in the study area. Packer tests were used in the oriented core holes. Pumping tests were used in the larger diameter wells that permitted insertion of a submersible pump. Determination of the hydraulic conductivities of the formations is important for determining potential mine pit inflows, evaluating potential impacts from mine dewatering, and estimating groundwater flow velocities.

3.2.1 Packer Testing

Constant head (Lugeon) packer injection tests were performed during drilling to determine the permeability of the rock in the project area. The number of permeability tests completed in each core hole and their locations are presented in **Table 3.3**. The testing was conducted by AMEC between November 2010 and February 2011. The geologic models of the ore deposit indicated several geologic units would be encountered within the Sept Iles Complex and the goal of the packer tests were to determine if the permeability varied with depth and by type of geologic unit. Testing was conducted in nine (9) core holes in the area of the planned open-pit. A total of ninety-eight tests were performed between the depths of 0 m and 170 m from top to bottom. Generally the tests were performed over a 1-m or 12-m interval resulting in an average of about 6.5 m of borehole length per test. The AMEC collected packer test data is provided in **Appendix A**.

Constant head packer testing was normally conducted under steady-state conditions at three different injection pressures (33, 66, and 100 percent of maximum pressure), with the maximum injection test pressure ranging from 60 to 80 psig. Pressure was increased for successive tests up to the maximum pressure for a total of three steps. Flow was measured at one minute intervals and the stabilized flow rate was used to determine the permeability.

Data analysis sheets compiled for permeability testing are presented in **Appendix B**; results are summarized in **Table 3-3.** In general, the analysis of the test data yielded similar permeability estimates for tests at different pressures over the same interval suggesting that measurement error was minimal. Permeability estimates range from 8.9 x 10^{-6} m/d to 7.7 x 10^{-1} m/d throughout the area tested during the field campaign. The average and geometric mean permeability measured from the packer testing is 1.8 x 10^{-2} m/d and 2.5 x 10^{-3} m/d, respectively. Geometric mean permeability is typically used since permeability is log-normally distributed. Analysis of trends indicates that the highest permeability values were measured in the upper portions of the bedrock and permeability decreased with depth in most coreholes. Less extensive fracturing with increasing depth is common in fractured rock aquifers due to a reduction in fracture aperture and fracture spacing (Singhal and Gupta, 2010). Generally, the packer results suggest moderately permeable rock except in thin localized zones where are interpreted to be discontinuities such as fractures or partings along contacts in the highly layered grabbroic bedrock.

Table 3.3 - Summary of Packer Test Results

Piezo ID	Test	Interval Depth		Average Depth (m)	Interval Length (m)	Permeability (cm/sec)			Geomean K (cm/sec)	Geomean K (m/d)
		Top	Bottom			Step #1	Step #2	Step #3		
CH-1	1	0	14	7	14	7.67E-06	1.28E-05	1.20E-05	1.05E-05	9.11E-03
	2	14	26	20	12	1.02E-07	0.00E+00	0.00E+00	1.02E-07	8.85E-05
	3	26	38	32	12	0.00E+00	1.42E-07	1.39E-07	1.41E-07	1.21E-04

Piezo ID	Test	Interval Depth		Average Depth (m)	Interval Length (m)	Permeability (cm/sec)			Geomean K (cm/sec)	Geomean K (m/d)
		Top	Bottom			Step #1	Step #2	Step #3		
	4	38	50	44	12	8.19E-08	1.54E-07	1.59E-07	1.26E-07	1.09E-04
	5	50	62	56	12	1.43E-07	2.01E-07	8.97E-08	1.37E-07	1.19E-04
	6	62	74	68	12	2.25E-07	2.13E-07	1.39E-07	1.88E-07	1.63E-04
	7	74	86	80	12	2.70E-07	2.55E-07	2.19E-07	2.47E-07	2.14E-04
	8	86	98	92	12	2.66E-07	0.00E+00	0.00E+00	2.66E-07	2.30E-04
	9	98	110	104	12	2.46E-07	1.54E-07	0.00E+00	1.94E-07	1.68E-04
	10	110	122	116	12	1.84E-07	1.77E-07	1.99E-07	1.87E-07	1.61E-04
	11	134	146	140	12	2.05E-07	1.54E-07	1.25E-07	1.58E-07	1.36E-04
	12	146	158	152	12	0.00E+00	0.00E+00	0.00E+00		
	13	157	158	157.5	1	0.00E+00	0.00E+00	0.00E+00		
	14	169	170	169.5	1	0.00E+00	0.00E+00	0.00E+00		
CH-2	1	5	6	5.5	1	8.11E-06	1.56E-05	1.59E-05	1.26E-05	1.09E-02
	2	14	15	14.5	1	1.50E-05	1.77E-05	1.65E-05	1.64E-05	1.41E-02
	3	26	27	26.5	1	1.92E-05	1.67E-05	1.64E-05	1.74E-05	1.50E-02
	4	38	39	38.5	1	0.00E+00	2.64E-05	2.48E-05	2.56E-05	2.21E-02
	5	50	51	50.5	1	0.00E+00	0.00E+00	6.57E-06	6.57E-06	5.68E-03
	6	62	63	62.5	1	0.00E+00	0.00E+00	6.57E-06	6.57E-06	5.68E-03
	7	86	87	86.5	1	0.00E+00	0.00E+00	3.29E-06	3.29E-06	2.84E-03
	8	98	99	98.5	1	0.00E+00	0.00E+00	8.55E-06	8.55E-06	7.38E-03
	9	110	111	110.5	1	0.00E+00	0.00E+00	7.67E-06	7.67E-06	6.63E-03
	10	122	123	122.5	1	0.00E+00	0.00E+00	2.47E-05	2.47E-05	2.13E-02
	11	134	135	134.5	1	0.00E+00	0.00E+00	8.55E-06	8.55E-06	7.38E-03
	12	146	147	146.5	1	0.00E+00	0.00E+00	3.51E-06	3.51E-06	3.03E-03
	13	158	159	158.5	1	0.00E+00	0.00E+00	8.02E-06	8.02E-06	6.93E-03
CH-3	1	6	9	7.5	3	2.45E-07	0.00E+00	2.25E-07	2.35E-07	2.03E-04
	2	9	12	10.5	3	1.24E-05	1.13E-05	1.17E-05	1.18E-05	1.02E-02
	3	12	15	13.5	3	3.68E-07	8.62E-07	7.01E-07	6.06E-07	5.24E-04
	4	15	18	16.5	3	1.29E-06	1.31E-06	1.64E-06	1.40E-06	1.21E-03
	5	18	21	19.5	3	2.52E-06	1.96E-06	2.30E-06	2.25E-06	1.94E-03
	6	21	24	22.5	3	9.21E-07	7.63E-07	1.31E-06	9.74E-07	8.41E-04
	7	24	27	25.5	3	6.51E-06	1.24E-06	1.29E-06	2.18E-06	1.88E-03
	8	27	30	28.5	3	3.31E-06	3.82E-06	2.45E-06	3.14E-06	2.72E-03
	9	30	31	30.5	1	1.78E-05	1.65E-05	1.60E-05	1.68E-05	1.45E-02
	10	32	33	32.5	1	1.22E-05	1.67E-05	1.69E-05	1.51E-05	1.30E-02
	11	35	36	35.5	1	1.34E-05	1.31E-05	1.59E-05	1.41E-05	1.22E-02
	12	50	51	50.5	1	2.07E-05	1.70E-05	1.88E-05	1.88E-05	1.62E-02
	13	65	66	65.5	1	1.54E-05	1.54E-05	1.73E-05	1.60E-05	1.38E-02
	14	77	78	77.5	1	2.12E-05	2.02E-05	2.26E-05	2.13E-05	1.84E-02
	15	89	90	89.5	1	1.79E-05	2.27E-05	2.57E-05	2.19E-05	1.89E-02
CH-4	1	5.5	6.5	6.5	1	1.08E-05	4.62E-05	4.18E-05	2.75E-05	2.38E-02
	2	24.5	25.5	25	1	1.04E-04	4.10E-05	4.06E-05	5.57E-05	4.82E-02

Ausenco Vector

Piezo ID	Test	Interval Depth Top	Interval Depth Bottom	Average Depth (m)	Interval Length (m)	Permeability (cm/sec) Step #1	Permeability (cm/sec) Step #2	Permeability (cm/sec) Step #3	Geomean K (cm/sec)	Geomean K (m/d)
	3	45.5	46.5	46	1	2.17E-05	0.00E+00	0.00E+00	2.17E-05	1.87E-02
	4	66.5	67.5	67	1	0.00E+00	7.69E-06	0.00E+00	7.69E-06	6.65E-03
	5	78.5	79.5	79	1	3.47E-05	7.69E-06	0.00E+00	1.63E-05	1.41E-02
	6	90.5	91.5	91	1	0.00E+00	3.85E-05	0.00E+00	3.85E-05	3.32E-02
CH-5	1	62	65	63.5	3	0.00E+00	0.00E+00	1.79E-06	1.79E-06	1.55E-03
	2	65	68	66.5	3	0.00E+00	0.00E+00	0.00E+00		
	3	68	71	69.5	3	0.00E+00	0.00E+00	2.87E-06	2.87E-06	2.48E-03
	4	71	74	72.5	3	0.00E+00	0.00E+00	0.00E+00		
	5	74	77	75.5	3	0.00E+00	0.00E+00	1.83E-06	1.83E-06	1.58E-03
	6	77	78	77.5	1	4.30E-05	3.46E-05	3.25E-05	3.64E-05	3.15E-02
	7	89	90	89.5	1	3.82E-05	5.35E-06	0.00E+00	1.43E-05	1.23E-02
	8	101	102	101.5	1	3.48E-05	3.86E-05	3.59E-05	3.64E-05	3.15E-02
	9	113	114	113.5	1	3.58E-05	3.74E-05	3.45E-05	3.59E-05	3.10E-02
CH-6	1	5	6	5.5	1	0.00E+00	8.95E-04	0.00E+00	8.95E-04	7.73E-01
	2	6	17	11.5	11	0.00E+00	0.00E+00	0.00E+00		
	3	17	32	24.5	15	0.00E+00	0.00E+00	0.00E+00		
	4	32	44	38	12	0.00E+00	0.00E+00	0.00E+00		
	5	45	56	50.5	11	0.00E+00	0.00E+00	0.00E+00		
	6	56	68	62	12	0.00E+00	1.02E-05	6.76E-06	8.31E-06	7.18E-03
	7	68	80	74	12	0.00E+00	0.00E+00	6.76E-06	6.76E-06	5.84E-03
	8	80	92	86	12	0.00E+00	0.00E+00	0.00E+00		
	9	92	104	98	12	0.00E+00	1.92E-06	1.71E-06	1.82E-06	1.57E-03
	10	104	116	110	12	2.00E-05	1.30E-05		1.61E-05	1.39E-02
	11	116	128	122	12	1.61E-07	1.71E-07	3.46E-07	2.12E-07	1.83E-04
	12	128	140	134	12	3.34E-07	2.46E-07	3.19E-07	2.97E-07	2.57E-04
CH-7	1	15	16	15.5	1	7.73E-05	8.39E-05	1.04E-04	8.77E-05	7.58E-02
	2	16	25	20.5	9	0.00E+00	3.95E-07	4.16E-07	4.05E-07	3.50E-04
	3	25	37	31	12	3.44E-07	4.54E-07	4.19E-07	4.03E-07	3.48E-04
	4	37	49	43	12	2.95E-07	0.00E+00	3.69E-07	3.30E-07	2.85E-04
	5	49	61	55	12	0.00E+00	2.84E-07	3.59E-07	3.19E-07	2.76E-04
	6	61	73	67	12	0.00E+00	3.41E-07	2.89E-07	3.14E-07	2.71E-04
	7	73	85	79	12	2.84E-07	0.00E+00	0.00E+00	2.84E-07	2.45E-04
CH-8	1	11	12	11.5	1	3.43E-05	3.74E-05	4.21E-05	3.78E-05	3.27E-02
	2	18	19	18.5	1	3.65E-05	4.18E-05	4.00E-05	3.94E-05	3.40E-02
	3	19	28	23.5	9	8.40E-06	8.29E-06	8.34E-06	8.34E-06	7.21E-03
	4	28	40	34	12	5.07E-06	6.94E-06	8.95E-06	6.80E-06	5.88E-03
	5	40	52	46	12	8.03E-06	6.20E-06	8.21E-06	7.42E-06	6.41E-03
	6	52	64	58	12	8.37E-07	5.53E-07	3.49E-07	5.45E-07	4.71E-04
	7	64	76	70	12	4.18E-07	6.67E-07	2.39E-07	4.06E-07	3.50E-04
	8	76	88	82	12	3.20E-07	4.54E-07	5.18E-07	4.22E-07	3.65E-04
	9	88	100	94	12	2.21E-07	2.98E-07	3.35E-07	2.81E-07	2.42E-04

Piezo ID	Test	Interval Depth		Average Depth (m)	Interval Length (m)	Permeability (cm/sec)			Geomean K (cm/sec)	Geomean K (m/d)
		Top	Bottom			Step #1	Step #2	Step #3		
	10	110	112	111	2	1.10E-06	4.03E-07	0.00E+00	6.64E-07	5.74E-04
CPW -1	1	30	31	30.5	1	1.18E-04	8.58E-05		1.00E-04	8.67E-02
	2	31	46	38.5	15	0.00E+00	6.97E-07	1.24E-06	9.31E-07	8.04E-04
	3	46	58	52	12	0.00E+00	2.38E-06	2.68E-06	2.52E-06	2.18E-03
	4	58	70	64	12	0.00E+00	1.21E-06	2.64E-06	1.79E-06	1.54E-03
	5	70	82	76	12	1.57E-06	1.22E-06	1.60E-06	1.45E-06	1.25E-03
	6	82	94	88	12	0.00E+00	0.00E+00	9.97E-07	9.97E-07	8.61E-04
	7	94	106	100	12	0.00E+00	2.47E-06	2.11E-06	2.28E-06	1.97E-03
	8	106	118	112	12	0.00E+00	1.70E-06	0.00E+00	1.70E-06	1.47E-03
	9	118	130	124	12	0.00E+00	0.00E+00	1.20E-06	1.20E-06	1.03E-03
	10	130	142	136	12	1.48E-07	1.56E-07	9.97E-08	1.32E-07	1.14E-04
	11	142	154	148	12	1.48E-07	1.56E-07	9.97E-08	1.32E-07	1.14E-04
	12	154	166	160	12	1.48E-07	1.56E-07	2.09E-07	1.69E-07	1.46E-04

Flow was not observed

3.2.2 Pumping Tests

Pumping tests were performed in the test wells (PW-1 and PW-2) in order to estimate the transmissivity, hydraulic conductivity and storativity of the bedrock and overburden aquifers. During testing a 0.5-hp submersible pump with a check valve and a 19-mm diameter discharge line. The flow rate was measured using a flow meter. The pumped water was discharged 30-m from the test well. Pressure transducer/ dataloggers were used to monitor water levels in pumping and observation wells. Periodic water level measurements were also recorded with a depth-to-water level meter. Observation wells OW-1 and OW-2 were positioned near PW-1, with OW-1 and PW-1 in the overburden and OW-2 installed in the shallow bedrock. PW-2 was installed into the deeper bedrock to a depth approximately equivalent to the base of the proposed pit. OW-3 and OW-4 were located a varying distances from PW-2 in the shallow bedrock (i.e. partially penetrating).

A brief summary of each test is provided below and in **Table 3-4**. Time-drawdown hydrographs for each test well and associated observation wells are provided in **Figures 3.2 through 3.5**.

Table 3.4 - Dewatering Well Constant Rate Testing Summary

Well ID	Test Length [minutes]	Test Pumping Rate [Lpm/Lps]	Maximum Observed Drawdown in Pumping Well [m]	Specific Capacity [m^3/d/m]	Test Pump	Comments
PW-1	1517	0.71 / 0.012	11.1 (15.2 early in test)	0.092	0.5-hp	Poor well design resulted in pumping water-levels in the well screen and thus low sustainable pumping rates.
PW-2	4320	0.55 / 0.009	> 46.8	0.017	0.5-hp	Water level in well drawdown to the pump intake or pressure transducer level, open hole was inefficient resulting in rapid water-

						level decrease.

3.2.2.1 PW-1 Constant-Rate Test

The Constant-Rate test was designed to obtain hydraulic conductivity, transmissivity and storativity estimates for the overburden aquifer and evaluate the hydraulic connection between the overburden and shallow bedrock. The test pumping at PW-1 was started on March 4, 2011 and completed on March 7, 2011. Pumping was continued for 1517 minutes at an average approximate discharge of between 0.012 liters per second (Lps) or 0.71 liters per minute (Lpm). Water-level recovery was monitored for 16.7 hours after pumping stopped or until approximately 67-percent recovered. The maximum drawdown measured in PW-1 was 15.32 meters (**Figure 3.2)** during the early part of the test when flow rates were unstable. The corrected water level data from OW-1 (54.3 m from PW-1) show a maximum of 0.36 m of water level declines (**Figure 3.3**) to pumping at PW-1 during the duration of testing. The response at OW-2, completed in the bedrock at a distance of 57.2 m, had a maximum response of 0.10 m (**Figure 3.3**). Ideally, observation wells are positioned sufficiently close to allow for a response of at least 1 m during pumping. The well design at PW-1, did not allow for significant available drawdown and thus the operating water-level was within the well screen creating an inefficient well and a lower sustainable discharge rate.

3.2.2.2 PW-2 Constant-Rate Test

The constant-rate test at PW-2 began at 08:25 hrs on March 2, 2011 and provided hydraulic property estimates for the bedrock. PW-2 was pumped at an average rate of 0.05 Lps for 8.1 hours. The initial pumping rate of the well was higher (~0.3 Lps at 73 min) but was adjusted to reach a sustainable rate of 0.05 Lps for the duration of the test. The maximum drawdown measured in PW-2 was 46.84 meters (**Figure 3.4**), which is likely either the bottom of the transducer level or the pump intake level, and is significantly less than the total depth of the well, 161 m. However, this value is somewhat consistent with hand measurements that indicated a maximum drawdown of 45.3 m. The rapid decrease in water-level upon pump start-up is indicative of poor well efficiency, which is normal for open holes. However, it may be that if the pump were positioned deeper in the well that the sustainable pumping rate could have been substantially greater.

During the test, water level data also were obtained from observation wells OW-3 and OW-4 (**Figure 3.5**), located 70.0 meters and 26.4 m from pumping well PW-2. The maximum drawdown measured by the pressure transducers in OW-3 and OW-4 was 0.02 meters and 0.32 meters, respectively. These values are consistent with hand measurements which indicated a maximum of 0.0 m and 0.29 m, for OW-3 and OW-4, respectively. Recovery was monitored in PW-2 for 16.5 hours (1-minute sampling intervals) but no pressure transducer recovery data was provided by AMEC for the observation wells. Only the data from OW-3 is considered usable for analysis.

3.2.2.3 Barometric Pressure Monitoring

During low-flow rate pumping tests such as those completed as part of this study, the total pressure recorded by the pressure transducers and used to estimate groundwater level drawdown during the test can be affected by barometric pressure. This is particularly true when the responses at the observation wells to the hydraulic stress are small (i.e. less than a meter).

As a result, barometric pressure was continuously monitored during testing (**Figures 3.3 and 3.5**) so that small drawdowns in some of the observation wells could be resolved from the transducer pressure changes induced by barometric pressure. The data collected with pressure transducers were corrected for changes in barometric pressure to ensure changes observed in the pressure of water column were a result of pumping rather changes in barometric pressure. For example, an increase in barometric pressure would exert a force on the potentiometric surface (magnitude governed by the barometric efficiency) that would create a drop in groundwater elevation that could be misinterpreted to have been induced by groundwater pumping. These corrections were particularly important given the relatively large distances to the observation wells, where drawdown was at times on the order of 10.0 cm.

Based on the limited data set, no barometric efficiency was defined but based the shallow water levels the corrections assumed a perfectly efficient system which resulted in a reasonable data set.

3.2.2.4 Constant-Rate Test Analysis

The constant-rate tests were designed to estimate the transmissivity, horizontal hydraulic conductivity, storativity and specific storage of the tested geologic media. Discharge remains constant during the pumping period and is stopped immediately prior to the recovery period. The curvature of the drawdown and recovery hydrographs depends upon the physical characteristics of the aquifer and the pumping rate. Drawdown is calculated as the difference between the pumped and static water levels at a given time of pumping. Residual drawdown is the difference between the recovering and static water levels at a given time of recovery. Drawdown analyses use drawdown data from the pumping period plotted versus time. Recovery analyses use residual drawdown data from the recovery period plotted versus dimensionless recovery time. Dimensionless recovery time is the ratio of the time since pumping started (t) to the time since pumping stopped (t’), or t/t’.

The horizontal hydraulic conductivity estimated in a constant-discharge pumping test is averaged over the saturated thickness of the aquifer. If a well is tested at a location where an aquifer is heterogeneous or if the screened interval of the well intersects more than one aquifer, the estimated hydraulic conductivity represents an averaged value, although the hydraulic conductivity may actually vary within the tested interval. Storativity is a measure of the specific yield of an unconfined aquifer plus the depth-integrated specific storage. In unconfined conditions the specific storage component is typically neglected (unless aquifer drawdown relative to saturated thickness is very large in which case specific storage can be significant). As a result the storativity is generally used as an estimate of the specific yield of an unconfined aquifer. Together, these hydraulic properties govern the amount, rate, and propagation of drawdown that result from pumping in the aquifer.

The Cooper-Jacob (1946), Theis (1935) and Theis Recovery (1935) methods were applied to the constant-rate pumping test data. These analytical solutions were selected because they are established, peer-reviewed methods appropriate for the conditions encountered at the site.

3.2.2.5 Cooper-Jacob Straight-Line Method

The Cooper-Jacob method is a simplified form of the Theis equation (Theis, 1935) developed for 18nalysing data from confined aquifers (Cooper and Jacob, 1946). Unconfined (water table) conditions can be accommodated by adjusting the drawdown as described by Jacob (1963), using the equation

$$s' = s - (s^2 / 2b)$$

where s’ is the adjusted drawdown, s is the measured drawdown, and b is the saturated thickness of the aquifer. Drawdown or adjusted drawdown data are plotted on a semi-log graph versus time, and a straight line is fit to the straight-line portion of the data. Transmissivity is estimated from the slope of the fitted line and the discharge rate, and hydraulic conductivity is calculated from transmissivity divided by aquifer saturated thickness.

The Cooper-Jacob method requires that sufficient time elapse during the test to ensure that the parameter “u” is less than 0.01 (Kruseman and de Ridder, 1990). Therefore, the fitted line frequently does not pass through the early-time data. The Cooper-Jacob method emphasizes the properties of material within the front of the cone of depression, unlike the Theis method which heavily weighs the local properties (Butler, 1990).

3.2.2.6 Theis Method

The Theis method (1935) was specifically developed as a solution for pumping tests performed in confined aquifers. Type curves are compared with drawdown data plotted on a logarithmic graph versus time. The type curves are matched with the time-drawdown data in order to estimate transmissivity, hydraulic conductivity and storativity.

3.2.2.7 Theis Recovery

Recovery data was analysed with the Theis Recovery method (Theis, 1935). Residual drawdown is plotted on a semi-log plot versus the dimensionless recovery time ratio (i.e. t/t', or the time in days since pumping started divided by the time in days since pumping stopped). Data falls on a straight line in a semi-log plot. Hydraulic conductivity is estimated from the slope of a line fitted to the straight line portion of the data, the discharge rate, and the aquifer saturated thickness.

3.2.2.8 Constant Rate Test Solutions

Results of the constant-rate pumping test for time-drawdown and recovery methods are summarized in Table 3.4 and the curve match solutions are shown in **Figures 3.6 through 3.12**.

Table 3.5 - Test Well Constant Rate Testing Summary

Pumping Well	Observation Well	Analysis Method	Transmissivity [m^2/d]	Saturated Thickness [m]	Hydraulic Conductivity [m/d]	Storativity
PW-1	PW-1	Theis Recovery	0.02	28	7.14×10^{-4}	--
	OW-1	C-J Time-Drawdown	0.24	40	6.00×10^{-3}	2.46×10^{-4}
	OW-1	Theis	0.17	40	4.25×10^{-3}	3.52×10^{-4}
	OW-2	C-J Time-Drawdown	1.09	34	3.20×10^{-2}	9.28×10^{-4}
	OW-2	Theis	0.33	34	9.70×10^{-3}	1.10×10^{-3}
PW-2	OW-4	C-J Time-Drawdown	0.62	51	1.22×10^{-2}	5.01×10^{-5}
	OW-4	Theis	0.69	51	1.35×10^{-2}	6.79×10^{-5}

The pumping test results indicate that in the area tested the overburden deposits are of relatively low permeability (geometric mean of 3×10^{-3} m/day). The Theis recovery solution is lower than those from the pumping conditions, potentially reflective of lower permeability materials or thicknesses away from PW-1. These permeability estimates are reasonable for a glacial till and interbedded sands and silts, as described in Section 2.4. However, the calculated permeability is not consistent with the mapping of glacial outwash (Section 2.4), which would be expected to have a hydraulic conductivity in the range of tens of meters per day to hundreds of meters per day. If the geologic materials around the test well are not representative of the mapped materials and relatively small cross-sections of highly conductive glacial outwash intersect the pit, the bulk permeability estimates would be higher, resulting in potentially significantly higher groundwater inflows to the pit. The storativity values are indicative of semi-confined conditions in the overburden aquifer.

The average estimated hydraulic conductivity for the bedrock is 1.3 x 10^{-2} m/d at OW-4 (**Figure 3-9 and 3-10**). This value is reasonable for moderately fractured bedrock. This value is also consistent with those determined at OW-2 from the uppermost bedrock in response to pumping the overburden at PW-1. The storativity values for the bedrock are indicative of confined conditions and averaged 5.9 x 10^{-5} (dimensionless), which results in an estimated specific storage of 1.2 x 10^{-6} m^{-1}. The storativity values for the uppermost bedrock determined at OW-2 are indicative of semi-confined conditions, whereas deeper bedrock storativity estimates from the PW-2 testing are confined, and likely more indicative of sub-regional scale conditions, appropriate for the groundwater inflow predictions. No determination of the specific yield of the bedrock was made as part of the hydrogeologic testing.

3.2.2.9 Comparison of Packer Testing Versus Pumping Tests

Generally, the pumping tests values are approximately equivalent to the average from the packer testing data (1.3 x 10^{-2} m/d versus 1.8 x 10^{-2} m/d) but lower than the geometric mean packer test result (2.5 x 10^{-3} m/d) by approximately an order of magnitude. It is fairly common in bedrock aquifers for pumping test results to be larger than packer test results, as pumping tests stress a larger volume and are more likely to include larger fractures that may dominate the flow system. Based on the larger volume tested by the pumping tests, these tests are the most reliable estimates of the bulk permeability of the bedrock in the vicinity of the proposed pit.

3.2.2.10 Role of Faulting, Fracturing, and Solution Features in Groundwater Flow

Faults, fractures, and shear zones in the study may conduct large amounts of water and play a significant role in groundwater flow on a sub-regional scale. The location of the pumping wells and observation wells were selected prior to the availability of mapping indicating the location of sub-vertical faults (**Figure 3.1**) in the study area. The trend of some of the mapped faults indicates that these features could provide a direct hydraulic connection to the Sept Iles Bay, which would act as a constant head boundary condition providing a sustained flow into these faults. If these faults behave as preferential flow paths, the faults could potential yield significant flows into the pit and result in the current bulk permeability estimates being too low.

4 Hydrogeologic Modeling

4.1 Hydrogeologic Conceptual Model

A Hydrogeologic Conceptual Model (HCM) brings together available information on geology and groundwater characteristics to develop a three-dimensional framework for groundwater flow in a given area. It provides a basis for a variety of evaluations, including design of efficient pit dewatering approaches and development of water supplies.

Recharge to the overburden aquifer is probably moderate in the study area due the relatively flat topography, moderate permeability and interbedded nature of the deposits. Recharge to the bedrock aquifer is also likely moderate throughout the study area because many of the fractures and fault zones probably daylight at the surface due to the lack of any clayey soil mantle. The thin veneer of glacial till and heavy forest vegetation likely act as termporary water storage prior to water entering the discontinuities in the bedrock. Freezing in the winter months likely reduces the amount of infiltration except where rivers and streams are able to flow across the bedrock surface.

Based on the limited fieldwork conducted in between November 2010 and March 2011, groundwater at the site typically occurs in a shallow aquifer composed of a variety of unconsolidated sedimentary overburden materials deposited by glacial processes; and a deeper aquifer composed of sparsely fractured gabbro, peridotite and nelsonite. The overburden and bedrock aquifers typically are in direct contact with each other. The buried contact between the two is undulatory but appears to descend rapidly from where it is mapped nearby borehole locations. The overburden aquifer overlaps with the proposed pit in two locations, both along the south-eastern boundary. It is assumed that these deposits continue in a south easterly direction to the Sept Iles Bay based on the lack of outcrops and gentle topography in that direction. There is some conflict in the geologic mapping (Section 2.4) and the hydraulic testing (Section 3.2.2.8) in terms of the likely hydraulic characteristics of these deposits. Further, the hydraulic connection to the Sept Iles Bay has not been characterized but if there are highly permeable glaciofluvial deposits that intersect the pit and extend to Sept Iies Bay, there could be significant inflows along this stretch of overburden.

The composition of the shallow aquifer includes interbedded and laterally discontinuous layers of sand, gravel, boulders, clay and silt. Boulders up to 1.5 m were encountered in the geotechnical borings but. The material is generally poorly consolidated. Our understanding of the composition of the overburden aquifer is based on the geotechnical borings and small exposures around the 'racetrack' in the eastern portion of the geologic map. No boring logs were constructed during the drilling of the test wells and the observation wells because AMEC reported the cutting were in slurry form and could not be adequately logged. While the geologic setting and materials are conducive to high permeability, in the small area tested by the PW-1 test, these materials have only low to moderate permeability, estimated to be 3×10^{-3} m/d.

In the vicinity of project proposed pit, the depth to bedrock is predominantly shallow as shown on the geologic map and cross sections with many outcrops occurring throughout the mapped area. Glacial till forms a thin veneer typically 1 to 3 m thick and the only substantial overburden is the aforementioned glacial outwash deposits mapped along the south eastern boundary of the pit. Generally, water in the overburden aquifer is under unconfined or semi-confined conditions in the study area based on observations made during the field investigation. The overburden aquifer is likely in hydraulic connection with surface water due to the shallow groundwater depths and granular nature of the overburden. Interbedded low permeability units such as clay or silt cause locally semi-confined conditions and it's likely that these units are dipping gently towards the Sept Iles Bay.

The bedrock aquifer is confined or semi-confined through the study area. It is composed of fractured rocks of the Sept-Iles Complex. These rocks are part of a layered intrusive igneous complex in which the layers were formed by differential crystallization segregation within a pluton and as such the layers probably have little primary porosity because of the interlocking nature of the mineral grains. Secondary fractures, faults and shear zones are probably the primary conduit through which water flows. The permeability estimates and field observations while mapping suggest that the rock mass is moderately fractured. The moderate degree of fracturing also suggests a low storage system, with low specific yields and specific storage, consistent with the pumping test results. Based on low flow pumping tests the bulk hydraulic conductivity of the bedrock is estimated to 1.3×10^{-2} md^{-1} and the specific storage is estimated to be 1.2×10^{-6} m-1. The specific yield of the bedrock is estimated from professional experience to be 1-percent.

The geologic map shows two north easterly oriented faults and one north westerly fault. These faults occur only in the bedrock units and were mapped by the exploration geologists at Mine Arnaud based on offset units in the subsurface. The data presented by Mine Arnaud shows these faults are vertically inclined with several meters of offset. During our reconnaissance mapping no surficial expression of these faults was observed. However, these faults are potential conduits for groundwater flow that may significantly affect the regional flow systems and future mine dewatering efforts.

Assuming the permeability estimates for the overburden are representative of the bulk permeability of the deposit, the groundwater inflow to the pit will be governed by the permeability and storage properties of the bedrock. Lateral boundary conditions will be important to pit inflow estimates due to the close proximity of Sept Iles Bay – which is expected to result in higher long-term inflows as a result of sustained hydraulic gradients back to the pit.

4.2 Numerical Modeling of Groundwater Flow

A rudimentary groundwater flow model of the proposed pit and surrounding areas was constructed to assess the potential effects of groundwater control associated with the dewatering of the proposed pit. A baseline model was first constructed to simulate steady-state conditions in the area and a mining phase model was used to simulate the effects of the pit dewatering and predict groundwater inflow rates. The model complexity is reflective of the amount of existing hydrogeologic and mine planning data available to Ausenco Vector at the time of model development and the authorized scope of work and budget. The model is necessarily simple, but as additional data becomes available, additional complexity and subsequent calibrations can be performed that will improve the accuracy of the model predictions. The objective of the flow modelling is to predict groundwater inflows to the pit and estimate drawdown associated with dewatering activities at the proposed mine.

4.2.1 Conceptual Approach to Simulating Groundwater Flow

Equivalent continuum approaches are typically appropriate for simulating problems that relate to averaged volume behaviour such as pit dewatering. However, as pointed out in NRC (1996), when constructing a conceptual model of a fractured rock aquifer, three factors necessarily must come into play. These are: (i) the geology of the fractured rock, (ii) the scale of interest and (iii) the purpose for which the model is being developed. In the case of the proposed Arnaud Mine, the geology suggests that enhanced permeability is possible along fractures and faults. The scale of interest is sub-regional as the primary objective is predicting groundwater inflow to the pit which will affect the groundwater flow system at the sub-regional to regional scale. As such, an equivalent porous media (EPM) approach, in which individual fractures are not explicitly treated in the model, but rather a simple approach is implemented whereby the heterogeneity of the fractured rock system is modelled as a single region or zone using the geometric mean hydraulic conductivity and specific storage values from the pumping test results (Section 3.2.2.8).

4.2.2 Numerical Model

The primary objective of the groundwater flow model is to provide estimates of the groundwater inflow during mine operations. This understanding will facilitate the development of a preliminary dewatering plan and be used in the FS to develop associated cost estimates. These flow models will represent pre-mining steady state conditions and active mining conditions.

The Arnaud groundwater model was formulated and simulated using MODFLOW-SURFACT (Version 3.0, Hydrogeologic, 2010) and Groundwater Vistas (Version 5.43, Rumbaugh and Rumbaugh, 2010), a graphical user interface. MODFLOW-SURFACT is used over traditional MODFLOW for the Project due to: 1) its enhanced capabilities to simulate variably-saturated flow, 2) the use of a newer Pre-Conjugate Gradient solvers (PCG4 and PCG5) that are faster and more robust than the PCG2 solver in MODFLOW, and 3) the option to use the adaptive time-stepping and output control package (ATO4).

Use of this code to fractured rock systems requires the application of the concept of a representative elementary volume (REV) and the assumption that rock masses can be treated as equivalent continuum media as discussed in **Section 4.2.1**.

4.2.2.1 Model Grid and Doman Boundary Conditions

The groundwater flow model grid was designed to: 1) increase accuracy in predicting groundwater inflow and drawdown in the pit area; and 2) encompass a large enough area to ensure lateral boundary conditions do not significantly affect model results. The lateral extent of the model domain was chosen to approximately coincide with the Riviere Sainte-Marguerite-en-Bas Gallix to the west, the large lakes to north (Lac Hingan and Lac Curot) and Sept Iles Bay to the south and southeast. A telescoping model grid was used to minimize the number of model cells while providing the level of detail necessary for simulation of the pit area. A model grid telescoping from a cell width of 500 m at the model domain edges to a cell width of 50 m in the vicinity of the pit was created (**Figure 4.1**). The model finite-difference grid consists of 112 rows by 119 columns by 4 layers, for a total of 53,312 cells (**Figure 4.1**). The model grid is not rotated (i.e., it is aligned north-south and east-west).

4.2.2.2 Model Layers

The groundwater flow model grid was constructed using flat layers, with the exception of the top surface of layer one which follows the topography within the model domain. The topography was generated from a digital elevation model (DEM). These data were provided by GeoBase and are Canadian Digital Elevation Data (CDED) and consist of an ordered array of ground elevations at regularly spaced intervals. The source digital data for CDED had a scale of 1:250,000 and is data extracted from the hypsographic and hydrographic elements of the National Topographic Data Base (NTDB) or various scaled positional data acquired from the provinces and territories.

The layers are of a constant thickness with the exception of the first layer which is variable based on top surface of the DEM (**Table 4.1**). A sufficient number of model layers were used to reduce numerical instability due to steep hydraulic gradients induced from pit dewatering and pit lake development and to more accurately simulate pit inflows. The elevation for the bottom of the model was chosen to be sufficiently deep below the anticipated bottom of the pit that hydraulic stresses should not encounter the peripheral boundary of the model as they propagate through the model over time.

Table 4.1 - Vertical Discretization in the Groundwater Flow Model

Layer	Elevation of Layer
1	DEM
2	0 m
3	-80 m
4	-300
4 (Bottom Elevation)	-500

Lateral flow boundaries are generally constant head boundary conditions as they largely coincide with rivers or are sufficient far from the hydraulic stress to minimize impacts on the model results. The head values for these cells were estimated based ground surface elevations and the elevations of nearby water surfaces (i.e. rivers and lakes).

4.2.2.3 Model Hydraulic Properties

The model incorporates the bedrock hydraulic testing completed within the proposed open-pit limits. The simulated hydraulic conductivity (K) values were intentionally biased towards the higher permeability estimates from the pumping tests so that the model would be somewhat conservative with respect to groundwater inflow rates (i.e. tend to have higher inflow estimates) and drawdown. The simulated hydraulic conductivity is 1.3 x 10^{-2} m/d. The simplified model uses only a single property zone, thus the overburden deposit on the southeast corner of the pit is ignored.

Table 4.2 - Groundwater Flow Model Hydraulic Parameters

Zone	Generalized Aquifer Material	K (md^{-1})	Specific Yield	Specific Storage (m^{-1})
1	Precambrian bedrock	1.3 x 10^{-2}	1.0 x 10^{-1}	1.2 x 10^{-6}

The predictive mining phase model is time dependant (i.e. transient) and requires that aquifer storage parameters be defined. Three (3) parameters are required for these transient simulations: specific yield, specific storage, and storativity. Specific yield is the volume of water that an unconfined aquifer releases from storage per unit surface area of the aquifer per unit decline in the water table. Specific storage applies to confined aquifers and is the volume of water released from storage under a unit decline in hydraulic head. These input parameters were used to determine the storativity for each model cell.

The mean specific storage value from the PW-2 pumping test was used in the model since it was deemed the most reflective of sub-regional conditions in the bedrock. Site-specific specific yield estimates have not been determined. As such, values from the literature and from professional experience based on core examinations have been applied. Based on professional experience, the specific yield of the bedrock was estimated to be one (1) percent.

4.2.2.4 Recharge

Recharge is defined as that part of infiltrated water which that reaches, or recharges the water table. The parameter is often a challenging variable to estimate using direct methods. Recharge in the vicinity of the pit will largely be controlled by the geology (permeability of the rock), topography, depth to the water table, rainfall and evapotranspiration. Recharge in fractured rock aquifers can often be rapid depending on the role of localized recharge along fractures and faults. In the absence of data to estimate recharge in the model domain, professional judgement was used based on the hydraulic testing done in the vicinity of the pit and other known site conditions. The recharge assigned in the model is 43 mm/year, which is 6-percent of precipitation (757.4 mm/year).

4.2.3 Steady-State Model

In the absence of a substantive and accurate water-level data set, the simulated steady-state water-level elevations were compared to the expected sub-regional horizontal hydraulic gradient and gradient in the pit area determined in Section 3. The simulated steady-state water-level elevations near the proposed pit are shown on **Figure 4-3**. The simulated groundwater elevations are between 50 m asl and 70 m asl and are sufficiently close to the measured values in the area for this stage of preliminary groundwater modeling. The measured values are based on GPS measurements and the elevations on the northeast corner of the pit are slightly different then the DEM, which is a significant control on groundwater elevation in this area. The slightly higher simulated groundwater elevations in this area would lead to slight higher inflows due to higher differential heads (between initial condition and pit bottom) then may actually be present in the field.

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4.2.4 Predictive Groundwater Flow Modeling

4.2.4.1 Transient Model Development

The predictive simulations simulated the 30-year operational period during pit development and dewatering. The MODFLOW drain (DRN) package was used to simulate pit dewatering. No detailed mine plans or phases were provided and thus the drain cells are set to the base of the proposed pit shell at 40 m and 80 m below sea level in the southwest and northeast, respectively. This is a conservative in that in practice the pit will be gradually excavated. However in the simulation the drains were permitted to not fully dewater the materials in the first time-step to more gradually allow for dewatering. As detailed mine plans become available the model can be updated to simulated pit phases through time to more accurately determine groundwater inflow and groundwater level lowering (drawdown) with time.

The drains only remove water from the groundwater system when heads in the adjoining cells exceed the drain elevation Drains were assigned to layers one and two based on the planned depth of excavation. This mining period was subdivided into thirty (30) time-steps to simulate each year of mining.

4.2.4.2 Pit Dewatering Simulation

Several drain-cell conductance values were tested to ensure that the drain cells would not impede groundwater discharge. Conductance was incrementally increased until the discharge stopped increasing with increasing conductance. The final drain conductance of 25,000 m^2d^{-1} was set slightly higher than necessary to ensure that there was no flow restriction. The higher conductance value did not result in numerical instability and the mass balance error was less than one (1) percent.

Groundwater inflow rates into the open pit varied throughout the simulation period, primarily due to removal of water from storage. In practice, dewatering rates during operations are anticipated to be more gradual. However, since the pit advance was simulated as an instantaneous event, maximum and minimum dewatering rates for the mining period should be averaged.

As the dewatering simulation is started, simulated groundwater inflow rapidly increased to approximately 800 Lps, but then decreased rapidly to less than 27 Lps as water was removed from aquifer storage and hydraulic gradients decreased. The simulation is somewhat unrealistic as a result of the build-out pit being simulated from the first day of the simulation, when in practice this will occur over a period of 30 years. Furthermore, the difference between the initial and long-term inflows is related to the specific yield of the bedrock for which there is no site specific data, which makes these estimates of initial dewatering rates speculative. For example, specific yield could quite reasonably be 0.5-percent which would substantial decrease initial inflows. However, as a preliminary estimate it is reasonable to consider the average simulated groundwater inflow during mining which is predicted to be 55 Lps. This represents a reasonable value to plan with; assuming that the planned mine expansion is relatively consistent through time with respect to the amount of pit deepening through time.

During the simulation the groundwater inflow at the end of mining (operational year 30), after most water is depleted from storage, was approximately 27 Lps. The range of groundwater inflow rates during dewatering operations by year of operation are presented in **Table 4.2**. The inflow rates are higher than the test well pumping rates might initially suggest. This is in part due to testing an open hole well, which had a low well efficiency and relatively shallow pump intake setting. Furthermore, the relatively nearby presence of the Sept Iles Bay, which acts as a constant head boundary, creates a hydrogeologic setting conducive to higher inflows. As a result, the EPM assumption and hydraulic connectivity of the fracture network between the pit and the bay will likely be important variable in pit inflow. It is possible that the fracture network is not sufficiently connected on the sub-regional scale to be affected by the presence of the bay, which would result in lower than predicted inflows. The opposite is also possible, whereby a hydraulically conductive fault may intersect both the pit and the bay, which could result in higher than simulated inflows.

Table 4.3 - Predicted Groundwater Inflow

Year	Predicted Average Dewatering Rate (Lps)	Predicted Average Dewatering Rate (m^3d^{-1})
0 - 5	194	30,080
5 - 10	28	450
10 -15	27	430
15 - 20	27	430
20 - 25	27	430
25 - 30	27	430

Uncertainty in the bulk hydraulic conductivity of the bedrock is quite substantial given that it is based on a single pumping test. For example, a bulk hydraulic conductivity equal to the geometric mean of the packer testing would result in substantially lower inflows. A sensitivity run of the model using 2.5 x 10^{-3} md^{-1} yields a steady state inflow of only 9 Lps (34 Lps average for the simulation), or roughly two thirds lower than the steady-state value from the base case model run. Additional characterization would aid in constraining the permeability estimates and thus the groundwater inflow predictions.

These dewatering rates represent average groundwater inflows and do not include net precipitation (direct precipitation minus evaporation) that reaches the pit bottom. Furthermore, the drain simulation is a highly efficient removal system for pit dewatering and in practice wells will be used for dewatering. These require overlapping cones of depression and thus drawdown is less uniformly distributed. Professional experience has shown that actual pumping rates are likely to be 10 to 20 percent larger than the simulated values.

Dewatering lowered the water table below the bottom of the pit and created a cone of depression that extended away from the pit (**Figure 4.5**). Because drawdown propagation away from the open pit depends on the transmissivity and storage properties of the rock units, hydraulic gradients, pit geometry and the effects of the Sept Iles Bay (e.g. surface water capture), the resultant cone of depression is not concentric. The furthest extent of the zone of influence (as defined by the 2.5-meter drawdown contour) at the end of the mining phase was predicted to be approximately 2.4 kilometers northwest, 1.3 kilometers east and west and 1.0 kilometers to the south, essentially reaching Sept Iles Bay. The predicted drawdown is likely larger than will be realized (i.e. worst-case) because mining of the pit will be gradual and the model simulates 30-years of dewatering the entire pit. Once detailed pit phases are incorporated into the model the predicted drawdown will be less than the current estimates.

It is also reasonable to expect that drawdown to the northwest will be less than simulated given the presence of numerous small lakes that were not simulated in the model. However, if the cone of depression associated with dewatering reaches these lakes, they would yield water to the groundwater flow system and some lowering of the lake stage could occur. Drawdown in the bedrock is relatively expansive due to the moderate bedrock hydraulic conductivity and relatively low specific yield and specific storage in the bedrock units. A cross-section through Row 52 of the model (**Figure 4.6**) shows the water table drawdown to 40 m bsl and 80 m bsl and the drawdown associated with the pit reaching Sept Iles Bay.

Changes to the other mass balance components were relatively minor compared to the simulated pre-mining, steady-state mass balance.

5 Preliminary Pit Dewatering Plan

Prior to mining, it will be necessary to initiate dewatering of the proposed pit area. A robust conceptual understanding of site hydrogeologic conditions and interactions with the mine plan is essential for planning, costing and implementing appropriate pit dewatering measures.

Initial pit development will primarily encounter Precambrian aged magnetite, nelsonite and associated rocks of the Sept Iles Complex and some overburden on the southeast corner of the pit. While the permeability of the tested overburden materials is relatively low, significantly higher permeability zones with the overburden may exist. Early phases of pit development will require managing larger amounts of water from these materials as water is released from storage, after which the flows in the overburden will be limited by the rate of replenishment from abutting materials and infiltration. The current study suggests that groundwater flow into the pit will be manageable but higher than what the test well pumping rates would initially suggest. However, some of the data gaps related to preferential flow along faults or glacial outwash could result in higher than predicted inflows that would require additional infrastructure to manage these conditions.

5.1 Pit Dewatering

Vertical dewatering wells both in-pit and outside the pit boundaries will be necessary to initiate operations and maintain operations. The in-pit wells should be used to remove groundwater occupying the pores and fractures in the rock mass within and surrounding the pit shell. These wells should be operated in advance of mining and are wells that would ultimately be consumed by the ultimate pit configuration.

Dewatering saturated overburden could also be supplemented with pumping from shallow excavations (drains) in the areas where the depth to groundwater is shallow. Pit perimeter wells on southwest corner of the pit between the pit and Sept Iles Bay will be needed to intercept water flowing to the pit from the surrounding groundwater system and lower the water table in this area. The potential for faults, particularly in the south pit wall to act as hydraulic barriers to groundwater flow should be explored as this could be an important consideration for studies related to the stability of the pit walls.

Available data suggests that operation of vertical dewatering wells should suffice in dewatering pit developments. In-pit sumps should be used to collect pit-wall runoff and direct precipitation, which will likely be substantial given the climate conditions at the site. Horizontal drains may need to be employed to induce lateral flow to the pit from low permeability zones in the bedrock. The packer testing data suggests low permeability zones exist but how significant these zones are at the scale of the pit is poorly understood.

Results of recent field work and groundwater modeling studies, in conjunction with drilling future exploration dewatering wells, exploration boreholes, piezometers and monitoring wells, and additional aquifer testing, will define the dewatering strategy and allow refinement of the predicted dewatering rates. While there are many factors that must be considered for wellfield design, a very crude estimate based on the predicted dewatering rates can be developed.

Based on the depth of the wells, available drawdown and hydraulic parameter estimates it is reasonable to assume that a discharge rate of approximately 1.5 Lps could be supported by an average properly designed dewatering well that has on the order of 125 to 150 m of available drawdown. Using steady-state inflow values of approximately 30 Lps and the average inflow rate of approximately 55 Lps, would lead to an estimate of between 20 and 38 dewatering wells. However, if the geometric mean from the packer testing is more representative of the bulk permeability fewer wells may be required (Section 4.2.4.2).

The number of wells will depend on the amount of pre-mining pumping to remove volume from storage, how far in advance this commences and the actual pit phases with time. Professional experience has shown that in practice achieving the necessary spatial distribution of wells may require more wells (e.g., an increase of 10 percent). Furthermore, the heterogeneous conditions may result in some wells producing significantly more water than others. Some additional shallow wells in the overburden may also be required depending on the bulk permeability of these deposits which is currently characterized by a single aquifer test. If implemented, the overburden wells should be designed so that only the bottom 30 to 50 percent of the aquifer is screened and the contact zone between the overburden and bedrock should be included in the screened interval. If possible subsurface samples should be collected from the overburden aquifer (i.e. sonic drilling) so that the filter pack and screen size can be optimized allowing for more efficient well operation and thus more cost effective groundwater lowering.

For preliminary planning capital and operating expenditures, a reasonable estimate at this stage of study is projected to be on the order of 30 bedrock wells, with additional shallow dewatering wells/trenches in the overburden. The bedrock dewatering wells should be drilled to well below the proposed pit bottom elevation so that the groundwater level in the aquifer (adjacent to the well and operating water level in the well) is well below the pit bottom. Improved hydrogeologic characterization of the data gaps detailed above will aid in refining these estimates.

5.2 Discharge Management

Ausenco Vector has not been provided information on the necessary process water requirements and or a mine water balance. However, if pit waters are planned for discharge to the environment these waters will have to meet appropriate water quality standards and permit requirements. Water quality sampling and additional analysis water quality data and the planned mine operations (i.e. effects of blasting, potential for acid mine drainage etc.) will have to be completed to more accurately quantify risks associated with water quality.

5.3 Surface Water

In terms of surface water control, the main concern is handling runoff and controlling sediment. Towards this end, a series of ditches/berms should be planned around the pit where necessary to control surface runoff. They should be designed to handle the run-off from a 100-year, 24-hour storm event or a determined equivalent event and route run-off around the perimeter of the pit area. If appropriate, ditches along some of the catch benches could be used for additional surface water control. Given the climate, direct precipitation onto the pit walls and pit bottom will likely be substantial.

5.4 Geochemistry

Geochemical characterization of pit area bedrock materials have not been completed to date. Geochemical sampling of a relatively small number of samples of the various bedrock materials for static geochemical testing should be completed so that acid-base accounting (ABA) can be completed.

5.5 Monitoring

As part of an overall dewatering program, it will be important to continuously monitor water levels in and around the pit and discharge rates from wells and sumps. Given that the existing test wells and standpipe piezometers and observation coreholes installed for this study are all within the pit shell, a monitoring well network will need to be installed. Usually pressure transducers are used to establish a detailed, long-term water-level monitoring data set and periodically amended with hand measurements. In addition, records should be kept on flow meters associated with dewatering wells and the sump. It is also conceptualized that potential receptors (ecological or otherwise; the identification of which is beyond the scope of this study) within the projected cone of depression associated with mine dewatering could be included in the monitoring program. These data should be reviewed on a quarterly to semi-annual basis and related to hydro-meteorological data so that pit water balances can be developed. In turn, this information will be used to further calibrate and modify the existing groundwater model.

5.6 Risk Evaluation

The hydrogeologic characterization remains incomplete and thus accurately assessing potential hydrologic and hydrogeologic risks associated with the proposed project is difficult. However, based on the evaluation of the water resources presented above, potential risks to the mining operation as it relates to mine dewatering a relatively minor. Environmental issues related to mine water management were beyond the scope of this project and cannot be addressed at this juncture due to the absence of water quality data. However, several operational risks related to hydrogeology and pit dewatering include:

- The predicted dewatering requirements are relatively modest. However, there is some potential of preferential flow through glacial outwash and faults that has not been adequately characterized. This could result in higher than predicted inflows which would impact the capital and operational expenditures.
    - These risks will be better defined upon additional hydrogeologic characterization or as mining progresses. However, the best solution is to appropriately characterize both the overburden on the southwest corner of the pit and faults intersecting the pit. The test wells should be designed and constructed as operational dewatering wells so that these wells could be used as part of a pit dewatering system, thus minimizing overall costs associated with the pit dewatering program. If additional characterization is not possible, sufficient planning ahead to allow for dewatering to begin ahead of mining activities can help mitigate operational risks at start-up.
- Discharge water quality from dewatering wells and/or sumps does not meet appropriate standards or permit requirements.
    - Ausenco Vector has been provided information on the necessary process water requirements and or general mine water balance or plan. However, if pit waters and waters from interceptor and in-pit dewatering wells are planned for discharge to the environment these waters will have to meet appropriate water quality standards and permit requirements. Water quality sampling and additional analysis water quality data and the planned mine operations (i.e. effects of blasting, potential for acid mine drainage

etc.) will have to be completed to more accurately quantify risks associated with water quality.

5.7 Summary

The development of a comprehensive dewatering plan will require additional hydrogeologic characterization and a mine water balance. Additional hydrogeologic test wells (designed and constructed as interceptor dewatering wells) should be installed and tested to refine the hydraulic parameter estimates in glaciofluvial deposits (if present) and faults. Water quality and geochemical data is necessary to advance the understanding of potential water quality issues associated with mine development. Improved characterization will allow for more accurate predictions and a dewatering plan that is as efficient as possible thus reducing capital and operational expenditures.

6 Conclusions and Recommendations

The current study has significantly advanced the understanding of the hydrogeology at the site. The study included the installation and testing of coreholes, test wells and piezometers which have provided a basic understanding on the spatial distribution of heads in the overburden and bedrock aquifers within the proposed pit shell. Localized hydraulic conductivity at various depths was estimated from packer tests. Small scale pumping tests were completed which allow for bulk estimates of the hydraulic conductivity and storativity of the tested aquifers. These data were used in the construction of a rudimentary groundwater flow model to predict groundwater inflow to the pit and predict the effects of pit dewatering on the groundwater flow system. The analysis suggests that the groundwater inflow should be manageable.

However, it is important to continue to advance the level of hydrogeologic understanding at the proposed Arnaud Mine, as there are important data gaps in the work completed to-date. Moving forward, additional hydrogeologic studies would significantly reduce the uncertainty in the predicted dewatering requirements and hydraulic head distribution during mining activities. This would allow for a more efficient and cost-effective dewatering system design with lower capital and operating costs. Some of the needed information could be acquired during initial dewatering system implementation or designed so that wells could be converted to dewatering system wells. However, some of the required information will certainly be needed to meet permitting requirements.

- Water quality samples should be collected from existing test wells and observation wells to evaluate water quality from the overburden and bedrock aquifers.
- Inclined coreholes should be drilled to intersect the primary faults (or at least the northwest trending fault through the centre of the pit) that intersect the pit to determine the hydraulic characteristics and potential for yielding significant flows to the pit. Conversely, if these faults act as hydraulic barriers there could potentially be implications on the stability of the pit walls. If the faults are highly permeable, a test well should be installed within the fault to evaluate the hydraulic response to sustained pumping and potentially a hydraulic connection to Sept Iles Bay.
- The nature of the thicker sequence of overburden on the southeast corner of the pit should be explored. A southwest-northeast trending transect of the deposit should be completed either using a sonic drilling program or geophysical techniques to identify any glacial outwash deposits. If present, these zones should be tested, particularly since they have the potential to be hydraulically connected to Sept Iles Bay. Experience at other mines has shown that relatively small cross-sectional areas of glacial outwash intersecting pit walls that are hydraulically connected to surface water bodies can result in very high, sustained pit inflows and costly well interceptor systems.

- Nested standpipe or vibrating wire piezometers should be installed so that vertical hydraulic gradients can be determined and a broader spatial distribution of heads can be developed. Some of these piezometers should be located outside of the proposed pit shell for incorporation into a water-level and water quality monitoring program.
- Additional test wells should be installed and tested to improve the bulk permeability and storativity estimates of the bedrock adjacent to the proposed pit. These wells should be designed as dewatering wells so that they can be incorporated into future dewatering systems.
- A more robust three-dimensional groundwater flow model should be developed based on a more robust geologic framework model that incorporates the results of the additional field work and detailed mine plans to more accurately predict mine inflows and hydraulic heads.

Further characterization, including associated mine facilities such tailings and waste rock facilities is also needed. At this juncture, the largest perceived risks related to dewatering are: 1) the potential untested high permeability zones in the overburden, that may be hydraulically connected to Sept Iles Bay; 2) the potential for faults to transmit large quantities of groundwater that may result in higher than predicted requirements for dewatering; and 3) the lack of available water quality and geochemical data which makes assessment of risks impossible. Implementing the proposed additional hydrogeologic studies will improve our ability to quantify these risks and develop FS level designs and cost estimates.

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Appendix A – AMEC Field Data

Hydrogeological Data

Packer test data

Mine Arnaud Project

TX10 1475 03

Sept-Îles (Québec)

BOREHOLE	CH-1					**TEST INTERVAL**	170

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing		Flow meter	Pressure meter
		Meter units	Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	819,77	
60	20	819,77	0,00
120	20	819,77	0,00
180	20	819,77	0,00
300	20	819,77	0,00
420	20	819,77	0,00
0	40	819,79	
60	40	819,79	0,00
120	40	819,79	0,00
180	40	819,79	0,00
300	40	819,79	0,00
420	40	819,79	0,00
540	40	819,79	0,00
0	60	819,79	
60	60	819,79	0,00
120	60	819,79	0,00
180	60	819,79	0,00
300	60	819,79	0,00
420	60	819,79	0,00
540	60	819,79	0,00

BOREHOLE	CH-1				**TEST INTERVAL**	158	
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	823,15	
60	20	823,15	0,00
120	20	823,15	0,00
180	20	823,15	0,00
300	20	823,15	0,00
420	20	823,15	0,00
540	20	823,15	0,00
0	40	823,15	
60	40	823,15	0,00
120	40	823,15	0,00
180	40	823,15	0,00
300	40	823,15	0,00
420	40	823,15	0,00
540	40	823,15	0,00
0	60	823,15	
60	60	823,15	0,00
120	60	823,15	0,00
300	60	823,15	0,00
420	60	823,15	0,00
540	60	823,15	0,00

BOREHOLE	CH-1	**TEST INTERVAL**	146-158

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	824,77	
60	20	824,77	0,00
120	20	824,77	0,00
180	20	824,77	0,00
300	20	824,77	0,00
420	20	824,77	0,00
540	20	824,77	0,00
0	40	824,79	
60	40	824,79	0,00
120	40	824,79	0,00
180	40	824,79	0,00
300	40	824,79	0,00
420	40	824,79	0,00
540	40	824,79	0,00
0	60	824,79	
60	60	824,79	0,00
120	60	824,79	0,00
180	60	824,79	0,00
300	60	824,79	0,00
420	60	824,79	0,00
540	60	824,79	0,00

BOREHOLE	CH-1				**TEST INTERVAL**	134-146	
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)
Static water depth	From top of casing:			**Meter units**	Flow meter: Gallon	Pressure meter: psi	
Casing/pump height	Abovel ground level:			**Borehole diameter (in rock):**	96 mm		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	826,80	
60	20	826,80	0,00
120	20	826,81	0,01
180	20	826,82	0,01
300	20	826,84	0,02
420	20	826,86	0,02
540	20	826,88	0,02
0	40	826,90	
60	40	826,91	0,01
120	40	826,92	0,01
180	40	826,93	0,01
300	40	826,96	0,03
420	40	826,98	0,02
540	40	827,00	0,02
0	60	827,01	
60	60	827,02	0,01
120	60	827,03	0,01
180	60	827,04	0,01
300	60	827,07	0,03
420	60	827,10	0,03
540	60	827,13	0,03

BOREHOLE	CH-1	**TEST INTERVAL**	38-50

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	845,59	
60	20	845,59	0,00
120	20	845,59	0,00
180	20	845,59	0,00
300	20	845,59	0,00
420	20	845,59	0,00
540	20	845,59	0,00
0	40	845,60	
60	40	845,60	0,00
120	40	845,60	0,00
180	40	845,60	0,00
300	40	845,60	0,00
420	40	845,60	0,00
540	40	845,60	0,00
0	60	845,61	
60	60	845,61	0,00
120	60	845,61	0,00
180	60	845,61	0,00
300	60	845,61	0,00
420	60	845,61	0,00

BOREHOLE	CH-1					**TEST INTERVAL**	110-122

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	829,85	
60	20	829,85	0,00
120	20	829,86	0,01
180	20	829,87	0,01
300	20	829,89	0,02
420	20	829,91	0,02
540	20	829,92	0,01
0	40	829,94	
60	40	829,95	0,01
120	40	829,96	0,01
180	40	829,97	0,01
300	40	830,00	0,03
420	40	830,03	0,03
540	40	830,06	0,03
0	60	830,07	
60	60	830,09	0,02
120	60	830,12	0,03
180	60	830,14	0,02
300	60	830,17	0,03
420	60	830,20	0,03
540	60	830,24	0,04

BOREHOLE	CH-1	**TEST INTERVAL**	98-110

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	831,21	
60	20	831,22	0,01
120	20	831,23	0,01
180	20	831,24	0,01
300	20	831,26	0,02
420	20	831,28	0,02
540	20	831,30	0,02
0	40	831,33	
60	40	831,34	0,01
120	40	831,35	0,01
180	40	831,37	0,02
300	40	831,38	0,01
420	40	831,40	0,02
540	40	831,42	0,02
0	60	831,43	
60	60	831,43	0,00
120	60	831,43	0,00
180	60	831,43	0,00
300	60	831,43	0,00
420	60	831,43	0,00
540	60	831,43	0,00

BOREHOLE	CH-1					**TEST INTERVAL**	86-98	
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)	
Static water depth	From top of casing					**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level					**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	832,92	
60	20	832,93	0,01
120	20	832,90	-0,03
180	20	832,95	0,05
300	20	832,98	0,03
420	20	833,00	0,02
540	20	833,02	0,02
0	40	833,03	
60	40	833,03	0,00
120	40	833,03	0,00
180	42	833,03	0,00
300	40	833,03	0,00
420	40	833,03	0,00
540	40	833,03	0,00
0	60	833,03	
60	60	833,03	0,00
120	60	833,03	0,00
180	60	833,03	0,00
240	60	833,03	0,00
300	60	833,03	0,00
420	60	833,03	0,00
540	60	833,03	0,00

BOREHOLE	CH-1	**TEST INTERVAL**	74-86

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	834,89	
60	20	834,91	0,02
120	20	834,92	0,01
180	20	834,93	0,01
300	20	834,94	0,01
420	20	834,96	0,02
0	40	834,98	
60	40	835,01	0,02
120	40	835,03	0,02
180	40	835,05	0,02
300	40	835,07	0,03
420	40	835,10	0,03
0	60	835,11	
60	60	835,13	0,02
120	60	835,16	0,03
180	60	835,18	0,02
300	60	835,22	0,04
420	60	835,26	0,04

BOREHOLE	CH-1	**TEST INTERVAL**	62-74

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	837,52	
60	20	837,53	0,01
120	20	837,54	0,01
180	20	837,55	0,01
300	20	837,57	0,02
420	20	837,60	0,03
540	20	837,62	0,02
0	40	837,64	
60	40	837,66	0,02
120	40	837,68	0,02
180	40	837,70	0,02
300	40	837,73	0,03
420	40	837,76	0,03
420	40	837,79	0,03
0	60	637,80	
60	60	637,82	0,02
120	60	637,84	0,02
180	60	637,86	0,02
300	60	637,88	0,02
420	60	637,88	0,00

BOREHOLE	CH-8	**TEST INTERVAL**	50-62

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi

Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	839,67	
60	20	839,68	0,01
120	20	839,68	0,00
180	20	839,68	0,00
300	20	839,69	0,01
420	20	839,71	0,02
540	20	839,73	0,02
0	40	839,75	
60	40	839,77	0,02
120	40	839,78	0,01
180	40	839,80	0,02
300	40	839,82	0,02
420	40	839,84	0,02
540	40	839,87	0,03
0	60	839,88	
60	60	839,89	0,01
120	60	839,91	0,02
180	60	839,92	0,01
300	60	839,92	0,00
420	60	839,93	0,01

BOREHOLE	CH-1				**TEST INTERVAL**	38-50	
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	843,14	
60	20	843,14	0,00
120	20	843,15	0,01
180	20	843,15	0,00
300	20	843,16	0,01
420	20	843,17	0,01
540	20	843,17	0,00
0	40	843,19	
60	40	843,20	0,01
120	40	843,21	0,01
180	40	843,22	0,01
300	40	843,25	0,03
420	40	843,27	0,02
540	40	843,29	0,02
0	60	843,31	
60	60	843,33	0,02
120	60	843,34	0,01
180	60	843,36	0,02
300	60	843,39	0,03
420	60	843,42	0,03

BOREHOLE	CH-1	**TEST INTERVAL**	26-38

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	848,24	
60	20	848,24	0,00
120	20	848,24	0,00
180	20	848,24	0,00
300	20	848,24	0,00
420	20	848,24	0,00
540	20	848,24	0,00
0	40	848,26	
60	40	848,27	0,01
120	40	848,28	0,01
180	40	848,29	0,01
300	40	848,31	0,02
420	40	848,33	0,02
540	40	848,35	0,02
0	60	848,36	
60	60	848,38	0,02
120	60	848,39	0,01
180	60	848,41	0,02
300	60	848,43	0,02
420	60	848,45	0,02

BOREHOLE	CH-1	TEST INTERVAL	14-26

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth — From top of casing:

Meter units — Flow meter: Gallon; Pressure meter: psi

Casing/pump height — Abovel ground level:

Borehole diameter (in rock): 96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	850,61	
60	20	850,61	0,00
120	20	850,62	0,01
180	20	850,62	0,00
300	20	850,63	0,01
420	20	850,64	0,01
540	20	850,65	0,01
0	40	850,67	
60	40	850,67	0,00
120	40	850,67	0,00
180	40	850,67	0,00
300	40	850,67	0,00
420	40	850,67	0,00
540	40	850,67	0,00
0	60	850,67	
60	60	850,67	0,00
120	60	850,67	0,00
180	60	850,67	0,00
300	60	850,67	0,00
420	60	850,67	0,00

BOREHOLE	CH-1					**TEST INTERVAL**	26-38	
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)	
Static water depth	From top of casing					**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level					**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	855,00	
60	20	855,59	0,59
120	20	856,17	0,58
180	20	856,78	0,61
300	20	857,47	0,69
420	20	857,47	0,00
540	20	857,47	0,00
0	40	857,67	
60	40	858,72	1,05
120	40	859,76	1,04
180	40	860,77	1,01
300	40	862,82	2,05
420	40	864,82	2,00
540	40	866,82	2,00
0	60	868,48	
60	60	869,82	1,34
120	60	871,15	1,33
180	60	872,55	1,40
300	60	875,30	2,75
420	60	878,05	2,75

BOREHOLE	CH-2	**TEST INTERVAL**	159

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2057,30	
30	20	2057,30	0,000
60	20	2057,30	0,000
90	20	2057,30	0,000
120	20	2057,30	0,000
180	20	2057,30	0,000
0	40	2057,50	
30	40	2057,50	0,00
60	40	2057,50	0,00
120	40	2057,50	0,00
180	40	2057,50	0,00
0	60	2057,70	
30	60	2057,78	0,08
60	60	2057,85	0,07
90	60	2057,91	0,06
120	60	2057,96	0,05
180	60	2058,05	0,09

BOREHOLE	CH-2	**TEST INTERVAL**	147

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual) PSI	Volume (cumulative) Gallons	Flow (per last minute) Gallon per minute
0	20	2074,70	
30	20	2074,70	0,00
60	20	2074,70	0,00
120	20	2074,70	0,00
0	40	2075,00	
30	40	2075,00	0,00
60	40	2075,00	0,00
120	40	2075,00	0,00
0	60	2075,20	
30	60	2075,25	0,05
60	60	2075,27	0,02
120	60	2075,29	0,02

BOREHOLE	CH-2	**TEST INTERVAL**	147

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual) PSI	Volume (cumulative) Gallons	Flow (per last minute) Gallon per minute
0	20	2074,70	
30	20	2074,70	0,00
60	20	2074,70	0,00
120	20	2074,70	0,00
0	40	2075,00	
30	40	2075,00	0,00
60	40	2075,00	0,00
120	40	2075,00	0,00
0	60	2075,20	
30	60	2075,25	0,05
60	60	2075,27	0,02
120	60	2075,29	0,02

BOREHOLE	CH-2	**TEST INTERVAL**	135

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2100,50	
30	20	2100,50	0,00
60	20	2100,50	0,00
120	20	2100,50	0,00
0	40	2100,60	
30	40	2100,60	0,00
60	40	2100,60	0,00
120	40	2100,60	0,00
0	60	2100,90	
30	60	2100,98	0,08
60	60	2101,04	0,06
120	60	2101,15	0,11

BOREHOLE	CH-2	**TEST INTERVAL**	123

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2116,20	
30	20	2116,20	0,00
60	20	2116,20	0,00
120	20	2116,20	0,00
0	40	2116,40	
30	40	2116,40	0,00
60	40	2116,40	0,00
120	40	2116,40	0,00
0	60	2116,70	
30	60	2116,77	0,07
60	60	2116,82	0,05
120	60	2117,95	1,13
180	60	2118,08	0,13

BOREHOLE	CH-2	**TEST INTERVAL**	111

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2135,20	
30	20	2135,20	0,00
60	20	2135,20	0,00
120	20	2135,20	0,00
0	40	2135,30	
30	40	2135,30	0,00
60	40	2135,30	0,00
120	40	2135,30	0,00
0	60	2135,60	
30	60	2135,66	0,06
60	60	2135,72	0,06
120	60	2135,83	0,11

BOREHOLE CH-2

TEST INTERVAL 99

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth From top of casing:

Meter units Flow meter: Pressure meter:

Casing/pump height Abovel ground level:

Borehole diameter (in rock):

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2153,10	
30	20	2153,10	0,00
60	20	2153,10	0,00
120	20	2153,10	0,00
0	40	2153,30	
30	40	2153,30	0,00
60	40	2153,30	0,00
120	40	2153,30	0,00
0	60	2153,60	
30	60	2153,68	0,08
60	60	2153,73	0,05
120	60	2153,86	0,13
180	60	2153,99	0,13

BOREHOLE	CH-2	TEST INTERVAL	87

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2166,50	
30	20	2166,50	0,00
60	20	2166,50	0,00
120	20	2166,50	0,00
0	40	2166,70	
30	40	2166,70	0,00
60	40	2166,70	0,00
120	40	2166,70	0,00
0	60	2166,90	
30	60	2166,95	0,05
60	60	2167,00	0,05
120	60	2167,10	0,10

BOREHOLE	CH-2	**TEST INTERVAL**	63

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter

Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2195,20	
30	20	2195,20	0,00
60	20	2195,20	0,00
120	20	2195,20	0,00
0	40	2195,40	
30	40	2195,40	0,00
60	40	2195,40	0,00
120	40	2195,40	0,00
0	60	2195,50	
30	60	2195,55	0,05
60	60	2195,60	0,05
120	60	2195,70	0,10

BOREHOLE CH-2

TEST INTERVAL 51

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth: From top of casing

Meter units: Flow meter | Pressure meter

Casing/pump height: Abovel ground level

Borehole diameter (in rock):

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2207,10	
30	20	2207,10	0,00
60	20	2207,10	0,00
120	20	2207,10	0,00
0	40	2207,30	
30	40	2207,30	0,00
60	40	2207,30	0,00
120	40	2207,30	0,00
0	60	2207,50	
30	60	2207,54	0,04
60	60	2207,60	0,06
120	60	2207,70	0,10

BOREHOLE	CH-2	**TEST INTERVAL**	39

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	30	2230,30	
30	30	2230,30	0,00
60	30	2230,30	0,00
120	30	2230,30	0,00
0	40	2230,50	
30	40	2230,67	0,17
60	40	2230,80	0,13
120	40	2231,07	0,27
180	40	2231,33	0,26
0	60	2231,70	
30	60	2231,90	0,20
60	60	2232,08	0,18
120	60	2232,47	0,39
180	60	2232,83	0,36

BOREHOLE	CH-2	TEST INTERVAL	27

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter: , Pressure meter:
Casing/pump height	Abovel ground level	Borehole diameter (in rock):	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2244,08	
60	20	2244,23	0,15
120	20	2244,38	0,15
180	20	2244,51	0,13
240	20	2244,63	0,12
360	20	2244,87	0,24
480	20	2245,06	0,19
600	20	2245,26	0,20
720	20	2245,42	0,16
0	40	2245,79	
60	40	2246,06	0,27
120	40	2246,28	0,22
180	40	2246,49	0,21
360	40	2246,69	0,20
480	40	2247,06	0,37
600	40	2247,36	0,30
720	40	2247,66	0,30
0	60	2248,18	
60	60	2248,40	0,22
120	60	2248,68	0,28
180	60	2248,96	0,28
300	60	2249,49	0,53
420	60	2249,99	0,50
540	60	2250,46	0,47
660	60	2250,9	0,44

BOREHOLE	CH-2	**TEST INTERVAL**	15

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2262,78	
60	20	2262,96	0,18
120	20	2263,01	0,05
180	20	2263,14	0,13
240	20	2263,22	0,08
300	20	2263,31	0,09
420	20	2263,48	0,17
540	20	2263,60	0,12
660	20	2263,73	0,13
0	40	2264,08	
60	40	2264,31	0,23
120	40	2264,53	0,22
180	40	2264,72	0,19
300	40	2265,08	0,36
420	40	2265,41	0,33
540	40	2265,71	0,30
0	60	2266,18	
60	60	2266,48	0,30
120	60	2266,80	0,32
180	60	2267,06	0,26
240	60	2267,30	0,24
300	60	2267,53	0,23
420	60	2267,99	0,46
540	60	2268,42	0,43
660	60	2268,85	0,43

BOREHOLE	CH-2	**TEST INTERVAL**	6

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2276,72	
60	20	2276,75	0,03
120	20	2276,82	0,07
240	20	2276,95	0,13
360	20	2277,04	0,09
480	20	2277,12	0,08
600	20	2277,22	0,10
0	40	2277,43	
60	40	2277,68	0,25
120	40	2277,85	0,17
180	40	2278,01	0,16
240	40	2278,17	0,16
360	40	2278,46	0,29
480	40	2278,74	0,28
600	40	2279,02	0,28
0	60	2279,46	
60	60	2279,76	0,30
120	60	2280,01	0,25
180	60	2280,27	0,26
300	60	2280,73	0,46
420	60	2281,17	0,44
540	60	2281,59	0,42
660	60	2282,03	0,44

BOREHOLE	CH-3	TEST INTERVAL	90

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	Meter units	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	Borehole diameter (in rock):		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1351,200	
30	20	1351,300	0,100
60	20	1351,400	0,100
90	20	1351,500	0,100
120	20	1351,600	0,100
150	20	1351,650	0,050
180	20	1351,700	0,050
240	20	1351,825	0,125
300	20	1351,950	0,125
360	20	1352,050	0,100
420	20	1352,150	0,100
480	20	1352,300	0,150
600	20	1352,480	0,180
720	20	1352,670	0,190
0	30	1353,00	
30	30	1353,10	0,10
60	30	1353,20	0,10
90	30	1353,30	0,10
120	30	1353,40	0,10
150	30	1353,50	0,10
180	30	1353,56	0,06
240	30	1353,73	0,17
300	30	1353,90	0,17
0	50	1354,40	
30	50	1354,60	0,20
60	50	1354,75	0,15
90	50	1354,90	0,15

BOREHOLE	CH-3	TEST INTERVAL	78

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	

Time (seconds)	Pressure (actual) PSI	Volume (cumulative) Gallon	Flow (per last minute) Gallon
0	20	1389,20	
60	20	1389,35	0,15
120	20	1389,50	0,15
240	20	1389,80	0,30
360	20	1390,05	0,25
480	20	1390,30	0,25
600	20	1390,47	0,17
0	30	1390,70	
60	30	1390,90	0,20
120	30	1391,10	0,20
180	30	1391,25	0,15
240	30	1391,40	0,15
300	30	1391,55	0,15
0	50	1392,00	
60	50	1392,40	0,40
120	50	1392,70	0,30
180	50	1393,05	0,35
240	50	1393,30	0,25
360	50	1393,85	0,55
480	50	1394,35	0,50
600	50	1394,80	0,45

BOREHOLE	CH-3	TEST INTERVAL	66

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:		Meter units	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:		Borehole diameter (in rock):		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1424,00	
60	20	1424,20	0,20
120	20	1424,35	0,15
180	20	1424,45	0,10
240	20	1424,57	0,12
360	20	1424,70	0,13
480	20	1424,90	0,20
600	20	1425,03	0,13
720	20	1425,16	0,13
0	30	1425,40	
60	30	1425,57	0,17
120	30	1425,70	0,13
240	30	1425,95	0,25
360	30	1426,20	0,25
480	30	1426,40	0,20
0	50	1427,00	
60	50	1427,30	0,30
120	50	1427,58	0,28
180	50	1427,80	0,22
240	50	1428,00	0,20
360	50	1428,43	0,43
480	50	1428,80	0,37
600	50	1429,13	0,33

BOREHOLE	CH-3	**TEST INTERVAL**	51

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1480,10	
60	20	1480,30	0,20
120	20	1480,48	0,18
180	20	1480,62	0,14
240	20	1480,76	0,14
360	20	1480,95	0,19
480	20	1481,10	0,15
600	20	1481,23	0,13
0	30	1481,40	
60	30	1481,60	0,20
120	30	1481,78	0,18
180	30	1481,92	0,14
240	30	1482,05	0,13
360	30	1482,30	0,25
480	30	1482,52	0,22
600	30	1482,75	0,23
0	50	1483,10	
60	50	1483,45	0,35
120	50	1483,73	0,28
180	50	1484,00	0,27
240	50	1484,20	0,20
360	50	1484,60	0,40
480	50	1485,00	0,40
600	50	1485,40	0,40

BOREHOLE	CH-3				**TEST INTERVAL**	42	
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)
Static water depth	From top of casing				**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level				**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1496,30	
60	20	1496,44	0,14
120	20	1496,52	0,08
180	20	1496,66	0,14
300	20	1496,70	0,04
420	20	1496,80	0,10
540	20	1496,90	0,10
0	30	1497,10	
60	30	1497,25	0,15
120	30	1497,36	0,11
180	30	1497,49	0,13
240	30	1497,57	0,08
360	30	1497,74	0,17
480	30	1497,90	0,16
600	30	1498,05	0,15
0	50	1498,30	
60	50	1498,60	0,30
120	50	1498,85	0,25
180	50	1499,05	0,20
240	50	1499,21	0,16
360	50	1499,50	0,29
480	50	1499,78	0,28
600	50	1500,02	0,24

BOREHOLE	CH-3	TEST INTERVAL	36

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	Meter units	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	Borehole diameter (in rock):		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1526,10	
60	20	1526,25	0,15
120	20	1526,37	0,12
180	20	1526,45	0,08
240	20	1526,50	0,05
360	20	1526,65	0,15
480	20	1526,77	0,12
600	20	1526,86	0,09
0	30	1527,10	
60	30	1527,26	0,16
120	30	1527,39	0,13
180	30	1527,50	0,11
240	30	1527,60	0,10
360	30	1527,80	0,20
480	30	1527,98	0,18
600	30	1528,15	0,17
0	50	1528,50	
60	50	1528,90	0,40
120	50	1529,15	0,25
180	50	1529,36	0,21
240	50	1529,55	0,19
360	50	1529,90	0,35
480	50	1530,20	0,30
600	50	1530,50	0,30
720	50	1530,75	0,25

BOREHOLE	CH-3	TEST INTERVAL	33

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1545,10	
60	20	1545,18	0,08
120	20	1545,25	0,07
0	30	1545,40	
60	30	1545,63	0,23
120	30	1545,79	0,16
180	30	1545,91	0,12
240	30	1546,05	0,14
300	30	1546,17	0,12
420	30	1546,40	0,23
540	30	1546,60	0,20
0	50	1547,00	
60	50	1547,35	0,35
120	50	1547,65	0,30
180	50	1547,88	0,23
240	50	1548,10	0,22
360	50	1548,50	0,40
480	50	1548,80	0,30
600	50	1549,10	0,30
720	50	1549,40	0,30

BOREHOLE	CH-3	**TEST INTERVAL**	30

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1566,50	
60	20	1566,64	0,14
120	20	1566,72	0,08
0	30	1566,90	
60	30	1567,14	0,24
120	30	1567,30	0,16
180	30	1567,43	0,13
240	30	1567,55	0,12
360	30	1567,75	0,20
480	30	1567,92	0,17
0	50	1568,50	
60	50	1568,80	0,30
120	50	1569,05	0,25
180	50	1569,25	0,20
240	50	1569,43	0,18
300	50	1569,60	0,17
420	50	1569,95	0,35
540	50	1570,30	0,35

BOREHOLE	CH-3	**TEST INTERVAL**	27 - 30

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1579,70	
60	20	1579,80	0,10
120	20	1579,85	0,05
240	20	1579,90	0,05
360	20	1579,95	0,05
480	20	1580,00	0,05
0	40	1580,30	
60	40	1580,43	0,13
120	40	1580,50	0,07
180	40	1580,58	0,08
300	40	1580,71	0,13
420	40	1580,88	0,17
540	40	1581,10	0,22
0	50	1581,75	
60	50	1581,82	0,07
120	50	1581,90	0,08
180	50	1581,97	0,07
300	50	1582,11	0,14
420	50	1582,23	0,12
540	50	1582,38	0,15
660	50	1582,51	0,13

BOREHOLE	CH-3	TEST INTERVAL	24 - 27

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	Borehole diameter (in rock):		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	30	1601,70	
60	30	1602,32	0,62
120	30	1602,35	0,03
180	30	1602,37	0,02
240	30	1602,39	0,02
360	30	1602,42	0,03
480	30	1602,46	0,04
0	40	1602,50	
60	40	1602,55	0,05
120	40	1602,58	0,03
180	40	1602,60	0,02
300	40	1602,65	0,05
420	40	1602,70	0,05
540	40	1602,75	0,05
0	50	1602,88	
60	50	1602,92	0,04
120	50	1602,96	0,04
180	50	1603,00	0,04
300	50	1603,06	0,06
420	50	1603,13	0,07
540	50	1603,20	0,07

BOREHOLE	CH-3	TEST INTERVAL	21 - 24

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1612,50	
60	20	1612,53	0,03
120	20	1612,55	0,02
180	20	1612,56	0,01
240	20	1612,57	0,01
360	20	1612,58	0,01
480	20	1612,58	0,00
0	30	1612,60	
60	30	1612,61	0,01
120	30	1612,63	0,02
180	30	1612,65	0,02
300	30	1612,68	0,03
420	30	1612,71	0,03
540	30	1612,72	0,01
0	50	1612,82	
60	50	1612,87	0,05
120	50	1612,91	0,04
180	50	1612,95	0,04
300	50	1613,01	0,06
420	50	1613,07	0,06
540	50	1613,14	0,07

BOREHOLE	CH-3	TEST INTERVAL	18 - 21

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	Borehole diameter (in rock):		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1626,10	
60	20	1626,17	0,07
120	20	1626,21	0,04
180	20	1626,24	0,03
240	20	1626,28	0,04
360	20	1626,31	0,03
480	20	1626,33	0,02
0	30	1626,62	
60	30	1626,70	0,08
120	30	1626,75	0,05
180	30	1626,78	0,03
240	30	1626,81	0,03
360	30	1626,87	0,06
480	30	1626,90	0,03
600	30	1626,94	0,04
0	50	1627,58	
60	50	1627,68	0,10
120	50	1627,72	0,04
180	50	1627,85	0,13
240	50	1627,91	0,06
300	50	1627,99	0,08
360	50	1628,05	0,06
480	50	1628,13	0,08
600	50	1628,22	0,09
720	50	1628,29	0,07

BOREHOLE	CH-3	**TEST INTERVAL**	15 - 18

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1639,30	
60	20	1639,32	0,02
120	20	1639,35	0,03
180	20	1639,38	0,03
300	20	1639,40	0,02
420	20	1639,42	0,02
540	20	1639,43	0,01
0	30	1639,58	
60	30	1639,61	0,03
120	30	1639,62	0,01
180	30	1639,65	0,03
240	30	1639,68	0,03
360	30	1639,72	0,04
480	30	1639,77	0,05
600	30	1639,82	0,05
0	50	1639,98	
60	50	1640,01	0,03
120	50	1640,07	0,06
180	50	1640,11	0,04
240	50	1640,18	0,07
300	50	1640,22	0,04
420	50	1640,32	0,10
540	50	1640,41	0,09
660	50	1640,49	0,08

BOREHOLE CH-3

TEST INTERVAL 12 a 15

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth — From top of casing:

Meter units — Flow meter: | Pressure meter:

Casing/pump height — Abovel ground level:

Borehole diameter (in rock):

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1657,47	
60	20	1657,49	0,02
120	20	1657,49	0,00
240	20	1657,49	0,00
360	20	1657,49	0,00
0	30	1657,49	
60	30	1657,51	0,02
120	30	1657,53	0,02
240	30	1657,57	0,04
360	30	1657,59	0,02
480	30	1657,61	0,02
0	50	1657,70	
60	50	1657,71	0,01
120	50	1657,73	0,02
240	50	1657,78	0,05
360	50	1657,82	0,04
480	50	1657,87	0,05

BOREHOLE	CH-3	**TEST INTERVAL**	9 a 12

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1673,82	
60	20	1674,08	0,26
120	20	1674,26	0,18
180	20	1674,43	0,17
240	20	1674,60	0,17
360	20	1674,89	0,29
480	20	1675,14	0,25
600	20	1675,40	0,26
0	30	1675,85	
60	30	1676,10	0,25
120	30	1676,31	0,21
180	30	1676,51	0,20
300	30	1676,90	0,39
420	30	1677,29	0,39
0	50	1677,85	
60	50	1678,23	0,38
120	50	1678,59	0,36
180	50	1678,93	0,34
300	50	1679,55	0,62
420	50	1680,13	0,58
540	50	1680,76	0,63

BOREHOLE	CH-3	**TEST INTERVAL**	6 a 9

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	1699,70	
60	20	1699,71	0,01
120	20	1699,71	0,00
240	20	1699,71	0,00
0	30	1699,71	
60	30	1699,71	0,00
120	30	1699,71	0,00
240	30	1699,71	0,00
0	50	1699,71	
60	50	1699,72	0,01
120	50	1699,72	0,00
240	50	1699,75	0,03
360	50	1699,77	0,02
480	50	1699,78	0,01
600	50	1699,79	0,01
720	50	1699,79	0,00

BOREHOLE	CH-4	TEST INTERVAL	91,5

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	5	38,6	
60	5	38,6	0,0
120	5	38,6	0,0
180	5	38,6	0,0
240	5	38,6	0,0
0	10	38,6	
60	10	38,7	0,1
120	10	38,8	0,1
180	10	39,9	0,1
240	10	39,1	0,2
0	15	39,1	
60	15	39,1	0,0
120	15	39,1	0,0
180	15	39,1	0,0
240	15	39,1	0,0

BOREHOLE CH-4

TEST INTERVAL 79,5

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth: From top of casing

Meter units: Flow meter | Pressure meter

Casing/pump height: Abovel ground level

Borehole diameter (in rock):

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	5	93,9	
60	5	64,1	0,2
120	5	64,3	0,2
180	5	64,3	0,0
240	5	64,3	0,0
300	5	64,3	0,0
0	10	64,6	
60	10	64,6	0,0
120	10	64,6	0,0
180	10	64,6	0,0
240	10	64,7	0,1
0	15	64,8	
60	15	64,8	0,0
120	15	64,8	0,0
180	15	64,8	0,0
240	15	64,8	0,0

BOREHOLE	CH-4				**TEST INTERVAL**	67,5
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)
Static water depth	From top of casing:				**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:				**Borehole diameter (in rock):**	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	5	83,0	
60	5	83,0	0,0
120	5	83,0	0,0
180	5	83,0	0,0
240	5	83,0	0,0
0	10	83,0	
60	10	83,0	0,0
120	10	83,0	0,0
180	10	83,1	0,1
240	10	83,1	0,0
0	15	83,2	
60	15	83,2	0,0
120	15	83,2	0,0
180	15	83,2	0,0
240	15	83,2	0,0

BOREHOLE	CH-4	TEST INTERVAL	46,5

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	Meter units	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	Borehole diameter (in rock):		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	5	104,5	
60	5	104,5	0,0
120	5	104,5	0,0
180	5	104,6	0,1
240	5	104,7	0,1
0	10	104,9	
60	10	104,9	0,0
120	10	104,9	0,0
180	10	104,9	0,0
240	10	104,9	0,0
0	15	104,9	
60	15	104,9	0,0
120	15	104,9	0,0
180	15	104,9	0,0
240	15	104,9	0,0

BOREHOLE	CH-4	**TEST INTERVAL**	25,5

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	5	121,3	
60	5	121,3	0,0
120	5	121,4	0,1
180	5	121,6	0,2
240	5	122,1	0,5
300	5	122,5	0,4
0	10	122,7	
60	10	122,9	0,2
120	10	123,2	0,3
180	10	123,4	0,2
240	10	123,5	0,1
300	10	123,5	0,0
600	10	123,5	0,0
0	15	123,5	
60	15	123,5	0,0
120	15	123,6	0,1
180	15	123,8	0,2
240	15	124,1	0,3
300	15	124,4	0,3
600	15	125,0	0,6

BOREHOLE	CH-4					**TEST INTERVAL**	6,5

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	5	131,3	
60	5	131,3	0,0
120	5	131,3	0,0
180	5	131,3	0,0
240	5	131,4	0,1
0	10	131,5	
60	10	131,7	0,2
120	10	131,9	0,2
180	10	132,0	0,1
240	10	132,1	0,1
0	15	132,1	
60	15	132,2	0,1
120	15	132,3	0,1
180	15	132,5	0,2
240	15	132,8	0,3

BOREHOLE	CH-5	**TEST INTERVAL**	114

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15		
60	15		0,150
120	15		0,150
0	30		
60	30		0,300
120	30		0,250
180	30		0,250
240	30		0,250
0	45		
60	45		0,380
120	45		0,350
180	45		0,325
240	45		0,350
300	45		0,325
360	45		0,310

BOREHOLE	CH-5						**TEST INTERVAL**	102
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)	
Static water depth	From top of casing						**Meter units**	Flow meter / Pressure meter
Casing/pump height	Abovel ground level						**Borehole diameter (in rock):**	

Time (seconds)	Pressure (actual) PSI	Volume (cumulative) Gallon	Flow (per last minute) Gallon
0	15		
60	15		0,150
120	15		0,150
180	15		0,150
240	15		0,130
300	15		0,150
0	30		
60	30		0,325
120	30		0,300
180	30		0,250
240	30		0,250
300	30		0,250
360	30		0,250
0	45		
60	45		0,400
120	45		0,350
180	45		0,325
240	45		0,340
300	45		0,350

BOREHOLE	CH-5	**TEST INTERVAL**	90

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15		
60	15		0,19
120	15		0,15
180	15		0,15
240	15		0,15
0	30		
60	30		0,15
120	30		0,00
180	30		0,00
240	30		0,00
0	45		
60	45		0,00
120	45		0,00
180	45		0,00

BOREHOLE	CH-5	**TEST INTERVAL**	78

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15		
60	15		0,23
120	15		0,20
180	15		0,17
240	15		0,15
300	15		0,15
0	30		
60	30		0,30
120	30		0,30
180	30		0,25
240	30		0,25
300	30		0,20
360	30		0,20
420	30		0,20
0	45		
60	45		0,35
120	45		0,34
180	45		0,35
240	45		0,32
300	45		0,3
360	45		0,3
420	45		0,3
480	45		0,3

BOREHOLE	CH-5	TEST INTERVAL	74-77

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	Meter units	Flow meter:	Pressure meter:
Casing/pump height	Abovel ground level:	Borehole diameter (in rock):		

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15		
30	15		0,00
60	15		0,00
120	15		0,00
0	45		
30	45		0,00
60	45		0,00
120	45		0,00
0	52	584,70	
60	52	584,75	0,05
120	52	584,79	0,04

BOREHOLE	CH-5	TEST INTERVAL	71-74

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15	605,90	
60	15	605,90	0,00
120	15	605,90	0,00
0	30	606,10	
60	30	606,10	0,00
120	30	606,10	0,00
0	60	606,20	
60	60	606,20	0,00
120	60	606,20	0,00

BOREHOLE	CH-5	**TEST INTERVAL**	68-71

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter: / Pressure meter:
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15	620,00	
60	15	620,00	0,00
120	15	620,00	0,00
0	30	620,20	
60	30	620,20	0,00
120	30	620,20	0,00
0	60	620,40	
60	60	620,48	0,08
120	60	620,56	0,08

BOREHOLE	CH-5
TEST INTERVAL	65-68

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:
Casing/pump height	Abovel ground level:
Meter units	Flow meter: / Pressure meter:
Borehole diameter (in rock):	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15	630,45	
60	15	630,45	0,00
120	15	630,45	0,00
0	30	630,60	
60	30	630,60	0,00
120	30	630,60	0,00
0	60	630,80	
60	60	630,80	0,00
120	60	630,80	0,00

BOREHOLE	CH-5	TEST INTERVAL	62-65

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	15	644,80	
60	15	644,80	0,00
120	15	644,80	0,00
0	30	645,00	
60	30	645,00	0,00
120	30	645,00	0,00
0	60	645,30	
60	60	645,35	0,05
120	60	645,40	0,05

BOREHOLE	CH-6	TEST INTERVAL	128-140

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter: Gallon	Pressure meter: psi

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	277,60	
30	20	277,61	0,01
60	20	277,61	0,00
90	20	277,62	0,01
120	20	277,63	0,01
150	20	277,63	0,00
180	20	277,64	0,01
240	20	277,65	0,01
360	20	277,68	0,03
720	20	277,72	0,04
660	20	277,72	0,00
0	45	277,77	
30	45	277,77	0,00
60	45	277,78	0,01
90	45	277,79	0,01
120	45	277,80	0,01
180	45	277,82	0,02
240	45	277,84	0,02
360	45	277,88	0,04
660	45	277,92	0,04
0	60	278,19	
30	60	278,20	0,01
60	60	278,21	0,01
90	60	278,22	0,01
120	60	278,26	0,04
180	60	278,28	0,02
240	60	278,3	0,02
360	60	278,35	0,05
660	60	278,39	0,04

BOREHOLE	CH-6	**TEST INTERVAL**	116-128

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	225,76	
30	20	225,77	0,01
60	20	225,77	0,00
90	20	225,77	0,00
120	20	225,77	0,00
180	20	225,77	0,00
300	20	225,79	0,02
420	20	225,80	0,01
720	20	225,84	0,04
1020	20	225,87	0,03
30	45	275,89	
120	45	275,90	0,01
180	45	275,91	0,01
240	45	275,92	0,01
360	45	275,95	0,03
660	45	276,02	0,07
0	60	276,05	
30	60	276,07	0,02
60	60	276,10	0,03
90	60	276,11	0,01
120	60	276,11	0,00
180	60	276,13	0,02
200	60	276,15	0,02
360	60	276,18	0,03
660	60	276,28	0,10

BOREHOLE	CH-6	**TEST INTERVAL**	104-116

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	6756,10	
30	20	6756,90	0,800
60	20	6757,41	0,510
90	20	6757,84	0,430
120	20	6757,94	0,100
180	20	6758,27	0,330
240	20	6758,71	0,440
360	20	6759,29	0,580
0	80	6764,50	
60	80	6766,90	2,40
120	80	6769,02	2,12
180	80	6770,10	1,08
240	80	6773,13	3,03
300	80	6775,20	2,07
420	80	6776,55	1,35
540	80	6777,13	0,58
660	80	6778,45	1,32
780	80	6780,83	2,38
900	80	6782,83	2,00
1140	80	6786,80	3,97

BOREHOLE	CH-6	TEST INTERVAL	92-104

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2829,70	
60	20	2829,70	0,00
180	20	2829,70	0,00
0	45	2869,8	
60	45	2869,92	0,12
120	45	2870,04	0,12
180	45	2870,18	0,14
240	45	2870,30	0,12
0	60	2870,55	
60	60	2870,67	0,12
120	60	2870,82	0,15
180	60	2870,98	0,16

BOREHOLE	CH-6	TEST INTERVAL	80-92

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter
			Gallon	psi

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	2902,80	
60	20	2902,80	0,00
120	20	2902,80	
180	20	2902,80	0,00
0	40	2902,80	
60	40	2902,80	0,00
120	40	2902,80	0,00
180	40	2902,80	0,00
0	60	2902,80	
60	60	2902,80	0,00
120	60	2902,80	0,00
180	60	2902,80	0,00

BOREHOLE	CH-6	**TEST INTERVAL**	68-80

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20		
60	20		0,00
180	20		0,00
0	40		
60	40		0,00
120	40		0,00
180	40		0,00
300	40		0,00
420	40		0,00
0	60	3026,40	
60	60	3027,00	0,60
120	60	3027,60	0,60
180	60	3028,15	0,55
300	60	3029,20	1,05
420	60	3030,30	1,10

BOREHOLE	CH-6	**TEST INTERVAL**	56-68

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20		
60	20		0,00
180	20		0,00
0	40	3026,40	
60	40	3027,00	0,60
120	40	3027,60	0,60
0	60	3026,40	
60	60	3027,00	0,60
120	60	3027,60	0,60
180	60	3028,15	0,55
300	60	3029,20	1,05
420	60	3030,30	1,10

BOREHOLE	CH-6	**TEST INTERVAL**	44-56

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

			Flow meter	Pressure meter
Static water depth	From top of casing	**Meter units**	Gallon	psi

Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20		
60	20		0,00
180	20		0,00
30	45		
120	45		0,00
180	45		0,00
240	45		0,00
360	45		0,00
660	45		0,00
0	60		
30	60		0,00
60	60		0,00
90	60		0,00
120	60		0,00
180	60		0,00
200	60		0,00
360	60		0,00
660	60		0,00

BOREHOLE	CH-6	**TEST INTERVAL**	32-44

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20		
60	20		0,00
180	20		0,00
300	20		0,00
420	20		0,00
0	40		
60	40		0,00
180	40		0,00
300	40		0,00
420	40		0,00
0	60		
60	60		0,00
180	60		0,00
300	60		0,00
420	60		0,00

BOREHOLE	CH-6			**TEST INTERVAL**	17-32		
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing		**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level		**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20		
60	20		0,00
180	20		0,00
30	45		
120	45		0,00
180	45		0,00
240	45		0,00
360	45		0,00
660	45		0,00
0	60		
30	60		0,00
60	60		0,00
90	60		0,00
120	60		0,00
180	60		0,00
200	60		0,00
360	60		0,00
660	60		0,00

BOREHOLE	CH-6	TEST INTERVAL	6-17

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter
			Gallon	psi

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20		
60	20		0,00
180	20		0,00
30	45		
120	45		0,00
180	45		0,00
240	45		0,00
360	45		0,00
660	45		0,00
0	60		
30	60		0,00
60	60		0,00
90	60		0,00
120	60		0,00
180	60		0,00
200	60		0,00
360	60		0,00
660	60		0,00

BOREHOLE	CH-6	**TEST INTERVAL**	6

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20		
60	20		0,000
120	20		0,000
180	20		0,000
240			
300			
240	20		0,000
0	40	3257,00	
60	40	3266,30	9,30
120	40	3274,70	8,40
180	40	3284,40	9,70
300	40	3293,30	8,90
420	40		-3293,30
540	40		0,00
0	60		
60	60		0,00
120	60		0,00
180	60		0,00
300	60		0,00
420	60		0,00
540	60		0,00

BOREHOLE	CH-7	**TEST INTERVAL**	73-85

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth

From top of casing

Meter units

Flow meter	Pressure meter
Gallon	psi

Casing/pump height

Abovel ground level

Borehole diameter (in rock): 96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	40	4630,30	
60	40	4630,30	0,00
120	40	4630,35	0,05
180	40	4630,35	0,00
0	60	4630,40	
60	60	4630,40	0,00
120	60	4630,40	0,00
180	60	4630,40	0,00
0	70	4630,70	
60	70	4630,70	0,00
120	70	4630,70	0,00
180	70	4630,70	0,00

BOREHOLE	CH-7						**TEST INTERVAL**	61-73
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)	

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	516,22	
60	20	516,22	0,00
120	20	516,22	0,00
180	20	516,22	0,00
300	20	516,22	0,00
420	20	516,22	0,00
540	20	516,22	0,00
0	40	516,23	
60	40	516,25	0,02
120	40	516,27	0,02
180	40	516,29	0,02
300	40	516,33	0,04
420	40	516,37	0,04
0	60	516,42	
60	60	516,44	0,02
120	60	516,46	0,02
180	60	516,49	0,03
300	60	516,54	0,05
420	60	516,59	0,05
540	60	516,64	0,05

BOREHOLE	CH-7	TEST INTERVAL	49-61

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	517,68	
60	20	517,68	0,00
120	20	517,68	0,00
180	20	517,68	0,00
300	20	517,68	0,00
420	20	517,68	0,00
540	20	517,68	0,00
0	40	517,72	
60	40	517,73	0,01
120	40	517,75	0,02
180	40	517,77	0,02
300	40	517,80	0,03
420	40	517,84	0,04
540	40	517,87	0,03
0	60	517,90	
60	60	517,93	0,03
120	60	517,95	0,02
180	60	518,00	0,05
300	60	518,06	0,06
420	60	518,10	0,04

BOREHOLE	CH-7	TEST INTERVAL	37-49

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter
			Gallon	psi

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	519,35	
60	20	519,35	0,00
120	20	519,36	0,01
180	20	519,37	0,01
300	20	519,40	0,03
420	20	519,42	0,02
540	20	519,45	0,03
0	40	519,49	
60	40	519,49	0,00
120	40	519,49	0,00
180	40	519,49	0,00
300	40	519,49	0,00
420	40	519,49	0,00
540	40	519,49	0,00
0	60	519,50	
60	60	519,53	0,03
120	60	519,56	0,03
180	60	519,59	0,03
300	60	519,66	0,07
420	60	519,72	0,06
540	60	519,78	0,06

BOREHOLE	CH-7	TEST INTERVAL	25-37

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	520,37	
60	20	520,39	0,02
120	20	520,40	0,01
180	20	520,41	0,01
300	20	520,44	0,03
420	20	520,46	0,02
540	20	520,47	0,01
0	40	520,54	
60	40	520,57	0,03
120	40	520,60	0,03
180	40	520,62	0,02
300	40	520,67	0,05
420	40	520,73	0,06
540	40	520,78	0,05
0	60	521,80	
60	60	521,85	0,05
120	60	521,88	0,03
180	60	521,91	0,03
300	60	521,97	0,06
420	60	522,03	0,06
540	60	522,11	0,08

BOREHOLE	CH-7				**TEST INTERVAL**	16-25	

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	523,90	
60	20	523,90	0,00
120	20	523,90	0,00
180	20	523,90	0,00
300	20	523,90	0,00
420	20	523,90	0,00
540	20	523,90	0,00
0	40	523,92	
60	40	523,94	0,02
120	40	523,96	0,02
180	40	523,98	0,02
300	40	524,02	0,04
420	40	524,06	0,04
540	40	524,08	0,02
0	60	524,19	
60	60	524,22	0,03
120	60	524,24	0,02
180	60	524,27	0,03
300	60	524,33	0,06
420	60	524,38	0,05
540	60	524,44	0,06

BOREHOLE	CH-7	**TEST INTERVAL**	16

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	528,15	
60	20	528,54	0,39
120	20	528,93	0,39
180	20	529,30	0,37
300	20	530,03	0,73
420	20	530,99	0,96
540	20	531,76	0,77
0	40	535,06	
60	40	535,80	0,74
120	40	536,53	0,73
180	40	537,28	0,75
300	40	538,80	1,52
420	40	540,30	1,50
540	40	541,80	1,50
0	60	546,30	
60	60	547,55	1,25
120	60	548,87	1,32
180	60	550,23	1,36
300	60	552,88	2,65
420	60	555,54	2,66
540	60	558,19	2,65

BOREHOLE	CH-8	TEST INTERVAL	110-112

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	Meter units	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level:	Borehole diameter (in rock):	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	373,91	
60	20	373,92	0,01
120	20	373,93	0,01
180	20	373,94	0,01
300	20	373,95	0,01
420	20	373,97	0,02
540	20	373,99	0,02
0	40	374,00	
60	40	374,00	0,00
120	40	374,00	0,00
180	40	374,00	0,00
300	40	374,02	0,02
420	40	374,04	0,02
540	40	374,07	0,03
0	60	374,14	
60	60	374,14	0,00
120	60	374,14	0,00
180	60	374,14	0,00
300	60	374,14	0,00
420	60	374,14	0,00
540	60	374,14	0,00

BOREHOLE	CH-8	**TEST INTERVAL**	88-100

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	379,00	
60	20	379,00	0,00
120	20	379,01	0,01
180	20	379,02	0,01
300	20	379,04	0,02
420	20	379,06	0,02
540	20	379,07	0,01
0	40	379,10	
60	40	379,12	0,02
120	40	379,14	0,02
180	40	379,15	0,01
300	40	379,19	0,04
420	40	379,22	0,03
540	40	379,26	0,04
0	60	379,32	
60	60	379,36	0,04
120	60	379,39	0,03
300	60	379,42	0,03
420	60	379,48	0,06
540	60	379,54	0,06

BOREHOLE	CH-8	**TEST INTERVAL**	76-88

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	383,96	
60	20	383,97	0,01
120	20	383,98	0,01
180	20	383,99	0,01
300	20	384,02	0,03
420	20	384,04	0,02
540	20	384,06	0,02
0	40	384,11	
60	40	384,14	0,03
120	40	384,17	0,03
180	40	384,19	0,02
300	40	384,25	0,06
420	40	384,30	0,05
540	40	384,35	0,05
0	60	384,41	
60	60	384,46	0,05
120	60	384,50	0,04
180	60	384,55	0,05
300	60	384,63	0,08
420	60	384,71	0,08
540	60	384,79	0,08

BOREHOLE	CH-8	**TEST INTERVAL**	64-76

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	390,21	
60	20	390,22	0,01
120	20	390,23	0,01
180	20	390,25	0,02
300	20	390,28	0,03
420	20	390,31	0,03
540	20	390,34	0,03
0	40	390,41	
60	40	390,46	0,05
120	40	390,50	0,04
180	40	390,54	0,04
300	40	390,61	0,07
420	40	390,68	0,07
540	40	390,75	0,07
0	60	390,82	
60	60	390,88	0,06
120	60	390,94	0,06
180	60	390,94	0,00
300	60	390,94	0,00
420	60	390,94	0,00
540	60	390,94	0,00

BOREHOLE	CH-8	TEST INTERVAL	52-64

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter
			Gallon	psi

Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	394,41	
60	20	394,50	0,09
120	20	394,52	0,02
180	20	394,54	0,02
300	20	394,57	0,03
420	20	394,59	0,02
540	20	394,62	0,03
0	40	394,68	
60	40	394,72	0,04
120	40	394,76	0,04
180	40	394,80	0,04
300	40	394,85	0,05
420	40	394,90	0,05
540	40	394,95	0,05
0	60	395,02	
60	60	395,08	0,06
120	60	395,13	0,05
180	60	395,17	0,04
300	60	395,22	0,05
420	60	395,22	0,00
540	60	395,22	0,00

BOREHOLE	CH-8	**TEST INTERVAL**	52-64

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing		Flow meter	Pressure meter
		Meter units	Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	3996,10	
60	20	3996,45	0,35
120	20	3996,70	0,25
180	20	3996,93	0,23
300	20	3997,39	0,46
420	20	3997,99	0,60
0	40	3998,50	
60	40	3999,15	0,65
120	40	3999,69	0,54
180	40	4000,14	0,45
300	40	4000,39	0,25
420	40	4001,21	0,82
540	40	4001,23	0,02
0	60	4004,00	
60	60	4004,71	0,71
120	60	4005,46	0,75
180	60	4006,20	0,74
300	60	4007,51	1,31
420	60	4008,66	1,15

BOREHOLE	CH-8	**TEST INTERVAL**	28-40

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth

From top of casing

Meter units

Flow meter	Pressure meter
Gallon	psi

Casing/pump height

Abovel ground level

Borehole diameter (in rock): 96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	4000,00	
60	20	4000,21	0,21
120	20	4000,42	0,21
180	20	4000,61	0,19
300	20	4001,00	0,39
420	20	4001,31	0,31
540	20	4001,45	0,14
0	40	4021,40	
60	40	4021,90	0,50
120	40	4022,34	0,44
180	42	4022,79	0,45
300	40	4023,48	0,69
420	40	4024,22	0,74
540	40	4024,90	0,68
0	60	4025,70	
60	60	4026,42	0,72
120	60		
180	60	4027,66	
240	63	4028,25	0,59
300	63	4028,80	0,55
360	63	4029,35	0,55
480	63	4030,42	1,07
600	63	4031,45	1,03

BOREHOLE	CH-8	**TEST INTERVAL**	19-28

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	4042,30	
60	20	4042,61	0,31
120	20	4042,85	0,24
180	20	4043,05	0,20
300	20	4043,44	0,39
420	20	4043,80	0,36
0	40	4044,70	
60	40	4045,12	0,42
120	40	4045,55	0,43
180	40	4045,95	0,40
300	40	4046,65	0,70
420	40	4047,30	0,65
0	61	4048,30	
60	61	4048,90	0,60
120	61	4049,47	0,57
180	61	4050,10	0,63
300	62	4051,12	1,02
420	62	4052,1	0,98

BOREHOLE	CH-8	TEST INTERVAL	19-déc

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	Borehole diameter (in rock):	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	4066,70	
60	20	4066,98	0,28
120	20	4067,19	0,21
180	20	4067,37	0,18
300	20	4067,74	0,37
420	20	4068,02	0,28
540	20	4068,28	0,26
0	40	4068,90	
60	40	4069,38	0,48
120	40	4069,76	0,38
180	40	4070,14	0,38
300	40	4070,77	0,63
420	42	4071,38	0,61
0	62	4072,00	
60	62	4072,66	0,66
120	62	4073,20	0,54
180	60	4073,67	0,47
300	61	4074,60	0,93
420	61	4075,55	0,95

BOREHOLE	CH-8	**TEST INTERVAL**	12

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing:	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level:	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	4081,60	
60	20	4081,85	0,25
120	20	4082,01	0,16
180	20	4082,18	0,17
300	20	4082,50	0,32
420	20	4082,78	0,28
0	40	4083,40	
60	40	4083,84	0,44
120	40	4084,21	0,37
180	41	4084,58	0,37
300	41	4085,35	0,77
420	42	4085,90	0,55
0	61	4086,50	
60	61	4087,15	0,65
120	63	4087,70	0,55
180	64	4088,25	0,55
300	65	4089,22	0,97
420	65	4090,16	0,94

BOREHOLE	C-PW-1	**TEST INTERVAL**	154-166

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	588,96	
60	20	588,96	0,000
120	20	588,97	0,010
180	20	588,97	0,000
300	20	588,98	0,010
420	20	589,00	0,020
540	20	589,01	0,010
0	40	589,01	
60	40	589,02	0,01
120	40	589,03	0,01
180	40	589,04	0,01
300	40	589,06	0,02
420	40	589,08	0,02
540	40	589,09	0,01
0	60	589,11	
60	60	589,13	0,02
120	60	589,15	0,02
180	60	589,17	0,02
300	60	589,2	0,03
420	60	589,23	0,03
540	60	589,26	0,03

BOREHOLE	C-PW-1				**TEST INTERVAL**	142-154	
Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	594,28	
60	20	594,29	0,010
120	20	594,29	0,000
180	20	594,30	0,010
300	20	594,31	0,010
420	20	594,31	0,000
540	20	594,32	0,010
0	40	594,32	
60	40	594,33	0,01
120	40	594,34	0,01
180	40	594,35	0,01
300	40	594,37	0,02
420	40	594,38	0,01
540	40	594,40	0,02
0	60	594,84	
60	60	594,85	0,01
120	60	594,86	0,01
180	60	594,87	0,01
300	60	594,88	0,01
420	60	594,90	0,02
540	60	594,91	0,01

BOREHOLE	C-PW-1	**TEST INTERVAL**	130-142

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	594,28	
60	20	594,29	0,010
120	20	594,29	0,000
180	20	594,30	0,010
300	20	594,31	0,010
420	20	594,31	0,000
540	20	594,32	0,010
0	40	594,32	
60	40	594,33	0,01
120	40	594,34	0,01
180	40	594,35	0,01
300	40	594,37	0,02
420	40	594,38	0,01
540	40	594,40	0,02
0	60	594,84	
60	60	594,85	0,01
120	60	594,86	0,01
180	60	594,87	0,01
300	60	594,88	0,01
420	60	594,90	0,02
540	60	594,91	0,01

BOREHOLE	C-PW-1	**TEST INTERVAL**	118-130

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	6615,40	
60	20	6615,40	0,000
120	20	6615,40	0,000
180	20	6615,40	0,000
0	40	6615,40	
60	40	6615,40	0,00
120	40	6615,40	0,00
180	40	6615,40	0,00
0	60	6615,50	
60	60	6615,66	0,16
120	60	6615,7	0,04

BOREHOLE	C-PW-1	TEST INTERVAL	106-118

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	Meter units	Flow meter	Pressure meter
			Gallon	psi

Casing/pump height	Abovel ground level

Borehole diameter (in rock): 96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	6630,90	
60	20	6630,90	0,000
120	20	6630,90	0,000
180	20	6630,90	0,000
0	40	6631,20	
60	40	6631,30	0,10
120	40	6631,40	0,10
180	40	6631,50	0,10
300	40	6631,70	0,20
0	60	6632,70	
60	60	6632,70	0,00
120	60	6632,70	0,00
180	60	6632,70	0,00
300	60	6632,70	0,00
420	60	6632,70	0,00

BOREHOLE	C-PW-1	**TEST INTERVAL**	94-106

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter: Gallon	Pressure meter: psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	6652,00	
60	20	6652,00	0,000
120	20	6652,00	0,000
180	20	6652,00	0,000
0	40	6652,50	
60	40	6652,65	0,15
120	40	6652,79	0,14
180	40	6652,97	0,18
300	40	6653,19	0,22
0	60	6653,50	
60	60	6653,70	0,20
120	60	6653,88	0,18
180	60	6654,06	0,18
300	60	6654,35	0,29

BOREHOLE	C-PW-1
TEST INTERVAL	82-94

Pressure step (circle one)

A	B	C	D	A+	B+	A+
(10psi)	(30psi)	(50psi)	(70psi)	(50psi)	(30psi)	(10psi)

Static water depth	From top of casing
Casing/pump height	Abovel ground level

Meter units	Flow meter	Pressure meter
	Gallon	psi

Borehole diameter (in rock): 96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	20	6668,10	
60	20	6668,10	0,000
120	20	6668,10	0,000
180	20	6668,10	0,000
0	40	6668,40	
60	40	6668,40	0,00
120	40	6668,40	0,00
180	40	6668,40	0,00
0	80	6668,70	
60	80	6668,79	0,09
120	80	6668,88	0,09
180	80	6668,95	0,07

BOREHOLE	C-PW-1	**TEST INTERVAL**	70-82

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	30	6689,70	
60	30	6689,80	0,100
120	30	6689,85	0,050
180	30	6689,93	0,080
300	30	6690,05	0,120
0	50	6694,30	
60	50	6694,40	0,10
120	50	6694,48	0,08
180	50	6694,56	0,08
0	80	6691,00	
60	80	6691,23	0,23
120	80	6691,42	0,19
180	80	6691,57	0,15
240	80	6691,72	0,15
300	80	6691,87	0,15

BOREHOLE	C-PW-1
TEST INTERVAL	58-70

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	
Casing/pump height	Abovel ground level	

Meter units	Flow meter	Pressure meter
	Gallon	psi

Borehole diameter (in rock): 96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	30	6701,40	
60	30	6701,40	0,000
120	30	6701,40	0,000
180	30	6701,40	0,000
0	50	6702,00	
60	50	6702,10	0,10
120	50	6702,18	0,08
180	50	6702,26	0,08
300	50	6702,41	0,15
420	50	6702,60	0,19
0	100	6704,00	
60	100	6704,41	0,41
120	100	6704,79	0,38
180	100	6705,1	0,31
300	100	6705,72	0,62

BOREHOLE	C-PW-1	**TEST INTERVAL**	46-58

Pressure step (circle one)

A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	30	6721,30	
60	30	6721,30	0,000
120	30	6721,30	0,000
180	30	6721,30	0,000
0	60	6722,10	
60	60	6722,37	0,27
120	60	6722,57	0,20
180	60	6722,76	0,19
300	60	6723,03	0,27
0	100	6723,60	
60	100	6724,08	0,48
120	100	6724,48	0,40
180	100	6724,81	0,33
300	100	6725,41	0,60
420	100	6725,96	0,55

BOREHOLE	C-PW-1	**TEST INTERVAL**	31-46

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

Static water depth	From top of casing	**Meter units**	Flow meter	Pressure meter
			Gallon	psi
Casing/pump height	Abovel ground level	**Borehole diameter (in rock):**	96 mm	

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	30	6735,10	
60	30	6735,10	0,000
120	30	6735,10	0,000
180	30	6735,10	0,000
0	50	6735,70	
60	50	6735,77	0,07
120	50	6735,84	0,07
180	50	6735,91	0,07
0	80	6736,40	
60	80	6736,70	0,30
120	80	6736,93	0,23
180	80	6737,09	0,16
300	80	6737,4	0,31
420	80	6737,7	0,30

BOREHOLE	C-PW-1	**TEST INTERVAL**	31

Pressure step (circle one)	A (10psi)	B (30psi)	C (50psi)	D (70psi)	A+ (50psi)	B+ (30psi)	A+ (10psi)

	From top of casing		Flow meter	Pressure meter
Static water depth		**Meter units**	Gallon	psi

	Abovel ground level		
Casing/pump height		**Borehole diameter (in rock):**	96 mm

Time (seconds)	Pressure (actual)	Volume (cumulative)	Flow (per last minute)
0	40	6756,10	
60	40	6756,90	0,800
120	40	6757,41	0,510
180	40	6757,84	0,430
240	40	6757,94	0,100
300	40	6758,27	0,330
420	40	6758,71	0,440
540	40	6759,29	0,580
660	40	6769,00	9,710
0	80	6764,50	
60	80	6766,90	2,40
120	80	6769,02	2,12
180	80	6770,10	1,08
240	80	6773,13	3,03
300	80	6775,20	2,07
420	80	6776,55	1,35
540	80	6777,13	0,58
660	80	6778,45	1,32
780	80	6780,83	2,38
900	80	6782,83	2,00
1140	80	6786,80	3,97

LEGEND

Rock Type Abbreviations		
Mag	Magnetite	
Nel	Nelsonite	
Prd	Peridotite	
An	Anorthosite	(also Labradorite)
Ap	Apatite	
DB	Diabase (Diorite)	
GN	Gabbro Norite	
Mf	Mafic	
Fel	Felsic	

Structure Type Abbreviations					
CT	Contact	VN	Vein	SJ	Single joint
FO	Foliation	IN	Intrusion	HJ	healed joint
FT	fault zone			SZ	shear zone
FC	fault cont			BZ	broken zone
BD	Banding			MZ	Mica zone

N discont. between runs
T/B meas. at top or bottom

Orientation codes

F.O.	Forward orientation
S.O.	Suspect orientation
N	No/Lost orientation
D.O.	Drill mark orientation
D.F.O	Drill mark forward orientation

Filling Abbreviations					
None	none	Q	quartz	Mf	Mafic
Ox	oxide	Cl	clay	Fel	Felsic
S	sulphide	Si	Silt	Ca	Calcite
Mo	Molybd.	Ch	Chlorite	Ap	Apatite
HBk	Hard black mineral (>mohs 6.0) - non magnetic - probable manganese hydroxide				
Mi	Mica	Go	Gouge	He	Hematite
HWt	Unidentifiable Hard White Material (Apatite?)				

GEOMECHANICAL LOG

Geomechanical Data Sheet

Of

Project	Arnaud	Job No.	TX10147503									
Hole No.	CH-1	Bearing		North		Core Box Lngth	1.57m - 181.32m				By	KA
Location	Open pit	Inclination		East		Core Dia.	From		To		Date	Feb 5 - Feb 08, 2011
						HQ	From		To			
							From		To			

Drill Interval			Rock Quality And Fracture Frequency												
From	To	Recovery	Whole Core Length	# Whole Pieces	Length of Longest Piece	Length of +.3m (+1ft)	RQD 2x diam (/recovered) Length of 2x Core Diam.	Length of Broken Core	Length of Rubble Zone	Length of run Hardness </= R2	RMR Harndess Rating	Number of Sets	Groundwater rating	Recovery	RQD (/recovered)
(m)	(m)	(m)	(m)	(#)	(m)	(m)	(m)	(m)	(m)	(m)	(SR - R6)	(#)	(0-15)	(%)	(%)
1.57	4.57	2.99	2.61	7	0.98	1.61	2.61	0.13	0	0	R5	SEE ORIENT SHEET			
4.57	7.57	2.96	2.96	8	1.42	2.35	2.48	0	0	0	R5	SEE ORIENT SHEET			
7.57	10.57	3.08	3.08	3	1.83	3.08	3.08	0	0	0	R5 - R6	SEE ORIENT SHEET			
10.57	13.57	2.95	2.63	9	0.97	1.96	1.96	0	0	0	R3 - R6	SEE ORIENT SHEET			
13.57	16.57	2.96	2.55	7	1.46	1.78	1.98	0.36	0	0.01	R3 - R5	SEE ORIENT SHEET			
16.57	19.57	2.95	2.94	10	0.48	1.48	2.68	0	0.01	0	R4 - R6	SEE ORIENT SHEET			
19.57	22.57	2.77	2.28	10	0.5	1.14	2.19	0.07	0	0	R5	SEE ORIENT SHEET			
22.57	25.32	2.54	2.2	7	0.76	1.13	2.07	0	0	0	R6	SEE ORIENT SHEET			
25.32	25.57	0.25	0.25	1	0.25	0	0.25	0	0	0	R6	SEE ORIENT SHEET			
25.57	28.57	2.89	2.89	5	1.43	2.42	2.89	0	0	0	R6	SEE ORIENT SHEET			
28.57	31.57	3.16	3.09	9	0.84	2.06	2.78	0	0.07	0	R5	SEE ORIENT SHEET			
31.57	34.57	2.99	2.68	5	1.31	2.52	2.63	0	0	0	R5 - R6	SEE ORIENT SHEET			
34.57	37.57	2.54	2.52	6	0.61	1.98	2.52	0	0	0	R5 - R6	SEE ORIENT SHEET			
37.57	40.57	3.37	3.33	7	0.7	3.3	3.17	0	0	0	R6	SEE ORIENT SHEET			
40.57	43.57	2.93	2.93	5	1.46	2.2	2.93	0	0	0	R5 - R6	SEE ORIENT SHEET			
43.57	46.57	2.83	2.83	9	0.75	2.37	2.6	0	0	0	R5 - R6	SEE ORIENT SHEET			
46.57	49.57	2.82	2.82	3	1.5	2.56	2.82	0	0	0	R5 - R6	SEE ORIENT SHEET			
49.57	52.32	3.09	3.09	6	1.26	2.75	3	0	0	0	R5 - R6	SEE ORIENT SHEET			
52.32	55.45	3.17	3.17	7	1.43	2.73	3.17	0	0	0	R5 - R6	SEE ORIENT SHEET			
55.45	58.57	3.07	3.07	2	2.16	3.07	3.07	0	0	0	R4 - R5	SEE ORIENT SHEET			
58.57	61.57	2.81	2.81	7	0.67	2.2	2.81	0	0	0	R4	SEE ORIENT SHEET			
61.57	64.57	3	2.6	13	0.88	0.88	2.02	0	0.1	0	R4 - R5	SEE ORIENT SHEET			
64.57	67.57	2.92	2.88	11	1.32	1.33	2.2	0	0	0	R4 - R6	SEE ORIENT SHEET			
67.57	70.57	2.72	1.88	18	0.17	0	0.5	0.45	0.15	0	R4	SEE ORIENT SHEET			
70.57	73.57	2.63	1.56	15	0.25	0	0.87	0	0.27	0	R5	SEE ORIENT SHEET			
73.57	76.57	2.99	2.99	8	1.75	2.49	2.71	0	0	0	R5 - R6	SEE ORIENT SHEET			
76.57	79.57	3.03	3.03	8	0.66	2.68	2.93	0	0	0	R5 - R6	SEE ORIENT SHEET			
79.57	82.57	3.03	3.03	5	1.2	2.93	2.93	0	0	0	R6	SEE ORIENT SHEET			
82.57	85.57	2.95	2.95	9	0.56	1.85	2.9	0	0	0	R6	SEE ORIENT SHEET			
85.57	88.57	2.92	2.92	4	1.12	2.92	2.92	0	0	0	R6	SEE ORIENT SHEET			
88.57	91.57	2.77	2.75	10	0.96	1.41	2.39	0.02	0	0	R5 - R6	SEE ORIENT SHEET			
91.57	94.57	2.99	2.99	10	1.06	1.96	2.58	0	0	0	R6	SEE ORIENT SHEET			
94.57	97.57	2.99	2.99	4	1.6	2.76	2.87	0	0	0	R6	SEE ORIENT SHEET			
97.57	100.57	2.95	2.95	5	1.67	2.41	2.95	0	0	0	R4 - R6	SEE ORIENT SHEET			
100.57	103.57	2.54	2.54	4	1.52	2.43	2.43	0	0	0	R5 - R6	SEE ORIENT SHEET			
103.57	106.31	3.17	3.17	5	1.23	3.02	3.09	0	0	0	R5	SEE ORIENT SHEET			
106.31	109.5	3.12	3.12	6	0.75	2.53	2.76	0	0	0	R5 - R6	SEE ORIENT SHEET			
109.5	112.32	2.81	2.6	3	1.89	2.46	2.46	0.13	0	0	R5 - R6	SEE ORIENT SHEET			
112.32	115.46	2.66	2.66	5	0.92	2.31	2.66	0	0	0	R5 - R6	SEE ORIENT SHEET			
115.46	118.25	3.1	3.1	6	1.15	2.78	3.1	0	0	0	R5 - R6	SEE ORIENT SHEET			
118.25	121.34	3.05	3.05	5	1.29	2.6	3.05	0	0	0	R5 - R6	SEE ORIENT SHEET			
121.34	124.44	3.05	3.05	7	0.96	2.31	3.05	0	0	0	R4 - R6	SEE ORIENT SHEET			
124.44	127.5	3.06	3.06	8	0.78	2.46	2.92	0	0	0	R5 - R6	SEE ORIENT SHEET			
127.5	130.57	3.16	3.16	5	1	3.01	3.16	0	0	0	R4 - R6	SEE ORIENT SHEET			
130.57	133.57	2.97	2.97	7	1.2	2.17	2.88	0	0	0	R6	SEE ORIENT SHEET			
133.57	136.57	2.92	2.92	6	0.97	2.56	2.92	0	0	0	R4 - R6	SEE ORIENT SHEET			
136.57	139.57	3.1	3.1	8	0.72	2.3	2.99	0	0	0	R4	SEE ORIENT SHEET			
139.57	142.57	2.99	2.99	7	0.86	2.1	2.75	0	0	0	R6	SEE ORIENT SHEET			
142.57	145.57	3.06	2.96	7	1.13	1.89	2.14	0.1	0	0	R5	SEE ORIENT SHEET			
145.57	148.57	2.91	2.79	12	0.55	1.76	1.98	0.12	0	0	R6	SEE ORIENT SHEET			
148.57	151.57	2.99	2.99	4	1.25	2.89	2.89	0	0	0	R5 - R6	SEE ORIENT SHEET			
151.57	154.57	3	3	8	1.52	2.18	2.95	0	0	0	R6	SEE ORIENT SHEET			
154.57	157.57	2.96	2.96	4	1.24	2.71	2.96	0	0	0	R6	SEE ORIENT SHEET			
157.57	160.57	2.99	2.99	12	0.66	1.57	2.57	0	0	0	R6	SEE ORIENT SHEET			
160.57	163.57	2.95	2.27	12	0.58	0.58	1.66	0.4	0	0.05	R4 - R6	SEE ORIENT SHEET			
163.57	166.57	2.97	2.43	15	0.3	0.3	1.62	0.35	0	0	R4 - R6	SEE ORIENT SHEET			
166.57	169.57	3.11	2.11	12	0.31	0.61	1.6	0.24	0	0	R5 - R6	SEE ORIENT SHEET			
169.57	172.57	3.05	2.96	7	1.23	2.2	2.84	0	0.09	0	R3	SEE ORIENT SHEET			
172.57	175.57	2.97	2.97	9	0.57	2.08	2.75	0	0	0	R6	SEE ORIENT SHEET			
175.57	178.57	2.5	2.5	6	0.91	1.96	2.5	0	0	0	R4 - R6	SEE ORIENT SHEET			
178.57	181.57	3.2	3.1	11	0.63	1.97	3.06	0	0	0	R6	SEE ORIENT SHEET			

Geomechanical Data Sheet

Of

Project	Mine Arnaud	Job No.	TX10147509								
Hole No.	CH-2	Bearing		North		Core Box Lngth				By	KA
Location	open pit	Inclination		East		Core Dia.	From		To	Date	Dec 12 Dec15, 2010
							From		To		
							From		To		

	Drill Interval			Rock Quality And Fracture Frequency												
Degrees error across run (Use from column)	From	To	Recovery	Whole Core Length	# Whole Pieces	Length of Longest Piece	Length of +.3m (+1ft)	RQD (/recovered) Length of 2x Core Diam.	Length of Broken Core	Length of Rubble Zone	Length of run Hardness </= R2	RMR Harndess Rating	Number of Sets	Groundwater rating	Recovery	RQD (/recovered)
Degrees	( )	( )	( )	( )	(#)	( )	( )	( )	( )	( )	( )	(S1 - R6)	(#)	(0-15)	(%)	(%)
	1.77	3.15	1.37	1.04	6	0.29	NONE	0.56	0.3	0	0	R4	See orient sheet			
CAN'T MEASURE	3.15	6.15	3.01	2.87	14	0.73	1.28	1.92	0.1	0	0	R4	See orient sheet			
CAN'T MEASURE	6.15	9.15	2.98	2.92	8	1.16	2.56	2.67	0	0	0	R4	See orient sheet			
CAN'T MEASURE	9.15	12.15	2.95	2.74	11	0.6	1.61	2.36	0.05	0	0	R4	See orient sheet			
	12.15	15.15	3	3	4	1	3	3	0	0	0	R4	See orient sheet			
	15.15	18.15	3	3	9	0.6	2.04	2.75	0	0	0	R4	See orient sheet			
12	18.15	21.15	3.02	3.02	4	1.85	2.7	3.02	0	0	0	R4	See orient sheet			
CAN'T MEASURE	21.15	24.15	2.8	2.1	6	1	1.43	1.93	0.06	0.24	0	R4	See orient sheet			
	24.15	27.15	3.12	2.93	9	0.91	1.85	2.86	0.04	0	0	R4	See orient sheet			
	27.15	30.15	3.01	3.01	4	1.83	2.56	3.01	0	0	0	R4	See orient sheet			
	30.15	33.15	2.97	2.97	6	1.52	2.46	2.73	0	0	0	R4	See orient sheet			
	33.15	36.15	2.99	2.99	3	2.4	2.79	2.99	0	0	0	R4	See orient sheet			
	36.15	39.15	2.99	2.99	3	1.45	2.99	2.99	0	0	0	R4	See orient sheet			
	39.15	42.15	2.93	2.75	7	1.31	1.29	2.62	0.15	0	0	R4	See orient sheet			
	42.15	45.15	2.98	2.85	6	0.97	1.95	2.76	0	0	0	R5	See orient sheet			
	45.15	48.15	3.09	3.09	10	0.53	1.21	2.77	0	0	0	R4	See orient sheet			
	48.15	51.15	2.97	2.97	1	2.97	2.97	2.97	0	0	0	R4	See orient sheet			
	51.15	54.15	2.93	2.87	4	1.82	2.47	2.73	0	0	0	R4	See orient sheet			
	54.15	57.15	2.85	2.77	4	1.21	2.71	2.71	0.03	0	0	R4	See orient sheet			
	57.15	60.15	3.12	3.12	5	1.04	2.38	3.04	0	0	0	R4	See orient sheet			
	60.15	63.15	2.98	2.98	2	1.6	2.98	2.98	0	0	0	R4	See orient sheet			
	63.15	66.15	2.98	2.98	3	1.75	2.71	2.98	0	0	0	R4	See orient sheet			
	66.15	69.15	2.98	2.98	2	2.57	2.98	2.98	0	0	0	R4	See orient sheet			
	69.15	72.15	2.97	2.97	9	1.46	2.3	2.5	0	0	0	R4	See orient sheet			
	72.15	75.15	2.94	2.94	5	1.17	2.84	2.84	0	0	0	R5	See orient sheet			
	75.15	78.15	2.96	2.94	8	1.15	2.91	2.91	0	0	0	R6	See orient sheet			
	78.15	81.15	3.02	3.02	6	1.23	2.84	3.02	0	0	0	R6	See orient sheet			
	81.15	84.15	2.98	2.98	8	1	2.65	2.98	0	0	0	R5	See orient sheet			
	84.15	87.15	3.03	3.03	9	0.53	1.97	3.03	0	0	0	R6	See orient sheet			
	87.15	90.15	2.99	2.99	5	0.95	2.99	2.99	0	0	0	R5	See orient sheet			
	90.15	93.15	2.98	2.98	3	1.77	2.98	2.98	0	0	0	R6	See orient sheet			
	93.15	96.15	3.02	3.02	4	1.86	2.98	2.98	0	0	0	R6	See orient sheet			
	96.15	99.15	2.95	2.95	3	1.62	2.85	2.95	0	0	0	R6	See orient sheet			
	99.15	102.15	3.03	3.03	6	1.54	2.63	3.03	0	0	0	R6	See orient sheet			
	102.15	105.15	2.97	2.97	3	2.03	2.83	2.86	0	0	0	R6	See orient sheet			
	105.15	108.15	3.04	3.03	5	1.2	3.02	3.02	0	0	0	R6	See orient sheet			
	108.15	111.15	3	2.9	11	0.75	1..76	2.6	0.1	0	0	R6	See orient sheet			
	111.15	114.15	2.95	2.95	5	0.87	2.95	2.95	0	0	0	R6	See orient sheet			
	114.15	117.15	3	2.6	7	0.82	2.27	2.27	0	0.4	0	R6	See orient sheet			
	117.15	120.15	2.97	2.97	3	1.67	2.71	2.97	0	0	0	R6	See orient sheet			
	120.15	123.15	2.97	2.97	7	0.97	2.61	2.97	0	0	0	R5	See orient sheet			
	123.15	126.15	2.93	2.48	2	2.12	2.93	2.93	0	0	0	R5	See orient sheet			
	126.15	129.15	3.1	2.98	5	0.9	2.98	2.98	0	0	0	R6	See orient sheet			
	129.15	132.15	3	2.97	5	1.16	2.72	3	0	0	0	R6	See orient sheet			
	132.15	135.15	3.01	3.01	4	1.56	2.87	3.01	0	0	0	R6	See orient sheet			
	135.15	138.15	3	3	4	1.31	2.85	2.85	0	0	0	R5	See orient sheet			
	138.15	141.15	2.99	2.99	1	2.99	2.99	2.99	0	0	0	R5	See orient sheet			
	141.15	144.15	3.01	3.01	1	3.01	3.01	3.01	0	0	0	R5	See orient sheet			
	144.15	147.15	3.02	3.02	4	1.35	2.78	3.02	0	0	0	R6	See orient sheet			
	147.15	150.15	3	2.95	2	1.62	2.95	2.95	0	0	0	R5	See orient sheet			
	150.15	153.15	3	1.84	10	0.55	0.88	1.22	1	0	0.15	R5	See orient sheet			
	153.15	156.15	3.03	3.03	8	1.55	2.3	2.84	0	0	0	R6	See orient sheet			
	156.15	159.15	2.96	2.82	7	1.61	1.97	2.7	0	0	0	R6	See orient sheet			
	159.15	162.15	3.04	3.04	6	0.83	2.92	2.92	0	0	0	R6	See orient sheet			
	162.15	165.15	3.04	2.92	7	0.95	2.1	2.78	0.12	0	0.12	R6	See orient sheet			
	165.15	168.15	2.98	2.94	7	1	2.41	2.68	0.04	0	0	R6	See orient sheet			
	168.15	171.15	3.02	3.02	9	0.6	2.62	2.9	0	0	0	R5	See orient sheet			

Geomechanical Data Sheet

Of

Project	Arnaud	Job No.	TX10147503						
Hole No.	CH-3	Bearing		North		Core Box Lngth	1.15m - 102.25m	By	KA
Location	Open pit	Inclination		East		Core Dia.	From / To	Date	Dec 9 - Dec 12, 2010
						HQ	From / To		
							From / To		

Drill Interval			Rock Quality And Fracture Frequency												
From (m)	To (m)	Recovery (m)	Whole Core Length (m)	# Whole Pieces (#)	Length of Longest Piece (m)	Length of +.3m (+1ft) (m)	**RQD 2x diam (/recovered)** Length of 2x Core Diam. (m)	Length of Broken Core (m)	Length of Rubble Zone (m)	Length of run Hardness </= R2 (m)	RMR Harndess Rating (S1 - R6)	Number of Sets (#)	Groundwater rating (0-15)	Recovery (%)	**RQD (/recovered)** (%)
1.15	3.25	2.06	1.72	7	0.74	1.18	1.44	0.3	0	0	R4	SEE ORIENT SHEET			
3.25	6.25	2.98	2.88	3	1.95	2.98	2.87	0	0	0	R4	SEE ORIENT SHEET			
6.25	9.25	3	3	4	1.12	1.88	3	0	0	0	R4	SEE ORIENT SHEET			
9.25	12.25	2.86	2.86	6	1.2	2.38	2.73	0	0	0	R4	SEE ORIENT SHEET			
12.25	15.25	3.01	3.01	3	1.46	2.92	2.92	0	0	0	R4	SEE ORIENT SHEET			
15.25	18.25	2.98	2.93	7	0.77	2.32	2.93	0	0	0	R5	SEE ORIENT SHEET			
18.25	21.25	2.97	2.97	4	1.35	2.97	2.97	0	0	0	R5	SEE ORIENT SHEET			
21.25	24.25	2.91	2.91	4	1.47	2.79	2.79	0	0	0	R4	SEE ORIENT SHEET			
24.25	27.25	3.04	3.04	3	1.54	3.04	3.04	0	0	0	R4	SEE ORIENT SHEET			
27.25	30.25	3	3	5	1.64	2.69	2.88	0	0	0	R4	SEE ORIENT SHEET			
30.25	33.25	3	2.94	6	1.3	2.59	2.85	0	0	0	R5	SEE ORIENT SHEET			
33.25	36.25	3	2.43	8	0.87	1.62	2.24	0	0	0	R5	SEE ORIENT SHEET			
36.25	39.25	3	1.09	6	0.27	0	0.87	0	1.91	1.91	R3	SEE ORIENT SHEET			
39.25	42.25	2.92	1.79	11	0.75	1.16	1.65	0.39	0	0	R6	SEE ORIENT SHEET			
42.25	45.25	3.05	2.61	4	2.09	2.43	2.54	0	0.16	0	R4	SEE ORIENT SHEET			
45.25	48.25	2.96	2.96	11	1.02	1.47	2.6	0	0	0	R4	SEE ORIENT SHEET			
48.25	51.25	3.06	3.06	8	1	2.46	2.56	0	0	0	R4	SEE ORIENT SHEET			
51.25	54.25	2.98	2.93	6	0.92	2.47	2.98	0	0	0	R6	SEE ORIENT SHEET			
54.25	57.25	3.04	3.04	8	0.84	2.59	2.78	0	0	0	R4	SEE ORIENT SHEET			
57.25	60.25	2.9	2.9	3	1.55	2.9	2.9	0	0	0	R4	SEE ORIENT SHEET			
60.25	63.25	3.04	3.04	7	0.83	2.64	2.98	0	0	0	R4	SEE ORIENT SHEET			
63.25	66.25	2.85	2.85	8	0.68	2.31	2.85	0	0	0	R5	SEE ORIENT SHEET			
66.25	69.25	3.12	3.12	6	1.77	2.2	3.12	0	0	0	R5	SEE ORIENT SHEET			
69.25	72.25	3.04	3.04	2	2.4	3.04	3.04	0	0	0	R6	SEE ORIENT SHEET			
72.25	75.25	2.95	2.95	9	0.93	2.65	2.65	0	0	0	R5	SEE ORIENT SHEET			
75.25	78.25	3	3	2	2.58	3	3	0	0	0	R5	SEE ORIENT SHEET			
78.25	81.25	3.04	3.04	7	0.75	2.45	3.04	0	0	0	R6	SEE ORIENT SHEET			
81.25	84.25	2.94	2.94	5	1.49	2.83	2.83	0	0	0	R6	SEE ORIENT SHEET			
84.25	87.25	2.93	2.93	6	0.93	2.46	2.84	0	0	0	R6	SEE ORIENT SHEET			
87.25	90.25	3.05	3.05	13	0.6	1.46	2.66	0	0	0	R6	SEE ORIENT SHEET			
90.25	93.25	2.96	2.96	8	0.41	2.18	2.9	0	0	0	R5	SEE ORIENT SHEET			
93.25	96.25	2.95	2.84	9	0.88	1.88	2.57	0	0	0	R6	SEE ORIENT SHEET			
96.25	99.25	2.97	2.97	5	1.29	2.42	2.87	0	0	0	R6	SEE ORIENT SHEET			
99.25	102.25	2.9	2.74	5	1.18	2.44	2.66	0	0	0	R6	SEE ORIENT SHEET			

Geomechanical Data Sheet

Of

Project	Arnaud	Job No.	TX10147503						
Hole No.	CH-4re	Bearing		North		Core Box Lngth	3.52m - 101.32m	By	KA
Location	Open pit	Inclination		East		Core Dia.	From / To	Date	
						HQ	From / To		
							From / To		

Drill Interval			Rock Quality And Fracture Frequency												
From (m)	To (m)	Recovery (m)	Whole Core Length (m)	# Whole Pieces (#)	Length of Longest Piece (m)	Length of +.3m (+1ft) (m)	**RQD 2x diam (/recovered)** Length of 2x Core Diam. (m)	Length of Broken Core (m)	Length of Rubble Zone (m)	Length of run Hardness </= R2 (m)	RMR Harndess Rating (SR - R6)	Number of Sets (#)	Groundwater rating (0-15)	Recovery (%)	**RQD (/recovered)** (%)
3.52	5.32	1.74	1.5	5	0.47	0.88	1.33	0.2	0	0	R6	SEE ORIENT SHEET			
5.32	8.32	2.92	2.85	6	0.73	2.3	2.85	0.07	0	0	R4 - R5	SEE ORIENT SHEET			
8.32	11.32	2.9	2.9	7	0.96	1.53	2.12	0	0	0	R6	SEE ORIENT SHEET			
11.32	14.32	3	2.93	11	0.59	2.18	2.48	0	0	0.01	R4 - R5	SEE ORIENT SHEET			
14.32	17.32	3.06	3.03	3	1.64	2.89	3.06	0	0	0	R5 - R6	SEE ORIENT SHEET			
17.32	20.32	2.88	2.75	4	1.46	2.54	2.74	0	0	0.005	R4 - R5	SEE ORIENT SHEET			
20.32	23.32	2.97	2.97	3	1.73	2.97	2.97	0	0	0	R4 - R6	SEE ORIENT SHEET			
23.32	26.32	2.98	2.98	4	1.4	2.76	2.98	0	0	0	R6	SEE ORIENT SHEET			
26.32	29.32	2.99	2.99	5	1.3	2.37	2.87	0	0	0	R5 - R6	SEE ORIENT SHEET			
29.32	32.32	2.88	2.88	6	1	2.42	2.88	0	0	0	R4	SEE ORIENT SHEET			
32.32	35.32	2.92	2.54	6	1.35	1.83	2.04	0.13	0.05	0	R6	SEE ORIENT SHEET			
35.32	38.32	3.08	3.08	6	1.32	2.34	3.08	0	0	0	R6	SEE ORIENT SHEET			
38.32	41.32	2.87	2.87	3	1.99	2.59	2.87	0	0	0	R6	SEE ORIENT SHEET			
41.32	44.32	3.06	3.06	4	1.79	2.95	2.95	0	0	0	R6	SEE ORIENT SHEET			
44.32	47.32	2.91	2.91	2	2.84	2.84	2.84	0	0	0	R6	SEE ORIENT SHEET			
47.32	50.32	2.75	2.71	4	2.15	2.2	2.75	0.04	0	0	R6	SEE ORIENT SHEET			
50.32	53.32	2.82	2.76	10	0.8	1.35	2.36	0.06	0	0	R4	SEE ORIENT SHEET			
53.32	56.32	3.12	3.07	8	0.52	2.49	2.89	0.05	0	0	R6	SEE ORIENT SHEET			
56.32	59.32	2.97	2.83	11	0.66	1.6	2.24	0	0	0	R6	SEE ORIENT SHEET			
59.32	62.04	2.75	2.68	13	0.4	1.12	2.14	0	0	0	R5 - R6	SEE ORIENT SHEET			
62.04	65.19	3.17	2.84	6	1.41	2.54	2.54	0.16	0	0	R5 - R6	SEE ORIENT SHEET			
65.19	68.32	2.65	2.24	6	0.67	1.5	2.2	0.04	0	0	R4 - R6	SEE ORIENT SHEET			
68.32	70.93	3.11	2.95	8	0.88	2.21	2.72	0	0	0	R6	SEE ORIENT SHEET			
70.93	73.85	2.77	2.61	12	0.4	1.17	2.03	0.07	0	0	R6	SEE ORIENT SHEET			
73.85	74.32	0.46	0.41	3	0.16	0	0.145	0	0	0	R5	SEE ORIENT SHEET			
74.32	77.32	2.78	2.38	10	0.43	1.35	2	0	0	0	R4 - R6	SEE ORIENT SHEET			
77.32	80.32	2.68	2.55	12	0.48	0.92	2.15	0	0	0	R4 - R5	SEE ORIENT SHEET			
80.32	83.1	3.18	3.18	9	0.58	2.44	2.86	0	0	0	R5	SEE ORIENT SHEET			
83.1	86.32	3.09	3.09	6	1.26	2.87	2.88	0	0	0	R5 - R6	SEE ORIENT SHEET			
86.32	89.32	2.96	2.94	5	1.54	2.45	2.87	0	0	0	R4 - R6	SEE ORIENT SHEET			
89.32	92.32	2.87	2.87	6	1.19	2.75	2.74	0	0	0	R5 - R6	SEE ORIENT SHEET			
92.32	95.32	3.15	3.15	8	1.42	2.69	2.81	0	0	0	R4 - R6	SEE ORIENT SHEET			
95.32	98.32	2.96	2.96	5	1.41	2.49	2.7	0	0	0	R4 - R5	SEE ORIENT SHEET			
98.32	101.32	2.97	2.97	9	0.89	2.69	2.86	0	0	0	R4 - R5	SEE ORIENT SHEET			

Geomechanical Data Sheet

Of

Project	Arnaud	Job No.	TX10147503						
Hole No.	CH-5	Bearing		North		Core Box Lngth	3.7m - 134.8m	By	KA
Location	Open pit	Inclination		East		Core Dia.	From / To	Date	Dec 2 - Dec 4, 2010
						HQ	From / To		
							From / To		

Drill Interval			Rock Quality And Fracture Frequency												
From	To	Recovery	Whole Core Length	# Whole Pieces	Length of Longest Piece	Length of +.3m (+1ft)	RQD 2x diam (/recovered) Length of 2x Core Diam.	Length of Broken Core	Length of Rubble Zone	Length of run Hardness </= R2	RMR Harndess Rating	Number of Sets	Groundwater rating	Recovery	RQD (/recovered)
(m)	(m)	(m)	(m)	(#)	(m)	(m)	(m)	(m)	(m)	(m)	(S1 - R6)	(#)	(0-15)	(%)	(%)
3.7	5.8	1.13	1.05	5	0.33	0.33	1.05	0.08	0	0	R3	SEE ORIENT SHEET			
5.8	8.8	2.99	2.99	15	0.55	1.35	2.36	0	0	0	R3	SEE ORIENT SHEET			
8.8	11.8	3.15	3.15	15	0.54	1.49	2.39	0	0	0	R4	SEE ORIENT SHEET			
11.8	14.8	3	3	14	0.36	1.37	2.67	0	0	0	R5	SEE ORIENT SHEET			
14.8	17.8	2.97	2.97	9	0.7	2.2	2.73	0	0	0	R5	SEE ORIENT SHEET			
17.8	20.8	2.96	2.86	8	0.55	2.07	2.82	0.1	0	0.1	R5	SEE ORIENT SHEET			
20.8	23.8	2.95	2.95	7	0.86	2.47	2.79	0	0	0	R5	SEE ORIENT SHEET			
23.8	26.8	2.9	2.75	10	0.46	1.88	2.71	0	0	0	R5	SEE ORIENT SHEET			
26.8	29.8	3.09	3.09	5	1.45	2.64	3.09	0	0	0	R5	SEE ORIENT SHEET			
29.8	32.8	2.99	2.99	7	1.12	2.39	2.99	0	0	0	R5	SEE ORIENT SHEET			
32.8	35.8	3.03	3.03	8	0.82	2.09	3.03	0	0	0	R5	SEE ORIENT SHEET			
35.8	38.8	2.98	2.98	5	1.97	2.83	2.85	0	0	0	R5	SEE ORIENT SHEET			
38.8	41.8	2.94	2.89	4	1.17	2.68	2.89	0.05	0.01	0.01	R4	SEE ORIENT SHEET			
41.8	44.8	2.93	2.93	3	1.29	2.93	2.93	0	0	0	R4	SEE ORIENT SHEET			
44.8	47.8	3.04	2.76	11	1.27	1.27	2.18	0	0	0	R4	SEE ORIENT SHEET			
47.8	50.8	3.02	3.02	10	0.55	0.89	2.92	0	0	0	R5	SEE ORIENT SHEET			
50.8	53.8	2.94	2.94	6	1.4	2.51	2.85	0	0	0	R3	SEE ORIENT SHEET			
53.8	56.8	3.02	3.02	6	0.73	2.79	2.93	0	0	0	R4	SEE ORIENT SHEET			
56.8	59.8	2.97	2.87	7	1.03	1.58	2.7	0	0	0	R4	SEE ORIENT SHEET			
59.8	62.8	2.89	2.83	9	0.59	1.77	2.73	0.06	0	0	R4	SEE ORIENT SHEET			
62.8	65.8	3.11	3.09	5	1.5	2.78	2.95	0.02	0	0	R4	SEE ORIENT SHEET			
65.8	68.8	2.89	2.89	5	1.38	2.5	2.69	0	0	0	R5	SEE ORIENT SHEET			
68.8	71.8	3.08	3.05	9	0.84	2.5	2.75	0	0.03	0	R4	SEE ORIENT SHEET			
71.8	74.8	2.88	2.88	7	1.06	2.18	2.88	0	0	0	R4	SEE ORIENT SHEET			
74.8	77.8	3.1	3.1	5	2.03	2.5	3	0	0	0	R4	SEE ORIENT SHEET			
77.8	80.8	3	3	5	1.4	2.63	2.9	0	0	0	R5	SEE ORIENT SHEET			
80.8	83.8	2.91	2.91	6	0.83	2.46	2.73	0	0	0	R4	SEE ORIENT SHEET			
83.8	86.8	2.98	2.98	6	1.5	2.17	2.17	0	0	0	R5	SEE ORIENT SHEET			
86.8	89.8	3.03	2.91	5	1.05	2.82	2.81	0	0	0	R4	SEE ORIENT SHEET			
89.8	92.8	2.95	2.91	5	1.3	2.67	2.67	0	0	0	R4	SEE ORIENT SHEET			
92.8	95.8	3.01	2.86	5	1.26	2.66	2.86	0	0	0	R4	SEE ORIENT SHEET			
95.8	98.8	2.96	2.96	6	1.29	2.33	2.96	0	0	0	R4	SEE ORIENT SHEET			
98.8	101.8	3	2.95	4	1.84	2.8	2.95	0	0	0	R4	SEE ORIENT SHEET			
101.8	104.8	3.03	2.99	5	1.25	2.69	2.99	0	0	0	R4	SEE ORIENT SHEET			
104.8	107.8	2.87	2.81	3	2.17	2.7	2.7	0	0	0	R4	SEE ORIENT SHEET			
107.8	110.8	3.04	2.86	11	0.95	1.48	2.3	0	0	0	R4	SEE ORIENT SHEET			
110.8	113.8	2.98	2.94	6	0.77	2.2	2.93	0	0	0	R4	SEE ORIENT SHEET			
113.8	116.8	2.99	2.98	8	0.85	2.43	2.99	0	0	0	R4	SEE ORIENT SHEET			
116.8	119.8	3.09	3.08	4	1.33	3.09	3.09	0	0	0	R4	SEE ORIENT SHEET			
119.8	122.8	2.9	2.83	8	0.69	2.6	2.9	0	0	0	R4	SEE ORIENT SHEET			
122.8	125.8	3	3	3	1.96	2.78	3	0	0	0	R4	SEE ORIENT SHEET			
125.8	128.8	2.99	2.99	6	1.16	2.72	2.89	0	0	0	R4	SEE ORIENT SHEET			
128.8	131.8	2.97	2.97	5	1.44	2.63	2.97	0	0	0	R4	SEE ORIENT SHEET			
131.8	134.8	3	3	4	1.98	2.83	3	0	0	0	R4	SEE ORIENT SHEET			

Geomechanical Data Sheet

Of

Project	Arnaud	Job No.	TX10147503						
Hole No.	CH-6	Bearing		North		Core Box Lngth	2.57m - 151.21m	By	KA
Location	Open pit	Inclination		East		Core Dia.	From / To	Date	Jan 05 - Jan 07, 2011
						HQ	From / To		
							From / To		

Drill Interval			Rock Quality And Fracture Frequency												
From	To	Recovery	Whole Core Length	# Whole Pieces	Length of Longest Piece	Length of +.3m (+1ft)	RQD 2x diam (/recovered) Length of 2x Core Diam.	Length of Broken Core	Length of Rubble Zone	Length of run Hardness </= R2	RMR Harndess Rating	Number of Sets	Groundwater rating	Recovery	RQD (/recovered)
(m)	(m)	(m)	(m)	(#)	(m)	(m)	(m)	(m)	(m)	(m)	(SR - R6)	(#)	(0-15)	(%)	(%)
2.57	3.21	0.64	0.64	3	0.29	0	0.53	0	0	0	R4	SEE ORIENT SHEET			
3.21	6.21	2.97	2.72	7	1.1	2.08	2.54	0	0	0	R5	SEE ORIENT SHEET			
6.21	9.21	2.92	2.11	7	0.9	1.8	2	0	0	0	R4	SEE ORIENT SHEET			
9.21	12.21	2.92	2.79	9	0.9	2.05	2.64	0	0	0	R4	SEE ORIENT SHEET			
12.21	15.21	2.73	2.57	3	1.14	2.57	2.57	0.1	0	0	R4	SEE ORIENT SHEET			
15.21	18.21	2.9	2.47	5	0.72	2.38	2.66	0.15	0	0	R4	SEE ORIENT SHEET			
18.21	21.21	3.08	2.74	9	0.69	1.7	2.76	0.34	0	0	R4	SEE ORIENT SHEET			
21.21	24.21	2.74	2.06	8	0.51	1.16	1.99	0.45	0	0	R4	SEE ORIENT SHEET			
24.21	27.21	3.08	3.08	6	1.22	2.64	3.08	0	0	0	R4	SEE ORIENT SHEET			
27.21	30.21	3.07	3.07	6	1.17	2.73	3.08	0	0	0	R3	SEE ORIENT SHEET			
30.21	33.21	2.84	2.61	7	1.3	2.27	2.45	0.06	0	0	R4	SEE ORIENT SHEET			
33.21	36.21	2.96	2.78	7	1.45	2.06	2.82	0	0	0	R4	SEE ORIENT SHEET			
36.21	39.21	2.83	2.79	9	0.74	2.16	2.46	0.04	0	0	R4	SEE ORIENT SHEET			
39.21	42.21	3.2	2.5	9	0.52	1.78	2.41	0.09	0.07	0	R4	SEE ORIENT SHEET			
42.21	45.21	3.07	3.07	5	0.9	3.07	3.07	0	0	0	R4	SEE ORIENT SHEET			
45.21	48.21	2.9	0.68	4	0.26	0	0.68	0.15	0.03	0	R3	SEE ORIENT SHEET			
48.21	51.21	3.22	3.11	8	1.14	2.67	3.11	0	0	0	R4	SEE ORIENT SHEET			
51.21	54.21	3.02	3.02	7	0.9	2.44	2.91	0	0	0	R4	SEE ORIENT SHEET			
54.21	57.21	2.55	2.55	1	2.55	2.55	2.55	0	0	0	R4	SEE ORIENT SHEET			
57.21	60.21	3.2	2.98	3	2.1	2.87	2.87	0	0	0	R4	SEE ORIENT SHEET			
60.21	63.21	3.2	3.19	7	1.14	2.56	2.97	0	0	0	R4 to R6	SEE ORIENT SHEET			
63.21	66.21	3.04	3.04	2	1.65	3.04	3.04	0	0	0	R4	SEE ORIENT SHEET			
66.21	69.21	2.68	2.68	6	0.94	2.42	2.42	0	0	0	R4	SEE ORIENT SHEET			
69.21	72.21	3.11	3.11	5	1.35	2.67	3.11	0	0	0	R4 to R6	SEE ORIENT SHEET			
72.21	75.21	2.94	2.94	4	1.6	2.94	2.94	0	0	0	R4	SEE ORIENT SHEET			
75.21	78.21	3.15	2.99	8	1.78	2.42	2.76	0	0	0	R3 to R5	SEE ORIENT SHEET			
78.21	81.21	3	3	4	1.83	2.76	3	0	0	0	R4	SEE ORIENT SHEET			
81.21	84.21	3.09	3.09	9	0.9	2.1	2.87	0	0	0	R4	SEE ORIENT SHEET			
84.21	87.21	2.88	2.71	7	1.16	2.12	2.6	0	0	0	R4 to R6	SEE ORIENT SHEET			
87.21	88.11	0.94	0.68	2	0.52	0.52	0.76	0	0	0	R4	SEE ORIENT SHEET			
88.11	90.21	2.23	2.23	9	0.59	0.6	1.98	0	0	0	R4	SEE ORIENT SHEET			
90.21	91.91	1.6	0.34	1	0.34	0.34	0.34	0	0.45	0	R4	SEE ORIENT SHEET			
91.91	93.21	1.31	0.92	1	0.92	0.92	0.92	0	0	0	R4	SEE ORIENT SHEET			
93.21	96.21	2.92	2.67	3	0.93	2.67	2.67	0	0	0	R4	SEE ORIENT SHEET			
96.21	98.6	2.23	2.07	7	0.93	1.82	1.96	0.07	0	0	R3 to R5	SEE ORIENT SHEET			
98.6	101.92	2.29	1.78	6	0.93	0.93	1.25	0	0	0	R5	SEE ORIENT SHEET			
101.92	103.21	1.22	1.13	4	0.4	0.7	0.99	0	0	0	R5	SEE ORIENT SHEET			
103.21	106.21	2.99	2.89	6	1	2.48	2.89	0	0	0	R4	SEE ORIENT SHEET			
106.21	109.21	2.82	2.82	3	1.7	2.82	2.82	0	0	0	R4	SEE ORIENT SHEET			
109.21	112.21	3.12	2.95	5	1.08	1.87	2.5	0	0	0	R4	SEE ORIENT SHEET			
112.21	115.21	3.18	2.41	6	1.09	1.85	2.39	0	0.05	0	R4	SEE ORIENT SHEET			
115.21	118.21	2.99	2.99	6	1.63	2.43	2.91	0	0	0	R4	SEE ORIENT SHEET			
118.21	121.21	2.88	2.8	7	1.34	2.06	2.44	0	0	0	R5	SEE ORIENT SHEET			
121.21	124.21	2.93	2.93	6	1.1	2.7	2.71	0	0	0	R4	SEE ORIENT SHEET			
124.21	127.21	2.76	2.5	3	1.11	2.45	2.45	0	0	0	R4	SEE ORIENT SHEET			
127.21	130.21	3.12	3.12	2	1.76	3.12	3.12	0	0	0	R4	SEE ORIENT SHEET			
130.21	133.21	3.15	3.15	3	1.38	3.15	3.15	0	0	0	R4	SEE ORIENT SHEET			
133.21	136.21	2.58	2.58	5	0.83	1.94	2.35	0	0	0	R5	SEE ORIENT SHEET			
136.21	139.21	3.05	2.64	5	1.17	2.64	2.95	0.1	0	0	R4	SEE ORIENT SHEET			
139.21	142.21	3.32	2.72	9	1.64	1.63	2.4	0	0.03	0	R3 to R5	SEE ORIENT SHEET			
142.21	145.21	2.82	2.82	6	1.78	2.16	2.73	0	0	0	R4	SEE ORIENT SHEET			
145.21	148.21	2.93	2.62	6	0.93	2.62	2.66	0	0	0	R4	SEE ORIENT SHEET			
148.21	151.21	3.09	3.09	3	2.52	3.01	3.01	0	0	0	R4	SEE ORIENT SHEET			

From(m)	To (m)	
21.21	24.21	Most of broken core in zone (0.27m) appears mechanical
45.21	48.21	Most broken or rubble core likely result of mechanical breaks along knife like joints in week mica rich rock.

Geomechanical Data Sheet

Project	Arnaud	Job No.	TX10147503								
Hole No.	CH-7	Bearing		North		Core Box Lngth	13.68m - 202.9m			By	KA
Location	Open pit	Inclination		East		Core Dia.	From		To	Date	
						HQ	From		To		
							From		To		

Drill Interval			Rock Quality And Fracture Frequency												
From	To	Recovery	dav	# Whole Pieces	Length of Longest Piece	Length of +.3m (+1ft)	RQD 2x diam (/recovered) Length of 2x Core Diam.	Length of Broken Core	Length of Rubble Zone	Length of run Hardness <= R2	RMR Harndess Rating	Number of Sets	Groundwater rating	Recovery	RQD (/recovered)
(m)	(m)	(m)	(m)	(#)	(m)	(m)	(m)	(m)	(m)	(m)	(SR - R6)	(#)	(0-15)	(%)	(%)
13.68	13.9	0.22	0.15	1	0.15	0	0.15	0.07	0	0	an't measu	SEE ORIENT SHEET			
13.9	16.9	2.97	2.8	5	0.97	2.6	2.6	0.02	0	0	R6	SEE ORIENT SHEET			
16.9	19.9	3.02	3.02	8	0.77	2.08	2.9	0	0	0	R4-R5	SEE ORIENT SHEET			
19.9	22.9	2.75	2.73	10	0.76	1.41	2.29	0.02	0	0	R6	SEE ORIENT SHEET			
22.9	25.9	3.01	3.01	10	0.67	1.42	2.65	0	0	0	R5-R6	SEE ORIENT SHEET			
25.9	28.9	3	3	3	1.82	2.82	3	0	0	0	R5	SEE ORIENT SHEET			
28.9	31.9	2.65	2.65	5	1.34	1.92	2.54	0	0	0	R6	SEE ORIENT SHEET			
31.9	34.9	2.96	2.96	2	1.57	2.96	2.96	0	0	0	R5-R6	SEE ORIENT SHEET			
34.9	37.9	3	2.9	5	0.87	2.3	2.72	0	0	0	R5-R6	SEE ORIENT SHEET			
37.9	40.67	3.15	2.55	2	2.03	2.5	2.5	0	0	0	ENT FOR U	SEE ORIENT SHEET			
40.67	43.05	2.38	2.27	6	0.6	1.69	2.27	0	0	0	R5-R6	SEE ORIENT SHEET			
43.05	43.9	0.85	0.85	1	0.85	0.85	0.85	0	0	0	R5-R6	SEE ORIENT SHEET			
43.9	46.9	2.6	2.6	1	2.6	2.6	2.6	0	0	0	R5-R6	SEE ORIENT SHEET			
46.9	49.74	3.18	3.18	11	0.92	1.96	2.58	0	0	0	R4-R6	SEE ORIENT SHEET			
49.74	52.9	2.98	2.95	7	0.64	2.57	2.95	0	0	0	R5	SEE ORIENT SHEET			
52.9	55.9	3.07	2.93	6	1.07	2.51	2.7	0	0	0	R5	SEE ORIENT SHEET			
55.9	58.9	3.11	3.04	12	0.65	1.75	2.58	0.07	0	0	R5-R6	SEE ORIENT SHEET			
58.9	61.9	2.84	2.84	4	1.32	2.75	2.75	0	0	0	R5	SEE ORIENT SHEET			
61.9	64.9	2.89	2.87	6	0.98	2.41	2.64	0	0	0	R5-R6	SEE ORIENT SHEET			
64.9	67.9	2.94	2.73	6	1.15	1.92	2.54	0	0	0	R5-R6	SEE ORIENT SHEET			
67.9	70.9	2.98	2.98	5	1.1	2.73	2.98	0	0	0	R5-R6	SEE ORIENT SHEET			
70.9	73.9	3.03	3.03	4	1.45	2.18	2.91	0	0	0	R5-R6	SEE ORIENT SHEET			
73.9	76.9	3.14	3.14	3	1.75	2.93	3.14	0	0	0	R4-R6	SEE ORIENT SHEET			
76.9	79.9	2.63	2.58	5	1.7	1.7	2.63	0	0	0	R6	SEE ORIENT SHEET			
79.9	82.56	3.17	3.17	8	0.82	2.34	3.04	0	0	0	R6	SEE ORIENT SHEET			
82.56	85.9	2.85	2.85	4	1.16	2.59	2.85	0	0	0	R4-R5	SEE ORIENT SHEET			
85.9	88.9	3.3	3.18	6	1.57	2.78	2.93	0.12	0	0	R4-R6	SEE ORIENT SHEET			
88.9	91.9	2.98	2.87	10	0.64	2.03	2.39	0	0	0	R4-R6	SEE ORIENT SHEET			
91.9	94.9	3.05	3.05	6	1.59	2.43	2.95	0	0	0	R5-R6	SEE ORIENT SHEET			
94.9	97.9	3.05	2.92	5	0.9	2.64	2.96	0	0	0	R4-R6	SEE ORIENT SHEET			
97.9	100.9	2.97	2.75	10	0.75	1.62	2.33	0.05	0	0	R5-R6	SEE ORIENT SHEET			
100.9	103.9	2.82	2.54	8	0.55	1.81	2.44	0.19	0	0	R5-R6	SEE ORIENT SHEET			
103.9	106.9	3.23	3.13	8	1.73	2.07	3.09	0.1	0	0	R5	SEE ORIENT SHEET			
106.9	109.9	2.99	2.94	5	1.07	2.77	2.9	0.05	0	0	R4-R6	SEE ORIENT SHEET			
109.9	112.9	2.87	2.39	9	0.41	1.4	2	0.03	0.05	0	R4-R5	SEE ORIENT SHEET			
112.9	115.9	2.87	2.87	3	1.43	2.67	2.87	0	0	0	R5-R6	SEE ORIENT SHEET			
115.9	118.9	3.09	3.09	6	1	2.44	2.99	0	0	0	R5	SEE ORIENT SHEET			
118.9	121.9	3.07	3.07	4	1.8	2.62	2.98	0	0	0	R4-R5	SEE ORIENT SHEET			
121.9	124.9	3.07	3.07	5	1.02	2.64	3.04	0	0	0	R4	SEE ORIENT SHEET			
124.9	127.9	2.78	2.78	4	0.86	2.54	2.78	0	0	0	R4-R5	SEE ORIENT SHEET			
127.9	130.9	2.85	2.85	11	0.73	1.15	2.13	0	0	0	R4-R5	SEE ORIENT SHEET			
130.9	133.9	2.95	2.95	3	1.32	2.95	2.95	0	0	0	R4-R6	SEE ORIENT SHEET			
133.9	136.9	2.92	2.92	1	2.92	2.92	2.92	0	0	0	R5	SEE ORIENT SHEET			
136.9	139.9	3	3	1	3	3	3	0	0	0	R4-R5	SEE ORIENT SHEET			
139.9	142.9	3.18	3.18	4	2.09	2.89	3.18	0	0	0	R4-R5	SEE ORIENT SHEET			
142.9	145.9	3.07	2.7	5	1.97	2.53	2.53	0.03	0	0	R4-R6	SEE ORIENT SHEET			
145.9	148.9	3.17	3.17	3	1.51	3.17	3.17	0	0	0	R5	SEE ORIENT SHEET			
148.9	151.9	2.81	2.81	3	1	2.81	2.81	0	0	0	R4-R5	SEE ORIENT SHEET			
151.9	154.9	2.94	2.89	5	1.42	2.14	2.8	0	0	0	R4	SEE ORIENT SHEET			
154.9	157.47	2.65	2.54	11	0.57	1.24	2.03	0	0	0	R4	SEE ORIENT SHEET			
157.47	157.9	0.43	0.43	1	0.43	0.43	0.43	0	0	0	an't measu	SEE ORIENT SHEET			
157.9	160.9	2.92	2.61	8	0.76	1.64	2.27	0	0	0.03	R4-R6	SEE ORIENT SHEET			
160.9	163.9	2.7	2.7	6	1.07	2.13	2.59	0	0	0	R5	SEE ORIENT SHEET			
163.9	166.9	3.14	3.14	9	0.7	2.44	3.03	0	0	0	R5	SEE ORIENT SHEET			
166.9	169.9	3.1	3.02	6	1.1	2.46	3.02	0	0.08	0	R5	SEE ORIENT SHEET			
169.9	172.9	3.03	3.03	6	1.06	2.7	3.03	0	0	0	R5	SEE ORIENT SHEET			
172.9	175.9	3.09	3.09	6	0.76	3.09	3.09	0	0	0	R5	SEE ORIENT SHEET			
175.9	178.9	2.8	2.8	2	2.57	2.8	2.8	0	0	0	R5	SEE ORIENT SHEET			
178.9	181.9	2.85	2.85	3	1.41	2.85	2.85	0	0	0	R5	SEE ORIENT SHEET			
181.9	184.9	3.19	2.84	14	0.57	1.33	2.23	0.2	0	0	R5	SEE ORIENT SHEET			
184.9	187.9	2.32	2.32	6	0.76	1.58	2.04	0	0	0	R5	SEE ORIENT SHEET			
187.9	190.9	3.2	2.97	8	0.65	2.12	2.02	0.05	0	0	R5-R6	SEE ORIENT SHEET			
190.9	193.9	2.9	2.87	5	1.4	2.42	2.6	0	0	0	R5	SEE ORIENT SHEET			
193.9	196.9	3.2	3	3	2.26	2.79	2.9	0	0	0	ENT FOR U	SEE ORIENT SHEET			
196.9	199.9	3.17	3.17	1	3.17	3.17	3.17	0	0	0	R5	SEE ORIENT SHEET			
199.9	202.9	3.14	3.14	3	2.73	2.73	3.17	0	0	0	R5	SEE ORIENT SHEET			

From (m)	To (m)	
157.47	157.9	Broken core mechanical

Geomechanical Data Sheet

Project	Arnaud	Job No.	TX10147503							
Hole No.	CH-8	Bearing		North		Core Box Lngth	10.3m - 149.7m		By	KA
Location	Open pit	Inclination		East		Core Dia.	From	To	Date	Jan 11 - Jan 13, 2011
						HQ	From	To		
							From	To		

Drill Interval			Rock Quality And Fracture Frequency												
From	To	Recovery	Whole Core Length	# Whole Pieces	Length of Longest Piece	Length of +.3m (+1ft)	RQD 2x diam (/recovered) Length of 2x Core Diam.	Length of Broken Core	Length of Rubble Zone	Length of run Hardness </= R2	RMR Harndess Rating	Number of Sets	Groundwater rating	Recovery	RQD (/recovered)
(m)	(m)	(m)	(m)	(#)	(m)	(m)	(m)	(m)	(m)	(m)	(S1 - R6)	(#)	(0-15)	(%)	(%)
10.3	11.7	1.38	1.38	2	1.14	1.38	1.38	0	0	0	R5	SEE ORIENT SHEET			
11.7	10.52	2.93	2.93	7	1.48	2.74	2.94	0	0	0	R5	SEE ORIENT SHEET			
14.52	17.7	3.15	3.15	8	0.68	2.73	3	0	0	0	R5	SEE ORIENT SHEET			
17.7	20.7	2.96	2.96	9	0.83	2.35	2.83	0	0	0	R5	SEE ORIENT SHEET			
20.7	23.7	2.94	2.94	10	0.8	1.71	2.94	0	0	0	R5	SEE ORIENT SHEET			
23.7	26.7	2.93	2.9	7	1.68	2.03	2.75	0.03	0	0	R5	SEE ORIENT SHEET			
26.7	27.7	2.71	2.56	9	0.63	2.18	2.38	0.12	0	0	R5	SEE ORIENT SHEET			
29.7	32.7	2.53	2.36	15	0.62	0.62	1.54	0.17	0	0	R5	SEE ORIENT SHEET			
32.7	35.7	3.05	2.62	13	0.34	0.34	2.1	0.43	0	0	R5	SEE ORIENT SHEET			
35.7	38.7	3	2.42	14	0.56	1.64	1.45	0.32	0	0	R5	SEE ORIENT SHEET			
38.7	41.7	3	2.32	14	0.34	0.66	1.56	0.09	0	0	R4	SEE ORIENT SHEET			
41.7	44.7	3	2.97	10	0.84	2.54	2.7	0.03	0	0	R4	SEE ORIENT SHEET			
44.7	47.7	3.02	3.02	14	0.48	0.88	2.72	0	0	0	R5	SEE ORIENT SHEET			
47.7	50.7	3	2.68	15	0.52	0.92	1.46	0.15	0	0	R3	SEE ORIENT SHEET			
50.7	53.7	3	2.7	15	0.67	0.67	1.95	0.22	0	0	R5	SEE ORIENT SHEET			
53.7	56.7	2.6	1.68	10	0.34	0.63	1.3	0.64	0.04	0	R4	SEE ORIENT SHEET			
56.7	59.7	2.92	2.6	7	0.79	2	2.21	0.24	0	0	R5	SEE ORIENT SHEET			
59.7	62.7	2.73	2.06	11	0.59	0.95	1.5	0.2	0.14	0	R5	SEE ORIENT SHEET			
62.7	65.55	2.85	2.7	9	0.66	2.39	2.37	0.03	0	0	R5	SEE ORIENT SHEET			
65.55	68.38	2.83	2.61	13	0.44	1.25	1.98	0.05	0	0	R5	SEE ORIENT SHEET			
68.38	70.4	2	1.78	10	0.45	0.77	1.37	0.18	0	0	R5	SEE ORIENT SHEET			
70.4	71.7	1.3	1.18	5	0.5	0.87	0.87	0	0	0	R4	SEE ORIENT SHEET			
71.7	74.38	2.62	2.17	11	0.75	1.06	1.37	0.23	0.09	0.03	R4	SEE ORIENT SHEET			
74.38	75.7	1.32	0.98	4	0.42	0.42	0.92	0.2	0	0	R5	SEE ORIENT SHEET			
75.7	77.14	1.26	0.9	5	0.24	0	0.62	0.1	0.27	0	R5	SEE ORIENT SHEET			
77.14	77.7	0.56	0.56	2	0.35	0.35	0.56	0	0	0	R5	SEE ORIENT SHEET			
77.7	80.7	2.81	2.78	7	0.94	1.73	2.81	0	0	0	R5	SEE ORIENT SHEET			
80.7	83.7	3	3	10	0.79	2.32	2.53	0	0	0	R5	SEE ORIENT SHEET			
83.7	86.7	3.1	3.1	6	1	2.78	3.1	0	0	0	R5	SEE ORIENT SHEET			
86.7	89.7	2.66	2.66	5	0.85	2.41	2.66	0	0	0	R5	SEE ORIENT SHEET			
89.7	92.7	3.18	3.12	6	0.73	2.96	3.12	0	0	0	R5	SEE ORIENT SHEET			
92.7	95.7	2.75	2.75	14	0.63	0.94	2.01	0	0	0	R4	SEE ORIENT SHEET			
95.7	98.7	2.85	2.75	9	0.62	2.15	2.66	0	0	0	R5	SEE ORIENT SHEET			
98.7	101.7	3.13	3.08	2	2.71	3.08	3.08	0	0	0	R5	SEE ORIENT SHEET			
101.7	104.7	3.08	2.95	5	1	2.66	2.86	0	0	0	R5	SEE ORIENT SHEET			
104.7	107.7	2.98	2.34	9	0.8	1.16	1.93	0.43	0	0	R5	SEE ORIENT SHEET			
107.7	110.7	2.58	2.58	5	0.97	2.51	2.51	0	0	0	R5	SEE ORIENT SHEET			
110.7	113.7	3.02	3.02	5	1.57	2.75	2.76	0	0	0	R5	SEE ORIENT SHEET			
113.7	116.7	3.2	3.09	12	0.77	1.93	2.52	0	0	0	R5	SEE ORIENT SHEET			
116.7	119.7	2.86	2.86	7	0.65	2.5	2.79	0	0	0	R5	SEE ORIENT SHEET			
119.7	122.7	3.11	2.98	5	0.99	2.07	2.28	0	0	0	R5	SEE ORIENT SHEET			
122.7	125.32	2.7	2.46	3	1.64	2.27	2.47	0	0.18	0	R5	SEE ORIENT SHEET			
125.32	128.48	3.05	3.02	3	1.59	2.88	2.88	0	0	0	R3	SEE ORIENT SHEET			
128.48	131.7	2.82	2.82	3	1.92	2.82	2.82	0	0	0	R3	SEE ORIENT SHEET			
131.7	134.7	2.95	2.87	7	1.09	2.34	2.82	0	0.08	0	R3	SEE ORIENT SHEET			
134.7	137.7	2.7	2.67	10	0.5	1.24	2.01	0	0	0	R3	SEE ORIENT SHEET			
137.7	140.7	3.65	3.65	6	1.64	2.98	3.54	0	0	0	R3	SEE ORIENT SHEET			
140.7	143.7	2.88	2.88	4	1.18	2	2.88	0	0	0	R3	SEE ORIENT SHEET			
143.7	146.7	3.2	3.2	7	1.32	2.37	3.05	0	0	0	R3	SEE ORIENT SHEET			
146.7	149.7	3.24	3.24	7	1.53	2.56	2.94	0	0	0	R3	SEE ORIENT SHEET			

LITHOLOGY LOG

Lithology Log

Sheet Of

Project	Arnaud	Datum				Core Dia.			Job No.	TX10147503	
Hole No.	CH-1	Bearing		North		HQ	From	1.57m	To	181.32m	By	KA
Location	Open pit	Inclination		East			From		To		Date	
Drilling Co. Downing Estate Drilling, Inc			Drill Model				From		To			
Drilling Method: Diamond			Driller			Start Date	Feb 05 2011		Finish date	Feb 08 2011		

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
1.57m - 7.6m	Fractured and highly oxidised layered iron formation.		
7.6m - 166.57m	Layered iron formation with rare diabase intrusions		
166.5m - 169.5m	Breccia		
169.5m - 181.32m	Layered iron formation		

Lithology Log

Sheet Of

Project: Min Arnaud		Datum			Core Dia.			Job No.	TX10147503	
Hole No.	CH-2	Bearing		North		From		To	By	KA
Location	open pit	Inclination		East		From		To	Date	
Drilling Co.: George Downing Estate			Drill Model			From		To		
Drilling Method: Diamond drill			Driller		Start Date	Dec 12, 2010		Finish date	Dec 15, 2010	

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
0 - 1.77	Overburden		
1.77 - 9.71	Fractured layered iron formations		
9.71 - 17.6	Layered iron formation with diabase intrusions.		
17.6 - 30.47	Diabase with magnitite intrusion or xenotliths. Significant chlorite alteration.		
30.47 - 171.15	Layered iron formation with diabase, anorthosite, and gabbro norite intrusions and mica rich zones.		

Lithology Log

Sheet Of

Project	Arnaud	Datum				Core Dia.			Job No.	TX10147503	
Hole No.	CH-3	Bearing		North		HQ	From		To	By	KA
Location	Open pit	Inclination		East			From		To	Date	
Drilling Co. Downing Estate Drilling, Inc			Drill Model				From		To		
Drilling Method: Diamond			Driller			Start Date	Dec 9 2010		Finish date	Dec 12 2010	

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
0 - 1.15	Overburden		
1.15m - 9.25m	Diabase		
9.25m - 102.25m	Layered iron formations with diabase, anorthosite, and felsic intrusions		

Lithology Log

Sheet Of

Project	Arnaud	Datum			Core Dia.			Job No.	TX10147503	
Hole No.	CH-4 re	Bearing		North	HQ	From	3.52	To	101.32	By KA
Location	Open pit	Inclination		East		From		To		Date
Drilling Co. Downing Estate Drilling, Inc		Drill Model				From		To		
Drilling Method: Diamond		Driller			Start Date			Finish date		

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
3.6 - 6.0	Fractured and highly oxidised layered iron formation		
6.0 - 64.92	Layered iron formation with minor pyroxinite, anorthosite, and diabase intrusions		
64.92 - 66.54	Felsic intrusion, highly fractured and vesicular, with quartz veins		
66.54 - 101.32	Layered iron formation with probable ilmenite rich zones		

Lithology Log

Sheet Of

Project	Arnaud	Datum				Core Dia.			Job No.	TX10147503	
Hole No.	CH-4 re	Bearing		North		HQ	From	3.52	To	101.32	By	KA
Location	Open pit	Inclination		East			From		To		Date	
Drilling Co. Downing Estate Drilling, Inc			Drill Model				From		To			
Drilling Method: Diamond			Driller			Start Date			Finish date			

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
3.6 - 6.0	Fractured and highly oxidised layered iron formation		
6.0 - 64.92	Layered iron formation with minor pyroxinite, anorthosite, and diabase intrusions		
64.92 - 66.54	Felsic intrusion, highly fractured and vesicular, with quartz veins		
66.54 - 101.32	Layered iron formation with probable ilmenite rich zones		

Lithology Log

Sheet Of

Project	Arnaud	Datum				Core Dia.			Job No.		TX10147503	
Hole No.	CH-5	Bearing		North		HQ	From		To		By	KA
Location	Open pit	Inclination		East			From		To		Date	
Drilling Co. Downing estate drilling, Inc			Drill Model				From		To			
Drilling Method: Diamond			Driller			Start Date	Dec 2 2010		Finish date		Dec 4 2010	

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
0 - 3.27	Overburden followed by boulders		
3.27 - 5.8	Fractured diabase		
5.8 - 25.09	Diabase with probable magnetite intrusions		
25.09 - 134.8	Layered iron formations with diabase, anorthosite, and gabbro norite intrusions	Intrusions may be xenoliths, dykes or sills	

Lithology Log

Sheet Of

Project	Arnaud	Datum				Core Dia.			Job No.		TX10147503	
Hole No.	CH-6	Bearing		North		HQ	From	2.57m	To	151.21m	By	KA
Location	Open pit	Inclination		East			From		To		Date	
Drilling Co. Downing Estate Drilling, Inc			Drill Model				From		To			
Drilling Method: Diamond			Driller			Start Date	Jan 05 2011		Finish date		Jan 07 2011	

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
0m - 7.5m	Fractured and highly oxidised layered iron formation		
7.5m - 51.2m	Layered iron formation with mica rich zones and anorthosite, gabbro norite and mafic intrusions.		
51.2m - 58.1m	Layered iron formation with numerous subhorizontal (relative to core axis) thin mica zones throughout.		
58.1m - 151.21	Layered iron formation with diabase and gabbro norite intrusions		

Lithology Log

Sheet Of

Project	Arnaud	Datum				Core Dia.			Job No.	TX10147503	
Hole No.	CH-7	Bearing		North		HQ	From	13.68	To	202.9	By KA
Location	Open pit	Inclination		East			From		To		Date
Drilling Co. Downing Estate Drilling, Inc			Drill Model				From		To		
Drilling Method: Diamond			Driller			Start Date			Finish date		

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
13.68 - 105.6	Layered iron formation		
105.6 - 107.5	Anorthosite intrusion		
107.5 - 202.9	Layered iron formation		

Lithology Log

Sheet Of

Project	Arnaud	Datum				Core Dia.			Job No.	TX10147503	
Hole No.	CH-8	Bearing		North		HQ	From		To	By	KA
Location	Open pit	Inclination		East			From		To	Date	
Drilling Co. Downing Estate Drilling, Inc			Drill Model				From		To		
Drilling Method: Diamond			Driller			Start Date	Jan 11 2011		Finish date	Jan 13 2011	

Drill length (m)	Lithology Description	Comments/ Remarks	Sample No.
0 - 10.3m	Overburden		
10.3m - 149.75m	Layered iron formations with diabase and felsic intrusions and occasional mica rich zones		

ORIENTED CORE LOG

ORIENTED CORE DATA SHEET

Project	Arnaud	Job No. TX10147503					
Hole No.	CH-1	Location Open pit	Elevation	Date	Feb 5 2011	By	KA
					to Feb 8, 2011		
Northing		Easting	Inclination 45	Bearing	151	Dia.	HQ

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
can't measure			**1.57m - 4.57m**																	
N		1.57				SJ		N	17	N		ox			6	PL	18	5	0.75	Heavily oxidized
N		1.70				SJ		N	70	N		ox			6	PL	18	5	0.75	Heavily oxidized
N		1.77				SJ		N	30	N		ox,si			6	PL	18	6	0.75	Heavily oxidized
N		1.96				SJ		N	19	N		ox			3	PL	15	5	0.75	Heavily oxidized
N		2.19				SJ		N	36	N		ox			5	PL	17	5	1.00	Heavily oxidized
N		2.25				BZ		-	-	N	0.13	-	2.25	2.38	-	-	-	5	-	Heavily oxidized
N		2.38				SJ		N	44	N		ox			5	PL	17	5	0.75	Heavily oxidized
N		2.66				SJ		N	25	N		ox,si			3	PL	15	5	1.00	Heavily oxidized
N		2.86				SJ		N	45	N		ca,ox			1	PL	17	5	1.50	Heavily oxidized
N		3.87				SJ		N	35	N		ox			3	PL	18	5	1.00	Heavily oxidized
can't measure			**4.57m - 7.57m**																	
N		4.66				SJ		N	40	N		ox			5	PL	15	5	1.00	Heavily oxidized
N		4.78				SJ		N	35	N		ox,ca			3	PL	13	5	1.50	Heavily oxidized
N		4.89				SJ		N	52	N		ox			3	PL	13	5	1.50	Heavily oxidized
		4.99				SJ		34	34			ch,ox			3	IR	15	5	1.00	Heavily oxidized
		5.92				SJ		6	44			su,hbk,ca			3	PL	19	6	1.00	
		7.35				SJ		12	33			hbk,ca			3	PL	19	6	0.75	
		7.51				SJ		170	77			hbk,ch,ca			3	PL	19	6	1.00	
can't measure			**7.57m - 10.57m**																	
FO		7.63				SJ		176	40			he,ch			3	PL	17	6	1.00	
FO		8.43				SJ		26	46			ch,ox,			3	ST	15	5	1.50	
		10.28				SJ		125	55			ch,si,ca			3	PL	19	6	1.00	
		10.32				SJ		328	41			hbk			5	PL	22	6	0.75	
can't measure			**10.57m - 13.57m**																	
FO		10.61				SJ		107	56			ch,ca			3	IR	16	6	1.00	

			Rock Type			Structure														
Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
FO		11.07				SJ		118	25			ch,ca			3	PL	19	6	1.00	
N		11.18				SJ		N	30	N		ch,si,ca			3	PL	19	6	1.00	
N		11.73				SJ		N	35	N		ch,ca			5	PL	20	6	1.00	
N		11.98				SJ		N	33	N		hbk,ca			5	PL	20	6	0.75	
N		12.17				SJ		N	42	N		ch,si			5	PL	21	6	1.50	
N		12.20				SJ		N	45	N		ch,ca			5	PL	22	6	1.00	
N		12.40				SJ		N	21	N		he,ch,ca			3	PL	17	6	1.00	
N		13.36				SJ		N	22	N		ch,ca			3	PL	19	6	1.50	
N		13.42				SJ		N	6	N		ch			3	PL	17	6	1.50	
can't measure		**13.57m - 16.57m**																		
N		13.07				SJ		N	62	N		ch			3	CU	17	6	2.00	
N		15.04				SJ		N	12	N		si			5	PL	14	6	4.00	
N		15.58				SJ		N	42	N		si			5	PL	14	6	4.00	
N		15.58				SJ		N	28	N		ch			5	PL	19	6	1.50	
N		16.00				SJ		N	28	N		ch,si			5	PL	14	6	4.00	
N		16.09				SJ		N	40	N		ch			3	PL	17	6	1.00	
N		16.26				SJ		N	21	N		ch			3	PL	19	6	1.00	
		16.37				SJ		50	34			mi,si			3	PL	0	6	4.00	
can't measure		**16.57m - 19.57m**																		
N		16.09				BZ		-	-	N	0.17	-	16.09	16.26	-	-	-	6	1.00	
N		16.45				BZ		-	-	N	0.08	-	16.45	16.53	-	-	-	6	1.00	
N		16.57				SJ		N	44	N		ox,ch,ca			3	IR	16	5	1.50	
N		16.57				RZ		-	-	N	0.01	-			-	-	-	6	1.00	
N		16.85				SJ		N	49	N		hbk,he,ch,si			3	PL	19	6	0.75	
N		17.18				SJ		N	51	N		ch			3	PL	20	6	0.75	
N		17.41				SJ		N	47	N		hbk,ch			3	IR	20	6	0.75	
		17.86				SJ		268	53			ca			3	PL	20	6	0.75	
		18.05				SJ		178	19			ch,ca,he			3	IR	19	6	1.00	
		18.48				SJ		342	24			si,ca,ox			5	PL	18	5	1.00	
		18.52				SJ		92	39			ox,ch			5	IR	20	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		18.70				SJ		258	82			ch,ox,ca,si			3	PL	16	5	1.50	
		18.93				SJ		71	70			ch,ox,ca,si			3	PL	18	5	1.00	
		19.11				SJ		75	47			ch,ca			5	PL	22	6	1.00	
can't measure		19.57m - 22.57m																		
FO		19.90				SJ		90	54			ch,mi			5	IR	19	6	1.00	
N		20.00				SJ		N	70	N		ch,mi			3	PL	17	6	2.00	
N		20.20				SJ		N	39	N		hbk			5	PL	18	6	1.00	
N		20.38				SJ		N	27	N		ch,mi			3	PL	16	6	1.50	
N		20.91				SJ		N	52	N		ch,mi			5	PL	17	6	2.00	
N		21.18				SJ		N	57	N		ch,ca			3	ST	19	6	1.50	
N		21.34				SJ		N	50	N		ch			3	IR	19	6	1.00	
N		21.50				SJ		N	54	N		ch			3	IR	16	6	1.00	
N		21.60				SJ		N	55	N		hbk,ca			3	PL	20	6	1.00	
N		21.82				SJ		N	44	N		ch,ca			3	PL	20	6	1.50	
N		22.20				SJ		N	27	N		si			3	PL	16	6	3.00	
N		22.33				BZ		-	-	N	0.07	-	22.33	22.40	-	-	-	6	1.50	
can't measure		22.57m - 25.32m																		
N		22.63				SJ		N	41	N		ch,si,ca			3	PL	19	6	1.50	
N		22.90				SJ		N	26	N		ch			3	PL	20	6	1.00	
N		23.35				SJ		N	87	N		ch			3	PL	19	6	1.50	
N		23.80				SJ		N	18	N		ch			3	PL	17	6	1.50	
N		23.95				SJ		N	69	N		ch			3	PL	20	6	1.00	
N		24.07				SJ		N	60	N		ch			3	PL	20	6	1.00	
		24.10				SJ		58	50			ch			3	IR	20	6	1.00	
		24.34				SJ		100	72			hbk,ch,ca			3	UN	20	6	1.00	
		25.13				SJ		70	11			si,ch,ca			3	PL	17	6	1.50	
can't measure		22.32m - 25.57m																		
N		25.32				SJ		N	47	N		ch,ca			6	PL	22	6	1.00	
can't measure		25.57m - 28.45m																		
N		25.76				SJ		N	40	N		ch,ca			3	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		26.28				SJ		N	24	N		ch,ca			5	PL	23	6	1.00	
		26.72				SJ		65	32			ch,ca			3	PL	17	6	1.00	
		26.72				SJ		316	26			ch			3	PL	17	6	1.00	
		28.19				SJ		158	55			si			3	PL	15	6	2.00	
can't measure		28.45m - 28.57m																		
		no joints																		
can't measure		28.57m - 30.79m																		
FO		28.74				SJ		288	35			hbk			5	UN	21	6	1.00	
FO		28.89				SJ		42	51			ch,ca			3	PL	19	6	1.00	
FO		29.18				SJ		182	54			ch,ca			3	PL	20	6	1.00	
FO		29.29				SJ		50	0			si,ca			3	UN	19	6	1.50	
FO		29.75				SJ		294	38			none			3	PL	19	6	0.75	
N		30.44				RZ		-	-	N	0.07	-	30.44	30.51						
		30.51				SJ		284	23			si,ca			3	PL	0	6	4.00	
91		30.79m - 31.57m																		
		30.79				SJ		290	41			ch			3	PL	20	6	1.50	
		31.15				SJ		212	66			mi			1	PL	18	6	1.00	Polished
		31.28				SJ		110	53			ch			3	PL	17	6	2.00	
		31.47				SJ		8	12			ch			5	UN	20	6	2.00	
292		31.57m - 34.57m																		
SO		31.72				SJ		214	46			ch,			5	PL	21	6	1.00	
SO		32.21				SJ		140	19			mi,ca			5	PL	0	6	3.00	
		32.27				SJ		240	43			ch,mi			5	PL	19	6	3.00	
		33.20				SJ		328	18			ch,ca			3	UN	24	6	1.00	
		33.45				SJ		300	0			ch,si,ca			3	UN	20	6	1.50	
		33.73				SJ		108	41			ch			3	PL	20	6	1.00	
353		34.57m - 37.57m																		
		35.23				SJ		196	69			ch,ca			3	PL	19	6	1.00	
		35.32				SJ		180	40			ox,ch,hbk			3	PL	14	5	1.50	
		35.56				SJ		247	42			hbk,ch			3	PL	14	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		35.56				SJ		240	17			hbk,ch			3	PL	14	6	1.00	
		36.12				SJ		50	53			hbk,ca			3	PL	14	6	1.00	
		36.54				SJ		328	53			ox,si,ch			5	PL	13	3	1.00	
		36.69				SJ		152	47			ch			5	PL	16	6	1.00	
334		**37.57m - 40.57m**																		
		38.10				SJ		50	64			ch,si,ca			3	PL	12	6	1.50	
		38.10				SJ		220	35			ch,si,ca			3	IR	12	6	1.50	
		38.15				SJ		18	53			ch,si,ca			3	PL	12	6	1.50	
		38.28				SJ		88	52			ch,ox,si,ca			3	ST	14	5	1.50	
		38.48				SJ		276	49			ch,ca			5	PL	17	6	1.50	
		39.03				SJ		316	33			si,ch			3	PL	15	6	1.50	
		39.40				SJ		312	28			ch,si,ca			1	PL	10	6	1.50	
24		**40.57m - 43.57m**																		
		41.32				SJ		154	63			hbk,ox			3	PL	13	5	1.00	
		42.78				SJ		270	50			hbk			3	PL	21	6	0.75	
		43.00				SJ		50	15			mi,ox,ca			3	PL	16	5	1.00	
		43.19				SJ		310	48			hbk			3	PL	18	6	0.75	
144		**43.57m - 46.57m**																		
		43.57				SJ		72	54			hbk			3	PL	17	6	0.75	
		43.84				SJ		78	45			hbk,ca			3	PL	14	6	0.75	
		44.24				SJ		324	69			ox,ch			3	PL	16	5	1.00	
		45.10				SJ		226	42			hbk,ch,ca			3	IR	17	6	1.00	
		45.21				SJ		68	50			ox,hbk			5	PL	18	5	1.00	
		45.33				SJ		193	30			hbk,ox,ca			5	PL	18	5	1.00	
		45.55				SJ		25	70			hbk,ox,ca			5	IR	16	5	1.00	
		46.07				SJ		92	62			hbk,ox,ca			3	PL	14	5	1.00	
188		**46.57m - 49.57m**																		
		48.09				SJ		275	39			hbk,ox,ca			3	PL	16	5	0.75	
		48.13				SJ		107	45			si,hbk			5	PL	21	6	1.00	
		48.68				SJ		93	52			hbk			3	PL	17	6	0.75	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		49.28				SJ		260	45			ca,hbk			3	PL	17	6	1.00	
can't measure		**49.57m - 52.32m**																		
FO		49.57				SJ		300	66			ox,hbk,ca			5	PL	15	5	1.00	
FO		50.07				SJ		260	66			hbk,ca			5	PL	16	6	1.00	
FO		50.32				SJ		280	33			hbk,ca			5	PL	18	6	1.00	
FO		50.32				SJ		260	80			hbk,ca			3	PL	14	6	1.00	
N		50.93				SJ		N	65	N		hbk,ca			3	PL	17	6	1.00	
		52.23				SJ		50	40			hbk,ca			3	PL	17	6	0.75	
		52.59				SJ		50	83			hbk,ca			3	IR	17	6	0.75	
60		**52.32m - 55.45m**																		
FO		52.56				SJ		330	83			ca,hbk			3	PL	17	6	1.00	
FO		53.21				SJ		230	70			ca,hbk			3	PL	17	6	1.00	
		53.58				SJ		135	42			ca,hbk,si			5	PL	13	6	1.00	
		53.83				SJ		323	27			ca,hbk			3	PL	17	6	1.00	
		54.48				SJ		322	44			ca,hbk,si			3	PL	17	6	1.00	
		55.25				SJ		300	69			ca,hbk			6	PL	20	6	0.75	Chatter marks ('
can't measure		**55.45m - 58.57m**																		
		57.57				SJ		177	54			hbk,ca			3	PL	16	6	1.00	
can't measure		**58.57m - 61.57m**																		
SFO		58.99				SJ		99	77			si,ox,ch,ca			3	PL	11	5	1.00	
SFO		59.24				SJ		52	66			hbk,si,ox			5	PL	15	5	1.00	Chatter marks ('
SFO		59.48				SJ		46	33			ox,hbk,ca			3	PL	17	5	1.00	
SFO		59.84				SJ		50	38			ox,hbk,ca,si			3	PL	16	5	1.00	
N		60.50				SJ		N	64	N		hbk,ox,ca			5	PL	20	5	1.00	
N		60.50				SJ		N	12	N		hbk,ox,ca			3	CU	16	5	1.00	
N		61.10				SJ		N	66	N		hbk,si,ca			5	PL	16	6	1.00	
can't measure		**61.57m - 64.57m**																		
N		61.57				SJ		N	23	N		ch,ox,ca			5	PL	15	5	1.00	
N		61.66				SJ		N	65	N		ch,ca			3	PL	12	6	1.00	
N		61.80				HJ		N	71	N		ch,ca			-	PL	-	6	-	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		61.87				SJ		N	66	N		ch,ca			3	PL	14	6	1.00	
N		61.97				SJ		N	40	N		ox,hbk			5	CU	15	5	1.00	
N		62.14				SJ		N	53	N		ox,hbk			5	PL	15	5	1.00	
N		62.20				SJ		N	16	N		ch,ca			3	PL	19	6	1.00	
N		62.37				SJ		N	48	N		ch,ox,hbk,ca			5	PL	18	5	1.00	
N		62.40				SJ		N	45	N		si,mi,ca			3	PL	14	6	1.00	
N		62.45				SJ		N	63	N		ca,hbk			5	PL	20	6	1.00	
N		62.70				SJ		N	72	N		ox,ch,ca			5	PL	15	5	1.00	
N		63.10				SJ		N	25	N		ch			3	PL	12	6	1.50	
N		63.10				SJ		N	12	N		ch			3	UN	12	6	1.50	
N		63.20				RZ		-	-	N	0.10	-	63.20	63.30	-	-	-	6	-	
		63.30				SJ		28	75			si,ch			3	PL	0	6	4.00	
		64.17				SJ		226	67			ch,ox,si,ca			5	PL	17	5	1.50	
		64.46				SJ		322	34			ch			3	PL	15	6	1.00	
		64.50				SJ		10	48			ch,si,ox,ca			3	PL	11	5	1.50	1 cm+/- of calcit
		64.55				SJ		36	63			hbk,ca			3	PL	20	6	1.00	
can't measure			64.57m - 67.57m																	
FO		64.63				SJ		222	25			hbk,ox,ca			3	ST	16	5	1.00	
FO		64.88				SJ		308	32			hbk,ox,ca			3	PL	16	5	1.00	
FO		65.00				SJ		300	45			si,hbk,ox,ch			3	UN	14	5	1.50	
FO		65.05				SJ		298	36			ch,ca			3	PL	15	6	1.50	
FO		65.10				SJ		298	28			ch,si,ca			3	PL	15	6	1.50	
FO		65.23				SJ		210	72			ox,hbk,he			3	PL	12	5	1.50	
SFO		65.26				SJ		163	50			ox,ch,hbk,ca			3	PL	14	5	1.50	
SFO		65.49				SJ		297	34			hbk,ca			3	PL	17	6	1.00	
SFO		65.51				SJ		200	35			hbk,ca			5	PL	19	6	1.00	
SFO		65.73				SJ		355	65			hbk,si,ox			3	PL	11	5	1.00	
SFO		65.73				SJ		91	38			hbk,ch,ox,ca			3	PL	13	5	1.00	
SFO		67.15				SJ		55	28			si,ox,ca,hbk			5	UN	13	5	1.50	
		67.44				SJ		300	35			ch,si			1	PL	10	6	4.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
can't measure		67.57m - 70.57m																		
FO		67.57				SJ		255	88			ch,su			3	PL	12	6	1.00	
FO		67.62				SJ		280	48			ch			3	PL	15	6	1.50	
N		67.70				SJ		N	46	N		ch,su			1	PL	10	6	4.00	3mm seam of ch
N		67.70				SJ		N	0	N		ox,ch,ca			3	UN	12	5	1.50	
N		67.80				SJ		N	90	N		ch,ox,ca			3	PL	11	5	1.00	
N		68.00				BZ		-	-	N	0.07	-	68.00	68.07	-	-	-	5	1.00	
N		68.22				SJ		N	60	N		ch,hbk,ca			3	PL	14	6	1.00	
N		68.32				SJ		N	82	N		ch,ca			1	PL	15	6	1.00	
N		68.32				SJ		N	17	N		mi,ch,ca			5	PL	19	6	1.00	
N		68.47				SJ		N	67	N		hbk,mi,ca			3	PL	17	6	1.00	
N		68.57				SJ		N	63	N		ch,hbk,ox,ca			3	PL	16	5	1.00	
N		68.64				SJ		N	65	N		ch			0	PL	13	6	1.00	Slickensides
N		68.65				SJ		N	90	N		ch			0	UN	13	6	1.00	Slickensides
N		68.73				SJ		N	70	N		ch			0	PL	12	6	1.00	Slickensides
N		68.78				BZ		-	-	N	0.09	-	68.78	68.87	-	-	-	6	1.00	
N		68.97				SJ		N	65	N		ch,ca			3	IR	14	6	1.00	
N		69.00				SJ		N	90	N		ox,hbk,ca			3	PL	13	5	1.00	
N		69.10				SJ		N	0	N		ca,si,ch,hbk,mi			5	UN	19	6	1.50	
N		69.18				BZ		-	-	N	0.17	-	69.18	69.35	-	-	-	6	1.50	
N		69.38				SJ		N	18	N		bk,ch,ca			6	PL	16	6	1.00	
N		69.45				SJ		N	67	N		ch,ca			3	PL	17	6	1.00	
N		69.50				BZ		-	-	N	0.05	-	69.50	69.55	-	-	-	6	1.50	
N		69.66				SJ		N	40	N		ch			3	UN	14	6	1.00	
N		69.75				BZ		-	-	N	0.07	-	69.75	69.82	-	-	-	6	1.50	
N		69.93				BZ		-	-	N	0.07	-	69.93	70.00	-	-	-	6	1.50	
N		70.12				RZ		-	-	N	0.15	-	70.12	70.27	-	-	-	6	1.50	
can't measure		70.57m - 73.57m																		
N		70.57				BZ		-	-	N	0.10	-	70.57	70.67	-	-	-	6	1.50	
N		70.67				SJ		N	34	N		u,hbk,ch			3	PL	14	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		70.67				SJ		N	55	N		u,hbk,ch			3	PL	14	6	1.00	
N		70.93				SJ		N	35	N		x,hbk,ca			3	PL	16	5	1.00	
N		71.15				SJ		N	20	N		,hbk,ch,ca			3	PL	16	5	1.00	
N		71.23				SJ		N	63	N		,hbk,ch,ca			3	PL	11	5	1.50	
N		71.33				SJ		N	66	N		,hbk,ch,ca			3	PL	16	5	1.00	
N		71.50				SJ		N	57	N		,hbk,ch,ca			3	PL	16	5	1.00	
N		71.60				SJ		N	77	N		hbk,ca			3	PL	17	6	1.00	
N		71.74				SJ		N	33	N		bk,ox,mi			6	ST	21	5	1.00	
N		71.83				SJ		N	64	N		hbk,ca			3	PL	18	6	1.00	
N		71.87				SJ		N	79	N		ox,hbk			3	PL	18	5	1.00	
N		72.15				SJ		N	45	N		hbk,ca			3	UN	18	6	1.00	
N		72.18				SJ		N	70	N		hbk,ca			3	PL	18	6	1.00	
N		72.33				RZ		-	-	N	0.27	go	72.33	72.60	-	-	-	6	4.00	Probable Gouge
N		72.60				SJ		N	23	N		ch,si			3	PL	0	6	4.00	
N		72.74				SJ		N	79	N		bk,ch,ca			0	PL	12	6	1.00	Slickensides
N		72.95				SJ		N	54	N		hbk,ca			0	PL	11	6	1.00	Slickensides
N		72.97				SJ		N	48	N		ch,ox,ca			0	PL	10	5	1.50	Slickensides
N		73.07				SJ		N	65	N		ch,ca			3	PL	14	6	1.00	
can't measure			73.57m - 76.57m																	
N		74.75				SJ		N	80	N		hbk,ca			3	PL	14	6	1.00	
N		75.18	DB			IN		N	70	N	0.02	-			-	-	-	-	-	
N		75.33				SJ		N	70	N		hbk			5	PL	16	6	0.75	
N		75.42				SJ		N	77	N		hbk			3	PL	14	6	0.75	
N		75.80				SJ		N	72	N		ca,hbk			3	PL	14	6	1.00	
N		76.18				SJ		N	85	N		ca,hbk			3	PL	14	6	1.00	
N		76.21				SJ		N	83	N		si,ca,hbk			3	PL	12	6	1.00	
N		76.24				SJ		N	47	N		,ox,si,hbk			3	PL	17	5	1.00	
N		76.29				SJ		N	27	N		ca,hbk			3	PL	13	6	1.00	
can't measure			76.57m - 79.57m																	
N		76.91				SJ		N	83	N		ch,si			1	PL	10	6	1.50	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		77.29				SJ		N	49	N		hbk			5	PL	22	6	1.00	
N		77.66				SJ		N	66	N		hbk,ca			5	PL	20	6	1.00	
SBO		78.29				SJ		140	80			,si,hbk,ca			5	IR	15	5	1.00	Angles approxin
SBO		78.38				SJ		90	43			x,ca,hbk			3	PL	13	5	1.00	
SBO		78.73				SJ		342	58			,hbk,ch,ca			5	PL	15	5	1.00	
		78.95				SJ		32	83			hbk,ca			5	PL	16	6	1.00	
7		**79.57m - 82.57m**																		
		80.21				SJ		143	85			hbk,ca			5	PL	20	6	1.00	
		80.81				SJ		320	62			hbk,ox			3	PL	16	5	1.00	
		81.31				SJ		298	43			h,hbk,ca			5	PL	20	6	1.00	
		81.40				SJ		230	53			ch,ca			3	PL	17	6	1.50	
can't measure		**82.57m - 85.57m**																		
FO		82.86				SJ		85	27			ch,si,ca			3	PL	12	6	2.00	3mm seam of ch
FO		82.97				SJ		268	64			ch,			3	PL	12	6	1.50	
FO		83.43				SJ		246	44			ch,ox,ca			3	PL	11	5	2.00	
FO		83.66				SJ		65	20			h,hbk,ca			3	PL	12	6	1.00	
SFO		84.15				SJ		192	63			hbk,si,ca			3	PL	14	6	1.00	
SFO		84.73				SJ		300	46			ch,ox			3	PL	14	5	1.50	
SFO		85.04				SJ		168	33			ch			5	PL	16	6	1.00	
SFO		85.04				SJ		240	20			ch			5	IR	16	6	1.00	
N		85.17				SJ		N	60	N		ch,ca			3	PL	12	6	1.50	
N		85.29				SJ		N	27	N		ch,ox,ca			5	PL	13	5	1.50	
can't measure		**85.57m - 88.57m**																		
		85.91				SJ		92	53			h,hbk,ca			3	PL	12	6	1.50	
		86.50				SJ		203	63			h,hbk,ca			3	PL	17	6	1.00	
		87.63				SJ		173	58			ch,ca			3	PL	17	6	1.00	
can't measure		**88.57m - 91.57m**																		
FO		89.02				SJ		100	67			ch,ca			1	PL	15	6	1.00	
FO		89.98				SJ		125	83			hbk,ca			3	PL	17	6	1.00	
FO		90.04				SJ		50	58			ch,ca			1	PL	13	6	1.50	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure													Joint Alteration	REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade		
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		90.24				BZ		-	-	N	0.02	-			-	-	-	5	1.50	
N		90.26				SJ		N	54	N		ch,ca			1	PL	0	6	1.00	
N		90.40				SJ		N	75	N		ch,ca,mi			3	IR	19	6	1.00	
N		90.45				SJ		N	68	N		hbk			3	PL	19	6	1.00	
N		90.50				SJ		N	13	N		ch,ca			3	PL	17	6	1.00	
SO		90.55				SJ		260	68			ch,ca			5	PL	14	6	1.50	
SO		90.85				SJ		150	76			ch,ca			5	PL	16	6	1.00	
		91.10				SJ		105	60			ch			3	PL	12	6	1.50	
		91.21				SJ		93	80			hbk,ca			3	PL	17	6	1.00	
		91.36				SJ		30	13			hbk,ca			5	PL	19	6	1.00	
0		**91.57m - 94.57m**																		
		91.68				SJ		136	76			ch,ca			3	PL	16	6	1.50	
		91.80				SJ		103	76			ch,ca			5	PL	19	6	1.00	
		91.90				SJ		73	70			ch,ca			3	PL	16	6	1.50	
		92.15				SJ		70	84			bk,ch,ca			6	PL	24	6	1.00	
		92.30				SJ		80	65			ch,ox			3	PL	12	5	1.50	
		93.36				SJ		98	54			ch,ca			5	PL	16	6	1.00	
		93.53				SJ		183	58			hbk,ch			1	PL	16	6	1.00	
		94.14				SJ		260	74			ch,ca			3	PL	17	6	1.00	
		94.20				HJ		14	32			ch			3	-	19	6	1.50	
		94.25				SJ		356	33			ch,ca			5	PL	20	6	1.00	
		94.50				SJ		125	10			ch,ca			3	PL	19	6	1.00	
can't measure		**94.57m - 97.57m**																		
FO		94.68				SJ		295	64			ch,ca			6	PL	22	6	1.00	
		96.30				SJ		292	47			ch,ca			3	PL	12	6	1.50	
		96.66				SJ		164	33			ch,ca,ox			3	PL	15	5	1.50	
		96.79				SJ		290	28			hbk,ca			5	CU	16	6	1.00	
can't measure		**97.57m - 100.57m**																		
SBO		97.80				SJ		278	31			ch,ca			5	PL	17	6	1.50	
SBO		98.10				SJ		274	28			h,ca,hbk			6	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
SBO		98.67				HJ		220	10			hbk,ca			5	PL	23	6	1.00	
		98.84				SJ		82	77			ch,ca			5	PL	16	6	1.00	
can't measure		100.57m - 103.57m																		
FO		100.66				SJ		282	33			ch			5	PL	16	6	1.00	
FO		101.06				SJ		102	42			ch			5	PL	16	6	1.00	
FO		101.06				SJ		5	15			ch,ca			3	PL	12	6	1.50	
FO		101.58				SJ		104	59			hbk,ca			3	PL	14	6	1.00	
		103.57m - 106.31m																		
FO		104.80				SJ		155	80			ox,hbk,ca			5	PL	13	5	1.50	
FO		104.80				SJ		218	27			ch,si,ox			3	PL	11	5	1.50	
N		105.42				SJ		N	79	N		x,ch,ca,si			5	PL	13	5	1.50	
		105.57				SJ		122	60			:h,hbk,si			5	PL	14	6	1.50	
		106.27				SJ		24	34			ɔx,ch,ca			5	PL	16	5	1.50	
can't measure		106.31m - 109.5m																		
FO		106.50				SJ		74	69			a,ox,hbk			3	PL	17	5	1.00	
FO		107.25				SJ		58	72			ch,ca			3	PL	20	6	1.00	
FO		108.05				SJ		24	63			ch,ca			3	PL	14	6	1.00	
FO		108.60				SJ		324	4			ch			3	UN	18	6	1.00	
FO		108.62				SJ		50	7			ch,ca			3	PL	14	6	1.00	
		109.26				SJ		14	73			ch			3	PL	14	6	1.00	
		109.26				SJ		94	24			ch			3	PL	14	6	1.00	
can't measure		109.5m - 112.32m																		
N		109.53				SJ		N	70	N		si,ch,ox			3	PL	13	5	1.00	
N		111.42				SJ		N	57	N		ch			3	IR	17	6	1.00	
N		111.57				SJ		N	29	N		si,ch,ca			3	PL	12	6	4.00	
N		112.07				SJ		N	44	N		ch,ca			3	PL	0	6	4.00	
N		112.07				BZ		-	-	N	0.13	-	112.07	112.20	-	-	-	6	1.50	
can't measure		112.32m - 115.46m																		
N		112.32				SJ		N	16	N		ox,ch			3	PL	16	5	1.00	
N		112.85				SJ		N	25	N		ox,hbk			5	PL	19	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		112.94				SJ		N	30	N		ch			5	PL	19	6	1.00	
N		112.94				SJ		N	68	N		su,ch			5	PL	14	6	2.00	
N		113.87				SJ		N	70	N		hbk			5	PL	19	6	1.00	
N		114.37				SJ		N	26	N		hbk,ca			3	PL	17	6	1.00	
		114.73				SJ		190	75			ch,ca			1	IR	11	6	1.00	
265		**115.46m - 118.25m**																		
		116.09				SJ		140	72			ch.hbk			3	PL	14	6	1.00	
		116.70				SJ		120	75			hbk,ca			3	PL	17	6	1.00	Polished
		117.46				SJ		84	47			si,ch,ca			3	PL	15	6	2.00	
		117.86				SJ		118	47			hbk,			5	PL	21	6	1.00	
		118.16				SJ		272	37			si,ch,hbk			3	PL	12	6	3.00	
		118.50				SJ		210	15			hbk			3	PL	25	6	1.00	Polished
can't measure		**118.25m - 121.33m**																		
		118.52				SJ		345	73			,ch,hbk,ca			3	PL	16	5	1.00	
		119.80				SJ		30	68			ch,			3	PL	19	6	1.00	
		120.74				SJ		10	25			hbk,ch			3	IR	14	6	1.00	
		120.88				SJ		170	53			hbk			3	PL	19	6	1.00	
16		**121.33m - 124.44m**																		
		121.52				SJ		0	51			hbk			5	PL	19	6	1.00	
		121.67				SJ		14	20			hbk			3	PL	20	6	1.00	
		121.80				SJ		4	47			hbk			5	PL	20	6	0.75	
		122.78				SJ		12	35			hbk			3	PL	20	6	1.00	
		123.04				SJ		36	56			hbk			3	PL	20	6	1.00	
		123.77				SJ		5	38			hbk			3	PL	20	6	1.00	
26		**124.44m - 127.50m**																		
		124.44				SJ		60	48			hbk			3	PL	19	5	1.00	
		124.99				SJ		40	57			hbk			3	PL	20	6	1.00	
		125.20				SJ		22	77			ch			3	PL	17	6	1.00	
		126.00				SJ		58	42			hbk			5	PL	21	6	1.00	
		126.20				SJ		54	64			hbk			3	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		126.67				SJ		32	67			hbk			5	PL	21	6	1.00	
		127.34				SJ		62	55			ch,ca			5	PL	14	6	1.50	
		127.34				SJ		260	77			hbk,ch			5	PL	21	6	1.00	
		127.41				SJ		355	80			ca,ch			3	PL	17	6	1.00	
		127.45				SJ		150	38			ca			0	PL	14	6	1.00	Slickensides
		127.45				SJ		240	86			ca			3	PL	14	6	1.00	
70		**127.50m - 130.57m**																		
		127.50				SJ		128	36			ch,ca			3	PL	14	6	1.00	
		128.47				SJ		134	50			hbk			5	PL	16	6	1.00	
		128.98				SJ		155	50			ch,hbk			3	PL	18	6	1.00	
		129.74				SJ		154	48			hbk			3	PL	14	6	1.00	
		130.54				SJ		342	46			hbk,ca			3	PL	17	6	1.00	
340		**130.57m - 133.57m**																		
		131.77				SJ		6	53			hbk,ox			3	PL	13	5	1.00	
		132.38				SJ		345	69			h,hbk,ca			3	PL	15	6	1.50	
		132.46				SJ		90	67			ch,ox			5	PL	15	5	1.00	
		132.82				SJ		315	85			hbk			3	PL	17	6	1.00	
		133.07				SJ		355	67			hbk			5	PL	16	6	1.00	
SO		133.31				SJ		134	67			bk,ox,hwt			5	PL	18	5	1.00	
can't measure		**133.57m - 136.57m**																		
		134.13				SJ		350	52			ch,ca			5	PL	14	6	1.00	
		134.29				SJ		154	68			hbk			3	PL	14	6	1.00	
		135.25				SJ		194	84			ch,hbk			3	PL	14	6	1.00	
		135.86				SJ		332	77			ca,hbk			5	PL	19	6	1.00	
		136.32				SJ		112	28			hbk			5	PL	20	6	1.00	
268		**136.57m - 139.57m**																		
		136.57				SJ		268	75			ch,ca			3	PL	17	6	1.00	
		136.80				SJ		46	57			a,ox,hbk			5	PL	15	5	1.00	
		137.26				SJ		256	58			ox,hbk			5	PL	13	5	1.50	
		137.56				SJ		252	59			hbk			5	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		138.27				SJ		66	58			hbk,ox			5	PL	19	5	1.00	
		138.93				SJ		288	66			hbk,ca			3	PL	17	6	0.75	
		139.02				SJ		236	40			x,hbk,ca			5	PL	17	5	1.00	
		139.49				SJ		42	54			hbk,ca			5	PL	16	6	1.00	
100		**139.57m - 142.57m**																		
SO		140.10				SJ		28	54			hbk			3	PL	19	6	1.00	
SO		140.31				SJ		250	73			ch,hbk			3	IR	17	6	1.00	
SO		141.02				SJ		144	56			hbk,ca			3	PL	20	6	1.00	
		141.30				SJ		334	52			ch			3	PL	12	6	1.00	
		141.40				SJ		330	52			ch,si,ca			3	IR	12	6	1.50	
		142.29				SJ		74	18			ch,si			1	PL	10	6	1.50	
		142.29				SJ		194	34			ch			1	PL	10	6	1.00	
		142.30				SJ		315	76			ox,hbk			3	PL	16	5	1.00	
can't measure		**142.57m - 145.57m**																		
FO		142.82				SJ		144	60			hbk,ox			5	PL	17	5	1.00	
FO		143.20				SJ		124	68			hbk			3	PL	14	6	1.00	
FO		143.45				SJ		88	64			hbk,ca			3	PL	17	6	1.00	
FO		143.82				SJ		144	69			hbk,si			3	PL	14	6	1.00	
SFO		144.97				SJ		345	76			ch,hbk,si			5	PL	16	6	1.00	
SFO		145.11				SJ		318	58			si,ch			0	PL	12	6	1.50	Slickensides
N		145.39				BZ		-	-	N	0.10	-	145.39	145.49	-	-	-	6	1.00	
-		145.49				SJ		236	26			ch,si			5	PL	0	6	1.50	
can't measure		**145.57m - 148.57**																		
FO		145.80				SJ		70	52			h,ca,hbk			5	PL	14	6	1.50	
FO		145.87				SJ		279	70			x,hbk,ch			5	PL	15	5	1.00	
FO		145.93				SJ		135	0			hbk,ca			5	UN	19	6	1.00	
N		145.96				BZ		-	-	N	0.12	-	145.96	146.08	-	-	-	5	1.50	
SBO		146.08				SJ		334	34			ch,si			3	PL	12	6	1.50	
SBO		146.08				SJ		160	30			hbk			3	PL	0	6	1.00	
SBO		146.17				SJ		330	37			si,ch			3	PL	15	6	4.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
SBO		146.24				SJ		330	48			si,ch			5	PL	11	6	2.00	
SBO		146.73				SJ		240	27			si,ch			3	ST	15	6	3.00	
SBO		146.84				SJ		332	52			si,ch			3	PL	12	6	3.00	
SBO		147.38				SJ		160	74			ch			3	PL	17	6	1.00	
SBO		147.53				SJ		320	32			hbk			3	ST	17	6	1.00	
SBO		147.82				SJ		238	25			ch			3	PL	15	6	3.00	
SBO		147.93				SJ		8	53			ox,ch			5	PL	16	5	1.00	
-		148.33				SJ		68	36			ch,si,su			5	PL	14	6	3.00	
can't measure		**148.57m - 151.57**																		
FO		149.38				SJ		45	65			ch			1	PL	12	6	1.00	
SO		150.64				SJ		272	50			ch			6	PL	15	6	2.00	
-		150.76				SJ		62	48			ca,ch			3	PL	14	6	1.00	
can't measure		**151.57m - 154.57**																		
FO		152.43				SJ		340	36			ch,ca,si			3	PL	12	6	1.50	
FO		152.65				SJ		196	83			hbk			5	PL	21	6	1.00	
FO		152.96				SJ		225	44			hbk			5	PL	20	6	1.00	
FO		153.24				SJ		84	44			ch			1	PL	13	6	2.00	
N		153.59				SJ		N	56	N		si,ch			1	PL	0	6	1.00	
-		153.66				SJ		322	62			ch			0	PL	11	6	1.00	Slickensides
-		153.87				SJ		64	49			ch			0	PL	11	6	1.00	Slickensides
248		**154.57m - 157.57**																		
-		155.81				SJ		264	50			ch,si			1	PL	14	6	1.00	
-		156.46				SJ		290	44			ch			0	PL	14	6	1.00	Slickensides
-		156.68				SJ		294	38			ch,ca			0	PL	9	6	2.00	Slickensides
55		**157.57m - 160.57**																		
-		157.65				SJ		220	54			ch			3	PL	17	6	1.00	
-		157.73				SJ		32	45			ch			1	ST	10	6	1.50	
-		157.90				SJ		40	36			hbk,ch			5	PL	18	6	1.50	
-		158.16				SJ		350	53			ch,hbk			3	PL	14	6	1.00	
-		158.48				SJ		342	50			ch			5	IR	19	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
-		158.55				SJ		330	48			ch			5	PL	19	6	1.00	
-		159.23				SJ		340	54			ch			1	PL	15	6	1.00	
-		159.36				SJ		44	54			ch			0	PL	14	6	1.50	Slickensides
-		160.00				SJ		20	53			ch,ca			3	PL	11	6	1.50	
-		160.03				SJ		265	38			ch			3	PL	15	6	1.50	
-		160.17				SJ		355	37			ch			3	PL	17	6	1.00	
-		160.17				SJ		230	37			ch,ca			5	PL	19	6	1.00	
-		160.42				SJ		48	47			hbk,he			5	PL	20	6	1.00	
can't measure		160.57m - 163.57																		
-		161.16				SJ		110	50			hbk,he			5	PL	16	6	1.00	
N		161.55				SJ		N	0	N		ch,si,he			0	UN	13	6	1.50	Slickensides
N		161.62				BZ		-	-	N	0.20	-	161.62	161.82	-	-	-	6	1.50	
N		162.11				SJ		N	57	N		ch,su,he			3	PL	12	6	1.50	
N		162.24				SJ		N	30	N		su,hbk,si			5	PL	20	6	1.00	
N		162.34				SJ		N	38	N		he,hbk			5	UN	20	6	1.00	
N		162.38				SJ		N	62	N		ch,ca			5	PL	19	6	1.00	Slickensides
N		162.55				SJ		N	33	N		hbk,si			5	PL	14	6	3.00	
N		162.60				SJ		N	46	N		hbk,ca			5	PL	19	6	1.00	
N		162.80	Go			FT		-	-	N	0.05	go	162.80	162.85	-	-	-	0	-	
N		162.85				BZ		-	-	N	0.15	-	162.85	163.00	-	-	-	6	4.00	
N		163.10				SJ		N	0	N		hbk			5	UN	16	6	1.00	
N		163.15				BZ		-	-	N	0.10	-	163.15	163.25	-	-	-	6	1.50	
can't measure		163.57m - 166.57																		
N		163.64				SJ		N	48	N		ch,ca			3	CU	12	6	1.50	
N		163.68				SJ		N	54	N		ch			0	PL	14	6	1.00	Slickensides
N		163.81				SJ		N	60	N		ch,			0	IR	9	6	1.50	Slickensides
N		163.90				SJ		N	35	N		ch,ca			0	PL	9	6	1.50	Slickensides
N		163.90				SJ		N	45	N		ch,ca			0	PL	9	6	1.50	Slickensides
N		164.07				SJ		N	37	N		ch,ca			0	PL	9	6	1.50	Slickensides
N		164.18				SJ		N	57	N		ch,ca			0	PL	9	6	1.50	Slickensides

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	2	3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		164.39				SJ		N	64	N		ch,ca			0	PL	9	6	1.50	Slickensides
N		164.61				SJ		N	28	N		,ca,mi,su			5	PL	20	6	1.00	
N		164.84				SJ		N	76	N		ch			3	PL	15	6	2.00	
N		164.90				SJ		N	32	N		he,ch			3	CU	14	6	1.00	
N		165.07				BZ		-	-	N	0.33	-	165.09	165.42	-	-	-	6	1.50	
N		165.56				SJ		N	49	N		ch			3	PL	17	6	1.00	
-		165.87				SJ		242	67			ch,su			0	PL	11	6	1.00	Slickensides
-		166.24				SJ		160	77			ch			1	PL	12	6	1.00	
-		166.42				SJ		135	22			hbk			5	UN	23	6	1.00	
can't measure		**166.57m - 169.57**																		
N		166.70				SJ		N	70	N		ch,su			0	IR	15	6	1.00	Slickensides
N		166.70				SJ		N	53	N		ch,su			0	PL	15	6	1.00	Slickensides
N		166.70				SJ		N	46	N		ch,su			0	PL	15	6	1.00	Slickensides
N		167.04				SJ		N	63	N		ch			3	PL	12	6	1.50	
N		167.17				SJ		N	55	N		ch			0	PL	11	6	1.00	Slickensides
N		167.60				SJ		N	0	N		ch,ca			0	UN	13	6	1.50	Slickensides
N		167.64				SJ		N	60	N		ch			0	ST	13	6	2.00	Slickensides
N		167.88				BZ		-	-	N	0.19	su	167.88	168.07	-	-	-	6	1.50	
N		168.10				SJ		N	56	N		su,ch			5	PL	17	6	1.50	
N		168.37				SJ		N	40	N		ch,ca			0	UN	9	6	1.50	Slickensides
N		168.55				BZ		-	-	N	0.05	-	168.55	168.60	-	-	-	6	1.50	
N		168.72				SJ		N	56	N		ch,ca			3	CU	15	6	1.50	
N		169.04				SJ		N	37	N		ch			0	PL	9	6	1.50	Slickensides
N		169.25				SJ		N	19	N		ch			0	PL	9	6	1.50	Slickensides
N		169.50				SJ		N	0	N		ca,ch			0	UN	13	6	4.00	Slickensides
can't measure		**169.57m - 172.57**																		
N		169.89				SJ		N	34	N		ox,ch			0	CU	13	6	1.00	Slickensides
-		170.03				RZ		-	-		0.09	-	170.03	170.12	-	-	-	6	1.50	
N		170.26				SJ		N	65	N		ch,su			0	PL	9	6	1.50	Slickensides
-		171.52				SJ		102	45			a,hbk,ox			6	PL	17	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
-		171.67				SJ		43	46			hbk			6	PL	24	6	1.00	
-		172.25				SJ		104	67			hbk			5	PL	19	6	1.00	
can't measure		172.57m - 175.57																		
FO		172.69				SJ		200	52			ch,su			3	PL	14	6	1.00	polished
FO		172.82				SJ		50	58			ch			0	PL	14	6	1.00	Slickensides
FO		173.36				SJ		195	48			ch			3	PL	14	6	1.00	
-		173.78				SJ		124	83			ch,su			3	PL	14	6	1.00	
-		174.18				SJ		10	0			ch			0	UN	14	6	1.00	Slickensides
-		174.36				SJ		340	31			hbk,hwt			5	PL	22	6	0.75	
-		174.45				SJ		340	32			ca,ch			0	PL	10	6	1.50	Slickensides
-		175.00				SJ		255	83			ch,ox			0	PL	15	5	1.00	Slickensides
-		175.23				SJ		160	55			bk,ox,ca			5	CU	20	5	1.00	
17		175.57m - 178.57																		
-		176.48				SJ		85	77			ch,			3	PL	13	6	1.00	
-		176.75				SJ		60	85			ch,ca			1	PL	13	6	1.50	
-		177.00				SJ		180	0			hbk,ca			5	UN	20	6	1.00	
-		177.50				SJ		190	68			hbk,si			5	CU	16	6	1.00	
-		177.75				SJ		33	78			hbk,ox			5	PL	18	5	1.00	
335		178.57m - 181.32																		
-		179.22				SJ		80	52			bk,ox,ch			5	PL	15	5	1.00	
-		179.53				SJ		62	65			hbk,ca			3	PL	17	6	1.00	
-		179.82				SJ		63	66			ch,hbk			3	PL	15	6	1.50	
-		180.05				SJ		80	53			k,ch,su,ca			3	PL	17	6	1.00	
-		180.29				SJ		342	27			ch,hbk			5	PL	19	6	1.00	
-		180.66				SJ		92	62			ch			3	PL	12	6	3.00	
-		180.96				SJ		94	60			hbk			3	PL	18	6	1.00	
-		181.16				SJ		264	46			hbk,ca			5	CU	19	6	1.00	
-		181.32				SJ		210	20			ch,si,su			5	UN	14	6	1.50	
-		181.63				SJ		90	54			ch,si			3	PL	15	6	1.50	

ORIENTED CORE DATA SHEET

Project	/line Arnau	Job No.	TX10147503						
Hole No.	CH-2	Location	open pit	Elevation		Date	Dec 12	By	KA
						to	Dec 15		
Northing		Easting		Inclination	48	Bearing	150	Dia.	HQ

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
			1.77m - 3.15m																	
		2.06				SJ		N	45	N		Ox, HBk			3	PL	15	5	1.00	
		2.16				HJ		N	30	N		Mf								
		2.20				SJ		N	63	N		Ox, HBk			3	PL	15	5	1.00	
		2.34				SJ		N	75	N		Ox, HBk			3	PL	15	5	1.00	
		2.46				SJ		N	69	N		Ca, HBk			3	PL	15	6	1.00	
		2.71				SJ		N	73	N		Ox			3	PL	15	5	0.75	
CAN'T MEASURE			**3.15m - 6.15**																	
		3.28				SJ		N	80	N		Ox, HBk			3	PL	18	5	1.00	
		3.29				HJ		N	31	N		Mf								
		3.39				SJ		N	58	N		Ox, HBk, Ca			3	PL	18	5	1.00	
		3.68				SJ		N	53	N		HBk, Ca, Ch			3	PL	18	6	1.00	
		3.84				SJ		N	56	N		HBk, Ca, Ch, Ox			3	PL	18	5	1.00	
		3.90				SJ		N	65	N		HBk, Ox, Ch			3	PL	18	5	1.00	
		4.01				SJ		N	50	N		HBk, Ox, Ch			5	PL	18	5	1.00	
		4.10				SJ		N	4	N		HBk, Ox, Ch			3	PL	19	5	1.00	
		4.22				SJ		N	40	N		Ox, Ch, HBk, Ca			3	PL	18	5	1.00	
		4.25				SJ		N	74	N		HBk, Ox, Ca			3	PL	18	5	1.00	
		4.32				SJ		N	47	N		HBk, Ca, Ch			3	PL	18	6	1.00	
		4.39				SJ		N	47	N		HBk			3	PL	15	6	1.00	
		4.97				SJ		N	78	N		Ch, HBk, Ca			3	PL	15	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)		(0-30)	(1-6)	(0-20)	
		5.07				SJ		N	49	N		Ch, HBk, Ca			3	PL	15	6	1.00	
		5.28				SJ		N	56	N		Ch, HBk			5	PL	15	6	1.00	2.1
		5.47	**Banded**			BD		N	20	N										
SO		6.00				SJ		0	67			HBk, Ch, Ca			3	PL	18	6	1.00	
Can't measure			6.15m - 9.15m																	
		6.26	**Banded**			BD		N	24	N	0.06	Mf								
		6.40				HJ		N	20	N		Mf								
		6.54				SJ		N	56	N		Ch, Ca, HBk			3	PL	15	6	1.00	
		6.76				HJ		N	26	N		Ch, Ca								
		6.94				HJ		N	29	N		Ch, Ca, HBk								
		7.47				HJ		N	20	N		Mf								
		7.69				SJ		N	28	N		Ch, Ca			3	PL	20	6	1.00	
		7.81				HJ		N	37	N		Mf								
		7.90				HJ		N	22	N		Mf								
		8.23				HJ		170	38			Mf								
		8.26				HJ		70	35			Mf								
		8.36				SJ		120 +/-	45 +/-	SPECTED		Ch, Ox			3	PL	18	5	1.00	
		8.40				SJ		115	59			Ch, Ca, HBk			3	PL	15	6	1.00	
		8.45				HJ		285	39			Mf								
		8.47				HJ		286	35			Mf								
		8.70				HJ		92	32			Mf								
		8.94				SJ		96	70			HBk, Ch			3	PL	18	6	1.00	
		9.00				BD		90	26											
		9.07				SJ		110	51			Ch, HBk, Ca			3	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)		(0-30)	(1-6)	(0-20)	
CAN'T MEASURE			**9.15m - 12.15m**																	
F.O.		9.35				SJ		238	46			Ox, HBk			3	PL	18	5	1.00	
F.O.		9.71				SJ		266	53			Ca, HBk, Ox			3	PL	18	5	1.00	
F.O.		9.98				SJ		280	42			Ch, Ca, Ox, HBk			3	PL	20	6	1.00	
F.O.		10.05				SJ		262	73			HBk, Ch, Ca			3	PL	21	5	1.00	
N		10.18				SJ		N	62	N		Ch, Ca, HBk, Ox			3	PL	15	5	1.00	
N		10.18				SJ		N	44	N		Ch, Ca, HBk, Ox			3	PL	15	6	1.00	
N		10.29				SJ		N	45	N		Ch, Ca			3	PL	15	6	1.00	
N		10.35				SJ		N	39	N		HBk			5	PL	20	6	1.00	
N		10.50				SJ		N	40	N		HBk, Ca			3	PL	15	6	1.00	
N		10.80				SJ		N	60	N		Ch, Ca			3	PL	19	6	1.00	
N		10.86				SJ		N	44	N		none			3	PL	20	6	0.75	
N		10.90				SJ		N	60	N		Ch, HBk, Ca			3	PL	19	6	1.00	
N		10.91				HJ		N	18	N		Mf								
N		11.18				SJ		N	60	N		Ch, HBk, Ca			2	PL	17	6	1.00	4.1
		11.78				SJ		210	60			Ch, HBk, Ca			5	PL	22	6	1.00	
		11.93				IN		210	16		0.03	Mf								
		12.00				HJ		0	44			Mf								
0			**12.15m - 15.15m**																	
		12.89				IN		346	31			FO	12.89	13.03						
		13.17				SJ		14	40			Ch, HBk			3	CU	19	6	1.00	
		14.10				SJ		200	55			Ch, HBk			3	PL	19	6	1.50	
		14.15				SJ		210	62			Ch, Ca			3	PL	19	6	1.00	
AN'T MEASURE			**15.15m - 18.15m**																	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
F.O.		15.18				SJ		210	46			Ch			2	PL	17	6	1.00	
F.O.		15.36				IN		220	18		0.03	Ano (?)								
F.O.		15.71				HJ		350	34			Mf								
F.O.		15.78				SJ		356	22			Ch, Ca			3	PL	19	6	1.00	
F.O.		15.85				SJ		128	82			HBk			3	PL	19	6	1.00	
F.O.		16.10				HJ		28	36			Mf								
F.O.		16.10				SJ		232	51			HBk, Ch			3	PL	19	6	1.00	
F.O.		16.17				HJ		210	27			Mf								
F.O.		16.22				HJ		250	33			Mf								
F.O.		16.66				SJ		36	41			Ch			5	PL	19	6	1.50	
F.O.		16.71				HJ		50	39			Mf								
F.O.		16.82				SJ		150	61			Ch, HBk, Ca			3	PL	19	6	1.00	
F.O.		17.00				HJ		34	30			Mf								
F.O.		17.07				SJ		230	50			Ch			3	PL	19	6	1.00	
F.O.		17.12	**Umf**			IN		235	25		0.04	Umf								5.1
F.O.		17.44				HJ		42	22			Mf								
N		17.60				BD		N	32	N										
		17.96				HJ		45	19			Mf								
				18.15m - 21.15m																
		18.28				SJ		190	49			Ox			3	PL	18	5	1.00	
		18.45				SJ		0	43			Ox			5	PL	20	5	1.00	
		18.73				HJ		20	0			Mf								
		19.33				HJ		190	13			Mf								
		19.47				HJ		10	19			Mf								
		19.83				HJ		22	8			Mf								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		19.86				HJ		25	14			Mf								
		20.17				HJ		200	4			Mf								
		20.27				HJ		190	38			Mf								
		20.34				SJ		160	58			Ch, Ca, Ox			3	PL	15	5	1.00	
		20.87				HJ		95	15			Mf								
		20.97				HJ		355	8			Mf								
		21.04				HJ		10	23			Mf								
			21.15m - 24.15m																	
F.O.		21.15				SJ		190	29			HBk			3	PL	18	5	1.50	
F.O.		21.24				HJ		90 +/-	5 +/-			Mf								
F.O.		21.32				HJ		355	23			Mf								
F.O.		21.34				SJ		195	33			HBk			3	PL	20	6	1.00	
F.O.		21.41				HJ		225	44			Mf								
F.O.		21.58				HJ		195	62			Mf								
F.O.		21.67	**DB**			IN		185	33		0.02	-								
F.O.		21.78				HJ		5	30			Mf								
F.O.		21.82				SJ		350	49			HBk, HWt			5	PL	21	6	1.00	
F.O.		21.89				HJ		230	60			Mf								
F.O.		21.96				SJ		210	55			Ch, Hwt			3	CU	19	6	1.00	
F.O.		22.15				HJ		5	26			Mf								
F.O.		22.50				HJ		190	43			Mf								
F.O.		22.51				HJ		190	44			Mf								
F.O.		22.55	**DB**			IN		205	60		0.02	-								
F.O.		22.60				HJ		180	34			DB								
F.O.		22.66				HJ		190	35			DB								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
F.O.		22.68				HJ		120	3			Mf								
F.O.		22.80				HJ		130	37			Mf								
F.O.		22.87	**DB**			IN		110	52			-								
F.O.		22.88				HJ		150	36			Mf								
F.O.		22.95				HJ		210	35			Mf								
F.O.		23.10				BZ							23.10	23.16						
F.O.		23.16				SJ		265	48			Si, Ch			5	PL	17	6	1.50	8.2
F.O.		23.19				HJ		220	35			Mf								
F.O.		23.28				HJ		250	45			DB								
F.O.		23.33				SJ		240 +/-	40 +/-			Ch, Si			6	IR	19	6	1.00	
F.O.		23.38				SJ		50	47			Ch			0	PL	11	6	2.00	8.3
F.O.		23.43				RZ							23.43	23.90						8.1
F.O.		23.43				SJ		50	13			Ch, Si, Ca			0	PL	11	6	2.00	8.3
F.O.		23.95				SJ		200	29			HBk, Si, Ca			3	PL	16	6	1.00	
F.O.		24.06				SJ		105	17			Si, Ch			3	PL	16	6	1.00	
F.O.		24.35				SJ		185	72						0	PL	11	6	2.00	8.4
F.O.		24.39				SJ2		170	47			Ch, Ca			1	PL	12	6	2.00	8.5
F.O.		24.42				SJ1		340	28			Ch, Ca			1	PL	14	6	1.00	
F.O.		24.45				SJ5		200	18			Ch, Ca			5	PL	16	6	2.00	
F.O.		24.52				SJ3		10	49			Ch, Ca			3	PL	16	6	1.50	
F.O.		24.53				SJ4		10	49			Ch, Ca			3	PL	16	6	1.50	
F.O.		24.80				HJ		280	7			Mf								
F.O.		24.93				HJ		270	7			Mf								
S.F.O.		24.95				SJ		350	63			Ch			3	PL	19	6	1.00	9.1
S.F.O.		25.44				HJ		25	18			Mf								
S.F.O.		25.54				HJ		10	29			Mf								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
S.F.O.		25.60				SJ		25	28			Si			1	PL	0	6	3.00	9.2
S.F.O.		25.70				HJ1		300	4			Mf								
S.F.O.		25.70				HJ2		300	33			Mf								
S.F.O.		25.70				HJ3		300	38			Mf								
S.F.O.		25.81	**Banded**			BD		350 +/-	26 +/-			Mf								
S.F.O.		25.90				HJ1		95	17			Mf								
S.F.O.		25.91				HJ2		85	17			Mf								
S.F.O.		25.98				SJ		28	29			Ch, Si			3	IR	17	6	1.50	
S.F.O.		26.01				SJ		300	52			Ch, Si			6	ST	20	6	2.00	
S.F.O.		26.06				BD		340 +/-	20 +/-		0.07									10.1
S.F.O.		26.18				HJ		60	25			Ch			0	CU	9	6	4.00	10.2
S.F.O.		26.20				SJ		60	40 +/-			Ch			5	IR	16	6	1.50	
S.F.O.		26.24				HJ		40	23			Mf								
S.F.O.		26.31				HJ		20	4			Ch								
S.F.O.		26.38				BD		340 +/-	14 +/-											10.1
S.F.O.		26.39				SJ		20	69			Ch, Ca			3	PL	15	6	1.50	
S.F.O.		26.73				HJ		320	70			Ch, Ca								
S.F.O.		26.88				HJ		256	6			Mf								
S.F.O.		27.11	**Banded**			BD		325	18											
			27.15m - 30.15m																	
S.F.O.		27.21				HJ		270	28			Mf								
S.F.O.		27.27				BD		320	34											
S.F.O.		27.30				HJ		330	33			Mf								
S.F.O.		27.45				HJ		320	28			Mf								
S.F.O.		27.49				IN		325	17		0.02		27.49	27.51						

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
S.F.O.		27.58				HJ		300	12			Mf								
S.F.O.		27.69				IN		295	29		0.02		25.69	25.71						
S.F.O.		27.74				SJ		10	25			Ch			5	PL	16	6	1.50	
S.F.O.		27.88				SJ		0	0			Ch			5	UN	16	6	1.50	
S.F.O.		27.94				SJ		10	67			Ch, Ca			3	PL	16	6	1.00	
S.F.O.		27.94				HJ		138	42			Mf								
S.F.O.		28.11				BD		338	34											
S.F.O.		28.17				HJ		336	52			Mf								
S.F.O.		28.20				HJ		140	31			Mf								
N		29.09				BD		N	42	N										
N		29.19				HJ		N	48	N		Mf								
N		29.37				HJ		N	27	N		Mf								
N		29.50				HJ		N	48	N		Mf								
N		29.52				HJ		N	47	N		Mf								
N		29.55				HJ		N	46	N		Mf								
N		29.78				SJ		N	46	N		Ch			3	PL	21	6	1.00	
N		29.81				BD		N	43	N										
D.O.		30.16				HJ		242	14	N		Mf						Beta angle based on		
				30.15m - 33.15m																
D.O.		30.27				SJ		N	30	N		Ox, Ch			3	PL	18	5	1.00	
D.O.		30.30				HJ		N	43	N		Mf								
D.O.		30.34				JK		N	2	N		Mf								
D.O.		30.40				JK		N	2	N		Mf								
D.O.		30.47				CT		N	33	N		see remark								12.1
D.O.		30.78				SJ		N	47	N		Ch			3	PL	21	6	0.75	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)		(0-30)	(1-6)	(0-20)	
D.O.		32.32				SJ		N	23	N		Ox, Ch, Ca			3	PL	18	5	1.00	
D.O.		32.36				HJ		N	16	N		Mf								
D.O.		32.39				SJ		N	62	N		Ch			5	PL	16	6	1.00	
D.O.		32.40				HJ		N	57	N		Mf								
D.O.		32.78				HJ		N	5	N		Mf								
D.O.		32.85				SJ		N	73	N		HBk, Ca, Ch			3	PL	19	6	1.00	
S.D.O.			**33.15m - 36.15m**																	
S.D.O.		33.52				SJ		N	74	N		Ca, HBk, Si			5	PL	21	6	1.00	
S.D.O.		33.73				SJ		N	43	N		Ch, HBk, Ca			3	PL	16	6	1.00	
S.D.O.		34.36				HJ		N	34	N		see remark								12.1
S.D.O.		34.40				HJ		N	34	N		see remark								12.1
S.D.O.		34.52				HJ		N	36	N		see remark								12.1
S.D.O.		34.57				HJ		N	44	N		Mf								12.1
S.D.O.		35.35				HJ		N	54	N		Mf								
			36.15m - 39.15m																	
S.D.O.		36.15				SJ		N	32	N		Ch, HBk			3	PL	16	6	1.00	
S.D.O.		36.56				IN		N	43	N		?	36.56	36.87						
S.D.O.		37.35				HJ		N	68	N		Mf								
D.O.		37.59				HJ		N	48	N		Mf								
D.O.		37.72				HJ		N	54	N		Mf								
D.O.		37.99				HJ		N	43	N		Mf								
D.O.		38.23				IN		N	74 +/-	N	0.08	ee rema	38.23	38.31						
D.O.		38.36				SJ		N	50	N		HBk			3	PL	21	6	1.00	13.1
D.O.		38.62				HJ		N	55	N		Mf								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
D.O.		38.92				HJ		N	60	N		Mf								
D.O.		38.99				HJ		N	22	N		Mf								
D.O.		39.04				HJ		N	39	N		Mf								
				39.15m - 42.15m																
D.F.O.		39.19				HJ		N	50	N		Mf								
D.F.O.		39.43				SJ		N	47	N		Ch, Ca			3	PL	19	6	1.00	
D.F.O.		39.65				HJ		N	43	N		Ch, Ca								
D.F.O.		39.65				SJ		N	45	N		HBk, Ch, Ca			5	PL	22	6	1.00	
D.F.O.		39.88				HJ		N	52	N		Mf								
N		39.93				BZ		-	-		0.15									14.1
N		40.10				SJ		N	42	N		si			3	IR	13	6	1.50	
N		40.25				SJ		N	14	N		mn,ca			3	1	21	6	1.00	
N		40.63				HJ		N	40	N		mf								
N		40.69				HJ		N	37	N		mf								
N		40.86				HJ		N	10	N		mf								
N		40.94				HJ		N	34	N		mf								
N		40.98				HJ		N	47	N										
		41.53				SJ		218	33			hbk,ca			3	2	21	6	1.00	
		41.68				IN		35	20		0.02	ee remark								14.2
		41.70				HJ		222	26			mf								
		41.80				SJ		228	63			ox,hbk,ca			5	1	20	5	1.00	
		42.06				SJ		224	47			hbk,ca			3	1	19	6	1.00	
	EMAIL FROM AUSENCO VECTOR REVERSING DECISION TO MEASURE HEALED JOINTS FROM THIS POINT ONWARDS																			

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core **(T.Gf output)**	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)		(0-30)	(1-6)	(0-20)	
			42.15m - 45.15m																	
FO		42.15				SJ		355	44			hbk,ch,ca			3	PL	15	6	1.00	
FO		42.26				SJ		182	33			ch,ca			3	PL	15	6	1.00	
FO		43.22				SJ		328	61			hbk,ch			3	PL	15	6	1.00	
FO		43.48				SJ		230	63			ch,ox,ca			3	PL	15	5	1.00	
FO		43.77				SJ		82	24			ch,ca			3	PL	15	6	1.00	
		43.82				SJ		210	75			ch,ca			3	PL	15	6	1.00	
		44.35				SJ		210	75			ch,hbk,ca			1	PL	13	6	1.00	
			45.15m - 48.15m																	
FO		45.15				SJ		296	52			ch,hbk,ca			3	IR	15	6	1.00	
FO		45.67				SJ		130	63			ch,hbk,ca			3	IR	17	6	1.00	
FO		45.97				SJ		230	47			ox,hbk,ca			5	IR	21	5	0.75	
FO		46.21				SJ		335	56			ch,ca			3	PL	12	6	1.00	
FO		46.54				SJ		122	64			hbk,ca,ch			3	PL	18	6	1.00	
FO		46.88				SJ		322	49			hbk,ch			3	PL	17	6	1.00	
FO		47.03				SJ		118	67			-			-	-	-	-	-	
FO		47.29				SJ		274	68			ch			3	PL	17	6	1.00	
FO		47.38				SJ		88	50			ch			3	PL	17	6	1.00	
			48.15m - 51.15m																	
			SINGLE CORE PIECE																	
342			**51.15m - 54.15m**																	
		53.00				SJ		145	48			hbk			3	PL	15	5	0.75	
		53.13				SJ		330	50			hbk,ca			3	PL	16	5	0.75	
		53.77				SJ		110	35			ch			1	PL	14	5	0.75	
		53.81				SJ		140	52			hbk,mi,ch			3	PL	16	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
Can't measure			**54.15m - 57.15m**																	
FO		55.40				SJ		321	27			none			3	PL	16	5	0.75	
FO		56.46				SJ		35	21			ca			3	PL	18	6	1.00	
FO		56.49				SJ		310	45			ca,ch			3	PL	16	5	1.00	
Can't measure			**57.15m - 60.15m**																	
		57.48				IN		201	19		0.02									
		58.17				SJ		212	85			hbk,ch,ca			3	PL	16	5	0.75	
		59.21				SJ		310	55			hbk,ch,ca			3	PL	17	5	1.00	
		59.27				SJ		100	18			ox,ch,ca			3	PL	16	5	1.00	
		59.45				BD		160	30											
		59.51				SJ		335	42			ca,hbk			3	PL	17	5	1.00	
		59.83				BD		165	32											
		60.08				SJ		320	48			hbk,ch,ca			3	PL	16	5	1.00	
30			**60.15m - 63.15m**																	
		61.56				SJ		180	45			hbk,si			3	PL	16	5	1.00	
		63.15				FO		180	27											
FO		65.11				SJ		140	57		0.02	ch			0	IR	5	5	1.50	
Can't measure			**63.15m - 66.15m**																	
FO		64.90				SJ		188	47			ox,si			3	PL	18	5	1.00	
FO		65.11				IN		158	37		0.03									18.1
24			**66.15m - 69.15m**																	
		66.90				IN		220	32											
		68.73				SJ		237	47			hbk,ca			5	PL	23	6	1.00	
345			**69.15m - 72.15m**																	
SO		69.20				SJ		218	42			si,hbk,ca,ox			6	PL	23	5	1.00	
SO		69.24				IN		198	38											

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)		(0-30)	(1-6)	(0-20)	
SO		69.24				SJ		198	38			hbk,ca			5	PL	16	6	1.00	
SO		70.74				SJ		2	49			ox,si,ca			3	PL	18	5	1.00	
SO		71.27				SJ		352	58			ox,ch,ca,hbk			3	PL	18	5	1.00	
-		71.40				SJ		352	67			hbk,ch,ca,ox			5	PL	17	5	1.00	
-		71.48				SJ		158	73			ox,si,ca			5	PL	17	5	1.00	
-		71.82				SJ		306	43			hbk,ch,ca			3	PL	19	6	1.00	
-		71.83				SJ		206	39			ox,si,ca,hbk			3	PL	18	5	1.00	
Can't measure			72.15m - 75.15m																	
FO		72.78				SJ		183	69			ch,hbk,ca,ox			3	PL	18	5	1.00	
FO		72.88				SJ		10	49			si,ch,ca,ox			3	PL	18	5	1.00	
FO		73.20				SJ		185	37			ch,ca,hbk			5	PL	19	6	1.00	
FO		73.29				SJ		27	36			ch,hbk,ca			5	UN	21	6	1.00	
FO		74.07				SJ		358	63			hbk,ca,			3	PL	19	6	1.00	
-		74.73				SJ		8	50			ox,hbk,ca			3	UN	15	5	1.00	
Can't puzzle			75.15m - 78.15m																	
		75.22				SJ		356	69			ch,ca			3	PL	17	6	1.00	
		75.50				SJ		182	43			ca,ch			3	PL	19	6	1.00	
		75.90				SJ		208	48			ca,ch			3	PL	19	6	1.00	
		76.11				SJ		202	42			hbk,ch,ca			3	ST	16	6	1.00	
		77.27				SJ		190	32			hbk,ca			1	PL	14	6	0.75	
		77.60				SJ		178	63			ch,si,ca			3	PL	20	6	1.00	
		77.65				SJ		190	28			ch,hbk,ca,si			3	PL	14	6	1.00	
FO		78.23				SJ		182	62			ch			3	UN	14	6	1.50	
FO		78.57				SJ		356	48			ch,ca			3	PL	17	6	1.00	
FO		79.00				SJ		140	72			hbk,ch,ca			3	PL	19	6	1.00	
FO		79.20				SJ		145	73			ch,ca			3	IR	19	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		80.44				SJ		N	76	N		ch,ca			5	PL	16	6	1.00	
Can't measure			**81.15m - 84.15m**																	
SFO		81.49				SJ		0	46			hbk,ch			3	PL	18	6	1.00	
SFO		82.13				SJ		190	32			ca			3	PL	17	5	1.00	
SFO		82.48				SJ		48	25			ch			3	PL	17	5	1.00	
SFO		82.62				SJ		190	45			ch			3	PL	17	5	1.00	
N		82.65				SJ		N	60	N		hbk,ch			3	PL	12	5	1.00	
N		82.79				SJ		N	73	N		ch,hbk			3	PL	18	6	1.00	
N		83.11				SJ		N	79	N		ch,hbk			3	PL	18	6	1.00	
			84.15m - 87.15m																	
FO		84.37				SJ		285	15			ch,ca,hbk			3	PL	18	6	1.00	
N		84.76				SJ		N	72	N		ch,hbk			3	PL	18	6	1.00	
N		85.04				SJ		N	71	N		ch,hbk			3	PL	18	6	1.00	
N		85.36				SJ		N	28	N		ca,ch			3	PL	18	6	1.00	
N		85.88				SJ		N	43	N		ch,mi,ca			3	PL	18	6	1.00	
N		86.40				SJ		N	52	N		ca,ch,mi			3	PL	18	6	1.00	
		86.70				SJ		210	50			ca			3	PL	18	6	1.00	
		86.96				SJ		190	27			ca			3	PL	18	6	1.00	
10			**87.15m - 90.15m**																	
		87.59				SJ		200	43			ch			3	PL	18	6	1.00	
		87.98				SJ		335	75			hbk			3	PL	18	6	1.00	
		88.87				SJ		15	51			hbk,ca			3	PL	18	6	1.00	
		89.18				SJ		180	45			hbk			3	PL	18	6	1.00	
235			**90.15m - 93.15m**																	
SO		90.74				SJ		60	36			ch			3	PL	16	5	1.00	
SO		92.50				SJ		235	52			ch,hbk			3	PL	18	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Structure Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)		(0-30)	(1-6)	(0-20)	
Can't measure			**93.15m - 96.15m**																	
BO		93.22				SJ		40	40			hbk,ca,ch			5	PL	19	5	1.00	
BO		93.76				SJ		50	65			hbk,ch			5	PL	19	5	1.00	
		95.63				SJ		160	55			ca,ch,hbk			3	PL	19	5	1.00	
85			**96.15m - 99.15m**																	
		96.23				SJ		240	45			ch,hbk			3	PL	18	6	1.00	
		97.84				SJ		50	62			ch			3	PL	18	6	1.00	
170			**99.15m - 102.15m**																	
		99.65				SJ		270	45			mi,hbk,ch			3	PL	18	6	1.00	
		99.82				SJ		270	35			hbk,ch,mi			3	PL	18	6	1.00	
		100.18				SJ		110	25			ch,ca			3	PL	18	6	1.00	
		100.48				SJ		280	40			ch,hbk			5	PL	20	6	1.00	
		100.49				SJ		115	35			ca,ch,ox			1	PL	15	5	1.00	
		102.06				SJ		290	35			ca,ch			3	PL	18	6	1.00	
180			**102.15m - 105.15m**																	
		104.13				SJ		100	25			hbk,su,ch			5	PL	19	5	1.50	
		104.96				FT		120	25			ch,mi			0	PL	0	1	4.00	
220			**105.15m - 108.15m**																	
		105.94				SJ		190	48			none			5	PL	22	6	0.75	
		106.37				SJ		70	45			ch,hbk			3	UN	17	5	1.50	
		107.13				SJ		110	50			none			5	PL	20	6	1.00	
		107.57				FT		0	30			ch,ca			0	PL	0	1	4.00	
			108.15m - 111.15m																	
FO		108.38				SJ		160	48			none			3	PL	17	6	0.75	
FO		108.61				SJ		160	52			ch			3	PL	18	6	1.00	
FO		108.68				SJ		260	35			ch			5	IR	19	5	1.50	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
FO		108.74				SJ		180	55			ch,ca			3	PL	18	6	1.00	
FO		108.95				SJ		180	50			ch,hbk			5	PL	19	5	1.00	
FO		109.06				SJ		310	65			ch,hbk			3	PL	17	6	1.00	
FO		109.11				SJ		190	40			mi			3	PL	17	5	1.00	
FO		109.15				SJ		170	48			mi			3	PL	18	6	1.00	
		109.59				SJ		240	64			hbk,ch			5	CU	20	6	1.00	
		109.75				BZ		70	30			ch,ca			3	PL	17	5	1.00	
		109.83				SJ		65	15			ch,ca			3	PL	18	6	1.00	
		110.56				SJ		320	75			hbk			3	PL	18	6	1.00	
350			**111.15m - 114.15m**																	
		112.02				SJ		0	88			none			3	PL	20	6	0.75	
		112.07				SJ		180	10			ch			3	PL	17	5	1.00	
		112.55				SJ		60	28			ch,hbk			3	PL	17	5	1.00	
		112.85				SJ		135	42			ch			3	PL	13	3	4.00	
		113.32				SJ		143	52			ca,ch			3	PL	17	5	0.75	
Can't measure			**114.15m - 117.15m**																	
FO		114.15				SJ		300	25			ch			3	PL	11	3	2.00	
FO		114.20				SJ		225	20			ch			3	PL	11	3	2.00	
FO		114.66				SJ		90	44			hbk,mi,ch			3	PL	18	6	1.00	
N		115.47				SJ		N	20		N	ch			3	PL	18	6	1.00	
N		115.90	**ult Breccia**			FT		N	55		N	ee remark			5	PL	0	1	2.00	23.1
		116.50				SJ		120	12			ch,hbk			0	CU	14	5	1.00	
		116.64				SJ		120	35			ch			0	PL	15	6	1.00	
		116.65				SJ		290	22			ch,ca			3	PL	18	6	1.00	
0			**117.15m - 120.15m**																	
		118.80				SJ		310	47			none			5	PL	22	6	0.75	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		119.02				SJ		65	15			ch			3	PL	17	5	1.00	
0			**120.15m - 123.15m**																	
		120.46				SJ		300	55			ch,hbk,ca			3	PL	17	5	1.00	
		122.00				SJ		110	27			ch,hbk			3	PL	18	6	1.00	
		122.90				SJ		50	20			ch,ca			3	PL	18	6	1.00	
		123.00				SJ		50	15			ch,ca			3	PL	18	6	1.00	
310			**123.15m - 126.15m**																	
		123.63				SJ		350	12			ch,ca			3	PL	18	6	1.00	
		124.03				SJ		235	14			ch,ca			3	PL	16	5	1.00	
Can't measure			**126.15m - 129.15m**																	
N		126.15				SJ		N	28		N	ch,ca			3	PL	18	6	1.00	
N		127.05				SJ		N	60		N	hbk			3	PL	18	6	1.00	
N		127.57				SJ		N	25		N	ch,ca			3	PL	18	6	1.00	
N		127.66				SJ		N	27		N	ch,ca			3	PL	18	6	1.00	
-		128.06				SJ		210	70			hbk			3	PL	17	5	1.00	
-		128.84				SJ		320	12			ch,ca			3	PL	18	6	1.00	
335			**129.15m - 132.15m**																	
		129.22				SJ		10	35			hbk,ch,ca			3	PL	18	6	1.00	
		130.15				SJ		95	22			ca,ch			3	PL	18	6	1.00	
		130.74				SJ		60	40			ch,ca			3	PL	18	6	1.00	
		131.01				SJ		275	80			mi			5	PL	20	6	1.00	
0			**132.15m - 135.15m**																	
		133.71				SJ		80	55			ch,ca			3	PL	18	6	1.00	
		134.69				SJ		18	70			ch,ca			3	PL	18	6	1.00	
		134.87				SJ		50	58			ch,ca			3	PL	18	6	1.00	
15			**135.15m - 138.15m**																	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)		(0-30)	(1-6)	(0-20)	
		135.50				SJ		80	20			ch,ca			3	PL	18	6	1.00	
		135.64				SJ		65	20			ch			3	PL	18	6	1.00	
		136.97				SJ		45	18			ch,ca			3	PL	18	6	1.00	
325			**138.15m -141.15m**																	24.1
			Single core piece																	
150			**141.15m - 144.15m**																	24.1
			Single core piece																	
15			**144.15m - 147.15m**																	
		145.50				SJ		190	5			ch,ca			3	PL	16	5	1.00	
		145.80				SJ		93	27			ch,ca			3	PL	17	5	1.00	
		146.07				SJ		90	25			ch,ca			3	PL	18	6	1.00	
0			**147.15m - 150.15m**																	
		148.50				SJ		100	20			ch			3	PL	17	5	1.00	
		148.52				SJ		100	20			ch			3	PL	18	6	1.00	
Can't measure			**150.15m - 153.15m**																	
FO		149.70				SJ		70	15			ch			3	PL	18	6	1.00	
N		150.91				SJ		N	50	N		ch			3	PL	17	5	1.00	
N		151.10				SJ		N	25	N		ch			1	PL	15	5	1.00	
N		151.13				SJ		N	35	N		ch			1	PL	15	5	1.00	
N		151.26				SJ		N	45	N		ch,hbk			3	PL	17	5	1.00	
N		151.37				SJ		N	35	N		ch,hbk			3	PL	17	5	1.00	
N		151.48				SJ		N	45	N		ch,ca			3	PL	18	6	1.00	
N		151.67				SJ		N	45	N		ch			3	PL	17	5	1.00	
N		151.78				SJ		N	40	N		ch			3	PL	17	5	1.50	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		152.10				BZ		N	30	N		ch	152.10	153.07	3	PL	12	5	1.00	
		153.07				FT		10	30			ch	153.07	153.10	5	PL	0	1	1.50	
Can't measure			153.15m - 156.15m																	
FO		153.15				SJ		15	40			hbk,su,ch			6	PL	21	6	1.00	
FO		153.20				SJ		160	28			ch			3	CU	18	6	1.00	
FO		153.31				SJ		170	65			ch			3	UN	18	6	1.00	
FO		153.76				SJ		310	52			ch			3	PL	18	6	1.00	
FO		153.94				SJ		190	48			none			5	PL	22	6	0.75	
		155.47				SJ		10	45			ch			3	PL	18	6	1.00	
		155.82				SJ		50	45			ch			3	PL	18	6	1.00	
		155.99				SJ		350	50			ch			3	CU	14	6	1.00	
Can't measure			156.15m - 159.15m																	
N		156.15				SJ		10	20			ch			5	PL	17	3	1.50	
		156.18				SJ		150	45			ch			3	PL	17	5	1.00	
		156.59				SJ		250	60			ch			3	PL	18	6	1.00	
		157.21				SJ		100	40			ch			3	PL	13	1	4.00	
		157.39				SJ		160	20			ch			3	PL	17	5	2.00	
		158.56				SJ		0	10			ch,ca			3	CU	17	5	1.00	
		158.85				SJ		240	35			ch			3	CU	17	6	1.00	
		158.98				SJ		335	50			ch			1	PL	16	6	1.00	
16			159.15m - 162.15m																	
		159.15				SJ		140	30			ch,ox			3	PL	17	5	1.00	
		159.99				SJ		320	45			ch,ca			3	PL	18	6	1.00	
		160.58				SJ		90	42			ch			3	IR	18	6	1.00	
		161.16				SJ		350	32			ch,hbk			3	PL	18	6	1.00	
		161.25				SJ		310	38			ch,hbk			5	CU	20	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		161.75				SJ		290	52			ch,ca,hbk			3	ST	18	6	1.00	
			162.15m - 165.15m																	
FO		162.78				SJ		320	65			ca,ox,ch			3	UN	17	5	1.00	
FO		163.03				SJ		320	70			ch,ca			1	PL	15	5	1.00	
FO		163.56				SJ		230	10			ch			3	PL	17	5	1.00	
FO		163.63				SJ		10	15			ch,hbk			3	PL	17	5	1.00	
FO		163.78				SJ		20	46			ch,hbk			5	PL	17	5	1.00	
FO		163.98				SJ		160	38			ch			3	PL	17	5	2.00	
FO		164.11				BC		320	40											
		164.22				SJ		330	52			ch			3	PL	17	5	1.00	
			165.15m - 168.15m																	
FO		165.73				BZ		335	30			ch,mi			3	PL	17	5	1.00	
		165.77				SJ		180	38			su,ch			5	IR	19	5	1.00	
		165.91				SJ		320	28			ch			3	PL	18	6	1.00	
		166.23				SJ		190	35			ch			3	PL	18	6	1.00	
		166.47				SJ		320	75			ca,ch			3	PL	18	6	1.00	
		166.55				SJ		90	10			hbk,ch			3	PL	18	6	1.00	
		167.00				SJ		270	45			ca,ch			3	PL	18	6	0.75	
		167.12				SJ		350	50			hbk			3	PL	18	6	1.00	
0			168.15m - 171.15m																	
		168.74				SJ		340	58			ox,ca			3	CU	17	5	1.00	
		168.85				SJ		180	20			ch,ca			5	PL	18	6	1.00	
		169.21				SJ		320	75			ch,ca			3	IR	18	6	1.00	
		169.38				SJ		180	24			ch,ca			3	PL	18	6	1.00	
		169.85				SJ		170	30			ca,ch			1	PL	16	6	1.00	
		170.17				SJ		145	30			ch,ca			3	PL	17	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		170.68				SJ		260	25			ch,ca			3	PL	18	6	1.00	
		170.76				SJ		180	32			mi,hbk			3	PL	17	6	0.75	

ORIENTED CORE DATA SHEET

Project	Arnaud	Job No.	TX10147503				
Hole No.	CH-3	Location	Open pit	Elevation		Date	Dec 9, 2010 to Dec 12, 2010
By	KA						
Northing		Easting		Inclination	72	Bearing	156
Dia.	HQ						

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Depth From Start (m)	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
			1.15m - 3.25m																	
BO		2.51				SJ		284	15			-			3	PL	20	6	1.00	
			3.25m - 6.25m																	
		3.64				SJ		260	30			Ca, HBK			3	PL	18	5	1.00	
		4.10				SJ		60	75			Ca, Ox			3	PL	16	5	1.00	
		4.20				SJ		250	10			Ch,Ca,Ox			3	PL	17	5	1.00	
			6.25m - 9.25m																	
		6.52				SJ		228	10			Ca,Ch,He			3	PL	19	6	1.00	
		6.78				SJ		30	55			He,Ca			3	PL	19	6	1.00	
BO		7.91				SJ		290	15			HBK,Ch,Ca			3	PL	19	6	1.00	
BO		8.96				SJ		170	35			HBK			3	PL	20	6	1.00	
BO		8.98				SJ		260	10			HBK			3	PL	19	6	1.00	
		9.25	DB to iron formation			CT														
			9.25m - 12.25m																	
N		10.43				SJ		N	80	N		Ox,Ch,Mi			3	PL	17	5	1.00	
N		10.50				BD		N	64	N		-			3	PL	20	6	1.00	
N		10.56				SJ		N	68	N		none			3	PL	20	6	1.00	
N		10.69				SJ		N	68	N		none			3	PL	20	6	1.00	
BO		10.86				BD		20	75			-			6	IR	20	6	1.00	
			12.25m - 15.25m																	
BO		13.72				SJ		40	60			Ch			3	PL	14	6	1.00	
BO		15.17				SJ		60	80			HBK			3	PL	18	6	1.00	
			15.25m - 18.25m																	
		15.37				SJ		320	65			-			3	UN	19	6	1.00	
		15.65				SJ		40	70			Ca,Ch			5	PL	20	6	1.00	
		16.31				SJ		70	55			Ch			3	PL	19	6	1.00	
N		17.10				SJ		N	55	N		none			3	PL	20	6	1.00	
N		17.14				SJ		N	36	N		Ch,Ca			3	PL	19	6	1.00	
BO		18.02				SJ		180	62			Ch			1	UN	13	6	1.00	
			18.25m - 21.25m																	
		18.78				SJ		280	52			none			5	PL	22	6	0.75	
		19.42				SJ		80	28			Ch,He			3	PL	18	6	1.00	
		19.85				SJ		180	15			Ch,He, Mi			3	PL	17	6	1.00	
Can't match across run			21.25m - 24.25m																	
		21.70				SJ		40	42			none			3	PL	19	6	1.00	
		22.59				SJ		130	62			HBK			3	PL	17	6	1.00	
		22.72				SJ		110	74			HBK			3	PL	19	6	1.00	
		24.00				SJ		270	85			none			5	PL	21	6	1.00	
			24.25m - 27.25m																	
		25.79				SJ		110	70			none			3	PL	17	6	1.00	
BO		26.69				SJ		280	70			none			3	PL	19	6	0.75	
			27.25m - 30.25m																	
		27.53				SJ		350	58			Ch			5	PL	19	6	1.00	
		27.57				SJ		50	55			Ch,Ca			3	PL	17	6	1.00	
		28.94				SJ		250	50											
		29.30				SJ		35	52			Ch,Ca			3	PL	17	6	1.00	
		29.46				SJ		260	64			Ch,Ca			3	PL	17	6	1.00	
		29.77				SJ		220	68			HBK			3	PL	17	6	1.00	
115			30.25m - 33.25m																	
		30.29				SJ		155	50			HBK			3	PL	17	5	1.00	
		30.36				SJ		140	45			Ch,Ca			3	PL	18	6	1.00	
		30.41				SJ		350	62			HBK,Ca			3	PL	17	6	1.00	
		31.72				SJ		100	60			Ca,Ch			3	PL	17	6	1.00	
		32.53				SJ		100	34			Ca,Ch			5	PL	19	6	1.00	
		32.76				SJ		280	72			HBK			3	PL	15	6	1.00	
			33.25m - 36.25m																	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Depth From Start (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		33.40				SJ		310	68			none			3	PL	20	6	1.00	
		34.28				SJ		150	45			Ca,Ch,HBK			5	PL	14	3	1.50	
N		34.35				SJ		N	32	N		Ch			3	PL	13	5	1.00	
N		34.37				SJ		N	42	N		Ch.Ca			3	PL	17	6	1.00	
N		34.48				SH		N	45	N		Mi,Si			5	IR	10	3	1.50	
N		34.88				SJ		N	82	N		Mi,Ch			3	PL	18	6	1.00	
N		34.91				SJ		N	80	N		Ch			3	PL	18	6	1.00	
N		35.34				SJ		N	65	N		none			5	CU	17	6	1.00	
BO		35.70				SJ		10	58			Mi,Ca			5	PL	20	6	1.00	
BO		35.85				SJ		200	20			Ch			5	PL	11	1	2.00	
BO		35.90				SJ		140	48			Su			6	IR	11	3	1.50	
BO		36.00				SJ		55	28			Ch,Mi,Su,Si			6	PL	3	1	4.00	
				36.25m - 39.25m																
		36.42				SJ		240	70			none			3	PL	20	6	1.00	
		36.68				SJ		250	50			none			5	PL	22	6	1.00	
		36.78				SJ		60	38			Ch,Su,Ca			5	PL	10	3	2.00	
		36.94				HJ		70	40			Ch			-	-	-	-	-	
		37.00				HJ		70	40			Ch			-	-	-	-	-	
		37.06				SJ		250	68			Ch			3	PL	17	6	1.00	
		37.09				BD		250	68			-								
		37.35				FC		-	-				37.35	39.25						4.1
				39.25m - 42.25m																
N		39.35				SJ		N	20	N		Ch			3	PL	12	5	1.00	
N		39.50				SJ		N	38	N		Ch			3	PL	12	5	1.00	
N		39.52				SJ		N	10	N		Ch			3	PL	16	5	1.00	
N		39.54				SJ		N	52	N		Ch			3	PL	13	5	1.00	
N		39.64				SJ		N	55	N		Ch			3	UN	16	5	1.00	
N		39.71				SJ		N	10	N		Ch			3	PL	16	5	1.00	
N		39.79				SJ		N	41	N		Ch			3	PL	16	5	1.00	
N		39.95				SJ		N	45	N		none			3	PL	16	5	1.00	
N		40.26				SJ		N	32	N	0.02	Ch			1	PL	13	6	1.00	
N		40.57				HJ		N	28	N	0.02	Ch			-	-	-	-	-	
N		40.68				SJ		N	35	N		Ch			5	PL	20	6	1.00	
N		40.81				SJ		N	40	N		Ch			6	ST	21	6	1.00	
N		40.95				SJ		N	50	N		Ch			3	PL	18	6	1.00	
N		41.13				SJ		N	5	N		Ch			1	PL	16	6	1.00	
N		41.55				SJ		N	35	N		HBK,Su,Ch,Ca			3	ST	17	5	1.00	
N		41.63				SJ		N	65	N		Ch			1	UN	16	6	1.00	
N		41.70				RZ		N	28	N		Ch	41.70	42.25	1	PL	8	5	1.00	
				42.25m - 45.25m																
		42.35				SJ		20	15			Ch			6	IR	15	5	1.00	
		42.37				SJ		150	60			Ch,Su			1	PL	16	6	1.00	
		42.50				SJ		20	50			Ch			1	UN	16	6	1.00	
		42.63				SJ		25	15		0.01	Ch			3	PL	17	5	1.00	
		42.76				SJ		15	55			Ch			0	PL	15	6	1.00	5.1
		43.06				FT		180	25		0.04	Ca,Ch,see remark								5.2
		43.12				RZ		110	45		0.16	Ch,Su	43.12	43.28	1	PL	6	3	1.00	
N		43.28				BD		N	35	N		-			5	PL	10	3	1.00	
N		43.81				BD		N	45	N		-								
N		44.09				BD		N	46	N		-								
				45.25m - 48.25m																
		45.29				SJ		0	55			Ox,HBK,Su			3	PL	18	6	1.00	
		45.35				SJ		0	60			Ox,Ch,HBK			3	PL	18	6	0.75	
		45.40				SJ		185	30			HBK			3	PL	17	5	0.75	
		45.55				SJ		280	35			ca,ch			6	PL	20	5	1.00	
		45.72				SJ		160	48			ca,ch,ox			5	PL	17	5	1.00	
		46.00				BD		30	65			ox			5	PL	20	5	0.75	
		46.25				SJ		220	35			ch,ca			1	PL	16	6	1.00	
		46.39				SJ		210	35			ch,ca,hbk			3	PL	18	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Depth From Start (m)	Rock Type 1	2	3	Struc. Type		Structure BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		46.47				BD		20	60			-								
BO		46.86				SJ		30	26			ch,ca,hbk			3	PL	17	6	1.00	
BO		47.88				SJ		30	50			none			3	PL	20	6	0.75	
BO		48.02				SJ		180	55			none			3	PL	20	6	0.75	
0			48.25m - 51.25m																	
		48.83				SJ		220	55			hbk			3	PL	18	6	1.00	
		49.83				SJ		10	35			ch,ca			3	PL	17	5	1.00	
		50.00				SJ		100	20			ca,ch			3	PL	17	5	1.00	
		50.03				SJ		5	42			ch,ca			3	PL	17	6	1.00	
		50.59				SJ		180	55			ox			3	PL	17	5	1.00	
		50.91				SJ		185	50			none			3	PL	20	6	0.75	
		50.98				SJ		180	50			none			5	PL	22	6	0.75	
		51.10				SJ		185	58			none			5	PL	20	6	0.75	
320			51.25m - 54.25m																	
		51.79				SJ		310	32			ch,ca,hbk			3	PL	18	6	1.00	
		52.00				SJ		120	55			none			3	PL	20	6	0.75	
		52.96				SJ		295	43			ch,ca,hbk			3	PL	18	6	1.00	
		53.08				SJ		20	5			ch,ca			3	PL	18	6	1.00	
		53.16				SJ		290	35			ch,hbk			3	PL	18	6	1.00	
		53.66				SJ		290	38			ca,hbk			3	ST	18	6	1.00	
		54.08				BD		110	40			-								
		54.23				SJ		270	25			ch,ca			3	PL	18	6	1.00	
0			54.25m - 57.25m																	
		54.36				SJ		310	42			ch,ca			3	PL	18	6	1.00	
		54.63				BD		130	45			-								
		54.68				SJ		300	45			ca,ch			3	PL	18	6	1.00	
		54.79				SJ		120	68			ch,ox			3	PL	18	6	1.00	
		55.25				SJ		280	40			hbk,ch,ca			3	PL	18	6	1.00	
		55.35				SJ		20	10			hbk,ch,ca			5	PL	19	5	1.00	
		55.43				SJ		280	24			ch,hbk			5	ST	19	5	1.00	
N		56.26				SJ		N	30	N		hbk,ch			3	PL	18	6	1.00	
		56.92				SJ		315	30			none			5	ST	17	6	0.75	
0			57.25m - 60.25m																	
		57.76				SJ		310	20			ch,hbk,ca			5	CU	20	6	1.00	
		59.35				SJ		130	45			none			3	PL	20	6	0.75	
45			60.25m - 63.25m																	
		60.96				SJ		160	58			ox,si			3	PL	15	5	0.75	
		61.37				SJ		150	60			si,hbk			3	PL	17	5	0.75	
		61.56				SJ		150	50			si,hbk			3	PL	17	6	0.75	
		62.28				SJ		340	48			hbk,mi			3	PL	18	6	0.75	
		62.32				SJ		160	55			si			3	PL	17	5	0.75	
		63.15				SJ		150	54			si,hbk			3	PL	17	5	0.75	
310			63.25m - 66.25m																	
		63.77				SJ		60	60			none			3	PL	20	6	0.75	
		64.45				SJ		90	60			ox			3	PL	20	6	0.75	
		64.55				SJ		100	35			ch,ca			3	PL	18	6	1.00	
		64.60				SJ		270	40			si,ch			3	PL	18	6	1.00	
		65.27				SJ		270	60			HBK			1	PL	18	6	1.00	
		65.43				SJ		120	24			Ch,Ca			3	PL	18	6	1.00	
		65.87				SJ		170	52			ox,ch			3	PL	18	6	1.00	
100			66.25m - 69.25m																	
		66.43				SJ		240	50			ox,ch			3	PL	17	5	1.00	
		66.63				SJ		310	75			ch,si,mi			3	UN	18	6	1.00	
		67.08				SJ		10	50			ch			3	PL	18	6	1.00	
		67.47				BD		240	55			-								
BO		68.86				SJ		110	50			ch,si,mi			1	PL	15	5	1.00	
BO		69.09				SJ		358	45			none			3	PL	20	6	0.75	
Can't measure			69.25m - 72.25m																	
		71.65				SJ		240	58			ch,hbk			3	PL	17	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Depth From Start (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
290			72.25m - 75.25m																	
		72.82				SJ		20	31			ch,ca,hbk			3	PL	17	5	1.00	
		73.30				SJ		335	55			ch			3	PL	16	6	1.00	
		73.33				SJ		340	49			ch			1	PL	14	6	1.00	
		73.42				SJ		0	19			ch,ca			3	PL	17	5	1.00	
		73.82				BD		350	35			-			-	-	-	-	-	
		74.34				SJ		340	38			ch,ca			3	PL	17	5	1.00	
		74.46				SJ		350	36			ca,ch			3	PL	17	5	1.00	
		74.52				SJ		348	40			hbk,ch,ca			3	PL	17	5	1.00	
		74.84				SJ		340	40			hbk,ch			3	PL	17	5	1.00	
-			75.25m - 78.25m																	
		75.25				SJ		345	30			ch,ca,hbk			3	PL	16	5	1.00	
		75.68				SJ		332	61			hbk,ca			3	PL	17	5	1.00	
			78.25m - 81.25m																	
		78.61				SJ		190	40			ca,hbk,ch			3	PL	17	5	1.00	
		78.84				SJ		220	50			-			3	CU	20	6	0.75	
BO		79.54				SJ		320	49			ch			3	PL	18	6	1.00	
BO		79.72				SJ		330	36			ch,su			3	PL	18	6	1.00	
BO		80.36				SJ		350	40			ch			3	PL	18	6	1.00	
BO		81.13				SJ		290	30			hbk			3	PL	18	6	1.00	
Can't measure			81.25m - 84.25m																	
		82.77				SJ		340	45			ca,ch			3	PL	17	5	1.00	
		82.86				SJ		310	64			ch,si			3	PL	17	5	1.00	
		83.47				SJ		320	52			ch,hbk			3	PL	17	5	1.00	
		83.77				SJ		330	52			hbk			3	PL	18	6	1.00	
270			84.25m - 87.25m																	
		84.30				SJ		270	38			mi,hbk,ch			5	PL	19	5	1.00	
		84.73				SJ		100	55			-			1	PL	18	6	0.75	
		84.76				SJ		240	43			ch,hbk			3	PL	18	6	1.00	
		85.10				SJ		280	40			hbk,ca			3	PL	18	6	0.75	
BO		85.92				SJ		260	50			hbk,ca			3	PL	18	6	1.00	
BO		86.21				SJ		255	25			ch			5	PL	20	6	1.00	
BO		87.13				SJ		300	35			ca,ch			5	PL	20	6	1.00	
			87.25m - 90.25m																	
		87.57				SJ		130	65			ca,ch			3	PL	17	5	1.00	
		87.64				SJ		120	65			ch,ca			3	PL	18	6	1.00	
		88.24				SJ		280	50			ox,ca,hbk			3	PL	17	5	1.00	
		88.31				SJ		130	55			ch,ca,hbk			3	PL	17	6	1.00	
		88.40				SJ		280	48			si,ch,ca			3	PL	17	5	1.00	
		88.53				SJ		270	55			si,ch,ca			3	PL	17	5	1.00	
		88.74				SJ		270	55			ca,si,ch			3	PL	17	5	1.00	
		89.28				SJ		270	45			ca,hbk,ch			3	PL	18	6	1.00	
		89.47				SJ		90	72			hbk,ca			3	PL	18	6	1.00	
		89.72				SJ		140	70			ca			3	PL	18	6	1.00	
		89.92				SJ		120	78			ox,mi,ca			3	PL	16	5	1.50	
		90.07				SJ		70	76			ch			3	PL	18	6	1.00	
325			90.25m - 93.25m																	
		90.25				SJ		70	55			ch			3	PL	18	6	1.00	
		90.47				SJ		60	58			ca,hbk,mi			3	PL	18	6	1.00	
		90.73				SJ		60	50			hbk,hbu,si			3	PL	17	5	1.00	
		90.78				SJ		60	50			hbk,hbu,si			5	PL	19	5	1.00	
		91.16				SJ		70	45			hbk			3	PL	18	6	0.75	
		91.54				SJ		60	58			ch			3	PL	18	6	1.00	
N		92.05				SJ		N	75	N		si,ca			3	PL	17	5	1.00	
BO		92.55				SJ		110	70			ch,ca			3	PL	17	6	1.00	
BO		92.80				SJ		140	62			si,ch			3	CU	17	5	1.00	
Can't measure			93.25m - 96.25m																	
BO		93.37				SJ		90	64			si,hbk,ch			1	PL	15	5	1.00	
BO		93.64				SJ		260	48			ch			1	PL	16	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.GI output) (degrees)	Depth From Start (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
BO		94.20				SJ		90	70			mi,hbk,ch			1	PL	16	6	1.00	
BO		94.43				SJ		130	55			hbu			6	PL	19	6	1.00	
BO		94.53				SJ		140	45			hbk			3	PL	17	5	1.00	
BO		94.60				SJ		280	45			mi,hbk,ch			5	PL	20	6	0.75	
BO		94.66				SJ		110	50			hbu,si,hbk			3	PL	18	5	1.00	
BO		94.84				SJ		100	68			ch			3	IR	18	6	1.00	
BO		95.31				SJ		270	50			hbk			3	PL	18	6	1.00	
Can't measure			96.25m - 99.25m																	
		97.54				SJ		250	70			hbk			3	PL	20	6	0.75	
		97.76				SJ		25	40			hbk,ch			3	UN	18	6	1.00	
		97.84				SJ		40	50			ca			3	PL	18	6	1.00	
		98.35				SJ		305	35			su,ch			3	PL	18	6	1.00	
			99.25m - 100.25m																	
N		100.44				SJ		N	65	N		ch,ca,hbk			3	PL	18	6	1.00	
N		100.56				SJ		N	60	N		ch,hbk			3	PL	18	6	1.00	
N		101.35				SJ		N	30	N		ca,ch,hbk			5	CU	18	6	1.00	
N		101.45				SJ		N	25	N		ca,ch,hbk			3	PL	18	6	1.00	
N		101.70				SJ		N	55	N		hbk,ch			3	PL	18	6	1.00	

ORIENTED CORE DATA SHEET

Project	Arnaud	Job No.	TX10147503						
Hole No.	CH-4 re	Location	Open pit	Elevation		Date		By	KA
						to			
Northing		Easting		Inclination	46	Bearing	235	Dia.	HQ

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
none			3.52m - 5.32m																	
-		3.60				BZ		-	-		0.20		3.60	3.80	-	-	-	5	-	highly oxidised
-		3.87				SJ		210	28			ox,ch,hbk			5	PL	15	5	1.00	
-		4.30				SJ		0	27			si,ox,ch			3	PL	11	5	1.50	highly oxidised
-		4.71				SJ		55	47			hbk,ca			3	IR	17	6	1.00	
-		5.18				SJ		32	47			hbk			5	PL	21	6	1.00	
can't measure			5.32m - 8.32m																	
FO		5.62				SJ		30	38			hbk,ox			5	PL	18	5	1.00	
FO		5.83				SJ		15	37			ox			6	PL	0	5	1.00	highly oxidised
N		5.83				BZ		-	-	N	0.07		5.83	5.90	-	-	-	5	1.00	
N		6.31				SJ		N	53	N		ca,hbk			3	PL	14	6	1.00	
N		6.60				SJ		N	59	N		hbk			6	PL	17	6	1.00	
N		7.06				SJ		N	58	N		ca,hbk			3	PL	14	6	1.00	
N		7.49				SJ		N	48	N		ch,hbk			6	PL	20	6	1.00	
can't measure			8.32m - 11.32m																	
SFO		8.32				SJ		272	17			hbk,ca			6	PL	17	6	1.00	
SFO		8.37				SJ		110	55			ca,ch			3	PL	17	6	1.00	
SFO		8.62				SJ		112	57			ca			5	PL	16	6	1.00	
N		9.19				SJ		N	54	N		hbk			3	PL	14	6	1.00	
N		9.40				SJ		N	24	N		hbk			5	PL	19	6	1.00	
N		9.52				SJ		N	48	N		ch,si			3	PL	12	6	4.00	
N		9.64				SJ		N	62	N		hbk			3	PL	16	6	1.00	
SO		9.81				SJ		233	61			hbk,mi			5	PL	16	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
SO		10.06				SJ		104	58			hbk			5	PL	19	6	1.00	
-		10.25				SJ		94	57			hbk,ch			3	PL	17	6	1.00	
can't measure			11.32m - 14.32m																	
FO		11.32				SJ		36	70			ch			1	PL	15	6	1.00	
N		11.40				SJ		N	74	N		ch,ca			3	PL	14	6	1.00	
N		11.70				SJ		N	46	N		ca,hbk			5	PL	16	6	1.00	
N		12.07				SJ		N	54	N		ca,mi			5	PL	19	6	1.00	
N		12.23				SJ		N	54	N		ch,mi,ca			5	PL	14	6	1.50	
N		12.28				SJ		N	55	N		ca,ch			5	PL	14	6	4.00	
N		12.86				SJ		N	63	N		ca,ch			5	PL	14	6	4.00	
N		13.14				SJ		N	60	N		ca,ch			5	PL	14	6	4.00	
N		13.17				SJ		N	55	N		ca,ch			5	IR	14	6	4.00	
N		13.23				IN		N	17	N	0.16		13.23	13.39	-	-	-	-	-	
N		13.32				SJ		N	17	N		ch,si			3	PL	0	6	4.00	1cm gouge
-		13.54				SJ		355	56			ch,mi			5	PL	17	6	1.50	
-		13.89				SJ		175	44			ch			3	PL	17	6	1.00	
can't measure			14.32m - 17.32m																	
SFO		15.98				SJ		346	44			ch			5	PL	16	6	1.00	
SFO		16.11				SJ		178	44			ch			3	PL	14	6	1.00	
SFO		16.78				BD		285	46						-	-	-	-	-	
can't measure			17.32m - 20.32m																	
N		17.50				SJ		N	37	N		ch,hbk			6	PL	18	6	1.50	
N		18.03				SJ		N	50	N		hbk,mi			6	PL	17	6	1.00	
N		18.95	Mf			IN		N	45	N	0.02				-	-	-	-	-	Probable anor
-		19.50				SJ		15	20			ch,si,ca			5	PL	0	6	1.00	5mm soft infill
-		19.59				SJ		14	20			mi,ch			5	UN	19	6	1.00	

			Rock Type			Structure														
Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
can't measure			**20.32m - 23.32m**																	
FO		22.06				SJ		130	59			hbk,ch			5	PL	16	6	1.00	
FO		22.83				SJ		325	27			hbk			5	PL	21	6	1.00	
60			**23.32m - 26.32m**																	
-		23.32				SJ		50	36			hbk			5	PL	16	6	1.00	
-		24.71				SJ		173	25			hbk			5	UN	19	6	1.00	
-		24.91				SJ		94	33			hbk,ch,ca			5	PL	16	6	1.00	
-		25.16				BD		255	53						-	-	-	-	-	
-		25.26				BD		245	32						-	-	-	-	-	
-		25.38				SJ		106	33			ch,mi,hbk			5	PL	19	6	1.00	
120			**26.32m - 29.32m**																	
-		27.36				SJ		213	36			ch,hbk			5	PL	19	6	1.00	
-		28.64				SJ		178	33			mi,ch,hbk			3	PL	17	6	1.00	
-		28.76				SJ		206	47			si,hbk			3	PL	17	6	1.50	
-		29.05				SJ		324	39			mi,hbk			3	PL	17	6	1.00	
135			**29.32m - 32.32m**																	
-		29.62	**DB**			IN		122	49		0.03				-	-	-	-	-	
-		30.05				SJ		225	0			hbk,ch			3	PL	18	6	1.00	
-		30.33				SJ		30	53			hbk,ca			5	PL	16	6	1.00	
-		30.64				SJ		2	65			hbk,ca			3	PL	17	6	1.00	
-		31.33				SJ		100	44			hbk,ca			3	PL	18	6	1.00	
-		31.75				SJ		85	47			si,ch			3	PL	12	6	3.00	
-		31.95				SJ		314	47			si,ch,su			3	PL	12	6	3.00	
can't measure			**32.32m - 35.32m**																	
FO		32.32				SJ		74	33			ch,su			5	PL	12	6	2.00	
FO		32.61				SJ		130	24			ch,su			5	CU	0	6	1.50	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		32.61				BZ		-	-	N	0.13	su,ca	32.61	32.74	-	-	-	6	1.50	
N		32.84				SJ		N	10	N		ch,ca			3	PL	12	6	1.50	
N		32.93				SJ		N	50	N		ch,mi,su,ca			5	PL	12	6	2.00	
N		33.10				SJ		N	30	N		ch			5	UN	17	6	2.00	
N		33.39				SJ		N	43	N		hbk,mi			3	PL	17	6	1.00	
N		34.62				RZ		N	-	N	0.05		34.62	34.67	-	-	-	-	3.00	
N		34.62				SJ		N	23	N		si,hbk,mi			5	PL	0	6	3.00	
N		34.85				SJ		N	57	N		si,hbk,mi			5	PL	14	6	3.00	
-		34.95				SJ		174	44			none			3	PL	19	6	0.75	
-		34.97	**See Remark**			IN		140	43		0.08				-	-	-	-	-	Intrusion appe
270			**35.32m - 38.32m**																	
-		35.50				SJ		235	30			ch,hbk			6	IR	18	6	1.50	
-		36.00	**See Remark**			IN		120	30		0.04				-	-	-	-	-	Intrusion appe
-		36.87				SJ		60	35			hbk			5	PL	19	6	1.00	
-		37.28				SJ		90	47			ca,hbk			5	PL	19	6	1.00	
-		37.54				SJ		86	48			ca,hbk			3	PL	17	6	1.00	
-		37.79				SJ		78	48			ca,hbk			5	PL	19	6	1.00	
65			**38.32m - 41.32m**																	
-		38.32				SJ		166	46			ca,ch,hbk			5	PL	19	6	1.00	
-		38.94				SJ		146	38			hbk			3	PL	17	6	1.00	
-		39.22				SJ		185	47			ca,hbk			5	PL	17	6	1.00	
can't measure			**41.32m - 44.32m**																	
-		43.14				SJ		55	37			ch,hbk			3	PL	14	6	1.00	
-		43.92				SJ		32	37			hbk			3	UN	17	6	1.00	
-		44.03				SJ		32	38			ch,hbk			5	PL	19	6	1.00	
120			**44.32m - 47.32m**																	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
-		47.16				SJ		146	43			hbk			5	PL	20	6	1.00	
can't measure			47.32m - 50.32m																	
FO		47.32				SJ		150	57			hbk			5	CU	19	6	1.00	
FO		47.60				SJ		120	55			hbk			5	PL	19	6	0.75	
-		49.48				BZ		-	-		0.04	hbk	49.48	49.52	-	-	-	6	1.00	
SO		49.52				SJ		74	45			hbk			5	PL	16	6	1.00	
SO		49.73				SJ		80	45			hbk			5	ST	16	6	1.00	
can't measure			50.32m - 52.41m																	
SFO		50.86				SJ		66	46			hbk			6	PL	20	6	0.75	
SFO		51.62	AN			IN		266	53		0.04				-	-	-	-	-	
SFO		51.66				SJ		70	47			ch			3	PL	15	6	1.00	
SFO		51.71				SJ		250	45			ch			6	PL	17	6	1.00	
N		51.90				SJ		N	0	N		ch,hbk			6	UN	15	6	1.50	
N		51.93				SJ		N	48	N		ch,si			6	CU	15	6	3.00	
N		52.03	AN			IN		N	45	N	0.02				-	-	-	-	-	
N		52.16	AN			IN		N	55	N	0.03				-	-	-	-	-	
N		52.23				SJ		N	28	N		ch,si			5	PL	14	6	3.00	
N		52.28				BZ		-	-	N	0.06	si	52.28	52.34	-	-	-	6	1.50	
SBO		52.41				SJ		40	10			si,hbk,ch			3	PL	0	6	4.00	
-		52.41				SJ		155	47			none			6	IR	19	6	0.75	
-		52.48				SJ		190	60			hbk			6	PL	20	6	1.00	
245			52.41m - 53.32m																	
-		52.82				SJ		257	39			hbk,mi			5	PL	20	6	1.00	
-		53.00				SJ		44	55			mi,si,hbk			5	PL	14	6	1.50	
-		53.05				SJ		75	44			hbk,mi			5	PL	19	6	1.00	
can't measure			53.32m - 56.32m																	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		53.82				SJ		N	54	N		ch,mi			5	PL	14	6	1.50	
N		53.82				SJ		N	64	N		ch,mi			5	PL	14	6	1.50	
N		54.22				BZ		-	-	N	0.05	ch,si	54.22	54.27	-	-	-	6	1.50	
-		54.35				SJ		300	30			ch,su,si			5	PL	0	6	1.50	
-		54.45				SJ		157	43			hbk			5	PL	19	6	1.00	
-		54.71				SJ		350	33			si,su,ch			5	PL	14	6	4.00	
-		55.21				SJ		332	46			hbk			3	PL	17	6	1.00	
-		55.67				SJ		300	51			si,ch			3	PL	12	6	4.00	
-		55.97				SJ		115	43			hbk,ca			3	PL	17	6	1.00	
-		56.02				SJ		134	43			ch,si			3	PL	12	6	4.00	
-		56.36				SJ		332	50			hbk,ca,he			3	PL	17	6	1.00	
310			56.32m - 59.32m																	
SO		56.48				SJ		140	47			hbk			6	PL	20	6	0.75	
SO		56.53				SJ		104	46			hbk,ch			3	PL	17	6	1.00	
-		56.59				SJ		110	45			hbk,ch			3	PL	17	6	1.00	
-		56.75				SJ		326	47			ch,ca			5	PL	14	6	1.50	
-		57.32				SJ		296	52			hbk,ch			3	PL	17	6	1.00	
-		57.71				SJ		284	57			hbk,ca			5	PL	19	6	1.00	
-		58.37				SJ		280	49			hbk,ch			3	PL	17	6	1.00	
-		58.58				SJ		128	45			hbk			6	PL	22	6	0.75	
-		58.65				SJ		290	39			ch,ca			5	PL	17	6	1.50	
-		58.76				SJ		148	5			hbk,ca			5	UN	14	6	4.00	
-		58.76				SJ		40	38			ch,ca			5	CU	16	6	1.00	
-		58.91				SJ		284	45			ch,hbk			3	PL	14	6	1.00	
-		59.16				SJ		256	53			hbk,mi			5	PL	19	6	1.00	
40			59.32m - 62.04m																	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
SO		59.32				SJ		332	42			mi,ch,hbk			5	PL	19	6	1.00	
SO		59.44				SJ		334	51			ch			1	PL	15	6	1.00	
SO		59.50				SJ		185	10			ch,ca			3	ST	17	6	1.00	
SO		59.88				SJ		330	46			hbk,ch			1	PL	15	6	1.00	
SO		59.95				SJ		300	46			ch,hbk			1	ST	15	6	1.00	
SO		60.32				SJ		304	47			hbk,ca			5	PL	19	6	1.00	
SO		60.74				SJ		300	48			ca,hbk			3	PL	15	6	4.00	
SO		60.81				SJ		294	42			hbk,ch,ca			3	PL	15	6	4.00	
-		60.91				SJ		310	48			hbk,mi			3	PL	14	6	1.00	
-		61.11				SJ		290	50			none			6	CU	22	6	0.75	
-		61.23				SJ		276	42			hbk			3	PL	18	6	1.00	
-		61.51				SJ		302	38			hbk			3	PL	17	6	1.00	
-		61.81				SJ		270	34			hbk,ca,mi			3	PL	18	6	1.00	
-		61.94				SJ		278	44			hbk			3	PL	17	6	0.75	
-		62.00				SJ		280	39			hbk			3	PL	17	6	0.75	
can't measure			**62.04m - 65.19m**																	
SFO		62.04				SJ		106	41			hbk,mi			5	PL	16	6	1.00	
SFO		62.16				SJ		288	46			hbk			3	PL	18	6	1.00	
SFO		62.30				SJ		110	16			hbk			5	PL	16	6	1.00	
SFO		62.30				SJ		270	35			hbk,ch			3	PL	17	6	1.00	
SFO		62.76				SJ		115	48			hbk			5	PL	16	6	1.00	
SFO		64.20				SJ		248	60			hbk			5	PL	16	6	1.00	
SFO		64.50				SJ		280	40			hbk			6	PL	20	6	1.00	
SFO		64.92				SJ		294	36			hbk			6	PL	17	6	1.00	
SFO		64.92	**Felsic**			IN		45	27		1.62		64.92	66.54	-	-	-	-	-	Felsic intrusion
N		64.99				BZ		-	-	N	0.16		64.99	65.15	-	-	-	6	0.75	Probably broke
SBO		64.99				SJ		250	34			hbk,ch			3	ST	0	6	1.00	Condition base

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		65.15				SJ		N	16	N		hbk			5	PL	0	6	1.00	Condition base
can't measure			65.19m - 68.32m																	
N		65.42				SJ		N	17	N		si,hbk			6	CU	15	6	4.00	
N		65.48				SJ		N	46	N		si,hbk			5	PL	0	6	4.00	
N		65.48				BZ		-	-	N	0.04		65.48	65.52	-	-	-	6	1.00	
-		65.84				SJ		0	30			ch,hbk			5	PL	0	6	1.00	
-		66.16				SJ		330	50			hbk			5	ST	16	6	1.00	
-		66.33				SJ		230	27			hbk			6	PL	20	6	1.00	
-		66.54				SJ		45	27			hbk			5	PL	19	6	1.00	
-		67.14				SJ		154	37			hbk			5	PL	19	6	1.00	
30			68.32m - 70.93m																	
-		68.89				SJ		76	42			hbk			6	PL	17	6	1.00	
-		69.36				SJ		250	41			hbk			5	UN	19	6	1.00	
-		69.65				SJ		280	54			ch,si			5	PL	14	6	3.00	
-		70.56				SJ		312	41			ch,si			5	PL	17	6	4.00	
-		70.61				SJ		256	54			hbk			5	PL	16	6	1.00	
-		70.63				SJ		222	35			hbk			5	IR	16	6	1.00	
-		70.98				SJ		326	27			ch,si			3	PL	15	6	3.00	
-		70.98				SJ		48	36			ch			5	PL	17	6	1.00	
-		71.06				SJ		30	34			ch,si			5	PL	17	6	4.00	
-		71.07				SJ		192	40			hbk			5	PL	19	6	1.00	
can't measure			70.93m - 73.85m																	
FO		71.33				SJ		268	49			ch			3	PL	14	6	1.00	
FO		71.41				SJ		258	50			ch			5	PL	16	6	1.00	
FO		71.97				SJ		326	23			ch,si			5	PL	17	6	3.00	
FO		71.97				SJ		252	18			hbk,ca			6	IR	20	6	1.00	
FO		72.18				SJ		72	22			hbk,ch			6	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	ALPHA Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
FO		72.51				SJ		240	64			ch,si			5	PL	14	6	4.00	
N		72.77				BZ		-	-	N	0.07	ca	72.77	72.84	-	-	-	-	1.00	
N		72.84				SJ		N	58	N		ni,hbk,ca			3	PL	0	6	0.75	
-		72.95				SJ		10	50			si,ch			3	PL	12	6	4.00	
-		72.95				SJ		142	33			hbk			6	PL	20	6	1.00	
-		73.04				SJ		30	56			hbk,ca			5	PL	19	6	1.00	
-		73.12				SJ		25	49			hbk,ca			5	PL	19	6	1.00	
-		73.24				SJ		82	55			hbk,ca			5	CU	19	6	1.00	
-		73.48				SJ		24	50			hbk,ca			5	ST	16	6	1.00	
-		73.60				SJ		22	54			hbk			5	PL	16	6	1.00	
can't measure			**73.85m - 74.32m**																	
-		73.85				SJ		104	65			hbk,ca			3	PL	14	6	1.00	
-		73.97				SJ		280	37			ch,ca			3	PL	17	6	1.00	
-		73.97				SJ		165	32			ıbk,ca,ox			3	PL	16	5	1.00	
-		74.10				SJ		280	38			ch,ca			5	PL	17	6	1.00	
-		74.25				SJ		90	53			ch,ca			3	PL	14	6	1.00	
can't measure			**74.32m - 77.32m**																	
N		74.32				SJ		N	47	N		hbk			3	PL	17	6	1.00	
N		74.47				SJ		N	60	N		ı,ca,he,su			3	PL	12	6	4.00	
N		74.51				SJ		N	54	N		ı,ca,he,su			3	PL	12	6	4.00	
N		74.64				SJ		N	38	N		ch,ca			3	PL	12	6	1.50	
N		74.95				MZ		-	-	N	0.15		74.95	75.10	-	-	-	-	-	
N		75.00				SJ		N	58	N		hbk,ca			6	PL	17	6	1.00	
N		75.06				SJ		N	55	N		ch			3	PL	14	6	1.00	
N		75.51				SJ		N	28	N		ıbk,ca,mi			5	PL	16	6	1.00	
N		75.89				SJ		N	43	N		‹k,ox,su,ca			5	PL	19	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Struc. Type	Structure	BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		76.06				SJ		N	65	N		hbk,ca			5	PL	19	6	1.00	
N		76.12				SJ		N	52	N		hbk			3	PL	17	6	1.00	
N		76.12				SJ		N	15	N		ca,hbk			3	UN	17	6	1.00	
N		76.51				SJ		N	45	N		si,ch			3	PL	12	6	4.00	
N		76.70				SJ		N	43	N		ch			5	PL	12	6	1.50	
N		76.70				SJ		N	25	N		ch,hbk			3	PL	17	6	1.00	
-		77.00				SJ		314	47			si,ch			3	PL	0	6	4.00	
-		77.00				SJ		90	25			ch			3	PL	14	6	1.00	
can't measure			77.32m - 80.32m																	
FO		77.77				SJ		296	52			ch			0	PL	14	6	1.00	slicks
FO		78.05				SJ		274	50			ni,hbk,ca			5	PL	16	6	1.00	
FO		78.13				SJ		260	48			ca,hbk			5	PL	16	6	1.00	
-		78.46				SJ		240	43			hbk,ch			3	PL	17	6	1.00	
-		78.46				SJ		40	38			hbk,ch			3	PL	17	6	1.00	
-		78.69				SJ		225	52			hbk,ch,ca			3	PL	17	6	1.00	
-		78.78				SJ		230	53			hbk,ch,ca			3	PL	17	6	1.00	
-		78.84				SJ		10	42			hbk			5	PL	19	6	1.00	
-		78.84				SJ		190	30			,hbk,he,ca			3	IR	15	6	1.50	
-		78.93				SJ		234	53			hbk			5	PL	16	6	1.00	
-		79.27				BD		255	55						-	-	-		-	
-		79.43				SJ		200	52			ch,hbk			5	PL	16	6	1.50	
-		79.50				SJ		210	58			ch,ca			5	PL	17	6	1.50	
-		79.57				SJ		195	64			ch,ca			5	PL	17	6	1.50	
-		79.74				SJ		222	55			ch,ca			5	PL	17	6	1.50	
can't measure			80.32m - 83.1m																	
FO		80.32				SJ		184	53			ch,hbk			5	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
FO		80.77				SJ		204	55			ch,hbk,ca			3	PL	14	6	1.00	
FO		80.77				SJ		90	10			ch,hbk,ca			3	PL	14	6	1.00	
FO		81.06				SJ		24	26			ch,hbk			5	PL	19	6	1.00	
FO		81.12				SJ		208	52			hbk,ch			5	PL	14	6	1.50	
FO		81.37				SJ		32	54			ch,hbk			3	PL	17	6	1.00	
FO		81.90				SJ		180	50			ch,hbk			3	PL	14	6	1.00	
FO		82.50				SJ		154	50			hbk			5	PL	20	6	1.00	
FO		82.78				SJ		138	33			hbk			5	PL	20	6	1.00	
FO		82.90				SJ		174	46			hbk			3	PL	18	6	1.00	
can't measure			**83.1m - 86.32m**																	
SO		83.22				IN		300	30		0.06				-	-	-	-	-	
SO		84.51				SJ		74	58			hbk,ca			3	PL	17	6	1.00	
SO		84.60				SJ		84	52			ch,ca			5	PL	19	6	1.00	
-		85.65				SJ		102	53			ch,ca			5	PL	19	6	1.50	
-		85.90				SJ		98	56			hbk,ca			3	PL	15	6	2.00	
112			**86.32m - 89.32m**																	
-		86.68				SJ		52	52			hbk,ca			3	PL	17	6	1.00	
-		87.60				BD		42	42						-	-	-	-	-	
-		88.25				SJ		32	32			ch,hbk,ca			3	PL	17	6	1.00	
-		88.41				SJ		40	40			hbk,ca			3	PL	17	6	1.00	
-		88.66				SJ		24	24			ca,hbk			3	PL	14	6	1.00	
-		88.68				SJ		30	30			ch,ca			0	ST	14	6	1.00	slicks
can't measure			**89.32m - 92.32m**																	
FO		90.27				BD		26	26						-	-	-	-	-	
FO		90.52				SJ		33	33			hbk,ca			3	PL	17	6	1.00	
BO		90.88				SJ		48	48			hbk			5	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
BO		90.94				SJ		33	33			hbk			5	CU	19	6	1.00	
BO		91.22				SJ		34	34			bk,he,mi			3	PL	18	6	1.00	
BO		91.68				SJ		38	38			hbk			5	PL	19	6	1.00	
can't measure			92.32m - 95.32m																	
-		92.65				SJ		62	62			hbk,ca			3	PL	17	6	1.00	
-		92.67				SJ		35	35			hbk,ca			5	PL	17	6	1.00	
-		93.39				SJ		53	53			e,hbk,ca			5	PL	17	6	1.00	
-		94.83				SJ		48	48			hbk			3	IR	17	6	1.00	
-		94.95				SJ		49	49			hbk,ca			3	PL	17	6	1.00	
-		95.30				SJ		52	52			ch,hbk			5	PL	19	6	1.00	
-		95.38				SJ		53	53			hbk			5	PL	19	6	1.00	
can't measure			95.32m - 98.32m																	
SFO		95.70				SJ		202	25			ch,si			0	UN	0	6	2.00	slicks
N		97.09				SJ		N	20	N		ch,ca			5	PL	19	6	1.00	
-		97.86				SJ		280	31			hbk.si			3	PL	17	6	1.00	
-		97.95				SJ		350	55			hbk,si			3	PL	17	6	1.00	
-		97.95				SJ		290	27			hbk,si			3	PL	17	6	1.00	
can't measure			98.32m - 101.32m																	
FO		98.76				SJ		54	33			hbk,ca			3	PL	17	6	1.00	
FO		98.83				SJ		215	47			hbk,ca			5	PL	19	6	1.00	
FO		99.01				SJ		230	55			hbk,ca			5	PL	19	6	1.00	
FO		99.15				BD		170	35						-	-	-	-	-	
FO		99.34				SJ		250	28			hbk,ca			5	CU	19	6	1.00	
FO		99.49				BD		150	47						-	-	-	-	-	
FO		99.67				SJ		144	41			hbk,hwt			5	PL	19	6	1.00	
FO		99.73				BD		140	42						-	-	-	-	-	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core **(T.Gf output)**	Drill length	Rock Type 1	2	3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
FO		99.92				BD		135	45						-	-	-	-	-	
FO		100.08				SJ		152	46			hbk,hwt			1	PL	15	6	1.00	
FO		100.87				SJ		134	36			hbk,ca			5	PL	19	6	1.00	
FO		100.96				SJ		174	46			hbk,ca			0	PL	14	6	1.00	slicks

ORIENTED CORE DATA SHEET

Project	Arnaud	Job No. TX10147503						
Hole No.	CH-5	Location	Open pit	Elevation		Date	Dec 2, 2010	By	KA
						to	Dec 4, 2010		
Northing		Easting		Inclination	50	Bearing	325	Dia.	HQ

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
		5.8m - 8.8m																		
B.O		5.98				SJ		310	45			Ch, Si,Ox			1	PL	19	5	1.50	
B.O		6.80				HJ		230	17			?								
B.O		7.10				SJ		180	75						3	UN	21	5	1.50	
B.O		7.22				SJ		90	75			Cl			3	UN	21	5	1.50	
B.O		7.30				SJ		110	80			Ch			3	UN	21	5	1.00	
B.O		7.39				HJ		105	75			?								
B.O		7.47				HJ		120	65			?								
B.O		7.49	**Banded**			BD		260+/-	54+/-											
B.O		7.53				SJ		150	80						6	ST	24	6	1.00	
B.O		7.71				SJ		100	50			Ch			3	UN	21	5	1.00	
B.O		7.92				SJ		35	50			Ch			1	PL	19	5	1.00	
B.O		7.99				SJ		130	70						3	PL	21	6	0.75	
B.O		8.07	**Banded**			BD		110+/-	60+/-											
B.O		8.22				SJ		140	70			Ch			3	PL	21	5	1.50	
B.O		8.44				HJ		120	65			?								
B.O		8.47	**Banded**			BD		84+/-	51+/-											
B.O		8.61				SJ		140	75			HBk			1	PL	19	6	0.75	
40		**8.8m - 11.8m**																		
B.O		8.80				SJ		90	80			Ch,HBk			3	ST	21	6	0.75	
B.O		8.91				SJ		170	65			Ch			1	PL	19	5	0.75	
B.O		9.24				BD		40	45											

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
B.O		9.63				HJ		120	55			?							1.00	
B.O		10.51				SJ		45	42			Ch,Ox,si			3	PL	21	5	0.75	
B.O		10.64				SJ		340	45			Ox			5	UN	21	6	0.75	
B.O		10.73				SJ		210	40			Ox			6	PL	24	5	0.75	
B.O		10.80				SJ		220	70						5	PL	21	6	0.75	
B.O		10.84				SJ		210	67			H			1	PL	19	6	0.75	
B.O		10.91	**Banded**			BD		180+/-	48+/-											
B.O		10.94				SJ		200	72			HBK			3	PL	21	6	0.75	
B.O		11.03				SJ		180	65			HBK			1	PL	19	6	0.75	
B.O		11.54				SJ		180	57			HBK			3	PL	21	5	1.00	
B.O		11.56				VN		175	55		0.02	AP?	11.56	11.58						
can't measure		**11.8m - 14.8m**																		
		12.03				SJ		290	32			Ch			1	PL	19	5	1.00	
		13.27				HJ		230	50			?								
		13.47				SJ		240	35			Ca,Ch			3	PL	21	6	1.00	
		13.54				SJ		230	62			Ch			1	PL	19	6	1.00	
		13.64				HJ		220	48			?								
		14.16				SJ		170	60			Ch			3	PL	21	5	1.00	
		14.27				SJ		324	28			Ca/Ch			3	PL	21	5	1.00	
		14.55				SJ		180	50			Ch			3	PL	21	5	1.00	
140		**14.8m - 17.8m**																		
		15.10				HJ		105	35			?								
		15.30				SJ		325	55			HBK			3	PL	21	6	0.75	
		15.68				HJ		250	30			?								
		15.80				SJ		290	65						3	PL	21	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		16.40				VN		290	45		0.01	AP?								
		16.57				VN		290	25		0.05	AP?	16.57	16.62						
		16.65				SJ		280	55			Ch			1	PL	19	6	1.00	
		16.75				SJ		310	67			Ch			3	PL	21	6	1.00	
		16.97				SJ		55	65			?								
		17.12				SJ		350	72			?								
		17.43				SJ		200	45						3	CU	21	6	1.00	
		17.58				SJ		270	48			?								
		17.67				SJ		0.335	48						6	PL	24	6	1.00	
250		**17.8m - 20.8m**																		
		18.25				HJ		50	48			?								
		18.59				SJ		80	25			Ch			3	PL	21	5	1.50	
		18.80				HJ		190	20			?								
		18.82				SJ		210	65			Ch			3	PL	21	5	0.75	
		19.00				HJ		160	28			?								
		19.11				HJ		330	25			?								
		19.33				VN/BZ		330	22		0.10	FI	19.33	19.43						
B.O		19.43				SJ		110	32			Ch			1	PL	19	5	1.50	
B.O		19.52				HJ		20	37			?								
B.O		19.65				VN		150	27		0.01	?								
B.O		19.70				VN		125	29		0.00	?								
B.O		19.77				HJ		105	25			?								
B.O		20.14				SJ		110	62			HBK			1	PL	19	6	1.00	
B.O		20.40				HJ		100	35			?								
B.O		20.51				SJ		310	55			Ch			3	PL	21	5	1.00	
B.O		20.73				HJ		70	50			?								

			Rock Type			Structure														
Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
can't measure		**20.8m - 23.8m**																		
		21.00				SJ		310	60			Mf			3	PL	21	6	1.00	
		21.10				SJ		310	65			Ch			3	PL	21	6	1.00	
		21.93				SJ		310	65			Ma/Ch			3	PL	21	6	1.00	
		22.09				HJ		310	54			Mf								
		22.30				SJ		340	58			none			5	PL	24	6	0.75	
		22.63				SJ		320	60			none			3	CU	21	5	0.75	
		22.89				HJ		110	62			Mf			3	PL	21	5	0.75	
		22.94				SJ		300	56			HBK			3	PL	21	6	0.75	
		23.30				VN		310	56		0.10	Mf	23.20	23.30						
		23.48				HJ		325	52		0.01	Mf								
		23.54				HJ		330	52		0.01	Mf								
		23.57				HJ		310	48		0.01	Mf								
40		**23.8m - 26.8m**																		
		23.86				SJ		105	20			Ch			1	PL	19	5	1.50	
		23.88				SJ		330	55			Ch			6	PL	20	5	1.50	
		23.93				SJ		0	46			Ch HBK			5	PL	20	5	1.50	
		24.01				HJ		345	55			?								
		24.07				VN		335	40		0.03	?	24.07	24.10						
		24.37				SJ		0	55						5	PL	24	6	0.75	
		24.62				SJ		265	8			Ch			3	PL	21	5	1.00	
		24.69	**DB**			IN		355	50		0.08	DB	24.69	24.77						
		24.73				SJ		220	53			Ch, HBK			3	PL	21	5	1.00	
		24.88				HJ		130	20			?								
		25.33	**DB**			IN		55	55		0.16	DB	25.33	25.49						

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		25.44				HJ		345	45			?								
		25.61				SJ		355	57						3	PL	21	6	0.75	
		25.63				HJ		105	9			?				UN				
		25.84				SJ		345	50			Ch			1	PL	19	6	0.75	
		25.94				HJ		350	50			?								
		25.97				HJ		350	55			?								
		26.03				SJ		25	55			HBK, Ch			1	PL	19	5	0.75	
		26.22				SJ		350	65			HBK, Ch			1	CU	19	5	1.00	
		26.27				HJ		160	14			?								
can't measure			**26.8m - 29.8m**																	
B.O		27.07				HJ		325	55			Mf								
B.O		27.08	**DB**			IN		325	55		0.19	DB	27.08	27.27						
B.O		27.42				HJ		290	57			Mf								
B.O		27.46				SJ		290	60			none			3	PL	21	6	1.00	
B.O		27.49				HJ		320	50			Mf								
B.O		27.54				HJ		320	50			Mf								
B.O		27.67				HJ		320	50			Mf								
B.O		27.75				HJ		320	50			Mf								
B.O		27.86				HJ		320	50			Mf								
B.O		27.91				HJ		320	50			Mf								
B.O		27.97				SJ		330	64			none			6	PL	24	6	1.00	
B.O		28.04				HJ		350	60			Mf								
B.O		28.15	**DB**			IN		300	58		0.12	DB	28.15	28.27						
B.O		28.20				SJ		200	40						1	CU	19	5	1.00	
B.O		28.42				HJ		290	50			Mf								
B.O		29.23				HJ		290	60			Mf								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
B.O		29.23	**Banded**			BD		290+/-	66+/-											
B.O		29.55	**DB**			IN		280	62		0.31	DB	29.55	29.86						
B.O		29.63				SJ		10	24			Ch/Ca			1	PL	19	5	1.00	
B.O		29.69				HJ		90	58			Mf								
can't measure		**29.8m - 32.8m**																		
		29.93				SJ		320	55			Mo			5	PL	24	6	1.00	
		30.22				SH		325	56			Ch			3	PL	21	5	1.00	
		30.38				HJ		325	55			Mf								
		30.43				HJ		325	55			Mf								
		30.49				SJ		325	40			Ca/Ch			3	PL	21	5	1.00	
		30.55				HJ		325	54			Mf								
		30.89	**Banded**			BD		315+/-	65+/-											
		30.92	**DB**			IN		320	60		0.01	DB	30.92	30.93						
		30.97				HJ		280	64			Mf								
		31.04				HJ		280	65			Mf								
		31.07				HJ		280	64			Mf								
		31.15				SJ		290	64			Ch			5	4	24	6	1.00	
		31.44				SJ		310	60			Ch			3	CU	21	6	1.00	
		31.62	**Banded**			BD		280+/-	66+/-											
		32.18				HJ		290	48			Mf								
		32.48				VN		90	30		0.01	AP(?)	32.48	32.49						
		32.49	**Banded**			BD		90+/-	30+/-											
		32.55				SJ		90	22			Ch/HBK			3	ST	21	5	1.00	
		32.66				HJ		280	70			Mf								
140		**32.8m - 35.8m**																		

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	PL-ST	(0-30)	(1-6)	(0-20)	
B.O		32.95				SJ		60	55			Ch			3	PL	21	5	1.00	
B.O		33.03				HJ		90	58			Mf								
B.O		33.20				HJ		90	58			Mf								
B.O		33.26				HJ		90	60			Mf								
B.O		33.34	**Banded**			BD		90+/-	60+/-											
B.O		33.80				SJ		50	60			Ca/Ch			5	PL	24	5	1.00	
B.O		34.00				SJ		50	62			Ch			3	PL	21	6	1.00	
B.O		34.03	**Banded**			BD		20+/-	62+/-											
B.O		34.20				SJ		70	60			Ch/Ca			3	PL	21	5	1.00	
B.O		34.44	**DB**			IN		40	60		0.04	DB	34.44	34.48						
B.O		34.51				SJ		230	32			Ch/Ca			6	ST	20	5	1.50	
B.O		35.53				SJ		50	50			Ch/Ca			5	PL	20	5	1.50	
B.O		35.55	**DB**			IN		50	50		0.18	DB	35.55	35.73						
B.O		35.73	**Banded**			BD		19+/-	56+/-											
can't measure		**35.8m - 38.8m**																		
		35.92				SJ		25	25			S.Ch			3	PL	21	5	1.50	
		35.67				HJ		300	16			Mf								
		36.33	**DB**			IN		245	20		0.22		36.33	36.55						
		36.68	**Banded**			BD		178+/-	56+/-											
		37.04				IN		20	55		0.06		37.04	37.10						
		37.05				HJ		305	13			Mf								
		37.78				HJ		20	43			Mf								
		37.89				SJ		175	35						3	PL	21	6	0.75	
		38.17				HJ		275	43			Mf								
		38.33				SJ		255	55			Ca/Ch			3	PL	21	5	1.00	
		38.49				SJ		40	7			Ca/Ch			3	PL	21	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
130		**38.8m - 41.8m**																		
B.O		38.90	**Banded**			BD		150+/-	70+/-											
B.O		39.00				HJ		40	65			Mf								
B.O		39.26				HJ		120	50			Mf								
B.O		39.42	**Banded**			BD		180+/-	55+/-											
B.O		39.67				SZ		140	30			Ch			5	PL	8	1	4.00	
B.O		40.34	**DB**			IN		190	45		0.28		40.34	40.62						
B.O		40.39				SJ		330	42			Ch			3	PL	21	6	1.00	
B.O		40.60				ST		320	40			Ch			3	PL	21	6	1.00	
B.O		40.64				CT		190	50			Ch			3	PL	20	5	1.50	
can't measure		**41.8m - 44.8m**																		
		41.87				SJ		340	20			Ch/Ca			1	PL	19	5	1.50	
		42.17				HJ		170	47			Mf								
		42.32				HJ		170	50			Mf								
		42.43				HJ		85	10			Mf								
		42.58				HJ		160	45			Mf								
		42.66				HJ		150	49			Mf								
		42.84	**Banded**			BD		175	70											
		42.87				HJ		185	70			Mf								
		42.88				IN		160	43		0.02	GB	42.88	42.90						
		42.94				SJ		335	15			o/Ca/HBK			1	PL	19	6	0.75	
		43.00	**Banded**			BD		220	63											
		43.62	**Banded**			BD		170+/-	52+/-											
		44.18				SJ		0	27						3	PL	21	6	0.75	
		44.19				IN		105	45		0.09	FG/DB	44.19	44.28						

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		44.20				HJ		240	42			Mf								
		44.28				HJ		275	15			Mf								
		44.37	**Banded**			BD		240+/-	55+/-											
		44.44				HJ		260	8			Mf								
		44.58				HJ		240	45			Mf								
		44.73				HJ		220	47			Mf								
0		**44.8m - 47.8m**																		
		44.94				HJ		160	46			Mf								
		45.02				HJ		200	38			Mf								
		45.76	**Banded**			BD		140+/-	50+/-											
		46.00				HJ		320	34			Mf								
		46.07				SJ		90	34			Ch/HT/Ca			3	PL	21	6	0.75	
		46.13				SJ		170	60			Ch/Ca			5	PL	24	6	1.00	
		46.27				SJ		270	18			Ch			3	PL	21	6	1.00	
		46.44				SJ		95	66			Ch/HT			3	PL	21	6	1.00	
		46.44				HJ		265	15			Mf								
		46.70				SJ		160	55			Ch/HT			3	PL	21	6	1.00	
		46.94				SJ		355	28			Ch/Ca			3	CU	21	5	1.00	
		47.01				SJ		140	52			Ch/Ca			3	PL	21	6	1.00	
		47.12				HJ		300	30			Mf								
		47.17				SJ		140	60			Mo/Ch			1	PL	19	6	1.00	
		47.26				SJ		285	20			Ch			1	PL	19	6	1.00	
		47.42				SJ		330	35			Ch/Ca			3	CU	21	6	1.00	
		47.44				SJ		140	60			Ch			3	PL	21	6	1.00	
		47.53				SJ		285	20			Ch/Mo/Ca			1	PL	19	5	1.00	
		47.58				SJ		120	60			Ch/HBK			3	PL	21	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		47.74				IN		270	20		0.02	Mf	47.74	47.76						
		47.74				CT		271	20											
		47.77				SJ		110	67			Ch/Ca/IL			3	UN	21	6	1.00	
		47.80	**Banded**			BD		100+/-	53+/-											
15		**47.8m - 50.8m**																		
		47.85				HJ		330	35			Mf								
		47.97				SJ		280	38			none			6	CU	25	6	0.75	
		47.98				HJ		150	45			Mf								
		48.37				HJ		13	60			Mf								
		48.48				HJ		310	25			Mf								
		48.53				SJ		130	55			none			5	PL	24	6	0.75	
		48.67				HJ		130	60			Mf								
		48.80				HJ		130	60			Mf								
		48.93				HJ		160	5			Mf								
		48.96				SJ		110	70			none			5	PL	24	6	1.00	
		49.13				SJ		120	55			HBK			3	PL	21	6	0.75	
		49.22				HJ		120	65			Mf								
		49.29				HJ		120	65			Mf								
		49.37				SJ		120	62			none			5	PL	24	6	1.00	
		49.43				HJ		170	15			Mf								
		49.47				SJ		120	62			ee remark			5	PL	25	6	0.75	11.1
		49.63				HJ		130	64			Mf								
		49.68				HJ		130	64			Mf								
		49.74				SJ		80	48			Ch			3	UN	21	6	1.00	
		49.77				HJ		90	65			Mf								
		49.84				HJ		180	65			Mf								

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
		49.96				HJ		180	65			Mf								
		50.41				HJ		100	65			Mf								
		50.48				HJ		100	65			Mf								
		50.56				SJ		140	67			ee remark			3	PL	21	5	1.00	
		50.69				HJ		160	80			Mf								
		50.73	**Banded**			BD		130+/-	64+/-											
330		**50.8m - 53.8m**																		
		50.90				SJ		100	65			Ch/Ox			3	PL	21	5	1.00	
		50.97				HJ		100	65			Mf								
		51.01				HJ		295	4			Mf								
		51.10				HJ		110	73			Mf								
		51.25				HJ		140	65			Mf								
		51.38	**Banded**			BD		175+/-	75+/-											
		51.55				HJ		265	20			Mf								
		51.71	**Banded**			BD		100+/-	75+/-											
		51.73				HJ		85	65			Mf								
		51.92				HJ		80	59			Mf								
		52.11	**Banded**			BD		280+/-	60+/-											
		52.14				HJ		90	63			Mf								
		52.25				HJ		115	57			Mf								
		52.31				SJ		357	75			Ca/HBK			3	PL	21	5	0.75	
		52.53				HJ		135	65			Mf								
		52.70				HJ		120	53			Mf								
		53.00				SJ		150	67			h/Ox/HBK			1	PL	19	5	0.75	
		53.16				SJ		130	55			Ch			3	PL	21	5	0.75	
		53.60				SJ		135	57			h/Ox/HBK			3	PL	21	5	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
		53.67				HJ		105	65			Mf								
0		**53.8m - 56.8m**																		
		54.09				HJ		30	4			Mf								
		54.15				IN		95	23		0.02	Mf	54.15	54.17						
		54.47				SJ		160	50			HBK			1	PL	19	6	1.00	13.1
		54.77				HJ		290	35			Mf								
		54.95				SJ		330	42			none			3	PL	21	6	1.00	
		55.27	**DB**			IN		200+/-	55+/-		0.34	DB	55.27	55.61						
		55.55				SJ		310	32			Ch			1	PL	19	5	1.00	
		55.71	**DB**			IN		130	62		0.05	DB	55.71	55.76						
		55.85				SJ		145	63			HBK			3	PL	21	5	0.75	
		55.90	**Banded**			BD		140+/-	60+/-											
		55.98				HJ		140	27			Mf								
		56.47	**Banded**			BD		210+/-	47+/-											
		56.63				SJ		295	17			n/Ca/HBK			1	PL	19	5	0.75	
		56.68				SJ		310	37			none			5	PL	24	6	0.75	
		56.74	**Banded**			BD		110+/-	43+/-											
16		**56.8m - 59.8m**																		
		57.27				SJ		150	55			Ch/HBK			3	PL	21	5	1.00	
		57.49				IN		170	56		0.01	?	57.49	57.50						
		57.53				IN		160	56		0.01	?	57.53	57.54						
		57.93				HJ		35	30			Mf								
		58.17				HJ		110	40			Mf								
		58.30				SJ		340	52			HBK			1	PL	19	6	0.75	
		58.57				SJ		280	16			Ch			1	PL	19	5	1.50	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
		58.60				SJ		145	56			Ch			1	PL	19	5	1.50	14.1
		58.66				SJ		280	16			Ch			1	PL	19	5	1.50	
		58.67				SJ		135	46			Ch/HBK			3	PL	21	5	1.00	
		58.99				SJ		315	22			Ch/Ca			3	PL	21	5	1.00	
		59.10				SJ		125+/-	80+/-			none			3	ST	21	6	0.75	
		59.18				HJ		310	30			Mf								
		59.54				HJ		110	37			Mf								
		59.57				HJ		300	43			Mf								
		59.63	**Banded**			BD		135+/-	60+/-											
		59.66				SJ		160	62						3	PL	21	6	0.75	
215		**59.8m - 62.8m**																		
		60.24				IN		345	62		0.02		60.24	60.26						
		60.28				HJ		190+/-	30+/-			?								
		60.40				SJ		170	47			HBK			3	PL	21	6	1.00	
		60.40				SJ		0	50			Ch/Ca			6	PL	25	5	1.50	
		60.46				HJ		15	40			?								
		60.49				HJ		10	58			Mf								
		60.68				SJ		140	45			none			3	PL	21	6	1.00	
		60.86				HJ		0	45			Mf								
		61.04				HJ		170	10			Mf								
		61.12	**Banded**			BD		300+/-	68+/-											
		61.21				CT		10	65											
		61.24				SJ		10	55			Ch/Ca			3	PL	21	5	1.00	
		61.65				SJ		10	17			Ch/Ca			3	PL	21	5	1.00	
		61.68				SJ		270	55			Ch			3	PL	21	5	1.00	
		61.82				HJ		260	60			Mf								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		61.84				SJ		235	55			Ch/Ca			3	PL	21	6	1.00	
		61.91				HJ		175	25			Fel								
		62.15				SJ		40	47			Ch/Ca			1	PL	19	5	1.00	
		62.50				SJ		160	32			Ca/HBK			3	PL	21	6	1.00	
0		**62.8m - 65.8m**																		
		63.08				HJ		330	70			Mf								
		63.77	**Banded**			BD		220+/-	55+/-											
		63.80				HJ		200	60			Mf								
		63.85				HJ		295	37			Mf								
		64.15				SJ		260	65			Ch/HBK			5	PL	24	6	1.00	
B.O		64.25				HJ		270	23			Mf								
B.O		64.50				SJ		280	21			Ch/Ca			0	PL	18	5	2.00	16.1
B.O		64.59				SJ		140	43			Ch/HBK			1	UN	19	5	1.00	
B.O		64.61				SJ		140	53			Ch/HBK			5	4	24	5	1.00	16.2
B.O		65.70				HJ		320	27			Mf								
B.O		65.82				HJ		165	50			Mf								
60 to suspect line		**65.8m - 68.8m**																		
		67.18				SJ		120	53			HBK/Ca			1	PL	19	6	1.00	
		68.23				HJ		130	70			Mf								
		68.30				SJ		100	67			HBK/Ch			3	PL	21	6	1.00	
		68.43				SJ		280	30			HBK/Ch			1	PL	19	6	1.50	
		68.48				SJ		270	34			Ch/Ca			1	4	19	5	1.50	16.3
20		**68.8m - 71.8m**																		
		68.80				SJ		130	49			e remarks			3	PL	21	6	1.00	17.1

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		68.86				IN					0.06		68.86	68.92						
		69.20	**Banded**			BD		170+/-	43+/1											
		69.41				SJ		125	57			Ca/Ch			3	PL	21	5	1.50	
		69.54				SJ		155	52			Ox/Ch/Ca			3	PL	21	5	1.00	
		69.88				SJ		170	50			HBK			3	PL	21	6	1.00	
		69.96				SJ		350	38			Ch			5	PL	24	5	1.50	
		70.26				HJ		190	53			Mf								
		70.40				SJ		0	40			Ch/HBK			5	PL	24	5	1.00	
		70.67				SJ		320	30			Ch/Ca			3	PL	21	5	1.00	
		70.99				SJ		170	45			h/HBK/Ca			3	PL	21	6	1.00	
		71.56	**Banded**			BD		195+/-	47+/-											
12		**71.8m - 74.8m**																		
		71.91				SJ		315	24			Ch/Ca			3	PL	21	6	1.00	
		72.04				HJ		315	18			Mf								
		72.41				SJ		170	60			Ch/Ca			3	PL	21	6	1.00	
		72.48				HJ		355	38			Mf								
		72.63				SJ		180	47			Ox/HBK			3	PL	21	5	1.00	17.2
		72.66				HJ		180	63			Mf								
		72.85	**Banded**			BD		155+/-	47+/-											
		73.77				SJ		355	27			ee remark			5	UN	24	6	1.00	17.2
		73.82	**Banded**			BD		190+/-	57+/-											
		73.87	**Banded**			BD		145+/-	54+/-											
		74.33				SJ		330	25			h/Ca/HBK			3	PL	21	6	0.75	
		74.45				SJ		190	66			Ox/Ch/Ca			3	PL	21	5	1.00	
		74.59				SJ		165	58			Ch/Ca			1	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
17		**74.8m - 77.8m**																		
		74.80				SJ		125	68			Ch/Ca			3	PL	21	6	1.00	
		75.96	**Banded**			BD		160+/-	59+/-											
		76.40	**Banded**			BD		155+/-	61+/-											
		76.89				SJ		310	10			Ch/Ca			5	PL	24	6	1.00	
		76.95				SJ		335	49			X/see remark			1	PL	19	6	0.75	
		77.00				HJ		150	47			Mf								
		77.04				HJ		100	47			Mf								
		77.22				HJ		155	43			Mf								
		77.39				SJ		135	57			x/HBK/Ca			3	PL	21	6	1.00	
		77.64				HJ		340	37			Mf								
		77.71				SJ		300	31			Ch/Ca/Ox			5	PL	24	6	1.00	
		77.78				HJ		340	22			Mf								
		77.83				HJ		350	32			Mf								
		77.85				HJ		335	38			Mf								
		77.88				HJ		350	32			Mf								
60		**77.8m - 80.8m**																		
		77.80				SJ		270	50			Ox/Ca/Ch			5	CU	24	5	1.00	
		78.05				SJ		20	8			Ox/Ca/Ch			5	PL	24	5	1.00	
		78.24				SJ		280	55			HBK			3	PL	21	6	1.00	
		79.09				SJ		260	65			Ch			3	PL	21	6	1.00	
		79.57				HJ		30	20			Mf								
		80.26	**Banded**			BD		105+/-	59+/-											
		80.48				SJ		235	30			Ox/Ca			3	PL	21	6	1.00	
238		**80.8m - 83.8m**																		

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
		80.82				SJ		320	47			Ox/Ca			3	PL	21	5	1.00	
		80.94	**Banded**			BD		60+/-	33+/-											
		81.35				SJ		215	8			Ox/Ca			3	PL	21	5	1.00	
		81.38				SJ		130	17			Ca/HBK			3	PL	21	6	1.00	
		81.64	**Banded**			BD		325+/-	65+/-											
		82.00				HJ		310	47			Mf								
		82.78	**Banded**			BD		250+/-	60+/-											
		82.82				SJ		305	63			o/Ox/HBK			3	PL	21	5	1.00	19.1
		83.07				SJ		335	63			Ch/Ca/HBK			3	PL	21	5	1.00	
205		**83.8m - 86.8m**																		
		83.79				SJ		0	15			HBk/Ch			3	PL	21	6	1.00	
		84.03				SJ		190	54			Ca/Ch			3	PL	21	6	1.00	
		84.23				HJ		300	21			Mf								
		84.38				SJ		335	37			Ca/Ch			5	CU	24	6	1.00	
		84.56				SJ		190	25			Ox/Ca/Ch			5	PL	24	5	1.00	
		84.57				HJ		190	54			Mf								
		84.81				SJ		180	53			Bk/Ca/Ch			5	CU	24	6	1.00	
		85.16				SJ		170	52			Ca/Ch			3	PL	21	6	1.00	
		85.22				HJ		180	52			Mf								
		86.28				HJ		325	7			Mf								
		86.31	**Banded**			BD		144+/-	49+/-											
352		**86.8m - 89.8m**																		
		87.43				SJ		190	37			Ca/Ch			3	PL	21	6	1.00	
		87.52				SJ		230	70			Ca/HBk			3	PL	21	6	1.00	
		87.58				HJ		285	20			Mf								

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
		87.66				HJ		310	24			Mf								
		87.95				SJ		0	35			Ox/Ca/Ch			3	PL	21	5	1.50	
		87.95				SJ		180	55			Ch/HBk			1	PL	19	6	1.00	
		88.87	**Banded**			BD		136+/-	52+/-											
		88.95				SJ		220	62			Ca/Ch			3	PL	21	6	1.00	
274		**89.8m - 92.8m**																		
		90.12				SJ		90	55			Ca/Ch/HBk			5	4	24	6	0.75	
		90.20				HJ		215	6			Ox/Ca/Ch			3	UN	21	5	1.00	20.1
		90.23				SJ		340	10			Ca/Ch/HBk			3	UN	21	6	1.00	
		90.32				SJ		90	50			Ch/HBk			3	PL	21	6	1.00	
		91.05				HJ		290	25			Ca								
		91.42	**Banded**			BD		60+/-	60+/-											
		91.67				SJ		70	55			Ch			3	UN	21	6	1.00	
		91.76				SJ		180	79			Ca/Ch			5	PL	24	6	1.00	
		92.01				HJ		0	5			unkn								
		92.21	**Banded**			BD		110+/-	55+/-											
		92.45				IN		85	32			DB								
236		**92.8m - 95.8m**																		
		93.03				HJ		320	0			Ca								
BO		93.18				SJ		170	67			Ch			3	PL	21	6	1.00	
BO		93.46				HJ		0	7			Ca/Ch								
BO		93.77				SJ		155	62			Bk/Ca/Ch			3	PL	21	6	1.00	
BO		93.83				SJ		80	5			Ch			3	PL	21	6	1.00	
BO		94.51				HJ		340	18			Ca/Ch								
BO		94.98				HJ		60	33			Mf								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
BO		95.18				SJ		0	43			Bk/Ca/Ch			3	PL	21	6	1.00	
BO		95.30	**Banded**			BD		220+/-	75+/-											
BO		95.59				SJ		310	33			Ca/Ch			5	PL	24	6	1.00	
can't measure		**95.8m - 98.8m**																		
		95.80				HJ		80	7			Mf								
		96.00				SJ		160	46			S/Ox/Ca			3	PL	21	5	1.00	
		96.06				HJ		75	7			Ca/Ch								
		96.36				SJ		335	37			Ch			1	PL	19	6	1.00	
		96.63				SJ		340	37			Ch			1	PL	19	6	1.00	
		96.81	**Banded**			BD		180+/-	62+/-											
		97.66	**Banded**			BD		235+/-	45+/-											
		97.72				HJ		200	38			Mf								
		97.95				SJ		355	37			Ca/Ch			3	PL	21	6	1.00	
		98.25	**Banded**			BD		120+/-	52+/-											
		98.57				HJ		350	27			Mf								
15		**98.8m - 101.8m**																		
		98.92	**Banded**			BD		165+/-	57+/-											
		99.76				SJ		300	26			Ca/Ch			3	PL	21	6	1.00	
		100.23				HJ		305	33			Mf								
		100.68	**Banded**			BD		20+/-	70+/-											
		101.39	**Banded**			BD		140+/-	60+/-											
		101.59				SJ		165	44			Ca/Ch/HBk			3	PL	21	6	1.00	
		101.64				SJ		160	39			x/Ca/HBk			3	4	21	5	1.00	
		101.65				HJ		155	28			Mf								

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														REM#
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
190		**101.8m - 104.8m**																		
		102.38				HJ		170	28			Mf								
		102.45				IN		170	28		0.03	GB	102.45	102.48						
		102.51				SJ		165	38			Ch			3	PL	21	6	1.50	
		102.73				HJ		95	0			Ca/Ch								
		102.95				HJ		180	23			Mf								
		103.11				SJ		355	53			HBk			1	PL	19	6	1.00	22.1
		103.30				SJ		175	37			Ch			5	PL	24	6	1.00	
		104.53				SJ		185	14			Ch			3	PL	21	6	1.00	
		104.53				SJ		260	8			Ch			3	PL	21	6	1.00	
115 to suspect line		**104.8m - 107.8m**																		
S.O		105.54				HJ		5	10			Mf								
S.O		105.56	**Banded**			BD		100	67											
S.O		106.11	**DB**			IN		65	62		0.19	DB	106.11	106.30						
S.O		106.65	**Banded**			BD		80	45											
S.O		107.10				SJ		255	16			a/Ch/HBk			5	PL	24	6	1.00	
S.O		107.13				SJ		105	63			HBk/Ch			3	PL	21	6	1.00	
S.O		107.69				SJ		325	54			Ca/Ch			5	PL	24	6	1.00	
		107.8m - 110.8m																		
		107.96	**Banded**			BD		205	54											
		108.33				SJ		80	0			Ca/Ch			5	UN	24	6	1.00	
		108.50				SJ		125	32+/-			a/Ch/HBk			5	ST	24	6	1.00	
		109.15	**Banded**			BD		225	66											
		109.46				SJ		210	70			a/Ch/HBk			3	PL	21	6	1.00	
		109.56				SJ		90	37			a/Ch/HBk			5	PL	24	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(PL-ST	(0-30)	(1-6)	(0-20)	
		109.63				SJ		215	57			Ca/Ch			5	UN	24	6	1.50	
		109.98				HJ		315	14			Ca/Ch								
		110.02				HJ		240	83			none								
		110.04				HJ		190	78			Ch								
		110.07				HJ		240	83			none								
		110.09				HJ		250	67			none								
		110.12				HJ		225	80			Ca/Ch								
		110.13				HJ		225	80											
		110.14				HJ		225	80											
		110.18				HJ		10	37			Ca/Ch								
		110.20				HJ		185	80			none								
		110.24				SJ		185	80			Ox			3	PL	21	6	0.75	
		110.28				SJ		210	73			a/Ch/HBk			5	PL	24	6	1.00	
		110.31				HJ		80	27			Ca								
		110.43				SJ		180	55+/-			HBk/Ch			3	CU	21	6	1.00	
		110.55				SJ		350	24			Ca/Ch			3	PL	21	6	1.00	
0		110.8m - 113.8																		
		111.14				HJ		315	8			Ca/Ch								
		111.46				HJ		175	45			Mf								
		111.49				SJ		355	43			HBk/Ch			3	PL	21	6	1.00	
		112.02				SJ		5	29			a/Ch/HBk			3	PL	21	6	1.00	
		112.45	**Banded**			BD		135	49											
		112.76				SJ		220	47			Wt/Ox/Ch			5	PL	24	5	1.00	
		113.10				SJ		355	27			HWt			3	PL	21	6	1.00	
		113.59				SJ		205	57			HBk			3	PL	21	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
342		**113.8m - 116.8m**																		
		114.10				HJ		75	5			Mf								
		114.10				HJ		320	28			Mf								
		114.23	**Banded**			BD		105	52											
		114.32				HJ		295	25			Mf								
		114.40				SJ		290	19			HBk/Ca			3	PL	21	6	1.00	25.1
		114.47	**Banded**			BD		190	48											
		114.58				SJ		340	26			x/Ca/HBk			3	PL	21	5	1.00	
		114.69				SJ		35	55+/-			HBk/Ca			5	CU	24	6	1.00	
		114.88				HJ		5	37			Mf								
		115.19				SJ		355	47			Ca			6	PL	25	6	1.00	
		115.25				HJ		350	42			Mf								
		115.47				HJ		275	33			Mf								
		115.54				SJ		215	47			S/Ca			6	PL	25	6	1.00	
		115.59				HJ		325	32			HBk/Ca								
		115.83	**Banded**			BD		180	55											
		115.97				SJ		345	37			Bk/Ca/Ch			3	PL	21	6	1.00	
can't match core		**116.8m - 119.8m**																		
		116.90	**Banded**			BD		125	50											
		117.34				SJ		315	24			Ox/Ca			3	PL	21	5	1.00	
		117.85	**Banded**			BD		120	60											
		118.26				SJ		345	39			Ca/HBk			5	PL	24	6	1.00	
		118.59				SJ		315	30			Bk/Ca/Ch			3	PL	21	6	1.00	
can't match core		**119m - 122.8m**																		
		120.05				SJ		280	40			Ca/Ch			3	PL	21	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	PL-ST	(0-30)	(1-6)	(0-20)	
		120.37				SJ		275	51			Ch			5	PL	24	6	1.00	
		121.01				SJ		0	42			HBk			3	PL	21	6	1.00	
		121.10				HJ		10	0			Ca/Ch								
		121.26				SJ		125	56			Ca/Ch			1	PL	19	6	1.50	
		121.68	**Banded**			BD		90	63											
		121.96				SJ		240	20			Ca/Ch			3	PL	21	6	1.00	
		122.14				SJ		335	67			Bk/Ca/Ch			3	PL	21	6	1.00	
		122.27	**Banded**			BD		65	40											
		122.38				HJ		80	75			Mf								
		122.48				SJ		300	33			Bk/Ca/Ch			5	4	24	6	1.00	
		122.62				HJ		120	33			Mf								
25		**122.8m - 125.8m**																		
		123.03	**Banded**			BD		115	47											
		123.05				SJ		27	13			Bk/Ca/Ch			1	PL	19	6	1.00	
		124.18				HJ		40	8			Ca/Ch								
		124.20				HJ		325	8			Ca/Ch								
		124.61				HJ		20	34			Ca/Ch								
		124.93	**Banded**			BD		130	55											
		125.05				SJ		310	5			Bk/Ca/Ch			5	UN	24	6	1.00	
		125.96	**Banded**			BD		105	42											
75		**125.8m - 128.8m**																		
		125.91				SJ		180	54			Ap?/HBk			5	PL	24	6	1.00	27.1
		125.95	**Banded**			BD		140	47											
		126.48				SJ		340	17			Bk/Ca/Ch			3	UN	21	6	1.00	
		126.66				HJ		350	29			Mf								

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (PL-ST	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		126.81				SJ		280	22			Bk/Ca/Ch			3	PL	21	6	1.00	
		126.94				SJ		330	52			HBk			3	PL	21	6	1.00	
		127.63				SJ		70	74			HBk			6	PL	25	6	1.00	
		127.91				HJ		275	12			Mf								
35+/-		**128.8m - 131.8m**																		
		128.97	**Banded**			BD		150	50											
		129.04				SJ		320	65			Bk/Ca/Ch			1	4	19	6	1.00	
		129.52				HJ		270	0			Mf				UN				
		130.49				SJ		315	52			Ca/HBk			3	UN	21	6	1.00	
		131.09				SJ		345	2			Ca/Ch/HBk			3	UN	21	5	1.00	
		131.68				SJ		325	41			Ca/HBk			3	PL	21	6	1.00	
18		**131.8m - 134.8m**																		
		133.47				HJ		355	41			Mf								
		133.81				SJ		340	44			Bk/Ca/Ch			3	PL	21	6	1.00	
		134.00				SJ		355	46			HBk/Ca			3	PL	21	6	1.00	
		134.50				SJ		285	21			Bk/Ca/Ch			3	PL	21	6	1.50	28.1
		134.57	**Banded**			BD		195+/-	60+/-											
		134.80				HJ		270	7			Bk/Ca/Ch								

ORIENTED CORE DATA SHEET

Project	Arnaud	Job No.	TX10147503							
Hole No.	CH-6	Location	Open pit	Elevation		Date	Jan 11, 2011	By	KA	
						to Jan 13, 2011				
Northing		Easting		Inclination	73	Bearing	325	Dia.	HQ	

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
can't measure			2.57m - 3.21m																	
N		2.82				SJ		N	55	N		ox,ch			3	PL	15	5	1.00	
N		3.12				SJ		N	77	N		ox,ch, ca			3	PL	18	5	1.00	
N		3.14				SJ		N	20	N		hbk,ch			3	IR	17	6	1.00	
can't measure			3.21m - 6.21m																	
N		3.89				SJ		N	51	N		ox			3	PL	19	5	1.00	
N		4.12				SJ		N	42	N		ox,ch			3	PL	18	5	1.00	
N		4.34				SJ		N	18	N		ox,ch			3	PL	18	5	1.00	
N		4.49				SJ		N	66	N		ox			3	PL	18	5	0.75	
N		4.57				SJ		N	76	N		ox,ch,ca			3	PL	18	5	1.00	
N		4.89				SJ		N	41	N		ox,ca,he			3	PL	18	5	1.00	
N		5.02				IN		N		N	0.24		4.90	5.14						
N		5.10				SJ		N	45	N		ox,ch,ca			3	PL	18	5	1.00	
can't measure			6.21m - 9.21m																	
N		6.45				SJ		N	69	N		ox,ch			3	PL	15	5	1.00	Heavy c
N		6.82				SJ		N	76	N		ox,hbk,ca			3	PL	18	5	1.00	Heavy c
N		6.90				SJ		N	-	N		ox,ch			3	PL	15	5	1.00	Heavy c
N		7.08				SJ		N	83	N		ox,ch			5	PL	17	5	1.00	Heavy c
N		7.98				SJ		N	13	N		ch,ca			3	PL	19	6	1.00	
N		8.32				SJ		N	74	N		ch,ox,ca			3	PL	18	5	1.00	
can't measure			9.21m - 12.21m																	
N		9.25				SJ		N	12	N		ch			3	PL	19	6	1.00	
N		9.31				SJ		N	28	N		ox,ca			3	PL	13	5	1.50	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		9.72				SJ		N	80	N		hbk,he			3	PL	19	6	1.00	
N		10.00				SJ		N	84	N		ch,hbk			3	PL	19	6	1.00	
N		10.04	**Mf**			IN		N		N	0.01									
N		10.21				SJ		N	81	N		ch			3	PL	14	6	1.00	
N		10.25				SJ		N	55	N		hbk			3	PL	16	6	1.00	
		11.11				SJ		292	16			ch,ca			3	PL	19	6	1.00	
		12.00				SJ		186	61			ch,si			3	PL	14	6	1.50	
can't measure			**12.21m - 15.21m**																	
N		12.22				SJ		N	64	N		ch,si,ca			3	PL	14	6	1.50	
N		13.12				SJ		N	72	N		ch			3	PL	19	6	1.00	
N		14.27				SJ		N	16	N		ch			3	PL	17	6	1.00	
		14.76				BZ					0.10		14.76	14.86				6	1.00	
can't measure			**15.21m - 18.21m**																	
		15.93				SJ		N	37	N		ch,ca			0	PL	14	6	1.50	Slicks (r
N		16.53	**An(?)**			IN		N		N	0.05									
N		16.57	**GN**			IN		N	-	N	0.06									
N		16.61				SJ		N	0	N		ch,mi			3	UN	16	6	1.00	
N		17.00				SJ		N	12	N		ch,ca,si			3	PL	17	6	1.50	
N		17.46				SJ		N	17	N		ch,mi			3	UN	19	6	1.00	
N		17.66				SJ		N	82	N		ch,ca			3	PL	19	6	1.00	
can't measure			**18.21m - 21.21m**																	
N		18.93				SJ		N	66	N		ch,ca			3	PL	19	6	1.50	
N		19.04				SJ		N	35	N		ch,ca,mi			3	PL	20	6	1.00	
N		19.67				BZ		N		N	0.09		19.67	19.76				6	1.00	
N		19.76				SJ		N	69	N		ch,mi,he,ca			3	PL	16	6	1.00	
N		20.16				BZ		N		N	0.13		20.16	20.29					1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		20.29				MZ		N		N	0.01									
N		20.36				SJ		N	57	N		ch,he			3	PL	19	6	1.00	
N		21.11				SJ		N	23	N		ch,ca			3	PL	19	6	1.00	
N		21.20				SJ		N	56	N		ch,ca			3	PL	20	6	1.00	
N		21.46				SJ		N	20	N		ch			3	PL	19	6	1.00	
can't measure			21.21m - 24.21m																	
N		21.44				SJ		N	27	N		ch,mi,ca			3	PL	19	6	1.50	
N		21.46				SJ		N	17	N		mi,ch,si,ca			3	PL	17	6	1.50	
N		21.75				SJ		N	86	N		mi,he,ch,ca			3	PL	19	6	1.00	
N		21.85				SJ		N	26	N		ch			3	PL	19	6	1.00	
N		22.37				SJ		N	30	N		ch,hbk,he,ca			3	PL	19	6	1.00	
N		22.69				BZ		N		N	0.05		22.69	22.74				6	1.00	
N		22.85				SJ		N	71	N		ch			3	PL	19	6	1.00	
N		23.22				RZ		N		N	0.28		23.22	23.50						Probabl
N		23.65				RZ		N		N	0.07		23.65	23.72				W1	1.00	
can't measure			24.21m - 27.21m																	
N		25.43				SJ		N	71	N		he,ch,ca			3	PL	20	6	1.00	
N		25.58				SJ		N	26	N		ch,ca			3	PL	19	6	1.00	
N		25.69				SJ		N	77	N		hbk,ca			3	PL	19	6	1.00	
N		26.38				SJ		N	65	N		ch,ca			3	PL	19	6	1.00	
N		27.13				SJ		N	58	N		ch,ca			3	PL	20	6	1.00	
can't measure			27.21m - 30.21m																	
N		28.39				SJ		N	33	N		hbk,ca			3	PL	19	6	1.00	
N		28.58				SJ		N	78	N		he,hbk,ch,mi,ca			1	PL	14	6	1.00	
N		28.73				SJ		N	62	N		ch,ca			3	PL	19	6	1.00	
		29.14				SJ		36	44			he,ch,ca			3	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		29.42				BD			71											
		29.46				SJ		154	82			he,ch,ca			3	UN	20	6	1.00	
can't measure			30.21m - 33.21m																	
N		30.30	An(?)			IN		N		N	0.01									
N		30.50				MZ		N		N	0.17		30.41	30.58						
N		31.49	-			IN		N		N	0.01									
N		31.53				SJ		N	44	N		ch,ca			3	PL	19	6	1.00	
N		31.86				SJ		N	51	N		ch			3	PL	19	6	1.00	
N		32.21				SJ		N	24	N		ch,ox,mi			5	PL	20	5	1.00	
N		32.31				SJ		N	77	N		ch			3	PL	19	6	1.00	
N		32.37				BZ		N		N	0.06		32.37	32.43				6	1.00	
		32.81				SJ		321	40			ch			3	PL	20	6	1.00	
can't measure			33.21m - 36.21m																	
N		33.22				SJ		N	63	N		ch			3	PL	14	6	1.00	
N		33.26				SJ		N	12	N		ch,ca,su,ox			3	ST	13	5	1.00	
N		33.97				SJ		N	36	N		ch,hbk,ca			6	PL	19	6	1.00	
N		34.17				SJ		N	37	N		ch,hbk,ca			6	PL	19	6	1.00	
N		34.44	BD			BD		N	80	N										
N		34.60				SJ		N	14	N		hbk,si			3	PL	18	6	1.00	
N		35.25	AN			IN		N	65	N	0.52		35.25	35.77						
N		35.63				SJ		N	73	N		ch,ca			3	PL	19	6	1.00	
N		35.86				SJ		N	70	N		si,ch,ox			3	PL	11	6	2.00	
N		35.94				SJ		N	15	N		ch			5	PL	21	6	1.00	
N		35.94				SJ		N	61	N		si,ch,ox			3	PL	11	6	2.00	
can't measure			36.21m - 39.21m																	
N		36.21				SJ		N	67	N		ch			1	IR	10	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		36.30				SJ		N	50	N		ch			3	IR	12	6	1.00	
N		36.44				BZ		N		N	0.04		36.44	36.48						
N		37.00				HJ		N	0/43	N		si,ch			1	IR	15	6	1.50	Two dip
N		37.03				SJ		N	90	N		ch,hbk			0	PL	9	6	1.50	Slicks
N		37.06				SJ		N	90	N		ch,hbk			0	PL	9	6	1.50	Slicks
N		37.16				SJ		N	77	N		ch,hbk			3	PL	12	6	1.00	
N		37.87				SJ		N	20	N		ox,ch,hbk			3	PL	11	5	1.00	
N		37.87				SJ		N	56	N		ox,ch,hbk			3	PL	17	5	1.00	
N		38.06				SJ		N	85	N		ox,ch,hbk,ca			3	PL	12	5	1.00	
N		38.56				SJ		N	78	N		hbk,ch,mi			3	PL	21	6	1.00	
can't measure				39.21m - 42.21m																
N		39.21				SJ		292	77	N		ca,hbk			5	PL	19	6	1.00	
N		39.50				SJ		N	23	N		ch,ca,ox			3	PL	11	5	1.50	
N		39.58				SJ		N	90	N		su,ch			0	PL	16	6	1.00	Slicks
N		39.85				SJ		N	0	N		ox,ca,ch			3	UN	12	5	1.00	
N		40.05				SJ		N	67	N		hbk,ch			5	PL	19	6	1.00	
N		40.56				SJ		N	72	N		hbk,ch			0	PL	14	6	1.00	Slicks
N		41.08				SJ		N	90	N		ch,ca			0	ST	15	6	1.00	Slicks
N		41.24				SJ		N	37	N		su,ch,ca,hbk			3	ST	19	6	1.00	
N		41.38				SJ		N	27	N		ca,hbk,ch			3	PL	13	6	1.00	
N		41.41				RZ		N		N	0.07		41.41	41.48						Probabl
N		41.43				SJ		N	44	N		ch,ca			0	PL	10	6	1.00	
N		41.48				SJ		N	18	N		hbk,ch			3	IR	13	6	1.00	
N		41.78				SJ		N	12	N		hbk			3	PL	19	6	1.00	
N		41.78				SJ		N	44	N		hbk			3	PL	19	6	1.00	
N		41.87				BZ		N		N	0.09		41.87	41.96						Probabl

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
can't measure			42.21m - 45.21m																	
F.O.		42.78				SJ		150	78			hbk			3	PL	19	6	1.00	
F.O.		43.20				SJ		183	46			hbk			0	PL	11	6	1.00	Slicks
F.O.		44.10				SJ		180	77			ch			1	PL	12	6	1.50	
F.O.		44.97				SJ		44	84			mi,ch,ox			3	PL	13	5	1.00	
can't measure			45.21m - 48.21m																	
N		45.21				MZ		N		N	0.79		45.21	46.00						
N		45.47				SJ		N	77	N		ox,he,hbk,ch,mi			5	PL	19	5	1.00	
N		46.04				RZ		N		N								6	1.00	
N		46.27				SJ		N	0	N		si,ox,he,ch,mi,ca			0	UN	10	5	1.00	Slicks
N		46.30				SJ		N	63	N		ch			3	PL	16	6	1.50	
N		46.47				SJ		N	35	N		ch			3	PL	18	6	1.00	
N		46.97				SJ		N	20	N		ch			3	CU	14	6	1.00	
N		47.09				BZ		N		N	0.06		47.09	47.15				6	1.00	
N		47.97				BZ		N		N	0.10		47.97	48.07				6	1.00	
can't measure			48.21m - 51.21m																	
N		48.77				SJ		N	65	N		ch,ca			5	PL	14	6	1.50	
N		48.80				HJ		N	55	N		ch								
N		49.30				SJ		N	65	N		ch,hbk,ca			3	PL	12	6	1.00	Polishe
N		50.00	An(?)			IN		N		N	0.05									
N		50.45				SJ		N	75	N		ox,ch,si,ca,hbk			3	PL	11	5	1.50	
N		50.85				SJ		N	90	N		ch,su			3	PL	12	6	1.00	
N		50.87				SJ		N	57	N		ch			3	PL	17	6	1.00	
N		50.97				SJ		N	53	N		ch			0	IR	14	6	1.00	Slicks
		51.30				SJ		32	16			ox,ca			3	PL	17	5	1.00	
can't measure			51.21m - 54.21m																	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		51.46				SJ		N	79	N		ch,ca			3	PL	17	6	1.00	
N		51.68				SJ		N	86	N		ch			3	PL	18	6	1.00	Polished
N		52.29				SJ		N	75	N		ch,ca			5	PL	17	6	1.50	
N		52.53				MZ		N	85	N		mi			5	PL	20	6	1.00	
N		52.88				MZ		N	85	N		mi			5	PL	20	6	1.00	
N		53.23				SJ		N	65	N		hbk,hwt			5	PL	21	6	1.50	
N		53.61				SJ		N	83	N		ch,hbk			3	PL	17	6	1.00	
		54.11				SJ		80	85			ch,mi			5	PL	20	6	1.00	
N		53.04				MZ		N	83	N		mi			5	PL	20	6	1.00	
N		53.43				MZ		N	84	N		mi			5	PL	20	6	1.00	
		53.85				MZ		260	83			mi			5	PL	20	6	1.00	
		54.04				MZ		180	77			mi			5	PL	20	6	1.00	
can't measure			**54.21m - 57.21m**																	
N		54.35				MZ		N	83	N		mi			5	PL	23	6	0.75	
N		54.68				MZ		N	78	N		mi			5	PL	23	6	0.75	
N		54.82				MZ		N	84	N		mi			5	PL	23	6	0.75	
N		55.86				MZ		N	87	N		mi			5	PL	23	6	0.75	
can't measure			**57.21m - 60.21m**																	
N		57.81				BD		N	90	N										
N		57.91				MZ		N		N	0.19		57.91	58.10						
N		57.99				SJ		N	83	N		ch,ca			3	PL	17	6	1.00	
N		58.10				HJ		N	73	N		hbk,mi			3	PL	16	6	1.00	
N		59.50	**DB**			IN		N	74	N	0.70		59.50	60.20						
N		60.27				SJ		N	25	N		mi,su,ch,ca			5	IR	14	6	1.00	
can't measure			**60.21m - 63.21m**																	
N		60.26				SJ		N	0	N		ch,su,ca			3	PL	19	6	1.00	
N		60.33				SJ		N	78	N		ch			3	IR	16	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		60.47				SJ		N	84	N		hbk,ch			3	PL	16	6	1.00	
N		60.58				SJ		N	78	N		ch			0	PL	17	6	1.00	Slicks/p
N		60.85				SJ		N	73	N		ch,hbk,ox,ca			3	PL	18	5	1.00	
N		61.15				SJ		N	0	N		ch			1	UN	17	6	1.00	Polishe
N		62.36				SJ		N	34	N		hwt, he			3	PL	20	6	1.00	
can't measure			63.21m - 66.21m																	
F.O.		63.24				SJ		24	25			ch,hbk,ca,mi			3	PL	16	6	1.00	
N		64.62				SJ		N	75	N		ca			3	PL	16	6	1.00	
N		65.06				BD		N	85	N										
can't measure			66.21m - 69.21m																	
N		66.25				SJ		N	88	N		ch,ca			3	PL	16	6	1.00	
N		66.35				SJ		N	72	N		ch,ca,ox			5	PL	15	5	1.50	
N		67.01				SJ		N	90	N		su,he,hbk,ca			1	PL	17	6	1.00	
N		67.11				BD		N	90	N										
S.O.		67.40				HJ		0	90			ch,ca			1	PL	19	6	1.00	
S.O.		67.83				SJ		140	63			hbk			3	IR	19	6	0.75	
		68.77				SJ		88	42			ch,mi			0	PL	14	6	1.50	Slicks
can't measure			69.21m - 72.21m																	
F.O		69.21				SJ		100	50			ch,ca			3	PL	19	6	1.00	
N		69.76				SJ		N	79	N		he,ch,ca			1	PL	13	6	1.00	
N		69.93				SJ		N	68	N		ch			1	PL	18	6	1.00	
N		70.21				SJ		N	82	N		ch,ox			1	PL	11	5	1.50	
		71.56				SJ		340	69			hbk,ca			1	PL	18	6	0.75	
can't measure			72.21m - 75.21m																	
		73.82				SJ		97	61			hbk,ca			5	PL	21	6	0.75	
		74.29				SJ		126	86			ch			3	PL	20	6	1.00	
		74.78				SJ		42	25			ch,ca			3	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. (measured from bottom of core)	**ALPHA** Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
can't measure			**75.21m - 78.21m**																	
N		75.24				SJ		N	67	N		ch,ca			5	PL	16	6	1.50	
S.O.		75.87				BD		78	79											
S.O.		76.98				BD		78	76											
S.O.		77.20				SJ		100	22			ch,mi,ca			1	PL	18	6	1.50	
S.O.		77.54				SJ		6	66			ch,ca			1	PL	19	6	1.00	
S.O.		77.69				SJ		196	53			ch,ca			3	CU	19	6	1.00	
S.O.		77.80				SJ		45	62			ch,mi,ca			5	PL	22	6	1.50	
		77.86				SJ		130	58			ch,ca			3	IR	19	6	1.50	
		78.21				SJ		202	71			ch,ca			3	CU	20	6	1.00	
		78.27				SJ		180	20			ch,ca			1	PL	18	6	1.00	
		78.30				SJ		282	66			ch,ca			3	PL	21	6	1.00	
21			**78.21m - 81.21m**																	
		80.04				SJ		120	51			ca,hbk			3	IR	19	6	1.00	
		80.66				SJ		330	33			ch,ca			3	PL	20	6	1.00	
		80.90				SJ		180	48			ch,ca			3	PL	17	6	1.50	
can't measure			**81.21m - 84.21m**																	
		81.91				SJ		68	73			ch			1	PL	14	6	1.50	
		82.82				SJ		74	26			ch,mi			6	IR	12	6	1.50	
		83.32				SJ		90	27			ch,mi			5	PL	19	6	1.50	
		83.44				SJ		24	51			ch,mi			6	CU	18	6	1.00	
		83.65				SJ		82	28			ch,mi			3	IR	15	6	2.00	
		84.00				SJ		260	23			ch			0	CU	9	6	2.00	Slicks
		84.16				SJ		38	45			ch			3	PL	19	6	1.00	
		84.29				SJ		60	47			ch			5	PL	19	6	1.00	
282			**84.21m - 87.21m**																	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		84.29				SJ		N	21	N		ch			0	PL	12	6	1.50	Slicks
N		84.42				SJ		N	40	N		ox,ch			3	CU	18	5	1.00	
N		84.61				SJ		N	45	N		ch			1	PL	15	6	1.50	Polished
N		84.65				SJ		N	0	N		ch,su			3	IR	18	6	1.50	
N		84.72				SJ		N	53	N		ch			3	PL	15	6	1.50	
N		85.18				SJ		N	58	N		ch			0	PL	15	6	1.50	Slicks
N		85.59				SJ		N	18	N		ch			3	PL	15	6	1.50	Polished
N		85.70				SJ		N	24	N		ch			3	PL	15	6	2.00	
N		85.75				SJ		N	28	N		-			3	PL	12	6	2.00	
16			**87.21m - 88.11m**																	
		87.34				SJ		136	17			ch			0	PL	9	6	2.00	Slicks
		87.46				SJ		10	32			ch,mi			3	PL	12	6	2.00	
can't measure			**88.11m - 90.21m**																	
F.O.		88.24				SJ		258	33			ch,ca			3	ST	19	6	1.00	
F.O.		88.45				SJ		246	48			ch,ca			3	PL	19	6	1.00	
F.O.		88.70				SJ		36	86			ch			3	PL	19	6	1.00	
		89.34				SJ		8	30			ch,ca			5	PL	18	6	1.50	
		89.40				SJ		158	55			ch,ca,su			3	CU	19	6	1.00	
		89.58				SJ		126	81			ch,su,ca			3	PL	15	6	1.00	
		89.90				SJ		356	37			ch			3	IR	19	6	1.00	
		90.10				SJ		180	0			ch,su			3	IR	19	6	1.00	
can't measure			**90.21m - 91.91m**																	
F.O.		90.56				SJ		352	17			ch,ca			3	PL	19	6	1.50	
N		90.64				SJ		N	36	N		ch,su,ca			1	PL	17	6	1.00	Polished
N		90.68				SJ		N	36	N		ch,su			3	PL	19	6	1.00	
N		90.96				SJ		N	50	N		ch,su,ca			5	PL	21	6	1.50	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		91.20				SJ		N	0	N		ch,ca,su,mi			3	PL	19	6	1.00	
N		91.36				RZ		N		N	0.45		91.36	91.81				6	1.00	
can't measure				**91.91m - 93.21m**																
N		92.24				SJ		N	0	N		ch,ca,mi			5	IR	19	6	1.50	
N		92.25				SJ		N	0	N		ch,ca			0	UN	14	6	1.50	
		93.07				BD		220	67											
				93.21m - 96.21m																
F.O		93.46				SJ		270	58			ch,ca			3	PL	19	6	1.00	
F.O		93.60				SJ		0	0			ch,ca			3	IR	19	6	1.00	
		95.26				SJ		180	80			hbk,ca			3	PL	20	6	1.00	
		95.26	**DB**			IN		210	73				95.26	95.56						
		96.03				BD		350	78											
Can't measure				**96.21m - 98.60m**																
		96.42				BZ		-	-	-	0.07		96.42	96.49						
N		97.54				SJ		N	19	N		ch,ca			3	PL	17	6	1.00	Probabl
S.O.		97.92				BD		10	80											
S.O.		98.25				BD		225	65											
S.O.		98.50				SJ		12	76			su,ca			3	PL	18	6	1.00	Polishec
Can't measure				**98.60m - 101.92m**																
N		99.27				SJ		N	14	N		ch,ca,su			3	IR	20	6	1.00	
N		99.64				SJ		N	11	N		ch,ca,su			3	IR	19	6	1.00	
N		100.12				SJ		N	26	N		ch,ca,su			3	PL	19	6	1.00	
N		100.15				SJ		N	24	N		su			3	PL	19	6	1.00	
N		100.30				SJ		N	31	N		ch,ca,su			3	PL	19	6	1.00	
N		100.42				SJ		N	71	N		ch,ca,su			3	CU	19	6	1.00	
N		100.53				SJ		N	30	N		ca,ch			3	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		100.65				SJ		N	84	N		ca			3	PL	19	6	1.00	
N		100.88				SJ		N	33	N		ch,ca,su,mi			3	PL	19	6	1.50	
Can't measure			101.92m - 103.21m																	
		101.97				SJ		0	0			hbk,su,ca			3	PL	19	6	0.75	
		102.11				SJ		0	77			ox,ch,ca			1	PL	16	5	1.00	
		102.41				SJ		95	46			ch,ca			3	PL	16	6	1.50	
		102.53				SJ		255	76			ch			3	PL	19	6	1.00	
		102.56				BD		330	65											
		102.77				SJ		108	32			ch,ca			3	PL	20	6	1.00	
Can't measure			103.21m - 106.21m																	
N		104.20				SJ		N	46	N		hbk,ch			3	PL	19	6	1.00	
N		104.30				SJ		N	51	N		ch			3	PL	19	6	1.50	
		104.62				SJ		202	45			ch			3	PL	12	6	2.00	
		105.10				SJ		10	64			ch			3	PL	15	6	1.50	
		105.36				SJ		106	18			ch,ca			5	ST	17	6	1.50	
		105.73				BD		55	63											
		105.80				SJ		34	56			ch,ca			3	PL	19	6	1.00	
52			106.21m - 109.21m																	
		106.50				SJ		112	63			ch,ox,ca			3	PL	20	5	1.00	
		106.64				BD		105	66											
		107.31				SJ		42	80			ch,ca			3	PL	20	6	1.00	
224			109.21m - 112.21m																	
		110.00				SJ		56	14			ch,ca			3	PL	17	6	1.00	
		111.10				HJ		184	57			ch,ca			3	PL	15	6	1.50	
		111.32				SJ		278	71			ch,ca			3	PL	16	6	1.50	
		111.75				SJ		50	17			ch,ca			0	PL	14	6	1.00	Slicks

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		Structure BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
		112.33				SJ		N	0	N		ch,ca			3	PL	19	6	1.50	
Can't measure			112.21m - 115.21m																	
N		112.42				SJ		N	74	N		mi,ca			3	PL	16	6	1.50	
N		112.65				SJ		N	15	N		ch,ca			5	PL	14	6	1.50	
N		112.80				SJ		N	21	N		ch,ca			0	PL	14	6	1.50	Slicks
N		113.20				SJ		N	0	N		ch,ca			3	UN	17	6	1.00	
N		113.63				SJ		N	19	N		ch,ca			3	PL	18	6	1.00	
N		113.70				SJ		N	29	N		ch,ca	113.77	113.82	3	IR	17	6	1.00	
N		113.75				SJ		N	14	N		ch,ca			3	PL	20	6	1.00	
N		113.77				RZ		N		N	0.05							6	1.00	
N		115.20				SJ		N	0	N		ch,ca			5	PL	15	6	2.00	
Can't measure			115.21m - 118.21m																	
N		115.31				SJ		N	85	N		ca,si,mi,ch,ox			3	PL	14	5	3.00	
N		115.50				SJ		N	17	N		ch,mi,ca			0	PL	0	6	3.00	Slicks
		115.99				SJ		90	78			ch,mi			5	PL	14	6	3.00	
		116.28				SJ		24	27			ch,mi,ca			0	PL	0	6	3.00	Slicks
		117.83	GN?			IN		230	36		0.01									
		117.89				SJ		340	78			ch,ca			5	PL	16	6	1.50	
		117.97	GN?			IN		115	17		0.01									
		118.04	GN?			IN		-	-		0.03									
Can't measure			118.21m - 121.21m																	
F.O.		118.40				SJ		300	47			si,ca,ch			5	PL	16	6	1.00	
F.O.		119.12				SJ		243	55			si,ca,ch			5	PL	16	6	1.00	
F.O.		119.21				SJ		287	55			si,ca,ch			3	PL	14	6	3.00	
F.O.		119.33				SJ		286	55			si,go,ca,ch			0	PL	0	6	3.00	Slicks. F
N		119.62				SJ		N	48	N		si,ch,mi,ca			0	PL	0	6	3.00	Slicks

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		120.98				SJ		N	90	N		si,ch,mi,ca			5	PL	14	6	2.00	
Can't measure			121.21m - 124.21m																	
F.O.		121.29				SJ		260	67			ch,ca			3	PL	18	6	1.00	
F.O.		121.90	GN?			IN		225	30		0.01									
N		122.15				SJ		N	74	N		ch,ca			5	PL	16	6	1.00	
N		122.27				SJ		N	62	N		ch,ca			3	PL	15	6	1.50	Slicks
N		123.36				SJ		N	69	N		ch			1	PL	10	6	1.50	
Can't measure			124.21m - 127.21m																	
		125.33				SJ		143	76			ch,ca			1	PL	12	6	1.00	
		126.40				SJ		12	13			ch			0	PL	9	6	1.50	
		126.50				SJ		270	75			mi,ch,hwt			5	IR	17	6	1.00	
Can't measure			127.21m - 130.21m																	
		129.00				SJ		165	54			hbk			5	IR	21	6	1.00	
Can't measure			130.21m - 133.21m																	
N		131.59				SJ		N	54	N		hbk			6	PL	22	6	0.75	
N		132.36				SJ		N	72	N		ch,si			5	PL	18	6	2.00	
Can't measure			133.21m - 136.21m																	
N		133.42				SJ		N	70	N		si,ch,mi			5	PL	16	6	1.00	
N		134.12				SJ		N	58	N		ch,ca			0	PL	9	6	2.00	Slicks
N		134.22				SJ		N	40	N		si,ch			5	PL	17	6	2.00	
N		134.60				SJ		N	6	N		hbk,ch,mi			5	PL	17	6	1.50	
		135.13				SJ		325	47			ch,hbk,mi			5	PL	16	6	1.00	
		135.40				SJ		35	50			ch,si,ca			5	IR	14	6	1.50	
Can't measure			136.21m - 139.21m																	
N		136.21				SJ		N	57	N		ch,ox,ca			3	PL	16	5	1.00	
N		137.13				SJ		N	10	N		ca,hbk,mi,ch,si			5	PL	18	6	1.50	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		137.74				SJ		N	28	N		ch,mi,ca			3	PL	16	6	1.50	
N		137.74				SJ		N	53	N		ch,mi,ca			3	PL	16	6	1.50	
		137.92				BZ		N		N			137.92	138.02				6	1.50	
N		138.03				SJ		N	28	N		si,mi,ch,ca			5	UN	17	6	1.00	
Can't measure			139.21m - 142.21m																	
N		139.21				SJ		N	37	N		ch,mi			3	PL	12	6	2.00	
N		139.55				SJ		N	21	N		mi,ch,si,ca			0	PL	0	6	3.00	Slicks
N		139.69				SJ		N	8	N		si,ch			1	PL	10	6	2.00	Polished
N		139.82				SJ		N	28	N		mi,ch			5	IR	17	6	2.00	
N		139.89				SJ		N	24	N		mi,ch			0	PL	17	6	2.00	Slicks
N		139.92				SJ		N	43	N		ch,si			5	UN	17	6	2.00	
N		140.08				SJ		N	17	N		ch,si			3	PL	12	6	2.00	
N		140.28				SJ		N	30	N		ch,si			0	PL	0	6	4.00	Slicks
N		140.54				SJ		N	33	N		ch,si			5	PL	0	6	4.00	gouge
N		140.65				SJ		N	30	N		ch,mi,ca			5	PL	21	6	1.50	
N		140.70				RZ		N	-	N	0.03							6	1.00	
Can't measure			142.21m - 145.21m																	
F.O.		142.36				SJ		62	23			ch,mi,ca			3	PL	17	6	1.50	
F.O.		142.40				SJ		76	47			ch,ca			5	PL	20	6	1.50	
F.O.		142.63				SJ		70	26			ch,ca			3	PL	16	6	2.00	
N		142.80				SJ		N	60	N		ch,ca			3	PL	16	6	0.75	
N		143.10				BD		N	61	N										
N		144.60				SJ		N	55	N		ch			3	PL	16	6	1.00	
N		144.66				SJ		N	62	N		hbk,ca,mi			5	PL	21	6	0.75	
Can't measure			145.21m - 148.21m																	
N		145.67				SJ		N	57	N		hbk,ch,ca			3	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		145.70	**DB**			IN		N	10	N	0.01									Intrusior
N		145.95	**Mf**			IN		N	62	N	0.01									
N		146.10				SJ		N	50	N		ch,ca			3	PL	19	6	1.00	
N		146.17				SJ		N	48	N		ch,ox			3	PL	19	5	1.50	
		146.74				SJ		358	62			ch,ca			5	PL	19	6	1.50	
		147.20				SJ		342	0			ch,ca			5	PL	22	6	1.00	
		147.20				SJ		40	50			ch,ca			5	IR	16	6	1.50	
		148.10				SJ		18	50			ch,si,ca			3	PL	15	6	2.00	
		148.16				SJ		10	40			ch,ca			3	PL	15	6	1.50	
Can't measure			**148.21m - 151.21m**																	
		148.31				SJ		304	60			ch,ca			3	PL	19	6	1.50	
		148.78				SJ		268	26			ch,ca			3	PL	17	6	1.50	

ORIENTED CORE DATA SHEET

Project	Arnaud	Job No. TX10147503							
Hole No.	CH-7	Location	Open pit	Elevation		Date		By	KA
						to			
Northing		Easting		Inclination	53	Bearing	336	Dia.	HQ

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
Can't measure			13.68m - 13.9m																	
N		13.81				SJ		N	36	N		ox,hbk			5	PL	18	5	1.00	
N		13.81				SJ		N	26	N		hbk			5	PL	19	6	1.00	
Can't measure			13.9m - 16.9m																	
N		13.90				SJ		N	-	N		bk,mi,ox,si			3	ST	13	5	1.00	
N		14.88				BZ		-	-	N	0.02	ox,ca			-	-	-	5	1.00	
N		14.90				SJ		N	39	N		ca,hbk,ch			3	PL	0	6	1.00	
N		14.90				SJ		N	48	N		hbk			5	IR	0	6	1.00	
N		14.99				SJ		N	32	N		hbk,ca			3	PL	14	6	1.00	
N		15.34				SJ		N	52	N		hbk,ca			3	PL	17	6	1.00	
N		15.88				SJ		N	35	N		mi			5	UN	19	6	0.75	
Can't measure			16.9m - 19.9m																	
SO		17.64				SJ		315	70			hbk			5	PL	16	6	1.00	
SO		17.83				SJ		64	83			ca,hbk			3	PL	17	6	1.00	
SO		18.42				SJ		10	66			ch,			1	PL	15	6	1.00	
SO		18.61				SJ		295	66			ch,su			3	PL	13	6	1.00	
SO		18.98				SJ		72	36			ch,ca			3	UN	13	6	1.00	
SO		19.09				SJ		8	67			ch			1	PL	12	6	1.00	
SO		19.36				SJ		206	40			hbk			3	PL	17	6	1.00	
-		19.54				SJ		28	69			ch,			5	PL	14	6	1.50	
Can't measure			19.9m - 22.9m																	
N		20.61				MZ		-	-	N	0.34	-	20.61	20.95	-	-	-	-	-	
SFO		20.64				SJ		280	49			hbk,mi			3	CU	14	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
SFO		20.73				SJ		330	50			ch			5	IR	14	6	1.00	
SFO		20.81				SJ		84	57			ch,ca			3	CU	14	6	1.00	
N		20.89				SJ		N	64	N		hbk,ch			3	PL	14	6	1.00	
N		21.09				BZ		-	-	N	0.02	ch			-	-	-	6	1.00	
SO		21.11				SJ		16	48			ch			3	PL	0	6	1.00	
SO		21.60				SJ		82	5			ch			3	PL	14	6	1.00	
SO		21.82				SJ		8	52			ch			3	PL	17	6	1.00	
SO		21.97				SJ		268	52			ch			5	PL	16	6	1.00	
SO		22.11				SJ		14	44			ch,hbk			3	PL	17	6	1.00	
-		22.38				SJ		290	17			ca,h			3	PL	17	6	1.00	
Can't measure				22.9m - 25.9m																
FO		23.08				SJ		70	47			h,si			5	PL	19	6	1.00	
FO		23.37				SJ		130	25			ch,ca			5	PL	14	6	4.00	
FO		23.70				SJ		112	67			h,ca			5	PL	16	6	1.00	
FO		23.88				SJ		8	62			ch,ca			5	PL	16	6	1.00	
FO		23.98				SJ		322	37			ch,si			5	PL	19	6	1.00	
FO		24.21				SJ		130	60			h,ca			3	PL	14	6	1.00	
SFO		24.49				SJ		340	50			h,ca			5	CU	16	6	1.00	
SFO		24.92				SJ		334	47			h,ca			3	PL	17	6	1.00	
SFO		24.92				SJ		80	0			h			5	PL	17	6	1.00	
SFO		25.05				SJ		354	55			hbk,ca			5	PL	16	6	1.00	
SFO		25.20				SJ		348	62			hbk,ca			3	PL	16	6	1.00	
N		25.86				SJ		N	64	N		hbk			3	PL	14	6	1.00	
Can't measure				25.9m - 28.9m																
N		26.89				SJ		N	42	N		hbk,ca			3	PL	19	6	1.00	
N		28.75				SJ		N	27	N		hbk			3	PL	14	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
Can't measure			28.9m - 31.9m																	
N		28.90				SJ		N	42	N		h			3	PL	17	6	1.00	
N		28.94				SJ		N	33	N		ch,ca			5	PL	16	6	1.00	
N		30.17				SJ		N	0	N		si,ch			3	PL	12	6	4.00	
N		30.70				SJ		N	10	N		si,ch			3	UN	12	6	4.00	
N		30.80				BZ		-	-	N	0.06	ch,ca	30.80	30.86	-	-	-	6	1.50	
N		30.86				SJ		N	25	N		si,ch			3	PL	0	6	1.00	
N		30.86				SJ		N	37	N		ch			3	CU	18	6	1.00	
N		30.86				SJ		N	34	N		ch,h,si			3	PL	0	6	1.50	
N		31.24				SJ		N	15	N		hbk,ca			3	PL	17	6	1.00	
Can't measure			31.9m - 34.9m																	
N		33.70				SJ		N	13	N		si,ch			3	PL	12	6	4.00	
Can't measure			34.9m - 37.9m																	
N		35.30				SJ		N	0	N		h,su			3	PL	18	6	1.00	
N		35.41				SJ		N	37	N		hbk			5	PL	19	6	1.00	
N		36.12				SJ		N	50	N		h			5	PL	16	6	1.00	
N		36.25				SJ		N	20	N		h,ca			3	PL	14	6	1.00	
N		37.25				SJ		N	50	N		hbk			3	IR	14	6	1.00	
Can't measure			37.9m - 40.67m																	
N		39.95				SJ		N	35	N		hbk			6	PL	17	6	1.00	
N		40.62				SJ		N	0	N		ch,hbk			3	UN	19	6	1.00	
Can't measure			40.67m - 43.05m																	
N		41.25				SJ		N	30	N		ch,si			0	PL	9	6	1.50	Slicks
N		41.51				SJ		N	54	N		hbk,ca			3	PL	17	6	1.00	
N		41.68				SJ		N	60	N		hbk			5	PL	16	6	1.00	
N		42.28				SJ		N	48	N		hbk			5	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		42.48				SJ		N	28	N		z			6	PL	20	6	1.00	
N		43.00				SJ		N	40	N		si,go,ch			3	PL	0	6	4.00	probabl
N		43.03				SJ		N	53	N		ıbk,ch,mi			3	PL	17	6	1.00	
Can't measure			**43.05m - 43.9m**																	
N		43.05				SJ		N	34	N		ch			0	PL	11	6	1.00	Slicks
Can't measure			**43.9m - 46.9m**																	
N		44.12				SJ		N	62	N		ch			0	PL	12	6	1.50	Slicks
N		44.62				SJ		N	50	N		ch			0	PL	12	6	1.50	Slicks
Can't measure			**46.9m - 49.74m**																	
N		47.58				SJ		N	66	N		hbk,ca			3	PL	17	6	1.00	
N		47.75				SJ		N	23	N		z			3	PL	17	6	1.00	
N		47.80				SJ		N	37	N		z,ca			3	IR	18	6	1.00	
N		47.98				SJ		N	62	N		z			3	ST	14	6	1.00	
N		48.03				SJ		N	53	N		z,ca			3	PL	14	6	1.00	
N		48.44				SJ		N	33	N		z			5	PL	21	6	0.75	
N		48.82				SJ		N	67	N		none			5	PL	22	6	0.75	
N		49.72				SJ		N	69	N		z			3	PL	17	6	1.00	
N		49.86				SJ		N	77	N		z			3	PL	17	6	1.00	
N		50.00				SJ		N	82	N		z			3	PL	17	6	1.00	
Can't measure			**49.74m - 52.9m**																	
N		49.74				SJ		N	69	N		ch,z			3	PL	17	6	1.00	Slicks
N		50.04				SJ		N	72	N		ch,z			0	PL	11	6	1.00	
N		50.24				SJ		N	38	N		z,ca			3	PL	17	6	1.00	
N		50.27				SJ		N	90	N		ch,mi			3	PL	17	6	1.00	Polishe
N		50.75				SJ		N	44	N		z,ca			3	PL	17	6	1.00	
N		51.31				SJ		N	72	N		z			3	PL	17	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		51.95				SJ		N	60	N		hbk,mi			5	PL	19	6	1.00	
N		52.07				SJ		N	56	N		z			5	PL	19	6	0.75	
Can't measure			52.9m - 55.9m																	
N		53.23				SJ		N	75	N		z,mi			5	PL	19	6	0.75	
N		53.63				SJ		N	86	N		z,mi			5	PL	19	6	1.00	
N		54.71				SJ		N	73	N		z,mi			5	PL	19	6	1.00	
N		54.85				SJ		N	71	N		z,mi			5	PL	19	6	0.75	
N		55.73				SJ		N	20	N		z			3	PL	17	6	1.00	
N		55.74				SJ		N	25	N		z,ca			3	ST	17	6	1.00	
Can't measure			55.9m - 58.9m																	
N		56.14				SJ		N	17	N		hbk,ca			5	PL	17	6	1.00	
N		56.21				SJ		N	28	N		z,ca			5	CU	17	6	1.00	
N		56.29				SJ		N	25	N		z			3	UN	17	6	1.00	
N		56.53				SJ		N	43	N		z,ca			5	PL	19	6	1.00	
N		56.96				SJ		N	70	N		z			5	PL	16	6	0.75	
N		57.02				SJ		N	70	N		z			5	PL	16	6	1.00	
N		57.02				BZ		-	-	N	0.07	z	57.17	57.24	-	-	-		1.00	Slicks
N		57.24				SJ		N	80	N		z,su,ca			5	PL	0	6	1.00	
N		57.33				SJ		N	30	N		z,ca			5	PL	19	6	1.00	
N		57.50				SJ		N	68	N		z			3	PL	18	6	1.00	
N		57.82				SJ		N	78	N		z,ca			5	PL	16	6	1.00	
N		58.47				SJ		N	53	N		z			5	PL	20	6	1.00	
N		58.81				SJ		N	55	N		z,ca			3	PL	17	6	1.00	
Can't measure			58.9m - 61.9m																	
N		59.42				SJ		N	73	N		z,mi			5	PL	16	6	0.75	
N		60.75				SJ		N	34	N		z,mi			5	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core **(T.Gf output)**	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		61.65				SJ		N	50	N		z,ca			3	PL	17	6	1.00	
Can't measure			**61.9m - 64.9m**																	
N		61.90				SJ		N	55	N		z			5	PL	16	6	0.75	
N		62.44				SJ		N	53	N		ca,z			5	PL	16	6	1.00	
N		62.48				SJ		N	22	N		ca,z			5	ST	20	6	1.00	
N		62.93				SJ		N	26	N		ca,z			5	PL	20	6	1.00	
N		62.98				SJ		N	60	N		ch			3	PL	12	6	2.00	
N		63.97				SJ		N	35	N		si,z			3	PL	15	6	3.00	
N		64.06				SJ		N	46	N		z			5	PL	19	6	1.00	
N		64.60				SJ		N	45	N		z			3	PL	17	6	1.00	
Can't measure			**64.9m - 67.9m**																	
N		65.14				SJ		N	40	N		z			5	PL	19	6	1.00	
N		65.44				SJ		N	28	N		z			3	CU	17	6	1.00	
N		66.23				SJ		N	8	N		z,ca			5	PL	19	6	1.00	
N		66.33				SJ		N	20	N		z			5	PL	19	6	1.00	
N		66.45				SJ		N	52	N		z			3	IR	18	6	1.00	
N		66.69				SJ		N	15	N		z,ca			5	PL	20	6	1.00	
Can't measure			**67.9m - 70.9m**																	
N		69.07				SJ		N	25	N		z,ch			5	UN	19	6	1.00	
N		69.07				SJ		N	64	N		z,ca			3	PL	17	6	1.00	
N		69.27				SJ		N	46	N		z,ca,mi			3	PL	17	6	1.00	
N		69.90				SJ		N	38	N		hbk			6	CU	20	6	1.00	
N		70.51				SJ		N	48	N		z,ca			5	PL	19	6	1.00	
Can't measure			**70.9m - 73.9m**																	
N		72.43				SJ		N	30	N		z			3	CU	17	6	1.00	
N		72.86				SJ		N	60	N		ca,z,ch			3	PL	14	6	2.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		72.94				SJ		N	32	N		z			3	PL	17	6	1.00	
Can't measure			**73.9m - 76.9m**																	
N		74.11				SJ		N	48	N		z			5	PL	19	6	1.00	
N		75.29				SJ		N	62	N		z,ca			5	PL	16	6	1.00	
Can't measure			**76.9m - 79.9m**																	
N		77.12				SJ		N	48	N		ch			0	PL	13	6	4.00	Slicks
N		77.16				SJ		N	74	N		ch,mi			5	ST	14	6	2.00	
N		77.18				SJ		N	48	N		ch,su,mi			5	PL	0	6	4.00	
N		77.49				SJ		N	55	N		ch,mi			6	PL	16	6	1.00	
N		77.64				SJ		N	35	N		ch			5	PL	19	6	1.00	
N		79.33				SJ		N	58	N		hbk,ca			5	PL	16	6	1.00	
Can't measure			**79.9m - 82.56m**																	
N		80.71				SJ		N	47	N		ch,z,ca			5	PL	17	6	1.50	
N		80.97				SJ		N	74	N		z,mi,ca			3	PL	17	6	1.00	
N		81.67				SJ		N	65	N		ca,ch			5	PL	14	6	2.00	
N		82.02				SJ		N	73	N		z,mi			5	PL	16	6	1.00	
N		82.14				SJ		N	73	N		z,ch			5	PL	16	6	1.00	
N		82.33				SJ		N	68	N		z,mi			5	PL	16	6	1.00	
N		82.57				SJ		N	70	N		z,mi			3	PL	14	6	1.00	
Can't measure			**82.56m - 85.9m**																	
N		83.73				SJ		N	65	N		z,ca			3	IR	14	6	1.00	
N		83.73				SJ		N	40	N		ch,ca			3	PL	14	6	1.00	
N		83.99				SJ		N	57	N		ch,mi,ca			5	PL	17	6	2.00	
N		84.62				SJ		N	36	N		z,ca			5	PL	18	6	1.00	
Can't measure			**85.9m - 88.9m**																	
N		87.46				SJ		N	65	N		z,ca			5	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		87.59				SJ		N	52	N		z,ch,ca			5	CU	16	6	1.00	
N		87.73				BZ		-	-	N	0.12	ch,ca	87.73	87.85	-	-	-	6	1.00	
N		87.85				SJ		N	14	N		ch,z,ca			5	PL	0	6	1.00	
N		87.98				SJ		N	80	N		ca,z			6	IR	17	6	1.00	
-		88.53				SJ		60	78			z,ca			6	CU	20	6	1.00	
-		88.88				SJ		130	72			ox,z,ca			5	PL	19	5	1.00	
Can't measure			88.9m - 91.9m																	
FO		88.90				SJ		340	45			ch,ca,ox			3	PL	14	5	2.00	
FO		89.07				SJ		174	44			ch,			3	PL	21	6	1.00	
FO		89.67				SJ		120	48			z			3	PL	18	6	1.00	
FO		90.34				SJ		340	50			ch,z			3	IR	14	6	1.00	
N		90.48				SJ		N	43	N		ch,z			1	PL	15	6	1.00	
N		90.50				SJ		N	83	N		ch,z			3	PL	15	6	2.00	
N		90.54				SJ		N	44	N		ch			3	PL	12	6	2.00	
N		90.68				SJ		N	72	N		ch			3	PL	12	6	2.00	
-		91.05				SJ		80	80			ch			3	PL	12	6	4.00	
-		91.17				SJ		310	40			z,ca			3	ST	17	6	1.00	
-		91.29				SJ		95	50			ch,z			1	PL	15	6	1.00	
-		91.36				SJ		-	-			z,ch			3	IR	17	6	1.00	
-		91.51				SJ		94	74			z,ca,mi			5	PL	20	6	1.00	
-		91.80				SJ		354	52			ch,z			1	PL	15	6	1.00	
Can't measure			91.9m - 94.9m																	
SFO		92.07				SJ		74	83			z,ca			3	PL	17	6	1.00	
N		93.70				SJ		N	60	N		ca,z			5	CU	20	6	1.00	
N		94.03				SJ		N	75	N		z,ca,mi			5	PL	16	6	1.00	
N		94.18				SJ		N	65	N		z,ca			5	PL	16	6	1.00	
N		94.65				SJ		N	75	N		z,ca			3	ST	14	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		94.70				SJ		N	35	N		z,ca			3	PL	14	6	1.00	
N		94.90				SJ		N	34	N		ch,z			5	PL	20	6	1.00	
Can't measure				**94.9m - 97.9m**																
N		94.90				SJ		N	38	N		ca,ch,z			5	PL	16	6	1.00	
N		95.48				SJ		N	63	N		ch,mi			3	PL	14	6	1.00	
N		96.36				SJ		N	90	N		hbk.ca			5	PL	16	6	1.00	
N		97.08				SJ		N	25	N		ch,ca			3	PL	17	6	1.00	
N		97.89				SJ		N	68	N		z,ca			5	PL	20	6	1.00	
Can't measure				**97.9m - 100.9m**																
FO		97.98				SJ		104	26			hbk,ca			3	PL	18	6	1.00	
FO		98.00				SJ		356	38			z,ca			5	PL	19	6	1.00	
FO		98.00				SJ		104	27			z,ca			3	PL	18	6	1.00	
FO		98.76				SJ		114	38			ca,ch			0	PL	13	6	2.00	Slicks
FO		98.88				SJ		116	32			ch			0	ST	13	6	2.00	Slicks
FO		99.02				SJ		320	35			ch			0	UN	0	6	4.00	Slicks
FO		99.05				SJ		314	72			ch,z			0	PL	0	6	1.00	Slicks
N		99.05				BZ		-	-	N	0.05	ch	99.05	99.10	-	-	-		1.00	Slicks
N		99.49				SJ		N	56	N		ch,z			5	PL	16	6	1.00	
N		99.96				SJ		N	34	N		z,ca			6	PL	14	6	1.50	
N		100.18				SJ		N	34	N		z,ca			5	PL	16	6	1.00	
N		100.35				SJ		N	35	N		z,ca			5	CU	19	6	1.00	
N		100.46				SJ		N	20	N		z			5	UN	19	6	1.00	
N		100.59				SJ		N	38	N		ch,z			0	UN	11	6	1.00	Slicks
N		100.59				SJ		N	48	N		z			5	PL	16	6	1.00	
N		100.75				SJ		N	50	N		ch			0	PL	11	6	1.00	Slicks
N		100.81				SJ		N	20	N		ch			0	PL	12	6	4.00	Slicks

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
Can't measure			**100.9m - 103.9m**																	
N		100.90				BZ		-	-	N	0.23	si,ch	100.90	101.13	-	-	-	6	3.00	
N		101.47				SJ		N	45	N		mi.z			5	ST	19	6	1.00	
N		101.79				SJ		N	15	N		z			5	PL	20	6	1.00	
N		101.79				SJ		N	45	N		z,ca			5	PL	19	6	1.00	
N		102.15				SJ		N	64	N		z,mi			5	PL	16	6	1.00	
N		102.15				SJ		N	40	N		z,ca			3	PL	14	6	1.00	
N		102.34				SJ		N	43	N		z			0	PL	14	6	1.00	Slicks
-		102.78				SJ		90	46			z			3	PL	17	6	1.00	
-		102.98				SJ		326	48			z,ca			3	UN	14	6	1.00	
-		103.52				SJ		112	30			ch,hbk			5	PL	0	6	1.00	
-		103.52				BZ		-	-		0.05	ch,ca	103.52	103.57	-	-	-	6	2.00	
Can't measure			**103.9m - 106.9m**																	
N		103.90				SJ		N	47	N		ch,z			0	PL	14	6	1.00	Slicks
N		104.08				SJ		N	53	N		ch			0	PL	14	6	1.00	Slicks
N		104.20				SJ		N	46	N		z,mi			3	PL	17	6	1.00	
N		104.27				SJ		N	0	N		ch,ca,si			3	UN	10	6	4.00	
N		104.59				SJ		N	68	N		z,hwt			6	PL	20	6	0.75	
N		104.75				SJ		N	58	N		z			5	PL	16	6	1.00	
N		104.77				SJ		N	10	N		z,ca			0	PL	14	6	1.00	Slicks
N		104.94				SJ		N	65	N		z			6	IR	17	6	1.00	
N		105.13				SJ		N	37	N		z,ca			5	IR	16	6	1.00	
N		105.25				SJ		N	22	N		hbk,ca,mi			5	PL	16	6	1.00	
N		105.30				BZ		-	-	N	0.10	ca	105.30	105.40	-	-	-	6	1.00	
-		105.40				SJ		130	27			ch,z			0	PL	11	6	1.00	Slicks
-		105.60	**AN**			IN		290	38		1.86	-	105.60	107.46	-	-	-	-	-	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
Can't measure			106.9m - 109.9m																	
FO		107.02				SJ		216	30			z			6	PL	20	6	1.00	
N		108.10				BZ		-	-	N	0.05	mi	108.10	108.15	-	-	-	6	1.00	Slicks
FO		108.10				SJ		160	14			hbk			5	PL	0	6	1.00	
N		108.15				SJ		N	53	N		ch,ca			0	IR	0	6	1.00	Slicks
N		108.55				SJ		N	80	N		z,ca			5	PL	19	6	1.00	
N		108.93				SJ		N	0	N		z,ca			5	UN	21	6	1.00	
Can't measure			109.9m - 112.9m																	
N		110.07				SJ		N	73	N		z,ca			6	PL	20	6	1.00	
N		110.17				SJ		N	15	N		z			3	UN	17	6	1.00	
N		110.34				SJ		N	67	N		z,ca			5	PL	0	6	1.00	
N		110.34				BZ		-	-	N	0.03	ca	110.34	110.37	-	-	-		1.00	
N		110.37				SJ		N	70	N		z,ca			5	PL	0	6	1.00	
N		110.77				SJ		N	63	N		z,ch			5	PL	19	6	1.00	
N		111.12				SJ		N	25	N		z,ch			5	UN	16	6	1.50	
N		111.29				SJ		N	30	N		z,ch,si			5	PL	14	6	2.00	
N		111.33				SJ		N	36	N		z,ch,si			5	PL	14	6	2.00	
N		111.40				SJ		N	40	N		z,ch,si			5	PL	16	6	1.00	
N		111.40				SJ		N	32	N		ch			3	PL	17	6	1.00	
N		111.76				SJ		N	30	N		z			5	UN	16	6	1.00	
N		111.86				SJ		N	0	N		ch,ca,z			5	UN	13	6	1.50	
N		112.01				RZ		-	-	N	0.05	mi,ca	112.01	112.06	-	-	-		1.00	
N		112.06				SJ		N	65	N		z			5	PL	0	6	0.75	
N		112.27				SJ		N	69	N		z			3	PL	17	6	1.00	
N		112.36				SJ		N	60	N		z,ca			5	PL	19	6	1.00	
N		112.70				SJ		N	20	N		si,z,ca			5	PL	17	6	3.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
Can't measure			**112.9m - 115.9m**																	
-		113.07				SJ		222	20			ch,ca			5	PL	20	6	1.00	
-		114.53				SJ		228	43			ch,ca,z			3	PL	18	6	1.00	
165			**115.9m - 118.9m**																	
-		116.45				SJ		22	40			z			5	PL	19	6	1.00	
-		117.44				SJ		272	47			z			5	PL	22	6	1.00	
-		117.83				SJ		32	47			z,si			3	PL	15	6	1.50	
-		118.33				SJ		20	25			ca,z			0	PL	15	6	1.00	Slicks
-		118.44				SJ		218	60			z,ca			5	PL	19	6	1.00	
-		118.62				SJ		30	46			z,ca			5	PL	19	6	1.00	
328			**118.9m - 121.9m**																	
-		118.90				SJ		352	42			ch,ca			5	PL	19	6	1.00	
-		120.70				SJ		352	30			z			3	PL	17	6	1.00	
-		120.76				SJ		182	60			z			5	PL	16	6	1.00	
-		121.00				SJ		348	27			z			5	PL	20	6	1.00	
-		121.83				SJ		340	55			z			5	CU	19	6	1.00	
Can't measure			**121.9m - 124.9m**																	
FO		122.90				SJ		174	63			z,mi,ca			3	PL	14	6	1.00	
FO		122.97				SJ		332	37			z,mi,ca			3	PL	14	6	1.00	
SFO		123.26				SJ		182	62			z			3	PL	17	6	1.00	
SFO		123.40				SJ		354	55			z			5	PL	19	6	1.00	
N		124.20				SJ		N	33	N		z			5	UN	19	6	1.00	
125			**124.9m - 127.9m**																	
-		125.75				SJ		318	65			z,hwt			6	CU	20	6	1.00	
-		126.49				SJ		304	52			z,ca			5	PL	21	6	1.00	
-		127.03				SJ		140	25			z,ca			5	PL	20	6	1.00	

			Rock Type			Structure														
Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
-		127.43				SJ		230	54			z			6	PL	21	6	1.00	
Can't measure			**127.9m - 130.9m**																	
N		128.04				SJ		N	43	N		z			5	ST	20	6	1.00	
N		128.11				SJ		N	50	N		z			5	PL	20	6	1.00	
N		128.30				SJ		N	10	N		ch,ca			5	PL	20	6	1.00	
N		128.65				SJ		N	70	N		ca,z			5	PL	19	6	1.00	
N		129.11				SJ		N	56	N		ch,mi			5	PL	19	6	1.00	
N		129.22				SJ		N	13	N		ch,si			3	PL	15	6	1.50	
N		129.38				SJ		N	57	N		ch,ca			3	PL	17	6	1.00	
N		129.50				SJ		N	56	N		z			3	PL	17	6	1.00	
N		129.57				SJ		N	65	N		ch,hbk			3	PL	17	6	1.00	
N		129.78				SJ		N	42	N		z			3	PL	9	6	1.00	Slicks
-		130.51				SJ		146	59			ch,z			0	PL	10	6	1.00	Slicks
-		130.51				SJ		245	27			ch,z			0	PL	10	6	0.75	Slicks
Can't measure			**130.9m - 133.9m**																	
FO		131.60				SJ		252	40			hbk,hwt			5	PL	20	6	1.00	
FO		131.85				SJ		164	18			z,ca			5	PL	19	6	1.00	
N		132.00				SJ		N	34	N		z			0	PL	11	6	1.00	Slicks
N		132.52				SJ		N	50	N		z			6	IR	17	6	0.75	
115			**133.9m - 136.9m**																	
-		NO JOINTS				-		-	-	-		-			-	-	-	-	-	
Can't measure			**136.9m - 139.9m**																	
-		NO JOINTS				-		-	-	-		-			-	-	-	-	-	
Suspect = 180			**139.9m - 142.9m**																	
SO		140.20				SJ		312	39			ch			0	PL	11	6	1.00	Slicks
-		142.24				SJ		130	35			h,z,ca,mi			6	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
Can't measure				142.9m - 145.9m																
N		143.48				SJ		N	74	N		ch			3	PL	12	6	1.50	
N		143.62				SJ		N	7	N		ch,si			5	PL	19	6	1.00	
N		145.76				SJ		N	70	N		hbk,mi			5	PL	19	6	1.00	
N		145.80				SJ		N	55	N		ch,			0	CU	9	6	4.00	Slicks
N		145.87				BZ		-	-	N	0.03	-	145.87	145.90	-	-	-		4.00	
-		145.90				SJ		166	73			ch,si			0	PL	0	6	4.00	Slicks
25				145.9m - 148.9m																
-		145.97				SJ		170	65			k,su,mi,ox			6	CU	19	5	1.00	
-		146.70				SJ		16	12			ch,mi,z			5	PL	19	6	1.00	
-		147.64				SJ		20	65			z,ch,mi			5	PL	19	6	1.00	
Can't measure				148.9m - 151.9m																
-		149.85				SJ		350	57			z			5	CU	19	6	0.75	
-		150.73				SJ		340	38			ch,mi,si			3	PL	12	6	3.00	
Can't measure				151.9m - 154.9m																
N		153.32				SJ		N	75	N		z			5	PL	19	6	0.75	
N		153.58				SJ		N	67	N		ch			5	PL	16	6	1.00	
-		154.26				SJ		210	70			ch			3	PL	14	6	1.00	
-		154.54				SJ		20	20			ch			3	PL	17	6	1.00	
-		154.55				SJ		174	57			ch			5	PL	19	6	1.00	
Can't measure				154.9m - 157.47m																
FO		155.25				SJ		166	45			z,ch			5	PL	19	6	1.00	
FO		155.84				SJ		2	9			ch			5	PL	19	6	1.00	
FO		156.37				SJ		12	43			ch,si,su			3	PL	15	6	3.00	
FO		156.46				SJ		226	57			z			6	PL	20	6	0.75	
FO		156.76				SJ		2	25			ch,			3	PL	12	6	4.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
FO		157.00				SJ		286	70			ch			0	PL	12	6	4.00	Slicks
FO		157.02				SJ		220	75			si,ch			0	CU	12	6	4.00	Slicks
FO		157.20				SJ		70	80			si,ch			3	PL	15	6	3.00	
FO		157.22				SJ		260	70			ch,si			0	CU	9	6	4.00	Slicks
FO		157.34				SJ		16	42			go,ch			0	PL	0	6	4.00	Probabl
FO		157.46				SJ		348	15			ch,go			0	PL	0	6	4.00	Slicks.
Can't measure				**157.47m - 157.9m**																
-		NO JOINTS				-		-	-	-		-			-	-	-	-	-	
Can't measure				**157.9m - 160.9m**																
N		157.90				SJ		N	51	N		ch			5	PL	16	6	1.00	
-		158.25				SJ		138	13			ch,ca			0	PL	9	6	2.00	Slicks
-		158.38				SJ		310	55			ch,z			5	IR	19	6	1.00	
-		158.43				SJ		285	48			ch,si			3	PL	0	6	4.00	>5mm s
-		158.43				SJ		100	70			su,ch			3	PL	12	6	4.00	
-		159.21				SJ		140	70			ch,su,z			5	PL	14	6	4.00	
-		159.49				SJ		345	45			ch,su			3	PL	0	6	2.00	
-		159.49				SJ		240	32			ch			3	PL	14	6	2.00	
-		159.82				SJ		340	40			ch,su			3	PL	0	6	4.00	
-		159.93				SJ		356	43			ch,su			3	PL	0	6	2.00	About 5
-		160.43				SJ		156	50			ch			0	PL	9	6	2.00	Slicks
-		160.66				SJ		344	46			ch,go,su			0	PL	0	6	4.00	About 5
80				**160.9m - 163.9m**																
-		161.94				SJ		266	56			ch			5	PL	16	6	1.00	
-		162.10				SJ		312	43			ch			5	PL	19	6	1.00	
-		162.10				SJ		122	50			ch			0	PL	9	6	2.00	Slicks
-		162.22				SJ		106	55			ch			0	PL	0	6	4.00	Slicks

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
-		163.30				SJ		66	40			ch,si			3	PL	11	6	3.00	
-		164.45				SJ		228	50			z,ch			5	PL	19	6	1.00	
Can't measure			**163.9m - 166.9m**																	
FO		163.90				SJ		68	35			ch,ca			0	PL	11	6	1.00	Slicks
FO		164.32				SJ		112	47			ch,mi			5	PL	14	6	1.50	
FO		164.40				SJ		282	55			z,ch			5	PL	17	6	1.50	
-		165.27				SJ		can't measu	an't measur			z,mi (?)			-	-	-	-	-	Joint fac
-		165.83				SJ		205	60			ch			5	PL	14	6	2.00	
-		166.26				SJ		194	50			ch,ca			5	PL	19	6	1.00	
-		166.54				SJ		194	60			ch			5	PL	19	6	1.00	
-		166.87				SJ		188	50			ch,si			3	PL	0	6	4.00	>5mm s
Can't measure			**166.9m - 169.9m**																	
FO		167.03				SJ		304	77			ch			5	PL	14	6	1.50	
N		167.85				SJ		N	57	N		hbk			5	PL	16	6	1.00	
N		168.40				SJ		N	60	N		z			5	PL	19	6	1.00	
N		168.56				RZ		-	-	N	0.08	si,su	168.56	168.64	-	-	-	6	4.00	
-		168.94				SJ		300	34			ch,z			5	PL	16	6	1.00	
35			**169.9m - 172.9m**																	
-		170.19				BD		200	70			-			-	-	-	-	-	
-		170.91				SJ		74	22			z,ca			5	PL	20	6	1.00	
-		171.03				SJ		76	18			ch,mi			5	PL	17	6	2.00	
-		171.73				SJ		354	30			z,ca			5	PL	20	6	1.00	
-		172.80				SJ		340	27			z,ca			3	PL	19	6	1.00	
335			**172.9m - 175.9m**																	
-		173.20				SJ		302	35			z,ca			3	PL	19	6	1.00	
-		173.73				SJ		304	26			z,ca			3	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
-		174.40				SJ		302	35			z			5	PL	21	6	1.00	
-		175.11				SJ		142	55			z			3	PL	19	6	1.00	
-		175.67				SJ		304	34			z			5	PL	21	6	1.00	
60			**175.9m - 178.9m**																	
-		175.90				SJ		94	17			ch,z			5	PL	20	6	1.00	
-		178.49				SJ		104	12			z,mi,ca			5	PL	19	6	1.00	
Can't measure			**178.9m - 181.9m**																	
-		180.31				SJ		316	19			z			5	PL	19	6	1.00	
-		181.26				SJ		324	23			z,ca			0	PL	14	6	1.00	Slicks
Can't measure			**181.9m - 184.9m**																	
FO		182.21				SJ		226	74			ch,z			0	PL	14	6	1.00	Slicks
FO		182.37				SJ		214	73			ch			0	PL	9	6	1.50	Slicks
FO		182.53				SJ		166	62			ch,ah			0	PL	0	6	1.50	Slicks.
FO		182.75				SJ		42	47			ch,ah			0	PL	0	6	1.50	Slicks
N		182.75				BZ		-	-	N	0.20	-	182.75	182.95	-	-	-	6	2.00	Slicks
-		182.95				SJ		0	30			ch,su			3	PL	0	6	1.00	
-		182.96				SJ		276	50			ch,si,ah			0	PL	9	6	4.00	Slicks
-		183.15				SJ		74	35			z			5	PL	16	6	1.00	
-		183.23				SJ		100	28			ch			5	PL	21	6	1.00	
-		183.27				SJ		210	22			ch			0	PL	11	6	1.00	Slicks
-		183.48				SJ		230	70			ch,ca			0	PL	11	6	1.00	Slicks
-		183.61				SJ		8	26			ch			0	PL	15	6	1.00	Slicks
-		183.68				SJ		192	56			ch			0	PL	12	6	2.00	Slicks
-		183.72				SJ		222	72			ch,mi,ca			0	PL	14	6	1.00	Slicks
-		183.78				SJ		160	57			ch			0	PL	11	6	1.00	Slicks
-		183.87				SJ		290	53			ch,si,ca			0	PL	9	6	4.00	Slicks

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core **(T.Gf output)**	Drill length	Rock Type			Structure														
			1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
-		183.95				SJ		264	58			z			5	PL	16	6	1.00	
-		184.40				SJ		282	54			z			5	PL	16	6	1.00	
280			**184.9m - 187.9m**																	
SO		184.98				SJ		210	70			z			5	PL	16	6	1.00	
SO		185.77				SJ		290	17			z,ch			5	PL	20	6	1.00	
SO		185.97				SJ		300	24			z			0	PL	11	6	1.00	Slicks
SO		186.05				SJ		346	19			z			5	PL	21	6	0.75	
-		186.27				SJ		296	27			z			5	PL	19	6	1.00	
-		186.60				SJ		140	63			z			5	PL	19	6	0.75	
-		186.65				SJ		102	9			z,ca,ch			0	PL	12	6	1.50	Slicks
Can't measure			**187.9m - 190.9m**																	
FO		188.70				SJ		26	18			z,ca			5	PL	20	6	1.00	
FO		188.70				SJ		162	67			ch,ca			0	PL	0	6	1.50	Slicks
N		188.70				BZ		-	-	N	0.05	ch	188.70	188.75	-	-	-	6	2.00	Slicks
N		188.75				SJ		N	25	N		ch,ca			0	PL	0	6	2.00	Slicks
N		188.85				SJ		N	43	N		ch,ca			3	PL	15	6	2.00	Polished
N		188.92				SJ		N	72	N		ch,ca			5	PL	19	6	1.00	Polished
N		189.00				SJ		N	67	N		ch			3	PL	17	6	1.00	
N		189.04				SJ		N	37	N		si,ch			3	PL	15	6	3.00	
N		189.51				SJ		N	32	N		ch,si			5	PL	17	6	2.00	
N		190.05				SJ		N	39	N		ch,			6	PL	15	6	1.50	
N		190.50				SJ		N	30	N		z			5	PL	16	6	1.00	
Can't measure			**190.9m - 193.9m**																	
N		191.09				SJ		N	33	N		z,ca			5	PL	19	6	1.00	
N		191.16				SJ		N	47	N		z,ca			5	PL	16	6	1.00	
N		191.23				SJ		N	44	N		ch,si			3	PL	15	6	3.00	

			Rock Type			Structure														
Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		191.73				SJ		N	23	N		z,ca			5	ST	20	6	1.00	
N		193.24				SJ		N	24	N		si,ch			3	PL	15	6	4.00	
-		193.30				SJ		355	19			si,ch			3	PL	15	6	4.00	
Can't measure				**193.9m - 196.9m**																
SO		196.15				SJ		175	45			z			5	PL	20	6	1.00	
-		196.45				SJ		282	10			ch			3	PL	12	6	2.00	
-		196.90				SJ		174	25			z			5	PL	19	6	1.00	
Can't measure				**196.9m - 199.9m**																
-		No Joints				No Joints		-	-	-		-			-	-	-	-	-	-
85				**199.9m - 202.9m**																
-		200.10				SJ		324	65			ch			5	PL	19	6	1.00	
-		200.30				SJ		286	54			ch			1	PL	15	6	1.00	

ORIENTED CORE DATA SHEET

Project	Arnaud	Job No. TX10147503							
Hole No.	CH-8	Location	Open pit	Elevation		Date	Jan 11, 2011	By	KA
						to	Jan 13, 2011		
Northing		Easting		Inclination	53.4	Bearing	89	Dia.	HQ

Reference Line (Top or Bottom)	B
Orientation Device	Devicore

Note: Azimuth based on true north, inclination from devicore.

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
			10.3m - 11.7m																	
N		10.55				SJ		N	12	N		ch			3	PL	13	6	1.00	
can't measure			**11.7m - 14.52m**																	
N		12.00				SJ		N	35	N		ox.ch			3	PL	10	5	1.00	
N		12.02				SJ		N	22	N		ox.ch,hbk			3	PL	10	5	1.00	
N		12.37				SJ		N	20	N		ox.ch,hbk			3	PL	17	5	1.00	
N		12.45				SJ		N	18	N		ch,hbk			3	PL	17	5	0.75	
N		13.99				SJ		N	25	N		ch,ox			3	PL	10	6	1.00	
N		14.02				SJ		N	35	N		ch,ox			3	PL	10	5	1.00	
N		14.20				SJ		N	36	N		ch,ox			3	PL	10	5	1.00	
N		14.34				SJ		N	25	N		ch,ox,hbk			3	PL	10	5	1.00	
N		14.64				SJ		N	40	N		hbk			3	PL	13	6	1.00	
can't measure			**14.52m - 17.7m**																	
		15.20				SJ		190	35			ch,hbk			3	PL	17	5	1.00	
		15.75				SJ		310	22			ox,ch,hbk			3	PL	17	5	1.00	
		16.15				SJ		195	55			hbk,ch,ca			3	PL	18	6	1.00	
		16.41				SJ		45	14			hbk,ch,ca			3	PL	17	5	1.00	
		16.73				SJ		187	42			hbk,ch,ca			3	PL	17	5	1.00	
		17.53				SJ		60	28			hbk,ch,ca			3	PL	17	5	1.00	
		17.59				SJ		180	35			ca,ch			3	PL	18	6	1.00	
can't measure			**17.7m - 20.7m**																	
FO		17.70				SJ		335	30			ch,ca			3	PL	12	5	1.00	
FO		17.85				SJ		80	40			ch,ca			3	PL	16	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc . Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
FO		17.90				SJ		190	55			ch,ca			3	PL	17	5	1.00	
FO		18.76				SJ		320	35			ca,ch,ox			3	PL	18	5	1.00	
FO		18.78				SJ		30	50			ca,ch,ox			3	PL	17	5	1.00	
FO		19.33				SJ		190	65			hbk,ch			3	PL	18	6	1.00	
N		19.62				SJ		N	40	N		ch,hbk,ca			3	PL	17	5	1.00	
N		19.77				SJ		N	35	N		ca,hbk			3	PL	17	5	0.75	
		19.84				SJ		40	38			mi,ca,ch			3	PL	10	5	1.00	
		19.97				SJ		240	35			si,hbk			3	PL	16	5	1.00	
		20.29				SJ		150	40			ca,hbk			3	PL	18	6	1.00	
can't measure				**20.7m - 23.7m**																
FO		20.79				SJ		350	45			hbk			3	PL	17	6	0.75	
FO		20.97				SJ		250	35			ox,hbk,ch			3	PL	17	6	1.00	
FO		21.55				SJ		10	52			ch,ox,ca			3	PL	17	5	1.00	
N		21.71				SJ		N	45	N		ca,ch,ox			3	PL	16	5	1.50	
N		21.91				SJ		N	23	N		ch,ox,ca,hbk			3	UN	18	5	1.00	
N		22.20				SJ		N	16	N		ch,ca			3	PL	18	6	1.00	
N		22.37				SJ		N	42	N		ch,ca			5	IR	20	6	1.00	
N		22.56				SJ		N	30	N		ox			5	PL	19	5	1.00	
		22.84				SJ		170	25			ch			1	PL	16	6	1.00	
can't measure				**23.7m - 26.7m**																
N		23.73				BZ		N	60	N	0.03	ch			3	PL	14	5	1.00	
N		23.93				SJ		N	25	N		ch,ca,ox			5	PL	20	6	1.00	
N		24.15				SJ		N	40	N		ch,mi			3	UN	17	5	1.00	
N		24.34				SJ		N	40	N		ch,ox			3	ST	17	5	1.00	
N		24.40				SJ		N	20	N		ch,ca			3	PL	17	5	1.00	
N		24.51				SJ		N	28	N		ch,hbk			5	PL	20	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		24.95				SJ		N	42	N		ch			5	PL	18	5	1.50	
		25.73				SJ		358	60			ch,si			3	PL	12	5	2.00	
N		26.41				SJ		N	87	N		none			3	PL	21	6	0.75	
can't measure			**26.7m - 29.7m**																	
N		26.90				SJ		N	78	N		ch			1	PL	16	6	1.00	
N		27.00				SJ		N	62	N		ch			3	PL	19	6	1.00	
N		27.38				SJ		N	70	N		ch,ca			3	PL	18	6	1.00	
N		27.46				SJ		N	25	N		ch			5	PL	18	5	2.00	
N		28.10				SJ		N	30	N		ch,ca			3	PL	18	6	1.00	
N		28.41				SJ		N	80	N		none			5	PL	21	6	1.00	
N		28.67				BZ		N	22	N	0.14	si,ch,ca	28.67	28.81	3	PL	9	3	2.00	
		29.43				SJ		290	40			hbk,mi			5	PL	20	6	0.75	
can't measure			**29.7m - 32.7m**																	
N		30.32				SJ		N	39	N		ch,hbk,mi			3	PL	18	6	1.00	
N		30.49				SJ		N	35	N		hbk			5	PL	20	6	1.00	
N		30.56				SJ		N	37	N		hbk,ca,ch			3	UN	18	6	1.00	
N		30.67				SJ		N	30	N		none			1	PL	15	5	0.75	
N		30.87				SJ		N	25	N		ch,ca,mi			3	PL	18	6	1.00	
N		31.05				SJ		N	52	N		ch,ca			3	PL	18	6	1.00	
N		31.16				BZ		N	38	N	0.48	-	31.16	31.64	3	PL	13	6	0.75	
N		31.70				SJ		N	38	N		ch,hbk,ca			3	PL	17	5	1.00	
N		31.76				SJ		N	42	N		ch,ca			3	CU	17	5	1.00	
N		31.88				SJ		N	25	N		ch,hbk			3	PL	17	5	1.50	
N		32.02				SJ		N	40	N		ch			3	PL	17	5	1.50	
N		32.06				SJ		N	58	N		ch,ca			3	PL	18	6	1.00	
N		32.16				SJ		N	26	N		ch,ox			3	PL	17	5	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core (T.Gf output) (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc . Type		BETA Circ. Angle Dip Dir. (measured from bottom of core) (degrees)	ALPHA Dip (measured from bottom of core) (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		32.27				SJ		N	58	N		ch			3	PL	18	6	1.00	
N		32.55				SJ		N	10	N		si			3	PL	14	5	1.50	
can't measure			32.7m - 35.7m																	
N		32.92				SJ		N	25	N		ch,ca			3	PL	18	6	1.00	
N		33.14				SJ		N	35	N		ch,ca			3	CU	18	6	1.00	
N		33.33				SJ		N	25	N		ch			5	IR	17	5	1.00	
N		33.42				BZ		N	80	N	0.13	-	33.42	33.55	5	IR	14	5		
N		33.67				SJ		N	45	N		-			3	PL	18	6	0.75	
N		34.23				SJ		N	55	N		ch			3	PL	18	6	0.75	
N		34.43				SJ		N	45	N		ch,ca			3	PL	18	5	1.00	
N		34.44				SJ		N	20	N		ch,ca			3	PL	18	5	1.00	
N		34.75				SJ		N	20	N		ch,ca			3	PL	18	6	1.00	
N		34.91				SJ		N	30	N		ch,ca			3	PL	18	6	1.00	
N		35.00				SJ		N	30	N		hbk,ch			3	PL	18	6	1.00	
N		35.13				SJ		N	36	N		none			3	PL	18	6	0.75	
N		35.18				SJ		N	54	N		ch			3	PL	18	6	1.00	
N		35.28				SJ		N	45	N		none			5	ST	22	6	0.75	
N		35.51				BZ		N	45	N		ch,hbk			3	PL	17	5	1.00	
can't measure			35.7m - 38.7m																	
N		35.81				SJ		N	64	N		hbk			3	PL	17	5	1.00	
N		35.90				SJ		N	47	N		ch,hbk			3	PL	13	5	1.00	
N		35.97				SJ		N	44	N		ch,ca,hbk			3	PL	16	5	1.00	
N		36.16				SJ		N	25	N		ch,ca,hbk			3	PL	16	5	1.00	
N		36.27				SJ		N	38	N		hbk,ca			3	PL	17	5	1.00	
N		36.38				SJ		N	26	N		hbk,ca			3	PL	17	5	1.00	
N		36.44				SJ		N	20	N		ch,hbk			3	PL	17	5	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core **(T.Gf output)**	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc . Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		36.51				SJ		N	43	N		ch,hbk			3	PL	12	5	1.00	
N		36.54				SJ		N	34	N		hbk			5	PL	16	5	0.75	
N		36.67				SJ		N	22	N		ca,ch,su			3	PL	18	6	0.75	
N		37.24				BZ		N	46	N	0.22	hbk,ch	37.24	37.56	3	PL	12	5	1.00	
N		37.56				SJ		N	20	N		hbk,ch			5	PL	12	5	1.00	
N		37.64				SJ		N	35	N		hbk,ch			5	PL	20	6	1.00	
N		37.92				SJ		N	70	N		ch,ca,hbk			3	PL	18	6	1.00	
N		38.04				SJ		N	48	N		hbk,ca			3	PL	18	6	1.00	
N		38.15				SJ		N	51	N		hbk,ca			3	PL	18	6	1.00	
N		38.62				SJ		N	70	N		ch			3	PL	18	6	1.00	
can't measure			**38.7m - 41.7m**																	
N		38.90				SJ		N	70	N		ch,ca			5	PL	20	6	1.00	
N		38.97				SJ		N	34	N		hbk,ca,ch			3	PL	18	6	1.00	
N		39.03				SJ		N	50	N		ca,hbk			3	PL	18	6	1.00	
N		39.18				SJ		N	55	N		ch,hbk			3	PL	17	6	1.00	
N		39.50				SJ		N	54	N		ch,hbk			3	PL	18	6	1.00	
N		39.69				SJ		N	35	N		hbk			3	PL	18	6	1.00	
N		39.82				SJ		N	49	N		ca,hbk			3	PL	18	6	1.00	
N		39.90				SJ		N	24	N		ca,ch			3	PL	16	5	1.00	
N		40.07				SJ		N	35	N		ch			3	PL	18	6	1.00	
N		40.40				SJ		N	35	N		hbk			3	PL	18	6	1.00	
N		40.42				BZ		N	48	N	0.04	ch			5	PL	10	5	1.00	
N		40.50				SJ		N	60	N		ch			3	PL	12	5	1.00	
N		40.53				SJ		N	22	N		ch			3	PL	13	6	1.00	
N		40.68				SJ		N	60	N		ch,hbk			3	PL	18	6	1.00	
N		40.82				SJ		N	51	N		ca,ox,ch			3	PL	18	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core **(T.Gf output)**	Drill length	Rock Type 1	2	3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. **(measured from bottom of core)**	ALPHA Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		41.00				BZ		N	36	N	0.05	hbk,ca,ch			3	PL	13	6	1.00	
N		41.62				SJ		N	48	N		ca,hbk			3	PL	13	6	0.75	
can't measure			**41.7m - 44.7m**																	
N		42.55				SJ		N	65	N		hbk			3	PL	18	6	1.00	
N		42.90				SJ		N	60	N		hbk			3	PL	18	6	0.75	
N		42.97				SJ		N	22	N		hbk,ch,ca			3	PL	18	6	1.00	
N		43.15				SJ		N	33	N		hbk			3	PL	17	5	1.00	
N		43.53				SJ		N	25	N		hbk			3	PL	18	6	1.00	
N		43.88				SJ		N	48	N		hbk,ca			3	PL	18	6	1.00	
N		43.95				SJ		N	45	N		hbk,ca			5	PL	20	6	1.00	
N		44.28				SJ		N	40	N		hbk,ca			3	PL	18	6	1.00	
N		44.63				SJ		N	15	N		hbk,ch			3	PL	18	6	1.00	
N		44.67				BZ		N	38	N	0.03	hbk,ca			3	PL	13	6	1.00	
can't measure			**44.7m - 47.7m**																	
N		44.70				SJ		N	25	N		hbk			3	PL	12	5	1.00	
N		44.87				SJ		N	33	N		ca,ch			3	PL	18	6	1.00	
N		45.06				SJ		N	50	N		hbk,ca			3	PL	18	6	1.00	
N		45.23				SJ		N	45	N		ca,ch			3	PL	17	5	1.00	
N		45.37				SJ		N	48	N		ca,ch			3	PL	18	6	1.00	
N		45.46				SJ		N	65	N		ca,ch			3	PL	18	6	1.00	
N		45.73				SJ		N	24	N		ch			3	PL	17	5	1.00	
N		45.80				SJ		N	56	N		ca,ch			3	PL	18	6	1.00	
N		46.03				SJ		N	40	N		hbk,ca			3	PL	18	6	1.00	
N		46.24				SJ		N	55	N		hbk			3	PL	18	6	1.00	
N		46.47				SJ		N	45	N		ch			5	PL	15	5	1.50	
N		46.55				SJ		N	50	N		ch			3	PL	18	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		47.04				SJ		150	44			ch,hbk			3	PL	18	6	1.00	
		47.42				SJ		310	56			ca			5	IR	20	6	0.75	
can't measure			**47.7m - 50.7m**																	
FO		47.83				SJ		330	40			ch			3	PL	17	6	1.00	
FO		48.07				SJ		80	52			ch,ca			5	PL	20	6	1.00	
FO		48.16				SJ		10	45			ch,ca			3	PL	18	6	1.00	
FO		48.36				BZ		190	60		0.02	ch,ca,ox			3	CU	18	6	1.00	
N		48.55				SJ		N	45	N		ch,ca,hbk			3	PL	18	6	1.00	
N		48.59				SJ		N	15	N		ox,ch,ca			3	PL	18	6	1.00	
N		48.63				SJ		N	28	N		ch,ca,hbk			3	PL	18	6	1.00	
N		48.73				SJ		N	24	N		ch,ca,hbk			3	PL	18	6	1.00	
N		48.82				SJ		N	50	N		ox,hbk			3	CU	17	5	1.00	
N		48.95				SJ		N	54	N		ch,si			1	PL	15	5	1.00	
N		49.02				SJ		N	58	N		ch,ca			3	PL	17	5	1.00	
N		49.06				SJ		N	42	N		ch,hbk			3	PL	18	6	1.00	
N		49.09				SJ		N	40	N		ch			5	PL	19	5	1.00	
N		49.21				BZ		N	10	N	0.08	ch,si	49.21	49.29	3	PL	12	5	1.00	
N		49.70				BZ		N	24	N	0.03	hbk,ch,ca			3	PL	12	5	1.00	
N		49.72				SJ		N	20	N		ch,ca			3	PL	18	6	1.00	
N		49.90				SJ		N	50	N		ch,ca,si			5	CU	19	5	1.00	
N		50.43				SJ		N	75	N		ch			3	PL	18	6	1.00	
N		50.54				SJ		N	35	N		ch,ca			1	PL	16	6	1.00	
N		50.58				BZ		N	51	N	0.03	ch			3	PL	12	5	1.00	
		50.61				SJ		90	45			ch			5	PL	14	5	1.00	
can't measure			**50.7m - 53.7m**																	
FO		50.70				SJ		280	60			ch			3	PL	18	6	1.00	
FO		51.36				SJ		90	62			ch,ca			3	PL	18	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc . Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		51.53				SJ		N	66	N		ch,ca			3	PL	18	6	1.00	
N		51.62				SJ		N	25	N		ch			3	PL	18	6	1.00	
N		51.86				SJ		N	68	N		ch,ca			5	PL	19	5	1.00	
N		51.92				SJ		N	74	N		ch			3	PL	17	5	1.00	
N		52.06				BZ		N	33	N	0.22	ch	52.06	52.28	3	PL	12	5	1.00	
N		52.50				SJ		N	40	N		ch,ca			3	PL	17	5	1.00	
N		52.54				SJ		N	38	N		ca,ch			3	PL	15	3	1.50	
N		52.71				SJ		N	48	N		ch,ox			1	PL	18	6	1.00	
N		52.82				SJ		N	55	N		none			5	PL	20	6	0.75	
N		53.07				SJ		N	40	N		ch,ox,ca			5	PL	19	5	0.75	
N		53.09				SJ		N	52	N		ch,ox,ca			1	PL	16	6	1.00	
N		53.19				SJ		N	52	N		ch			3	PL	17	5	1.50	
N		53.34				SJ		N	58	N		hbk			3	PL	18	6	1.00	
N		53.55				SJ		N	22	N		ch			3	PL	17	5	1.00	
		53.62				SJ		120	45			ch,ca			3	PL	17	5	1.00	
can't measure			**53.7m - 56.7m**																	
N		53.75				SJ		N	40	N		ch,ca			3	PL	18	6	1.00	
N		53.76				BZ		N	46	N	0.12	ch	53.76	53.88	3	PL	12	5	1.00	
N		53.88				SJ		N	48	N		ch			3	PL	12	5	1.00	
N		53.96				SJ		N	40	N		ch,ca			5	IR	19	5	1.00	
N		54.06				SJ		N	56	N		ch,ca			5	PL	18	5	1.00	
N		54.27				SJ		N	50	N		ch			5	PL	19	5	1.50	
N		54.40				BZ		N	90	N	0.17	ch	54.40	54.57	5	IR	15	6	0.75	
N		54.66				SJ		N	40	N		ch,mi			3	PL	17	5	1.00	
N		54.70				SJ		N	45	N		mi,ch,ca			5	PL	20	6	1.00	
N		54.77				FT		N	35	N	0.06	see remark			1	PL	2	1	1.50	11.1
N		55.08				RZ		N	70	N	0.02	hbk			5	UN	19	6	0.75	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Structure Struc . Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		55.30				RZ		N	68	N	0.02	-			5	PL	17	6	0.75	
N		55.62				BZ		N	48	N	0.35	-	55.62	55.97	5	PL	16	5	0.75	
can't measure				**56.7m - 59.7m**																
FO		56.95				SJ		50	38			mi,ch,ca			3	PL	17	5	1.00	
FO		57.00				SJ		270	30			hbk			5	PL	19	5	0.75	
N		57.50				SJ		N	56	N		hbk			5	PL	20	6	0.75	
N		58.32				SJ		N	72	N		hbk			3	PL	17	5	1.00	
N		58.76				SJ		N	42	N		mi,ch,ca			3	PL	18	6	1.00	
N		58.90				BZ		N	50	N	0.05	a,ch,hbk			3	PL	12	5	1.00	
N		59.25				SJ		N	45	N		ca,ch,hbk			1	PL	18	6	1.00	
N		59.32				BZ		N	30	N	0.15	a,ch,hb	59.32	59.47	6	PL	15	5	1.00	
N		59.55				SJ		N	28	N		ch,ca			3	PL	17	5	1.00	
N		59.60				SJ		N	26	N		ch,ca			3	PL	17	5	1.00	
can't measure				**59.7m - 62.7m**																
FO		60.30				SJ		230	45			ca			5	PL	16	5	1.00	
FO		60.37				SJ		60	64			hbk,ca			3	PL	17	6	1.00	
FO		60.53				SJ		90	50			ch			0	PL	15	6	1.00	slickens.
FO		60.70				BZ		160	50		0.20	ch,si,su	60.70	60.90	5	IR	10	3	1.00	
N		61.00				SJ		N	22	N		ch,ca			3	PL	18	6	1.00	
N		61.16				SJ		N	38	N		ca,hbk			5	PL	20	6	1.00	
N		61.27				SJ		N	49	N		ca,hbk			5	PL	20	6	1.00	
N		61.48				SJ		N	35	N		ch			5	PL	20	6	1.00	
N		61.49				SJ		N	40	N		ca			5	PL	20	6	1.00	
N		61.60				BZ		N	36	N	0.14	,ca,su,h	61.60	61.74	5	PL	12	3	1.50	
N		61.90				RZ		N	69	N	0.14	ch,hbk	61.90	62.04	5	PL	12	3	1.00	
can't measure				**62.7m - 65.55m**																

			Rock Type			Structure														
Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		62.75				SJ		N	60	N		ca			3	CU	18	6	1.00	
N		63.30				SJ		N	52	N		ca,ch			3	PL	18	6	1.00	
N		63.89				SJ		N	65	N		hbk,ch,ca			3	PL	18	6	1.00	
N		64.04				SJ		N	46	N		hbk,ch,ca			3	PL	18	6	1.00	
N		64.40				SJ		N	50	N		hbk,ch,ca			3	PL	18	6	1.00	
N		64.72				SJ		N	47	N		ca,ch			1	PL	17	6	1.00	
N		65.42				SJ		N	42	N		ca,ch			3	PL	18	5	1.00	
N		65.46				SJ		N	40	N		ca,ch			3	CU	16	5	1.50	
can't measure			**65.55m - 68.39m**																	
N		65.80				SJ		N	68	N		ca,ch,hbk			3	PL	17	5	1.00	
N		65.83				SJ		N	56	N		ca,ch,hbk			3	PL	17	5	1.00	
N		65.99				SJ		N	36	N		ca,ch,hbk			5	PL	20	6	1.00	
N		66.38				SJ		N	34	N		ca,ch,hbk			3	PL	18	6	1.00	
N		67.05				SJ		N	37	N		ca,ch			3	PL	18	6	1.00	
N		67.11				SJ		N	61	N		ca,ch,hbk			3	PL	18	6	1.00	
N		67.47				SJ		N	46	N		ca,ch			3	PL	18	6	1.00	
N		67.62				BZ		N	41	N	0.02	ch			5	PL	14	5	1.00	
N		67.92				BZ		N	44	N	0.07	ch,ca			3	PL	12	5	1.00	
N		67.98				SJ		N	24	N		ch,ca,hbk			3	PL	12	5	1.00	
N		68.02				SJ		N	18	N		ch,ca			3	PL	12	5	1.50	
N		68.07				SJ		N	20	N		su,ch,ca			3	PL	17	5	1.00	
N		68.17				SJ		N	32	N		ch			3	PL	17	5	1.00	
can't measure			**68.39m - 70.40m**																	
N		68.38				BZ		N	26	N	0.18	ch	68.38	68.56	3	UN	12	5	1.00	
N		68.68				SJ		N	25	N		ch,ca			3	PL	18	6	1.00	
N		69.05				SJ		N	20	N		ch			3	PL	17	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core **(T.Gf output)**	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)**	**ALPHA** Dip **(measured from bottom of core)**	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		69.12				SJ		N	38	N		none			5	PL	19	6	0.75	
N		69.25				SJ		N	36	N		ch,su			0	PL	14	6	1.00	
N		69.30				SJ		N	36	N		ch			1	PL	16	6	1.00	
		69.41				SJ		50	18			ch			3	PL	18	6	1.00	
		69.58				SJ		160	20			ch,su,ca			3	PL	17	5	1.00	
		70.06				SJ		270	46			hbk,ca			3	PL	18	6	1.00	
		70.10				SJ		70	20			ch,ca			3	PL	18	6	1.00	
		70.25				SJ		260	20			ca,hbk			3	PL	18	6	1.00	
can't measure			**70.40m - 71.7m**																	
FO		70.51				SJ		25	50			hbk			3	PL	17	5	1.00	
FO		70.85				SJ		170	13			ch			3	PL	15	5	1.50	
FO		71.42				SJ		280	32			ch			3	PL	17	5	1.00	
FO		71.48				SJ		260	28			ch,ca			5	PL	20	6	1.00	
can't measure			**71.7m - 74.38m**																	
FO		71.82				SJ		145	15			ch,hbk			3	PL	18	6	1.00	
FO		72.60				SJ		140	16			ch,hbk			5	PL	20	6	1.00	
FO		72.71				SJ		20	42			ch			3	PL	18	6	1.00	
FO		72.50	**Fel**			IN		140	20		0.01	fel				PL				
FO		72.65	**Fel**			IN		can't measu	30		0.01	fel				PL				
FO		72.67	**Fel**			IN		can't measu	50		0.01	fel				PL				
		73.07				SJ		300	45			ch,ca			3	PL	18	6	1.00	
FO		73.21				SJ		135	34			ch,hbk			0	PL	6	3	4.00	
		73.47				SJ		340	30			su,ch			5	CU	20	6	1.00	
		73.58				SJ		230	48			ch			5	UN	20	6	1.00	
		73.73				SJ		40	81			ca			5	PL	20	6	1.00	
		73.76				SJ		70	75			ch,hbk			3	PL	18	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc . Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		73.97				SJ		100	42			ch,ca			3	PL	17	5	1.00	
		73.98				RZ		130	40		0.12	si,ch	73.95	74.07	3	PL	10	3	4.00	
N		74.15				BZ		N	50	N	0.23	si,ch	74.15	74.38	3	PL	6	3	4.00	
can't measure			**74.38m - 75.7m**																	
N		74.44				SJ		N	75	N		ch,ca			3	PL	18	6	1.00	
N		74.50				SJ		N	17	N		ch			3	PL	18	6	1.00	
N		74.91				SJ		N	81	N		ch			1	PL	16	6	1.00	
N		75.10				SJ		N	50	N		none			3	PL	20	6	0.75	
N		75.29				SJ		N	30	N		ch			5	PL	19	5	1.00	
N		75.50				BZ		N	22	N	0.20	ch,ca	75.50	75.70	3	PL	10	3	1.50	
can't measure			**75.7m - 77.14m**																	
N		75.70				BZ		N	20	N	0.11	ch	75.70	75.81	3	PL	12	5	1.00	
N		75.81				RZ		N	60	N	0.21	ch	75.81	76.02	5	IR	14	5	1.00	
N		76.20				SJ		N	26	N		ch			3	PL	17	5	1.00	
N		76.36	**Fel**			IN		N	54	N	0.02	fel				PL				
N		76.43				RZ		N	26	N	0.06	ch			3	PL	12	5	1.00	
N		76.71				SJ		N	78	N		ch			3	PL	17	5	1.00	
		76.96				SJ		160	16			none			3	PL	18	6	1.00	
can't measure			**77.14m - 77.7m**																	
		77.49				SJ		130	70			ch,ca			3	PL	17	6	1.00	
		77.70				SJ		290	38			ch,ca,hbk			3	PL	17	6	1.00	
can't measure			**77.7m - 80.7m**																	
N		77.94				SJ		N	35	N		ch,ca,hbk			3	PL	17	5	1.00	
N		78.27				SJ		N	45	N		ch,ca			5	PL	20	6	1.00	
N		79.25				SJ		N	30	N		ch,ca			3	PL	18	6	1.00	
N		79.47				SJ		N	52	N		ch,ca			5	PL	19	5	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc . Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		79.56	**Fel**			IN		N	30	N	0.01	fel				PL				
N		79.65	**Fel**			IN		N	30	N	0.01	fel				PL			.	
N		79.81				SJ		N	25	N		none			5	PL	20	6	0.75	
		80.07				SJ		70	72			ch			3	PL	18	6	1.00	
can't measure			**80.7m - 83.7m**																	
FO		81.07				SJ		310	62			ch			3	PL	18	6	1.00	
FO		81.27				SJ		300	67			ch,hbk			3	PL	17	5	1.00	
FO		81.34				SJ		310	58			ch,ca			3	PL	17	5	1.00	
FO		81.71				SJ		290	60			ch,su			3	PL	18	6	1.00	
FO		82.12				SJ		290	74			ch,ca,hbk			3	PL	18	6	1.00	
FO		82.24				SJ		310	65			ch,ca,hbk			3	PL	18	6	1.00	
FO		82.36				SJ		290	70			none			3	PL	20	6	0.75	
		82.90				SJ		10	63			ch,ca			3	PL	18	6	1.00	
		83.38				HJ		80	28			ch			3	PL	18	6	1.00	
can't measure			**83.7m - 86.7m**																	
N		84.42				SJ		N	65	N		ch,ca,hbk			3	PL	17	6	1.00	
N		85.41				SJ		N	49	N		none			5	IR	22	6	0.75	
N		85.82				SJ		N	62	N		ca,ch			3	PL	18	6	1.00	
N		85.97				SJ		N	70	N		ca,ch			3	PL	18	6	0.75	
N		86.12				SJ		N	60	N		ca,ch			3	PL	18	6	0.75	
can't measure			**86.7m - 89.7m**																	
		86.70				MZ					0.05									
		87.49				SJ		350	57			ca,ch			3	PL	18	6	1.00	
		88.35				SJ		320	45			ch,su			5	ST	20	6	1.00	
		88.46	**Fel**			IN		170	50		0.01	fel								
		88.66				SJ		130	48			hbk			3	PL	18	6	0.75	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		88.85				SJ		330	55			ca,he,ch			3	PL	18	6	1.00	
40				**89.7m - 92.7m**																
		90.23				SJ		340	46			ch,ca,hbk			3	PL	18	6	1.00	
		90.73				SJ		180	74			ch,ca			3	PL	18	6	1.00	
		90.92				SJ		20	45			mi,hbk			3	CU	18	6	1.00	
		91.62				MZ					0.05									
		91.63				SJ		125	32			mi,ca,ch			5	PL	20	6	1.00	
		92.41				SJ		15	42			none			5	PL	22	6	0.75	
		92.43				SJ		180	66			ca,hbk			3	PL	18	6	1.00	
can't measure				**92.7m - 95.7m**																
FO		92.82				SJ		310	37			ch			3	PL	18	6	1.00	
FO		93.12				MZ					0.50		93.12	93.62						
FO		93.17				SJ		320	30			ch,ca			3	PL	18	6	1.50	
N		93.19				SJ		N	45	N		ca,ch,hbk			5	PL	19	5	1.00	
		94.16				MZ					0.49		94.16	94.65						
		93.62				SJ		250	12			ca,ch,hbk			3	PL	18	6	1.00	
		94.26				SJ		250	45			he,su,ch,ca			5	PL	18	6	1.00	
		94.37				SJ		230	72			ca,ch,he			3	PL	18	6	1.00	
		94.49				SJ		150	70			ca,ch,he			3	PL	18	6	1.00	
		94.62				SJ		260	58			ca,ch,he			5	IR	20	6	1.00	
		94.75				SJ		350	40			hbk,ch			1	PL	16	6	1.00	
		94.88				SJ		150	78			ch,ca			3	IR	18	6	1.00	
		95.04				SJ		80	55			ca,ch,hbk			5	PL	18	6	1.00	
		95.24				SJ		200	64			ch			3	PL	17	5	1.00	
		95.33				SJ		100	36			ch,ca,he			3	PL	18	6	1.00	
can't measure				**95.7m - 98.7m**																

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		95.73				SJ		N	54	N		ch			1	PL	15	5	1.00	
N		96.01				SJ		N	39	N		ch,hbk			1	PL	15	5	1.00	
N		96.64				SJ		N	39	N		he,hbk,ch,ca			3	CU	18	6	1.00	
N		97.06				MZ					0.35		97.06	97.41						
N		97.19				SJ		N	41	N		ch,he,su			5	PL	19	5	1.00	
		97.32				SJ		220	28			ch,ca			5	PL	18	6	1.00	
		97.71				SJ		220	66			ca,hbk,mi			3	PL	18	6	1.00	
		97.96				SJ		240	24			ch			3	PL	18	6	1.00	
		97.98				SJ		80	65			ch,mi,ca			3	PL	17	5	1.00	
		98.17				SJ		240	36			ch,ca			3	PL	17	5	1.00	
can't measure			**98.7m - 101.7m**																	
		101.43				SJ		188	57			hbk			5	PL	23	6	1.00	
can't measure			**101.7m - 104.7m**																	
FO		102.20				SJ		357	16			hbk,ch,ca			6	IR	22	6	1.00	
FO		102.35				SJ		188	43			ch			5	PL	21	6	1.00	
FO		103.27				SJ		40	28			si,ch			5	IR	13	6	3.00	
FO		103.33				SJ		278	64			hbk,ch,mi			1	PL	12	6	1.00	
FO		103.79				SJ		252	38			ch			5	PL	16	6	1.00	
FO		104.19				SJ		128	53			ch			5	PL	23	6	1.00	
can't measure			**104.7m - 107.7m**																	
FO		104.77				SJ		292	16			hbk			3	PL	14	6	3.00	
FO		105.50				SJ		182	20			ch			3	PL	17	6	1.00	
FO		105.90				BZ		178	48		0.03									
N		105.93				SJ		N	57	N		hbk,ch			5	PL	0	6	1.00	
N		106.00				SJ		N	47	N		hbk,ch,ca			3	PL	16	6	1.00	
N		106.02				SJ		N	37	N		hbk,ch,ca			5	PL	19	6	1.00	

Degrees error across runs or Back Oriented (BO)	Angle to Top face of core (T.Gf output)	Drill length	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		BETA Circ. Angle Dip Dir. (measured from bottom of core)	ALPHA Dip (measured from bottom of core)	N	Thickness	Filling	FROM	TO	Roughness	Shape	Condition	Weath Grade	Joint Alteration	REM#
Degrees	(degrees)	(m)						(degrees)	(degrees)		(m)	(Type	(m)	(m)	(0-6)	(1-5)	(0-30)	(1-6)	(0-20)	
N		106.25				SJ		N	20	N		hbk,ch,ca			3	PL	14	6	1.00	
N		106.56				SJ		N	29	N		ch,hbk			5	ST	21	6	1.00	
N		106.64				SJ		N	20	N		ch,hbk			3	PL	17	6	1.00	
N		106.70				BZ		N		N	0.40	-	106.70	107.10						
		107.28				SJ		12	45			ch,hbk			3	PL	14	6	1.00	
		107.28				SJ		135	45			ch,hbk			3	PL	14	6	1.00	
		107.55				SJ		162	47			hbk,ch,mi			5	PL	20	5	1.00	
		107.65				MZ					0.05									
		107.70				SJ		320	40			ch			0	PL	9	6	1.00	
can't measure			**107.7m - 110.7m**																	
		107.70				SJ		258	65			ch,su			3	PL	16	6	1.00	
		108.20				SJ		296	23			he,ca			5	PL	18	5	1.00	
		108.26				SJ		278	26			hbk,ca			5	PL	21	6	1.00	
		109.24				SJ		273	37			hbk,he			3	PL	18	5	1.00	
		109.85				SJ		228	23			hbk			3	PL	20	6	1.00	
can't measure			**110.7m - 113.7m**																	
FO		111.69				SJ		30	23			ch,ca,hbk			3	UN	19	6	1.00	
FO		113.16				SJ		280	25			ch,ca,si			3	PL	0	6	4.00	
FO		113.16				MZ					0.10									
		113.33				SJ		48	27			ch,ca			3	ST	13	6	1.00	
		113.41				SJ		208	39			hbk			5	PL	22	6	1.00	
15			**113.7m - 116.7m**																	
		114.06				SJ		262	50			ox,hbk			5	PL	20	5	1.00	
		114.86				SJ		90	35			ch,ca,hbk			5	PL	20	6	1.00	
		114.95				SJ		240	42			ch,ca,he			5	PL	20	5	1.00	
		115.14				SJ		4	23			ch,ca			3	PL	18	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Structure: Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		115.16				SJ		72	30			ch,ca,hbk			3	PL	21	6	1.00	
		115.26				SJ		92	35			ox,hbk			3	ST	19	5	1.00	
		115.43				SJ		308	34			ca,hbk			3	PL	19	6	1.00	
		115.51				SJ		50	49			hbk			3	PL	21	6	1.00	
		115.84				SJ		80	33			ox,ca,hbk			3	PL	20	5	1.00	
		116.24				SJ		232	37			mi,ch,ca			3	PL	18	6	1.00	
		116.62				SJ		63	33			he,hbk,ca			3	PL	20	5	1.00	
		116.66				SJ		244	50			ca			5	PL	21	6	1.00	
26			**116.7m - 119.7m**																	
		117.08				SJ		4	31			ch,ca,ox			1	PL	14	5	1.00	
		117.14				SJ		14	31			si,ox,ch,ca			1	PL	14	5	1.00	
		117.79				SJ		82	27			ch			3	PL	17	6	1.00	
		118.07				SJ		113	33			si,ch,ca			3	PL	14	6	1.00	
194			**119.7m - 122.7m**																	
		119.95				BD		93	43			-								
		120.53				BD		67	50			-								
		120.58				BD						-								
		120.72				SJ		268	22			si,ca,ch,mi			3	PL	17	6	1.00	
		120.84				SJ		195	41			ch,si,hbk,ca			1	PL	12	6	1.50	
		121.09				SJ		258	42			ch,ca			1	PL	12	6	1.50	
		121.20				SJ		264	7			ch,ca			1	PL	12	6	1.50	
		121.97				SJ		2	57			ch,ca			1	PL	15	6	1.00	
		122.23				SJ		52	8			ch,ca			1	PL	15	6	1.00	
can't measure			**122.7m - 125.32m**																	
		122.91				BZ					0.18		122.91	123.09						
		124.72				SJ		312	34			si,ch,su,ca			5	PL	16	6	1.00	

			Rock Type			Structure														
Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	1	2	3	Struc. Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		125.32				SJ		4	40			ch,si			1	PL	12	6	1.00	
can't measure			**125.32m - 128.48m**																	
		125.34				SJ		168	40			ch,ox			1	PL	11	5	1.00	
		125.60				BD		290	30			-								
		126.66				SJ		273	40			ch,si			1	PL	12	6	1.00	
		126.66				SJ		130	25			ch,si			1	PL	12	6	1.00	
		126.84				SJ		62	23			ch,si			1	PL	10	6	4.00	
310			**128.48m - 131.7m**																	
		129.00				SJ		73	26			mi,hbk			5	PL	22	6	1.00	
		130.96				SJ		23	41			ch,ca			3	PL	19	6	1.00	
can't measure			**131.7m - 134.7m**																	
		132.17				SJ		300	63			ox,hbk			5	PL	19	5	0.75	
		132.66				SJ		15	22			ch,hbk			5	UN	21	6	1.00	
		132.98				SJ		310	55			mi			3	PL	19	6	1.00	
		133.10				SJ		215	0			hbk,hbl			5	UN	21	6	1.00	
		133.23				SJ		115	45			mi			3	PL	19	6	1.00	
		133.43				SJ		107	50			he,ca,hbk,ox			3	PL	16	5	1.00	
		134.24				MZ		23	37		0.02	-								
		134.42				MZ		0	18		0.02	-								
		134.50				MZ					0.20	-	134.50	134.70						
		134.50				RZ					0.08	-								
N		134.58				SJ		N	34	N		si,ch			1	PL	0	6	1.00	
can't measure			**134.7m - 137.7m**																	
N		134.70				SJ		N	74	N		mi,si,ch			3	PL	14	6	1.00	
N		134.87				SJ		N	44	N		ox,hbk			3	PL	13	5	1.00	
N		135.03				SJ		N	43	N		cl			1	PL	23	6	1.00	

Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	2	3	Struc . Type		**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
N		135.20				SJ		N	57	N		ch,ox,ca,si			3	PL	16	5	1.00	
N		135.23				SJ		N	28	N		ch,ox,si			1	IR	12	5	3.00	
N		135.46				SJ		N	18	N		ch,si			3	PL	11	5	4.00	
N		135.81				SJ		N	18	N		ch,ca			0	PL	11	6	1.50	Slicken.
		135.94				SJ		170	72			si,ox,mi			0	PL	10	5	1.00	Slicken.
		135.98				SJ		150	70			he,ca,si,hbk,ox			5	PL	15	5	1.00	
		136.52				SJ		172	16			hbk,ca,mi			3	PL	16	6	1.00	
		137.08				SJ		77	64			hbk,ca			5	PL	21	6	0.75	
210			**137.7m - 140.7m**																	
SO		139.32				SJ		206	30			hbk			3	PL	20	6	1.00	
		139.68				SJ		346	38			hbk,ca			3	PL	19	6	1.00	
		139.72				SJ		218	30			hbk,ca			3	PL	19	6	1.00	
		140.66				SJ		227	37			hbk,ch,ca			3	PL	19	6	1.00	
		141.06				SJ		220	35			hbk,ch,ca			3	PL	19	6	1.00	
can't measure			**140.7m - 143.7m**																	
FO		141.10				MZ		228	32		0.30	-	141.10	141.40						
FO		141.23				SJ		193	27			ch,ca,si			5	PL	17	6	3.00	24.1
FO		141.23				VN		193	27			ch,ca								
		142.50				SJ		0	39			hbk,ch			3	PL	19	6	1.00	
		142.68				SJ		84	47			hbk			3	CU	20	6	1.00	
		143.18				SJ		176	12			ch,ca			3	IR	19	6	1.00	
		143.41				MZ					0.29		143.41	143.70						
		143.49				HJ		94	28			ca				PL				24.2
28			**143.7m - 146.7m**																	
		143.70				MZ					0.05		143.70	143.75						
		143.70				SJ		16	46			ch,ca,su,ox,si			3	PL	14	5	1.00	24.3

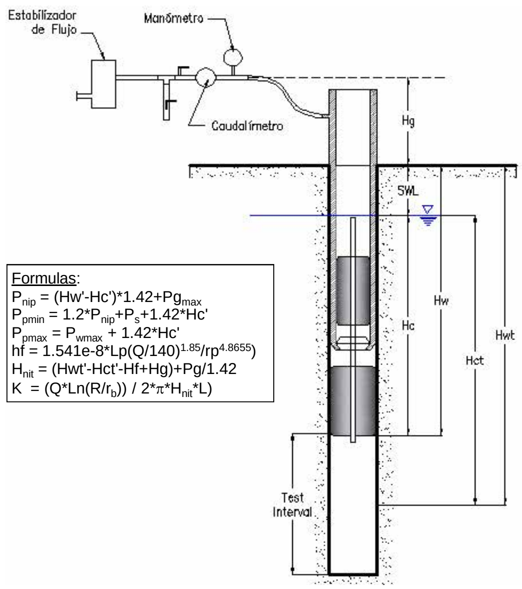
Degrees error across runs or Back Oriented (BO) Degrees	Angle to Top face of core **(T.Gf output)** (degrees)	Drill length (m)	Rock Type 1	Rock Type 2	Rock Type 3	Struc. Type	Structure	**BETA** Circ. Angle Dip Dir. **(measured from bottom of core)** (degrees)	**ALPHA** Dip **(measured from bottom of core)** (degrees)	N	Thickness (m)	Filling (Type	FROM (m)	TO (m)	Roughness (0-6)	Shape (1-5)	Condition (0-30)	Weath Grade (1-6)	Joint Alteration (0-20)	REM#
		143.70				VN		16	46			ch,ca,su								
		144.96				MZ		345	24		0.15		144.96	145.11						
		145.00				SJ		18	38			ch,ca			3	PL	17	6	1.00	
		145.33				SJ		292	67			ch,ca			3	PL	20	6	1.00	
		145.52				SJ		338	44			ch,ca			3	PL	19	6	1.00	
		146.23				SJ		280	61			hbk,ch,ca			3	PL	19	6	1.00	
		146.53				SJ		87	28			hbk			3	PL	20	6	1.00	
		146.62	**DB**			IN		248	46		0.04	-								
		146.63				SJ		250	46			hbk,ca			3	PL	20	6	0.75	
260			**146.7m - 149.7m**																	
		146.74				SJ		230	51			ch,ca			3	PL	19	6	1.00	
		146.91				SJ		236	54			ch,ca			3	PL	19	6	1.00	
		146.91				SJ		216	15			ch,ca			3	PL	20	6	1.00	
		147.43				BD		130	26			-								
		147.66				BD		108	30			-								
		148.02				SJ		330	28			ch,ca			3	PL	19	6	1.00	
		148.10				SJ		260	54			hbk,ca			3	PL	20	6	1.00	
		148.18				SJ		246	36			ch,ca			3	PL	19	6	1.00	
		148.40				SJ		254	50			hbk,ca			3	PL	20	6	1.00	
		149.00				BD		124	26			-								

Appendix B – Packer Test Analyses

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	0.00	**To**	14.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	1
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	14.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

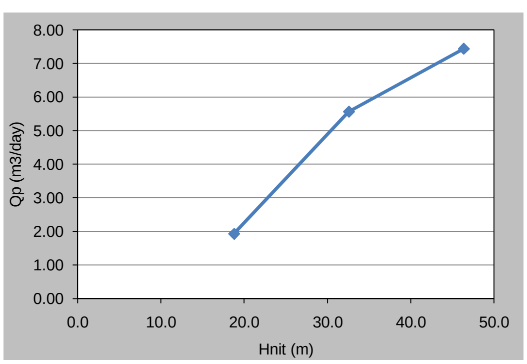
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	0.00	m
Hwt	Water column over test midpoint	7.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	0.00	m
Hct	Hydrostatic head on test midpoint	2.00	m
Hw'	Water column over packer (corrected)	0.00	m
Hwt'	Water column over test midpoint (corrected)	7.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	0.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	2.00	m
L	Length of test section	14.00	m
Lp	Length of discharge pipe	0.00	m
R	Radius of influence	14.00	m

Packer Pressures

Pnip	Net injection pressure at packer	100	psi
Ppmin	Minimum packer inflation pressure	180	psi
Ppmax	Maximum packer inflation pressure	500	psi

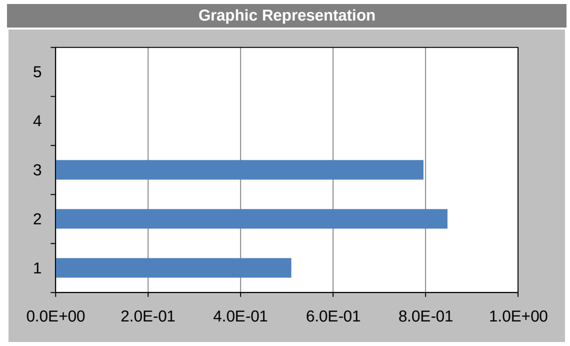
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	2.23	3.97	5.07		
2	2.20	3.94	5.03		
3	2.31	3.82	5.30		
4	1.31	3.88	5.20		
5	0.00	3.79	5.20		
6	0.00	3.79			
7					
8					
9					
10					
Q_P (lit/min)	1.34	3.86	5.16		
Q_P (m^3/day)	1.93	5.56	7.44		
Hf (m)	0.0E+00	0.0E+00	0.0E+00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	6.6E-03	1.1E-02	1.0E-02		
K (cm/sec)	7.7E-06	1.3E-05	1.2E-05		
UL	5.1E-01	8.5E-01	8.0E-01		
K Sensitivity :		2.00E-05 (m/day)		2.32E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



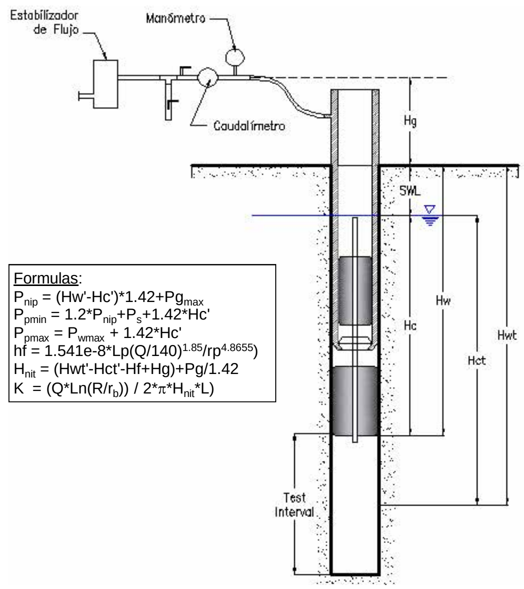
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	14.00	**To**	26.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	26.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

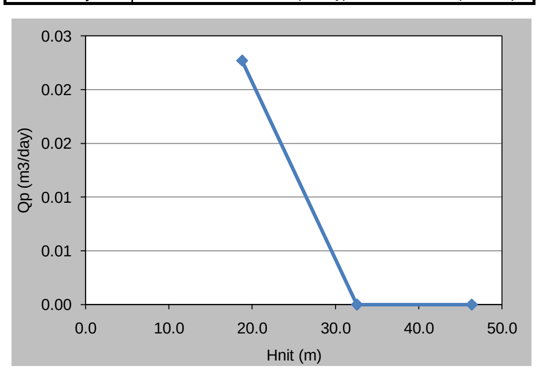
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	14.00	m
Hwt	Water column over test midpoint	20.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	9.00	m
Hct	Hydrostatic head on test midpoint	15.00	m
Hw'	Water column over packer (corrected)	14.00	m
Hwt'	Water column over test midpoint (corrected)	20.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	9.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	15.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	14.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	201	psi
Ppmax	Maximum packer inflation pressure	513	psi

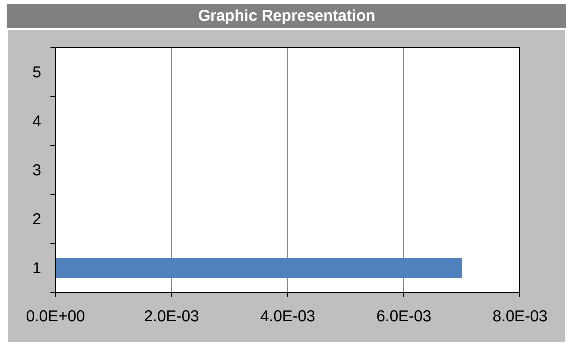
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.00		
2	0.04	0.00	0.00		
3	0.00	0.00	0.00		
4	0.02	0.00	0.00		
5	0.02	0.00	0.00		
6	0.02	0.00			
7					
8					
9					
10					
Q_P (lit/min)	0.02	0.00	0.00		
Q_P (m^3/day)	0.02	0.00	0.00		
Hf (m)	2.6E-09	0.0E+00	0.0E+00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	8.9E-05	0.0E+00	0.0E+00		
K (cm/sec)	1.0E-07	0.0E+00	0.0E+00		
UL	7.0E-03	0.0E+00	0.0E+00		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

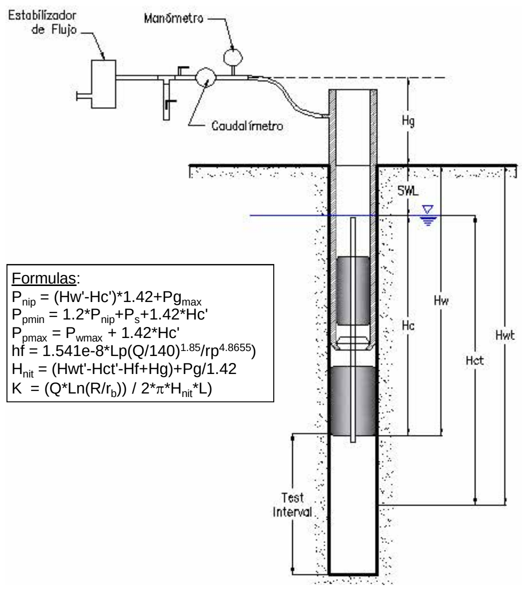
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 26.00	**To** 38.00	**Borehole :** CH-1		
Area:	**Date :**	**Start:**	**Test Number :** 3		
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 38.00		
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**		



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

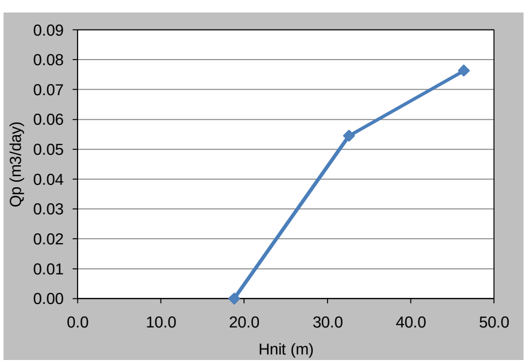
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	°
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	26.00	m
Hwt	Water column over test midpoint	32.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	21.00	m
Hct	Hydrostatic head on test midpoint	27.00	m
Hw'	Water column over packer (corrected)	26.00	m
Hwt'	Water column over test midpoint (corrected)	32.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	21.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	27.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	26.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	218	psi
Ppmax	Maximum packer inflation pressure	530	psi

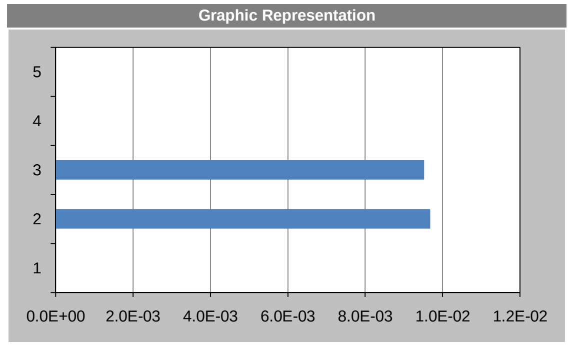
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.04	0.08		
2	0.00	0.04	0.04		
3	0.00	0.04	0.08		
4	0.00	0.04	0.04		
5	0.00	0.04	0.04		
6	0.00	0.04			
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.04	0.05		
Q_P (m^3/day)	0.00	0.05	0.08		
Hf (m)	0.0E+00	2.5E-08	4.6E-08		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	1.2E-04	1.2E-04		
K (cm/sec)	0.0E+00	1.4E-07	1.4E-07		
UL	0.0E+00	9.7E-03	9.5E-03		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



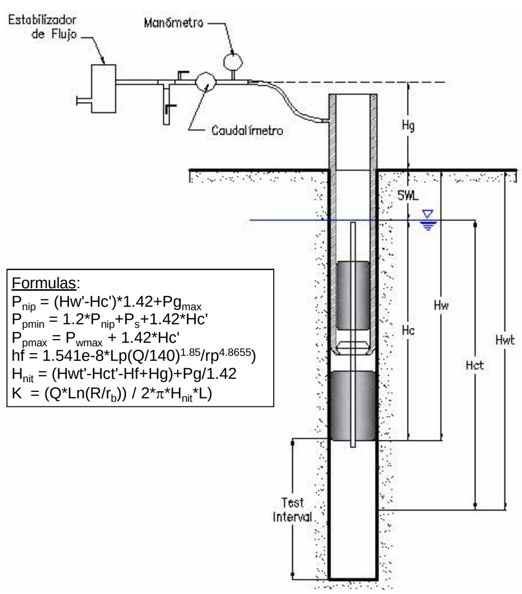
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 38.00	**To** 50.00	**Borehole :**	CH-1
Area:	**Date :**	**Start:**	**Test Number :**	4
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	50.00
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L$

Nota 1: If hole is dry enter SWL = depth.

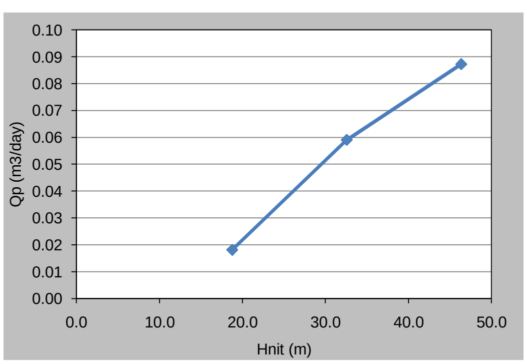
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	38.00	m
Hwt	Water column over test midpoint	44.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	33.00	m
Hct	Hydrostatic head on test midpoint	39.00	m
Hw'	Water column over packer (corrected)	38.00	m
Hwt'	Water column over test midpoint (corrected)	44.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	33.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	39.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	38.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	235	psi
Ppmax	Maximum packer inflation pressure	547	psi

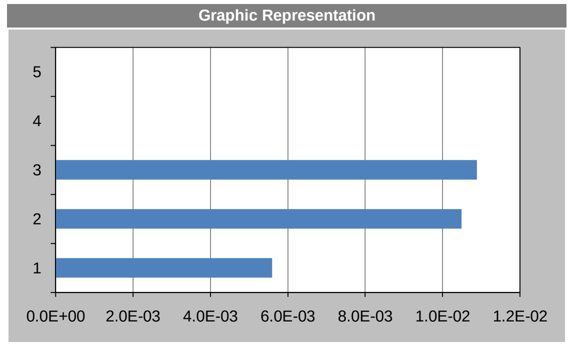
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.04	0.08		
2	0.04	0.04	0.04		
3	0.00	0.04	0.08		
4	0.02	0.06	0.06		
5	0.02	0.04	0.06		
6	0.00	0.04			
7					
8					
9					
10					
Q_P (lit/min)	0.01	0.04	0.06		
Q_P (m^3/day)	0.02	0.06	0.09		
Hf (m)	4.7E-09	4.2E-08	8.6E-08		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	7.1E-05	1.3E-04	1.4E-04		
K (cm/sec)	8.2E-08	1.5E-07	1.6E-07		
UL	5.6E-03	1.0E-02	1.1E-02		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



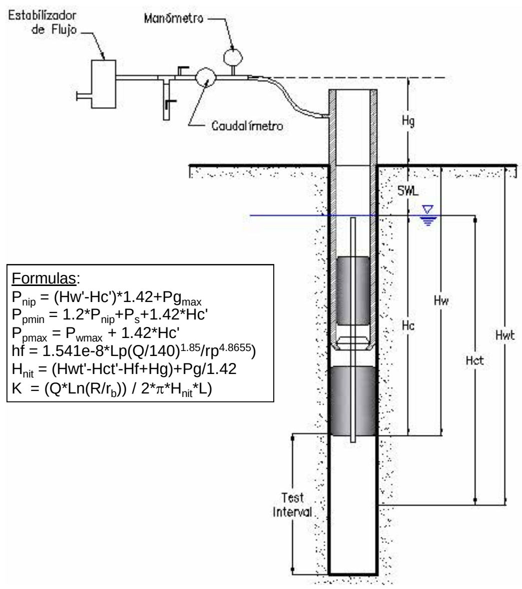
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 50.00	**To** 62.00	**Borehole :**	CH-1
Area:	**Date :**	**Start:**	**Test Number :**	5
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	62.00
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

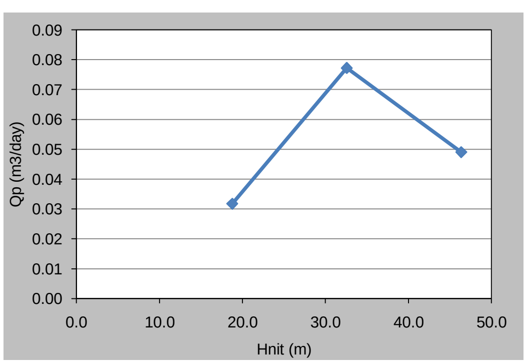
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	50.00	m
Hwt	Water column over test midpoint	56.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	45.00	m
Hct	Hydrostatic head on test midpoint	51.00	m
Hw'	Water column over packer (corrected)	50.00	m
Hwt'	Water column over test midpoint (corrected)	56.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	45.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	51.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	50.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	252	psi
Ppmax	Maximum packer inflation pressure	564	psi

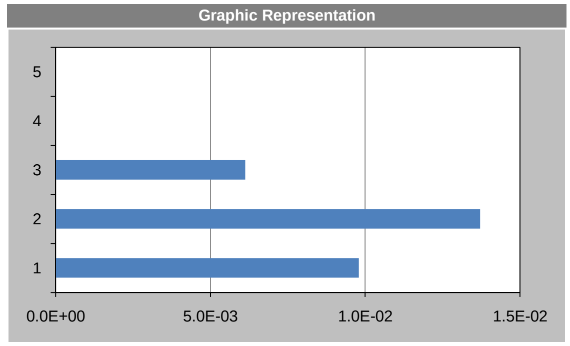
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.04	0.08	0.04		
2	0.00	0.04	0.08		
3	0.00	0.08	0.04		
4	0.02	0.04	0.00		
5	0.04	0.04	0.02		
6	0.04	0.06			
7					
8					
9					
10					
Q_P (lit/min)	0.02	0.05	0.03		
Q_P (m^3/day)	0.03	0.08	0.05		
Hf (m)	1.8E-08	9.0E-08	3.9E-08		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.2E-04	1.7E-04	7.7E-05		
K (cm/sec)	1.4E-07	2.0E-07	9.0E-08		
UL	9.8E-03	1.4E-02	6.1E-03		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

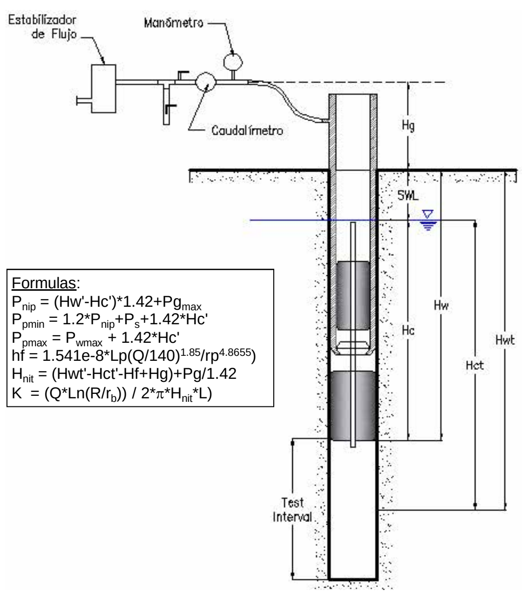
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	62.00	**To**	74.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	74.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

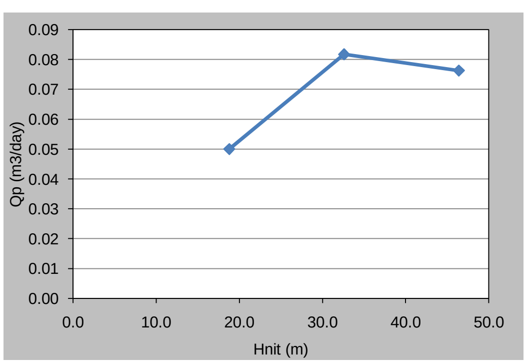
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	62.00	m
Hwt	Water column over test midpoint	68.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	57.00	m
Hct	Hydrostatic head on test midpoint	63.00	m
Hw'	Water column over packer (corrected)	62.00	m
Hwt'	Water column over test midpoint (corrected)	68.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	57.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	63.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	62.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	269	psi
Ppmax	Maximum packer inflation pressure	581	psi

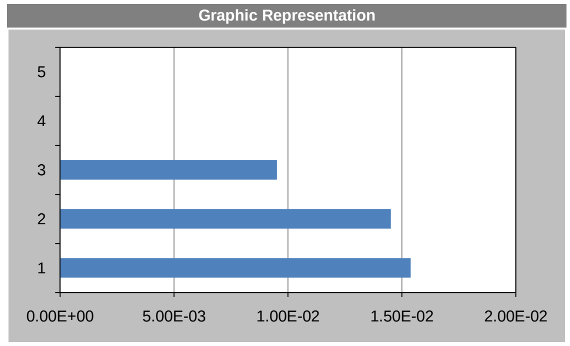
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.04	0.08	0.08		
2	0.04	0.08	0.08		
3	0.04	0.08	0.08		
4	0.04	0.06	0.04		
5	0.06	0.06	0.00		
6	0.00	0.00			
7					
8					
9					
10					
Q_P (lit/min)	0.03	0.06	0.05		
Q_P (m^3/day)	0.05	0.08	0.08		
Hf (m)	5.01E-08	1.25E-07	1.10E-07		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.9E-04	1.8E-04	1.2E-04		
K (cm/sec)	2.3E-07	2.1E-07	1.4E-07		
UL	1.54E-02	1.45E-02	9.52E-03		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

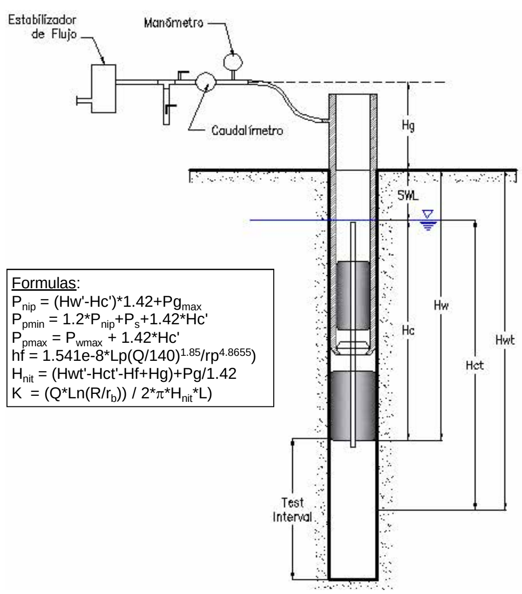
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	74.00	**To**	86.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	7
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	86.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

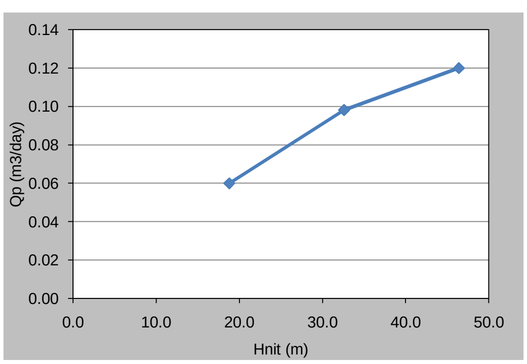
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	74.00	m
Hwt	Water column over test midpoint	80.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	69.00	m
Hct	Hydrostatic head on test midpoint	75.00	m
Hw'	Water column over packer (corrected)	74.00	m
Hwt'	Water column over test midpoint (corrected)	80.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	69.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	75.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	74.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	287	psi
Ppmax	Maximum packer inflation pressure	598	psi

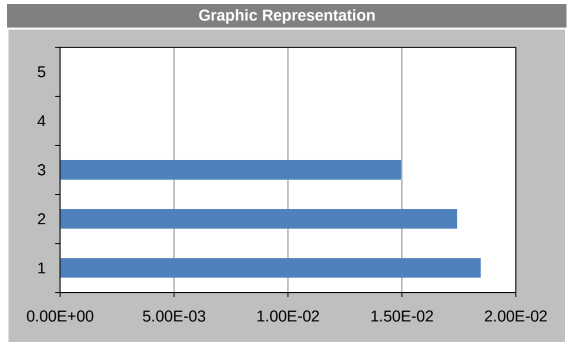
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.08	0.08	0.08		
2	0.04	0.08	0.11		
3	0.04	0.08	0.08		
4	0.02	0.06	0.08		
5	0.04	0.06	0.08		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.04	0.07	0.08		
Q_P (m^3/day)	0.06	0.10	0.12		
Hf (m)	8.38E-08	2.08E-07	3.02E-07		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	2.3E-04	2.2E-04	1.9E-04		
K (cm/sec)	2.7E-07	2.6E-07	2.2E-07		
UL	1.85E-02	1.74E-02	1.50E-02		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

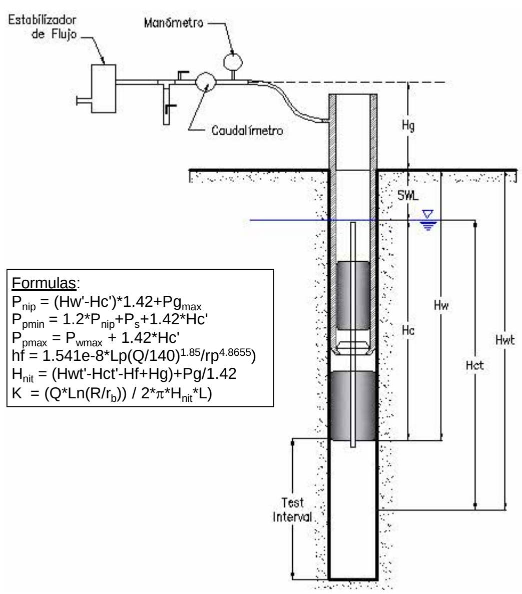
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	86.00	**To**	98.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	8
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	98.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

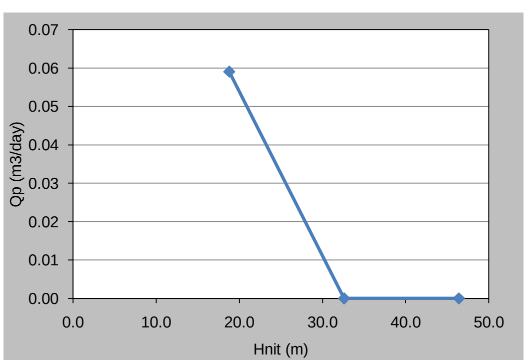
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	86.00	m
Hwt	Water column over test midpoint	92.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	81.00	m
Hct	Hydrostatic head on test midpoint	87.00	m
Hw'	Water column over packer (corrected)	86.00	m
Hwt'	Water column over test midpoint (corrected)	92.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	81.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	87.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	86.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	304	psi
Ppmax	Maximum packer inflation pressure	615	psi

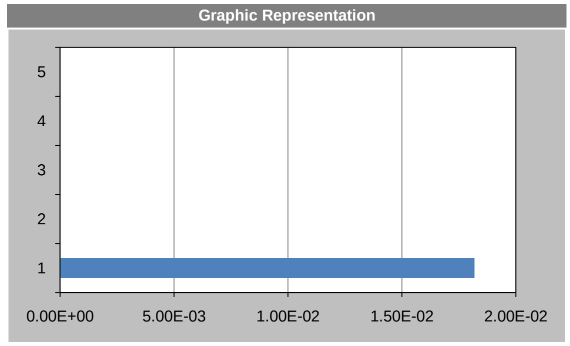
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.04	0.00	0.00		
2	-0.11	0.00	0.00		
3	0.19	0.00	0.00		
4	0.06	0.00	0.00		
5	0.04	0.00	0.00		
6	0.04	0.00	0.00		
7			0.00		
8					
9					
10					
Q_P (lit/min)	0.04	0.00	0.00		
Q_P (m^3/day)	0.06	0.00	0.00		
Hf (m)	9.47E-08	0.00E+00	0.00E+00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	2.3E-04	0.0E+00	0.0E+00		
K (cm/sec)	2.7E-07	0.0E+00	0.0E+00		
UL	1.82E-02	0.00E+00	0.00E+00		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



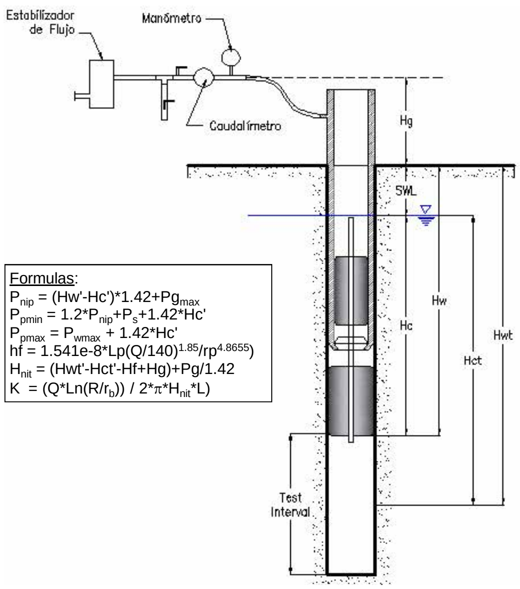
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	98.00	**To**	110.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	110.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

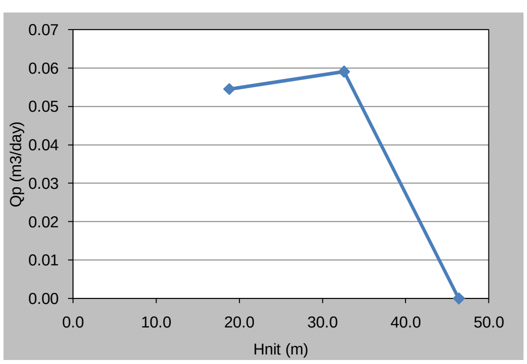
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	98.00	m
Hwt	Water column over test midpoint	104.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	93.00	m
Hct	Hydrostatic head on test midpoint	99.00	m
Hw'	Water column over packer (corrected)	98.00	m
Hwt'	Water column over test midpoint (corrected)	104.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	93.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	99.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	98.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	321	psi
Ppmax	Maximum packer inflation pressure	632	psi

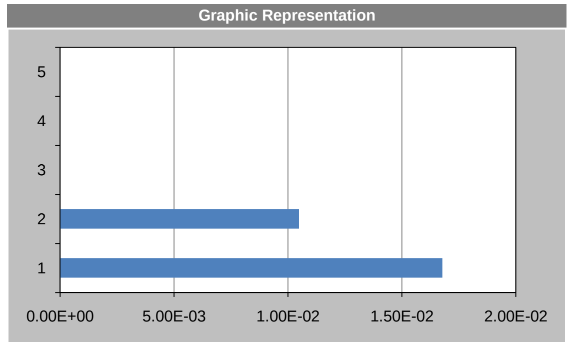
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.04	0.04	0.00		
2	0.04	0.04	0.00		
3	0.04	0.08	0.00		
4	0.04	0.02	0.00		
5	0.04	0.04	0.00		
6	0.04	0.04	0.00		
7					
8					
9					
10					
Q_P (lit/min)	0.04	0.04	0.00		
Q_P (m^3/day)	0.05	0.06	0.00		
Hf (m)	9.30E-08	1.08E-07	0.00E+00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	2.1E-04	1.3E-04	0.0E+00		
K (cm/sec)	2.5E-07	1.5E-07	0.0E+00		
UL	1.68E-02	1.05E-02	0.00E+00		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



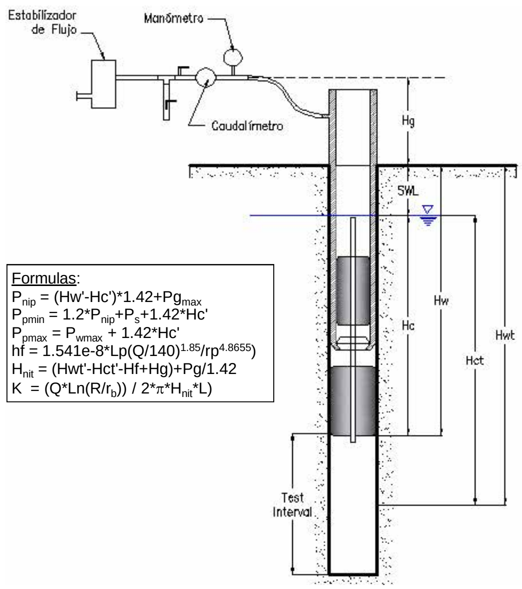
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	110.00	**To**	122.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	10
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	122.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

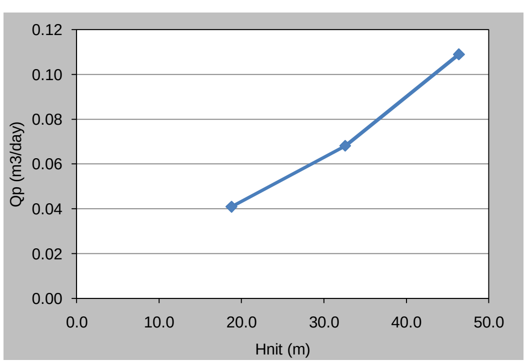
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	110.00	m
Hwt	Water column over test midpoint	116.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	105.00	m
Hct	Hydrostatic head on test midpoint	111.00	m
Hw'	Water column over packer (corrected)	110.00	m
Hwt'	Water column over test midpoint (corrected)	116.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	105.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	111.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	110.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	338	psi
Ppmax	Maximum packer inflation pressure	649	psi

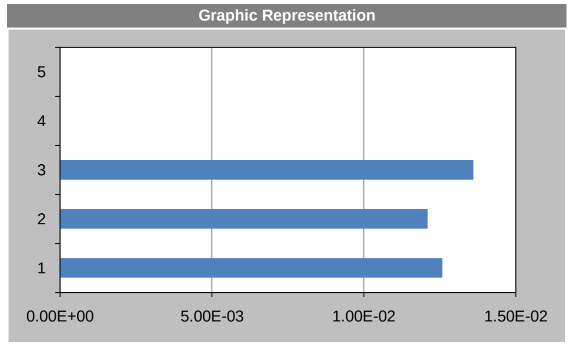
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.04	0.08		
2	0.04	0.04	0.11		
3	0.04	0.04	0.08		
4	0.04	0.06	0.06		
5	0.04	0.06	0.06		
6	0.02	0.06			
7					
8					
9					
10					
Q_P (lit/min)	0.03	0.05	0.08		
Q_P (m^3/day)	0.04	0.07	0.11		
Hf (m)	6.13E-08	1.58E-07	3.77E-07		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.6E-04	1.5E-04	1.7E-04		
K (cm/sec)	1.8E-07	1.8E-07	2.0E-07		
UL	1.26E-02	1.21E-02	1.36E-02		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



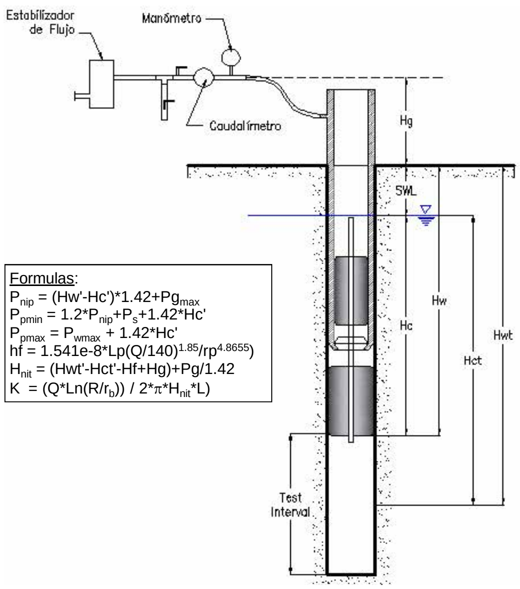
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	134.00	**To**	146.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	11
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	146.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

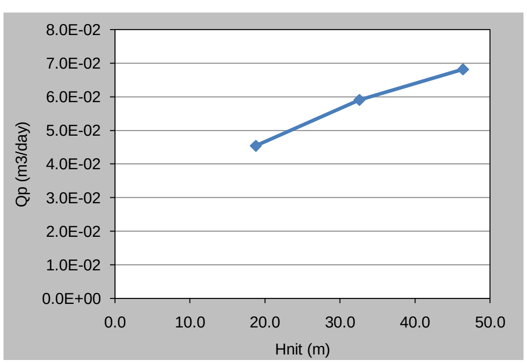
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	134.00	m
Hwt	Water column over test midpoint	140.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	129.00	m
Hct	Hydrostatic head on test midpoint	135.00	m
Hw'	Water column over packer (corrected)	134.00	m
Hwt'	Water column over test midpoint (corrected)	140.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	129.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	135.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	134.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	372	psi
Ppmax	Maximum packer inflation pressure	683	psi

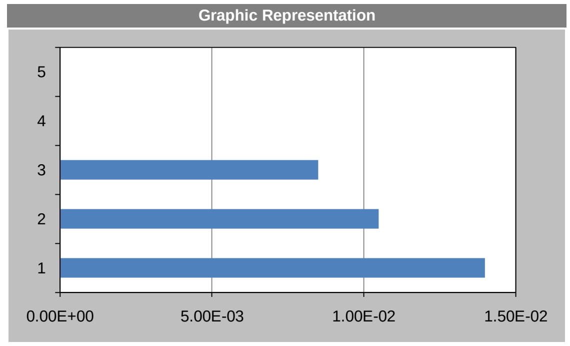
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.04	0.04		
2	0.04	0.04	0.04		
3	0.04	0.04	0.04		
4	0.04	0.06	0.06		
5	0.04	0.04	0.06		
6	0.04	0.04	0.06		
7					
8					
9					
10					
Q_P (lit/min)	0.03	0.04	0.05		
Q_P (m^3/day)	0.05	0.06	0.07		
Hf (m)	9.1E-08	1.5E-07	1.9E-07		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.8E-04	1.3E-04	1.1E-04		
K (cm/sec)	2.0E-07	1.5E-07	1.2E-07		
UL	1.40E-02	1.05E-02	8.50E-03		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



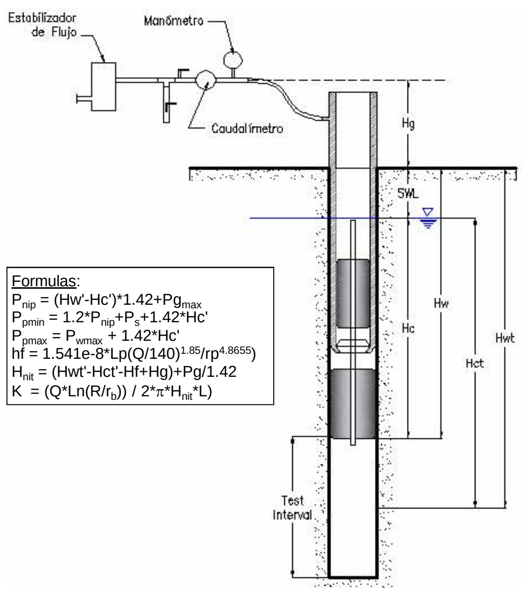
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	146.00	**To**	158.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	12
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	158.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

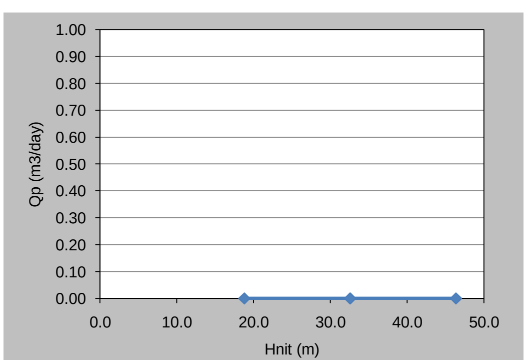
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	146.00	m
Hwt	Water column over test midpoint	152.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	141.00	m
Hct	Hydrostatic head on test midpoint	147.00	m
Hw'	Water column over packer (corrected)	146.00	m
Hwt'	Water column over test midpoint (corrected)	152.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	141.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	147.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	146.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	389	psi
Ppmax	Maximum packer inflation pressure	700	psi

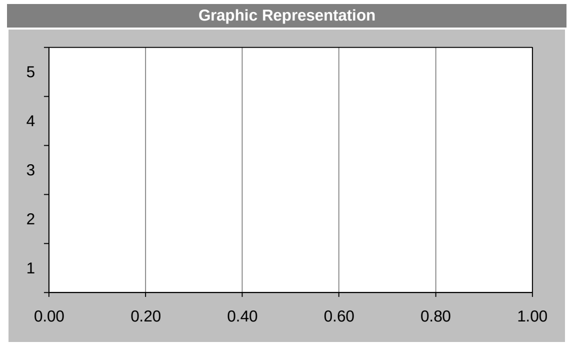
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3	0.00	0.00	0.00		
4	0.00	0.00	0.00		
5	0.00	0.00	0.00		
6	0.00	0.00	0.00		
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



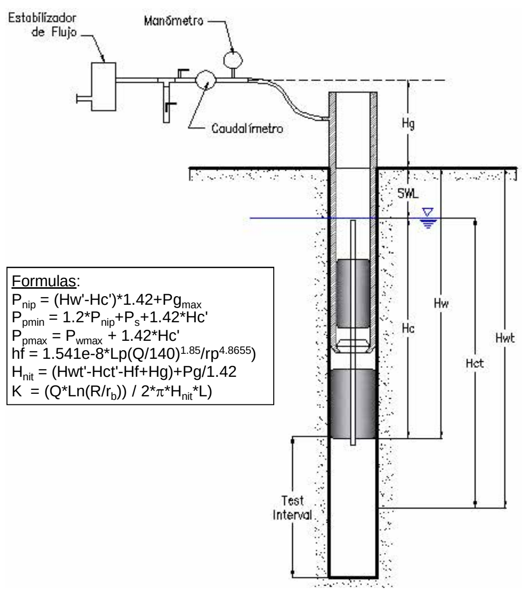
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	157.00	**To**	158.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	13
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	158.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

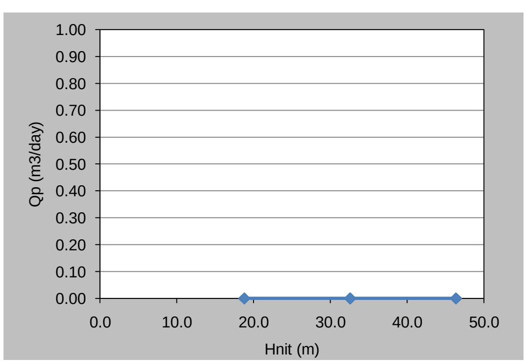
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	157.00	m
Hwt	Water column over test midpoint	157.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	152.00	m
Hct	Hydrostatic head on test midpoint	152.50	m
Hw'	Water column over packer (corrected)	157.00	m
Hwt'	Water column over test midpoint (corrected)	157.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	152.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	152.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	157.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	404	psi
Ppmax	Maximum packer inflation pressure	716	psi

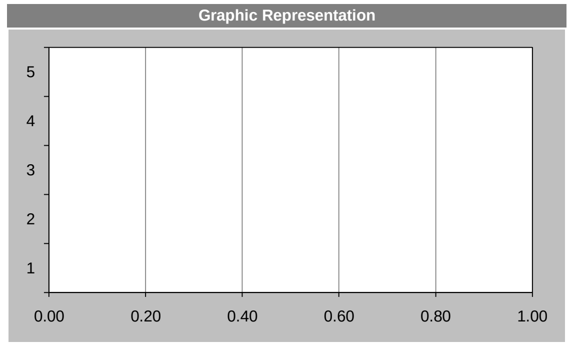
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3	0.00	0.00	0.00		
4	0.00	0.00	0.00		
5	0.00	0.00	0.00		
6	0.00	0.00			
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



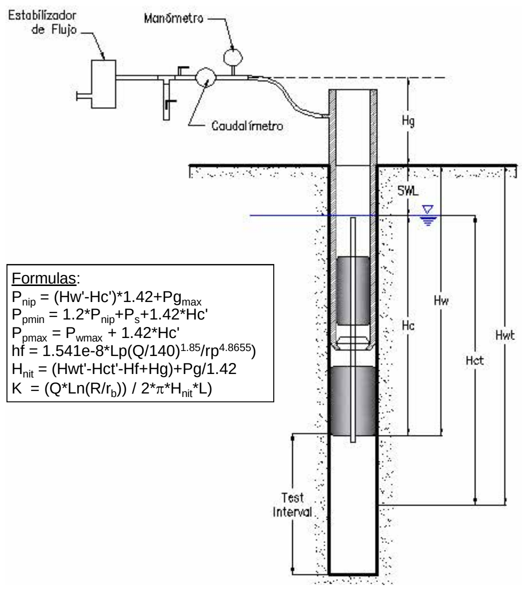
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	169.00	**To**	170.00	**Borehole :**	CH-1
Area:		**Date :**		**Start:**		**Test Number :**	14
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	170.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

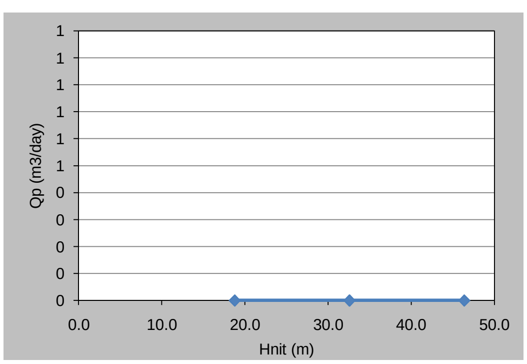
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	169.00	m
Hwt	Water column over test midpoint	169.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	164.00	m
Hct	Hydrostatic head on test midpoint	164.50	m
Hw'	Water column over packer (corrected)	169.00	m
Hwt'	Water column over test midpoint (corrected)	169.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	164.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	164.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	169.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	421	psi
Ppmax	Maximum packer inflation pressure	733	psi

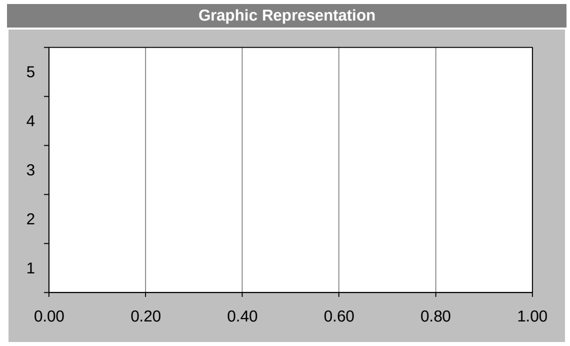
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3	0.00	0.00	0.00		
4	0.00	0.00	0.00		
5	0.00	0.00	0.00		
6	0.00	0.00	0.00		
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

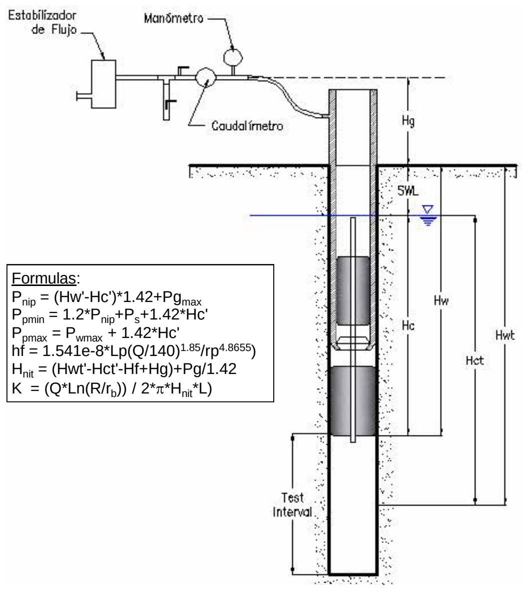
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	5.00	**To**	6.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	1
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	6.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e-8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

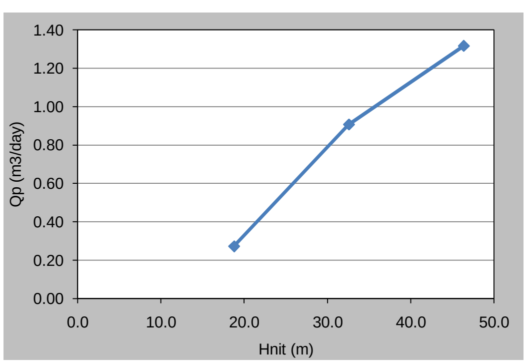
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	5.00	m
Hwt	Water column over test midpoint	5.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	0.00	m
Hct	Hydrostatic head on test midpoint	0.50	m
Hw'	Water column over packer (corrected)	5.00	m
Hwt'	Water column over test midpoint (corrected)	5.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	0.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	0.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	5.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	189	psi
Ppmax	Maximum packer inflation pressure	500	psi

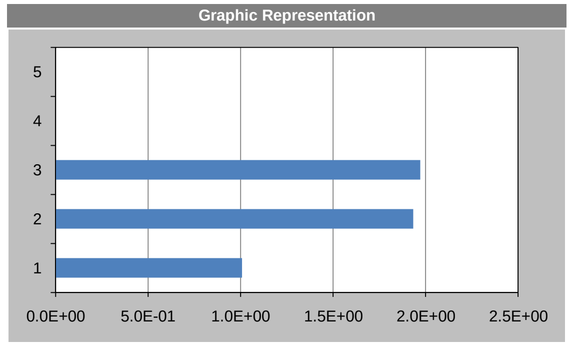
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.11	0.95	1.14		
2	0.26	0.64	0.95		
3	0.25	0.61	0.98		
4	0.17	0.61	0.87		
5	0.15	0.55	0.83		
6	0.19	0.53	0.79		
7		0.53	0.83		
8					
9					
10					
Q_P (lit/min)	0.19	0.63	0.91		
Q_P (m^3/day)	0.27	0.91	1.32		
Hf (m)	9.3E-08	8.6E-07	1.7E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	7.0E-03	1.3E-02	1.4E-02		
K (cm/sec)	8.1E-06	1.6E-05	1.6E-05		
UL	1.0E+00	1.9E+00	2.0E+00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

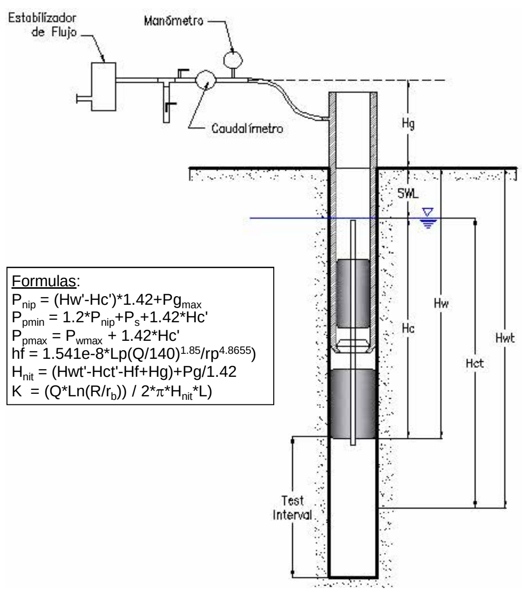
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 14.00	**To** 15.00	**Borehole :** CH-2		
Area:	**Date :**	**Start:**	**Test Number :** 2		
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 15.00		
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**		



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

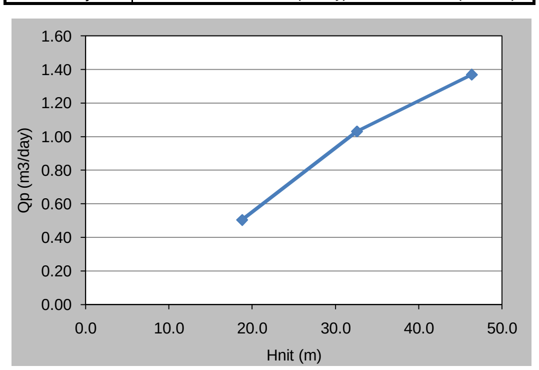
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	14.00	m
Hwt	Water column over test midpoint	14.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	9.00	m
Hct	Hydrostatic head on test midpoint	9.50	m
Hw'	Water column over packer (corrected)	14.00	m
Hwt'	Water column over test midpoint (corrected)	14.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	9.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	9.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	14.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	201	psi
Ppmax	Maximum packer inflation pressure	513	psi

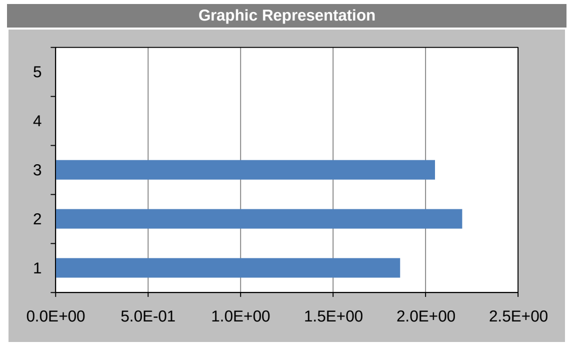
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.68	0.87	1.14		
2	0.19	0.83	1.21		
3	0.49	0.72	0.98		
4	0.30	0.68	0.91		
5	0.34	0.62	0.87		
6	0.32	0.57	0.87		
7	0.23		0.81		
8	0.25		0.81		
9					
10					
Q_P (lit/min)	0.35	0.72	0.95		
Q_P (m^3/day)	0.50	1.03	1.37		
Hf (m)	8.1E-07	3.1E-06	5.2E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.3E-02	1.5E-02	1.4E-02		
K (cm/sec)	1.5E-05	1.8E-05	1.7E-05		
UL	1.9E+00	2.2E+00	2.1E+00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

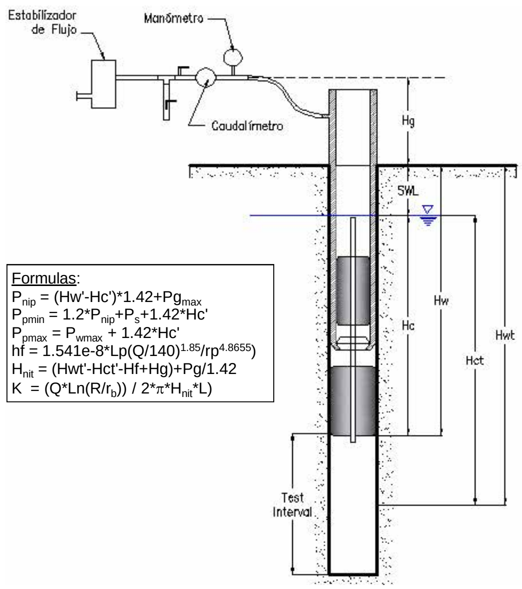
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	26.00	**To**	27.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	3
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	27.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

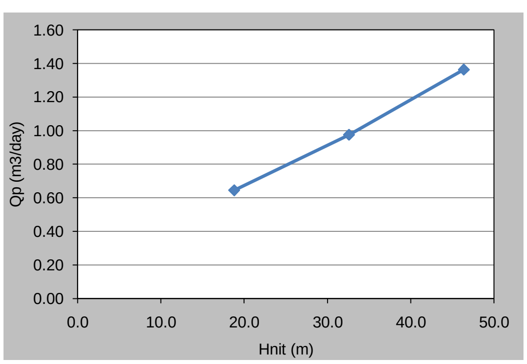
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	26.00	m
Hwt	Water column over test midpoint	26.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	21.00	m
Hct	Hydrostatic head on test midpoint	21.50	m
Hw'	Water column over packer (corrected)	26.00	m
Hwt'	Water column over test midpoint (corrected)	26.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	21.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	21.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	26.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	218	psi
Ppmax	Maximum packer inflation pressure	530	psi

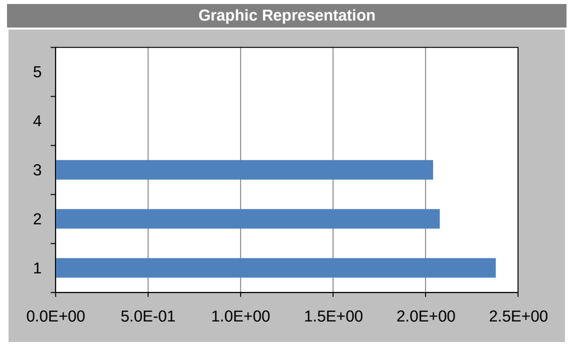
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.57	1.02	0.83		
2	0.57	0.83	1.06		
3	0.49	0.79	1.06		
4	0.45	0.25	1.00		
5	0.45	0.70	0.95		
6	0.36	0.57	0.89		
7	0.38	0.57	0.83		
8	0.30				
9					
10					
Q_P (lit/min)	0.45	0.68	0.95		
Q_P (m^3/day)	0.64	0.97	1.36		
Hf (m)	2.4E-06	5.1E-06	9.5E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.7E-02	1.4E-02	1.4E-02		
K (cm/sec)	1.9E-05	1.7E-05	1.6E-05		
UL	2.4E+00	2.1E+00	2.0E+00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



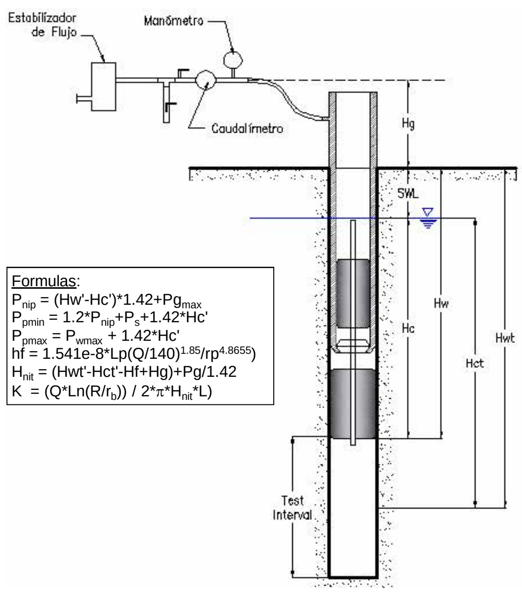
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	38.00	**To**	39.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	4
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	39.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

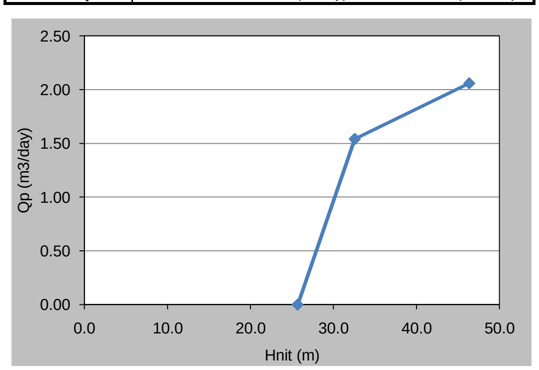
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	38.00	m
Hwt	Water column over test midpoint	38.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	33.00	m
Hct	Hydrostatic head on test midpoint	33.50	m
Hw'	Water column over packer (corrected)	38.00	m
Hwt'	Water column over test midpoint (corrected)	38.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	33.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	33.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	38.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	235	psi
Ppmax	Maximum packer inflation pressure	547	psi

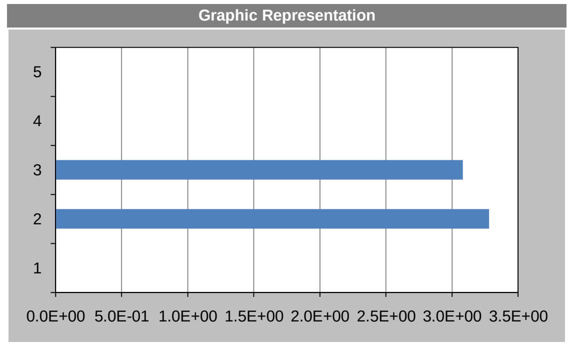
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	30.0	40.0	60.0		
1	0.00	1.29	1.51		
2	0.00	0.98	1.36		
3	0.00	1.02	1.48		
4		0.98	1.36		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	1.07	1.43		
Q_P (m^3/day)	0.00	1.54	2.06		
Hf (m)	0.0E+00	1.7E-05	3.0E-05		
Hnit (m)	25.7	32.6	46.4		
K (m/day)	0.0E+00	2.3E-02	2.1E-02		
K (cm/sec)	0.0E+00	2.6E-05	2.5E-05		
UL	0.0E+00	3.3E+00	3.1E+00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

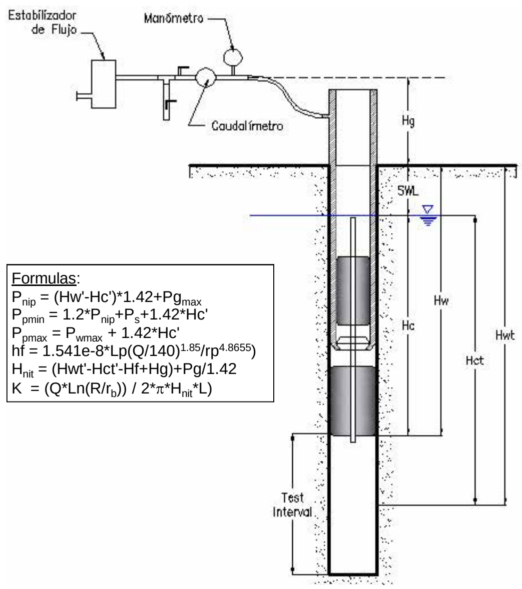
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	50.00	**To**	51.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	51.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

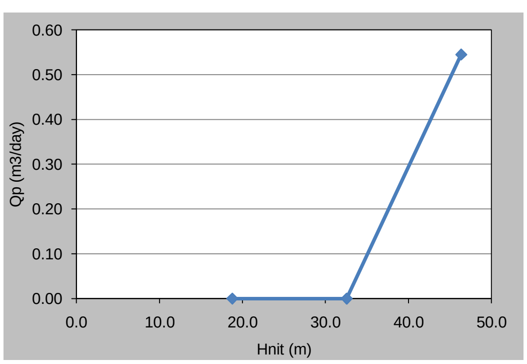
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	50.00	m
Hwt	Water column over test midpoint	50.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	45.00	m
Hct	Hydrostatic head on test midpoint	45.50	m
Hw'	Water column over packer (corrected)	50.00	m
Hwt'	Water column over test midpoint (corrected)	50.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	45.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	45.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	50.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	252	psi
Ppmax	Maximum packer inflation pressure	564	psi

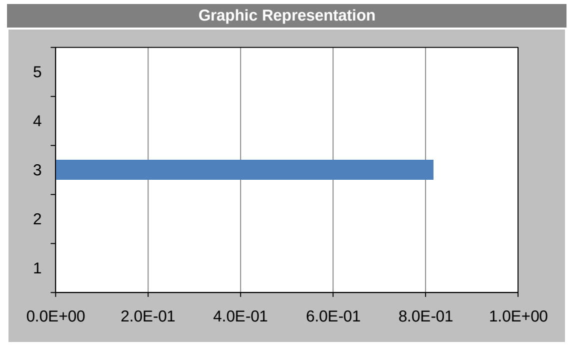
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.30		
2	0.00	0.00	0.45		
3	0.00	0.00	0.38		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.38		
Q_P (m^3/day)	0.00	0.00	0.55		
Hf (m)	0.0E+00	0.0E+00	3.4E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	5.7E-03		
K (cm/sec)	0.0E+00	0.0E+00	6.6E-06		
UL	0.0E+00	0.0E+00	8.2E-01		
K Sensitivity :	1.50E-04 (m/day)		1.74E-07 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

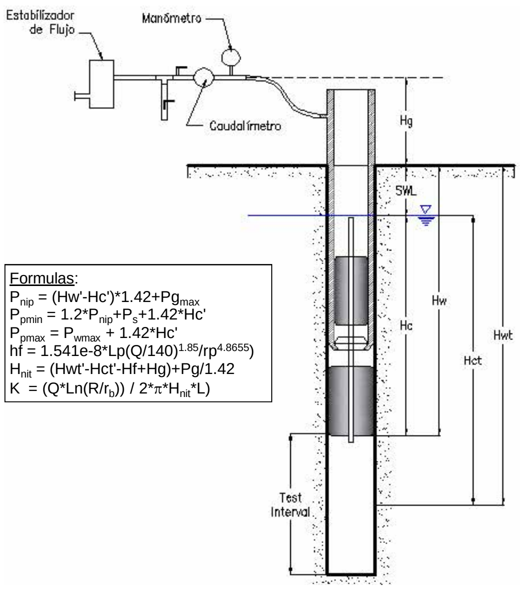
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	62.00	**To**	63.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	63.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

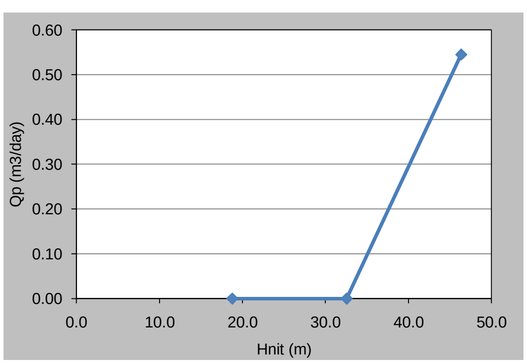
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	62.00	m
Hwt	Water column over test midpoint	62.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	57.00	m
Hct	Hydrostatic head on test midpoint	57.50	m
Hw'	Water column over packer (corrected)	62.00	m
Hwt'	Water column over test midpoint (corrected)	62.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	57.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	57.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	62.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	269	psi
Ppmax	Maximum packer inflation pressure	581	psi

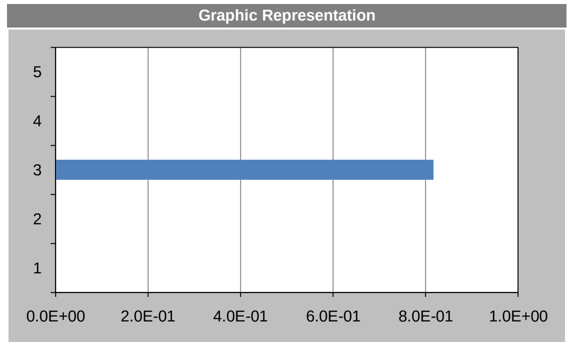
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.38		
2	0.00	0.00	0.38		
3	0.00	0.00	0.38		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.38		
Q_P (m^3/day)	0.00	0.00	0.55		
Hf (m)	0.0E+00	0.0E+00	4.2E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	5.7E-03		
K (cm/sec)	0.0E+00	0.0E+00	6.6E-06		
UL	0.0E+00	0.0E+00	8.2E-01		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

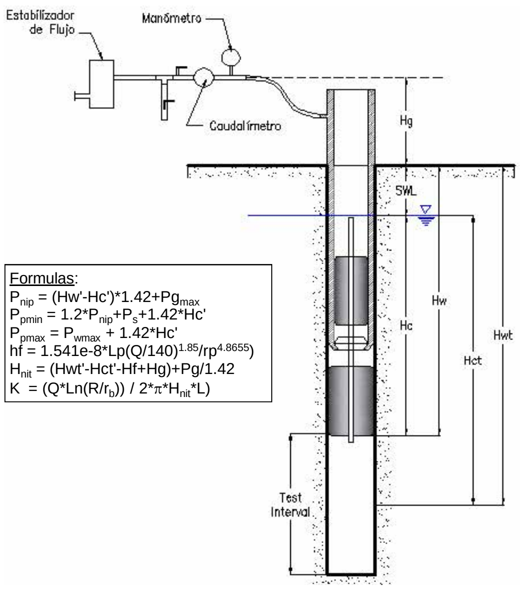
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 86.00	**To** 87.00	**Borehole :** CH-2
Area:	**Date :**	**Start:**	**Test Number :** 7
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 87.00
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

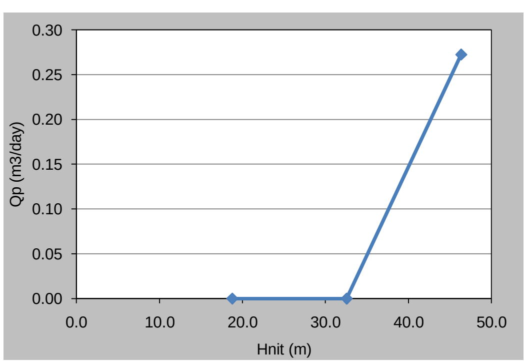
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	86.00	m
Hwt	Water column over test midpoint	86.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	81.00	m
Hct	Hydrostatic head on test midpoint	81.50	m
Hw'	Water column over packer (corrected)	86.00	m
Hwt'	Water column over test midpoint (corrected)	86.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	81.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	81.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	86.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	304	psi
Ppmax	Maximum packer inflation pressure	615	psi

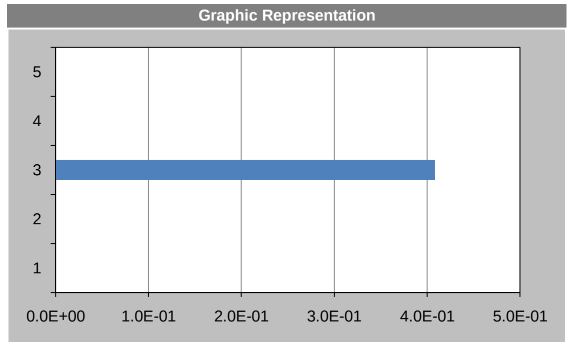
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.19		
2	0.00	0.00	0.19		
3	0.00	0.00	0.19		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.19		
Q_P (m^3/day)	0.00	0.00	0.27		
Hf (m)	0.0E+00	0.0E+00	1.6E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	2.8E-03		
K (cm/sec)	0.0E+00	0.0E+00	3.3E-06		
UL	0.0E+00	0.0E+00	4.1E-01		
K Sensitivity :	1.50E-04 (m/day)		1.74E-07 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

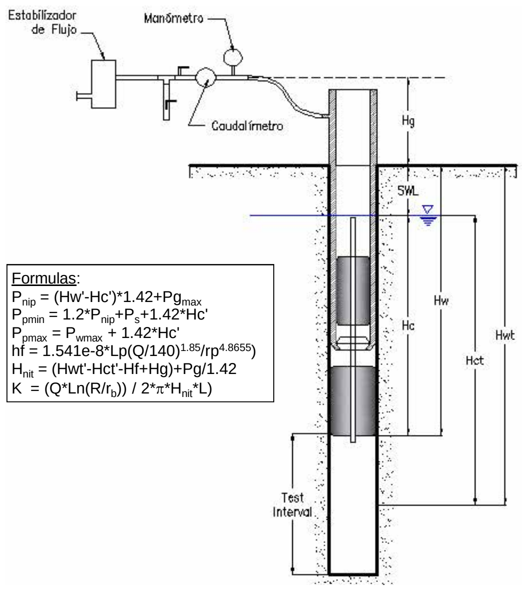
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	98.00	**To** 99.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**	**Test Number :**	8
Coordinates (m):		**Altura Caudalímetro:**		**End:**	**Total Depth (m) :**	99.00
Elevation (msnm):		**Interval Lithology :**			**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

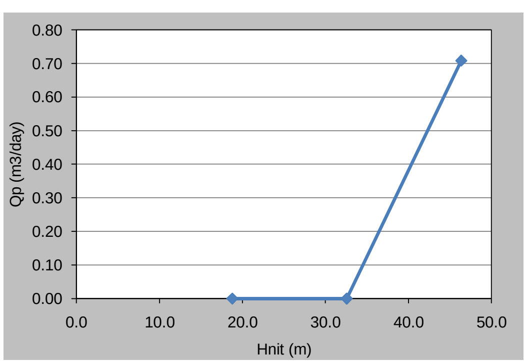
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	98.00	m
Hwt	Water column over test midpoint	98.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	93.00	m
Hct	Hydrostatic head on test midpoint	93.50	m
Hw'	Water column over packer (corrected)	98.00	m
Hwt'	Water column over test midpoint (corrected)	98.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	93.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	93.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	98.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	321	psi
Ppmax	Maximum packer inflation pressure	632	psi

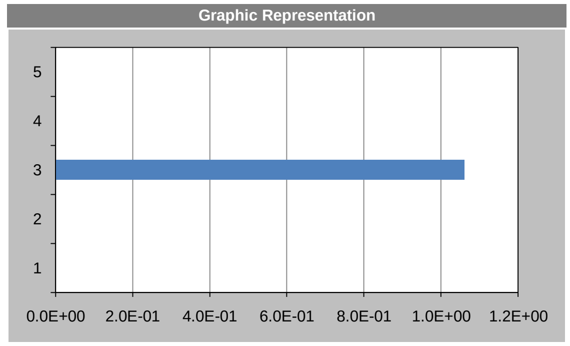
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.61		
2	0.00	0.00	0.38		
3	0.00	0.00	0.49		
4			0.49		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.49		
Q_P (m^3/day)	0.00	0.00	0.71		
Hf (m)	0.0E+00	0.0E+00	1.1E-05		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	7.4E-03		
K (cm/sec)	0.0E+00	0.0E+00	8.5E-06		
UL	0.0E+00	0.0E+00	1.1E+00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

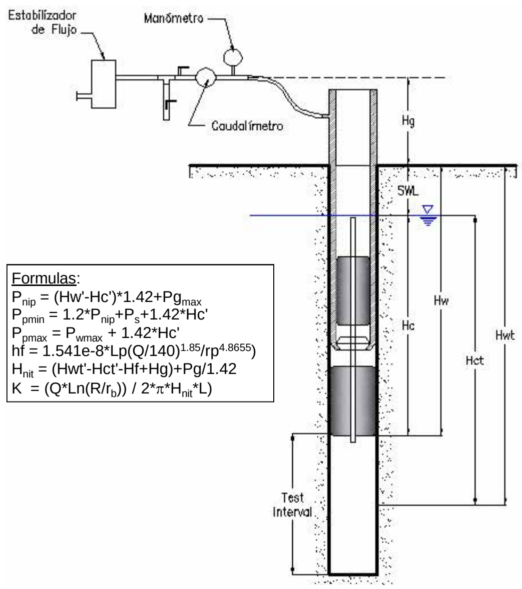
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	110.00	**To**	111.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	111.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

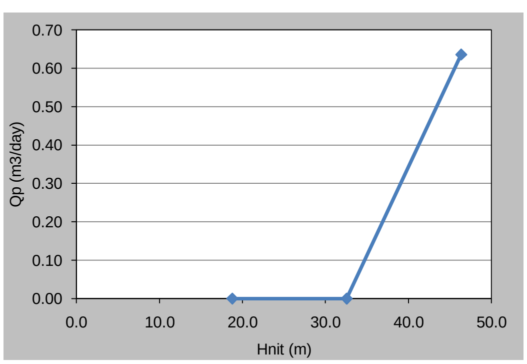
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	110.00	m
Hwt	Water column over test midpoint	110.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	105.00	m
Hct	Hydrostatic head on test midpoint	105.50	m
Hw'	Water column over packer (corrected)	110.00	m
Hwt'	Water column over test midpoint (corrected)	110.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	105.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	105.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	110.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	338	psi
Ppmax	Maximum packer inflation pressure	649	psi

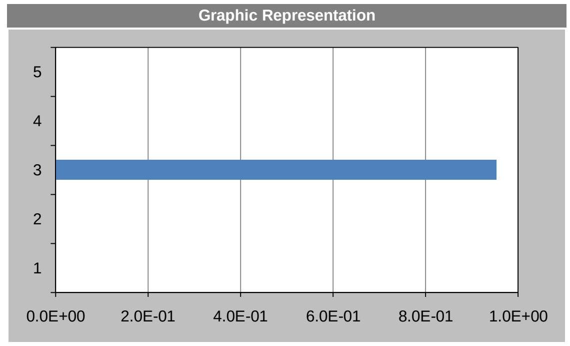
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.45		
2	0.00	0.00	0.45		
3	0.00	0.00	0.42		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.44		
Q_P (m^3/day)	0.00	0.00	0.64		
Hf (m)	0.0E+00	0.0E+00	9.8E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	6.6E-03		
K (cm/sec)	0.0E+00	0.0E+00	7.7E-06		
UL	0.0E+00	0.0E+00	9.5E-01		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



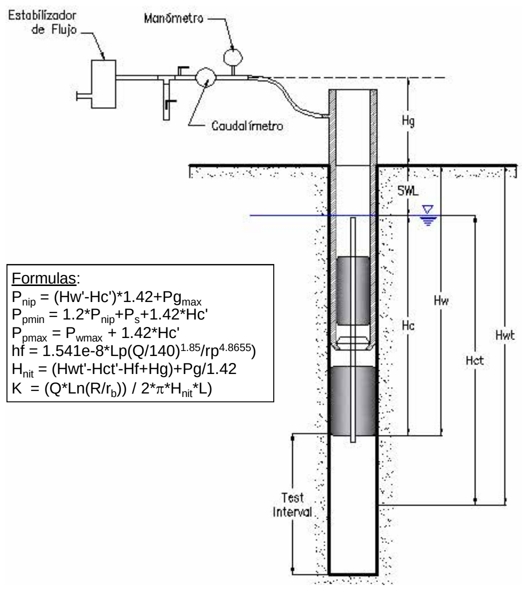
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	122.00	**To**	123.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	10
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	123.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

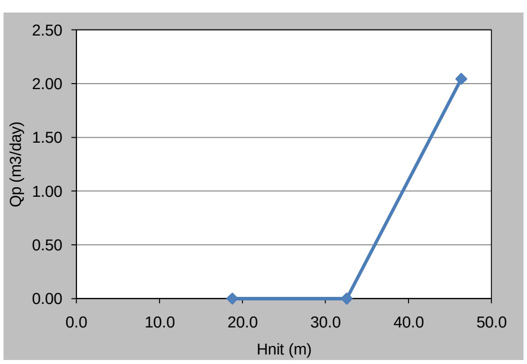
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	122.00	m
Hwt	Water column over test midpoint	122.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	117.00	m
Hct	Hydrostatic head on test midpoint	117.50	m
Hw'	Water column over packer (corrected)	122.00	m
Hwt'	Water column over test midpoint (corrected)	122.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	117.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	117.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	122.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	355	psi
Ppmax	Maximum packer inflation pressure	666	psi

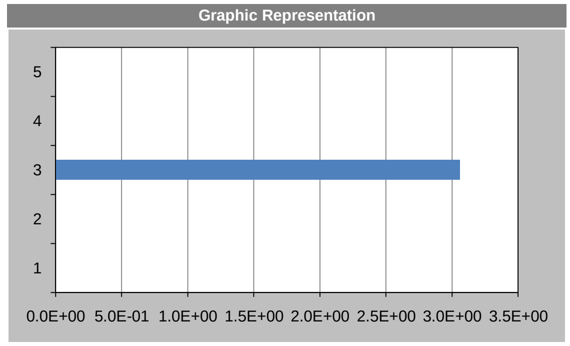
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.53		
2	0.00	0.00	0.38		
3	0.00	0.00	4.28		
4			0.49		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	1.42		
Q_P (m^3/day)	0.00	0.00	2.04		
Hf (m)	0.0E+00	0.0E+00	9.5E-05		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	2.1E-02		
K (cm/sec)	0.0E+00	0.0E+00	2.5E-05		
UL	0.0E+00	0.0E+00	3.1E+00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



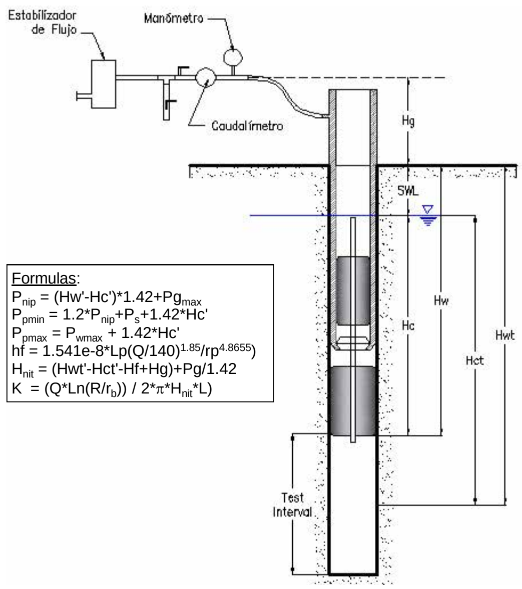
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	134.00	**To**	135.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	11
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	135.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

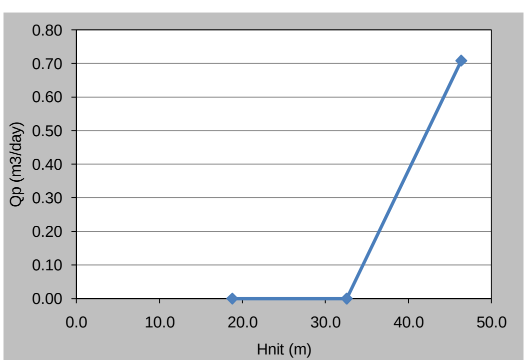
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	134.00	m
Hwt	Water column over test midpoint	134.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	129.00	m
Hct	Hydrostatic head on test midpoint	129.50	m
Hw'	Water column over packer (corrected)	134.00	m
Hwt'	Water column over test midpoint (corrected)	134.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	129.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	129.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	134.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	372	psi
Ppmax	Maximum packer inflation pressure	683	psi

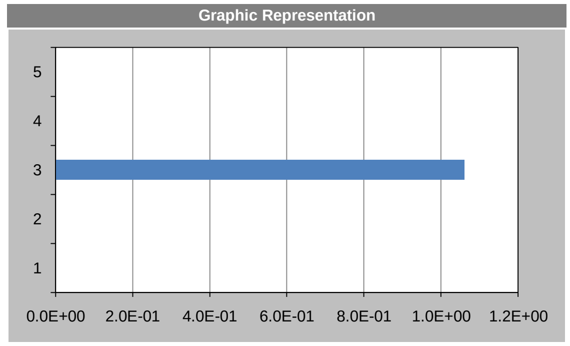
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.61		
2	0.00	0.00	0.45		
3	0.00	0.00	0.42		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.49		
Q_P (m^3/day)	0.00	0.00	0.71		
Hf (m)	0.0E+00	0.0E+00	1.5E-05		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	7.4E-03		
K (cm/sec)	0.0E+00	0.0E+00	8.5E-06		
UL	0.0E+00	0.0E+00	1.1E+00		
K Sensitivity :	1.50E-04 (m/day)		1.74E-07 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

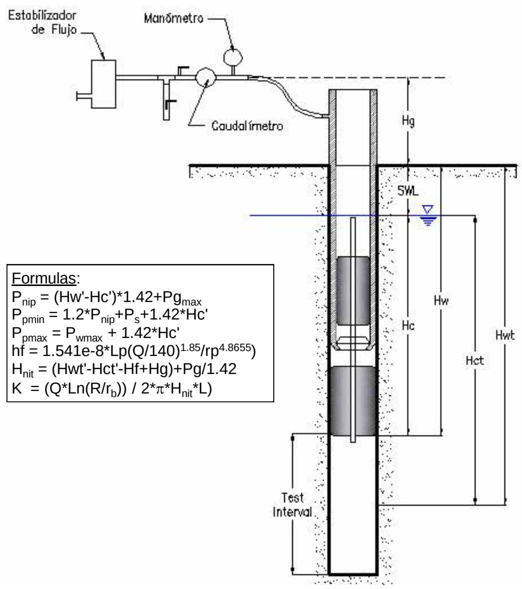
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	146.00	**To**	147.00	**Borehole :**	CH-2
Area:		**Date :**		**Start:**		**Test Number :**	12
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	147.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

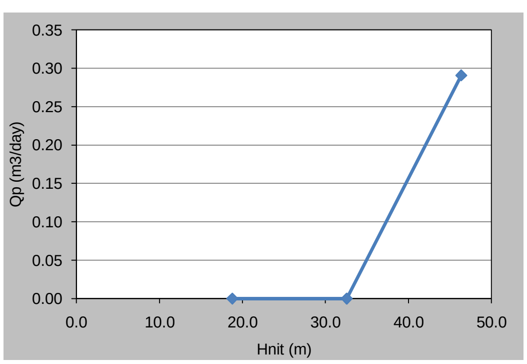
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	146.00	m
Hwt	Water column over test midpoint	146.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	141.00	m
Hct	Hydrostatic head on test midpoint	141.50	m
Hw'	Water column over packer (corrected)	146.00	m
Hwt'	Water column over test midpoint (corrected)	146.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	141.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	141.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	146.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	389	psi
Ppmax	Maximum packer inflation pressure	700	psi

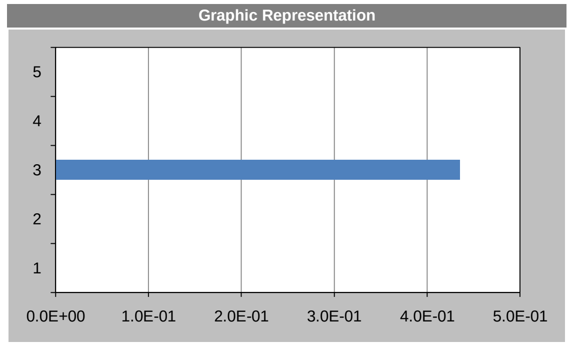
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.38		
2	0.00	0.00	0.15		
3	0.00	0.00	0.08		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.20		
Q_P (m^3/day)	0.00	0.00	0.29		
Hf (m)	0.0E+00	0.0E+00	3.1E-06		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	3.0E-03		
K (cm/sec)	0.0E+00	0.0E+00	3.5E-06		
UL	0.0E+00	0.0E+00	4.4E-01		
K Sensitivity :	1.50E-04 (m/day)		1.74E-07 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



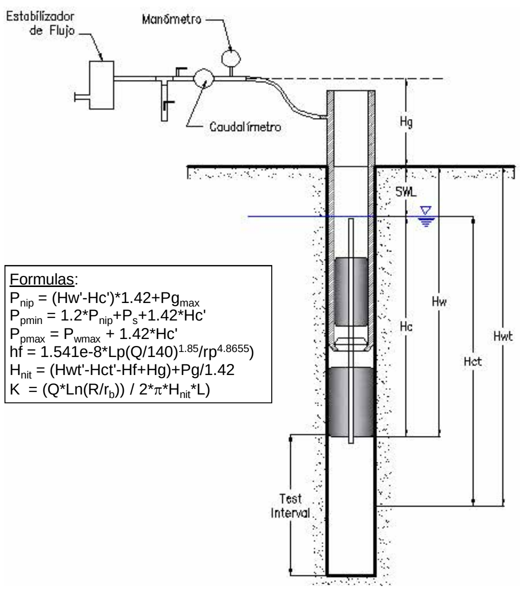
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :** 158.00	**To** 159.00	**Borehole :**	CH-2
Area:		**Date :**	**Start:**	**Test Number :**	13
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	159.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:

$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$

$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$

$P_{pmax} = P_{wmax} + 1.42*Hc'$

$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$

$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$

$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

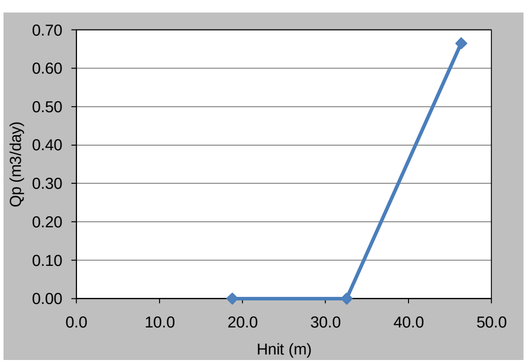
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	158.00	m
Hwt	Water column over test midpoint	158.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	153.00	m
Hct	Hydrostatic head on test midpoint	153.50	m
Hw'	Water column over packer (corrected)	158.00	m
Hwt'	Water column over test midpoint (corrected)	158.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	153.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	153.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	158.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	406	psi
Ppmax	Maximum packer inflation pressure	717	psi

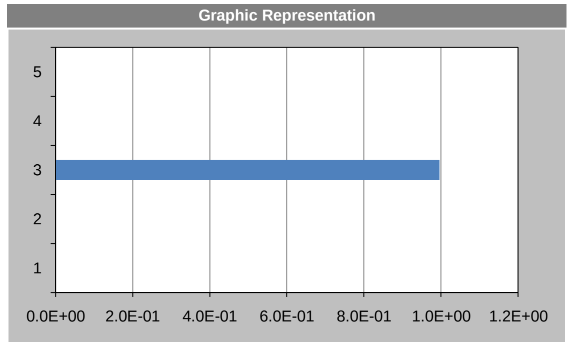
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.61		
2	0.00	0.00	0.53		
3	0.00	0.00	0.45		
4	0.00	0.00	0.38		
5	0.00		0.34		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.46		
Q_P (m^3/day)	0.00	0.00	0.67		
Hf (m)	0.0E+00	0.0E+00	1.5E-05		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	6.9E-03		
K (cm/sec)	0.0E+00	0.0E+00	8.0E-06		
UL	0.0E+00	0.0E+00	1.0E+00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



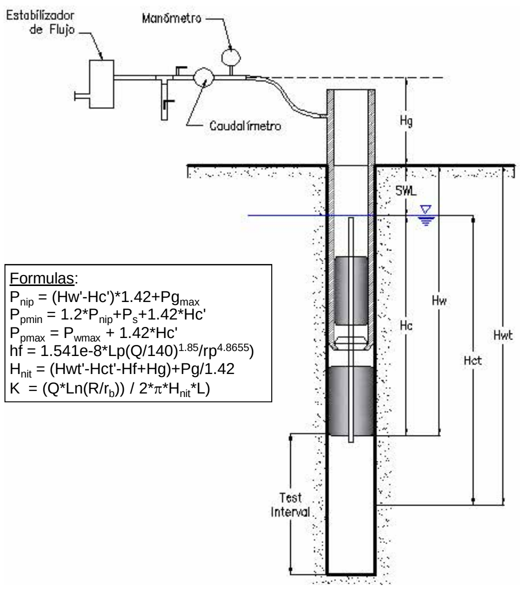
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	6.00	**To**	9.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	1
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	9.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

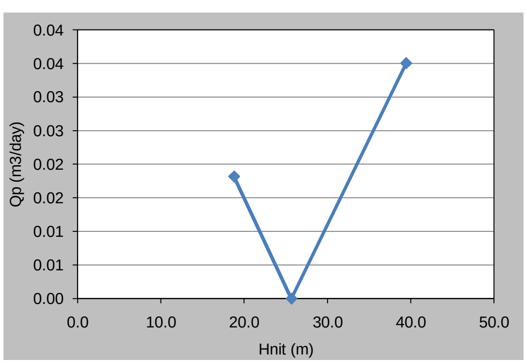
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	6.00	m
Hwt	Water column over test midpoint	7.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	1.00	m
Hct	Hydrostatic head on test midpoint	2.50	m
Hw'	Water column over packer (corrected)	6.00	m
Hwt'	Water column over test midpoint (corrected)	7.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	1.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	2.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	6.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	190	psi
Ppmax	Maximum packer inflation pressure	501	psi

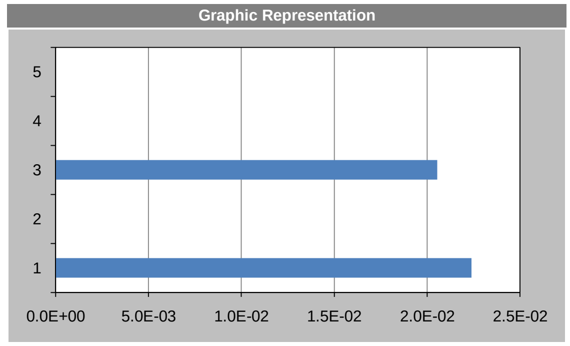
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.04	0.00	0.04		
2	0.00	0.00	0.00		
3	0.00	0.00	0.06		
4			0.04		
5			0.02		
6			0.02		
7			0.00		
8					
9					
10					
Q_P (lit/min)	0.01	0.00	0.02		
Q_P (m^3/day)	0.02	0.00	0.04		
Hf (m)	7.5E-10	0.0E+00	2.5E-09		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	2.1E-04	0.0E+00	1.9E-04		
K (cm/sec)	2.5E-07	0.0E+00	2.3E-07		
UL	2.2E-02	0.0E+00	2.1E-02		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



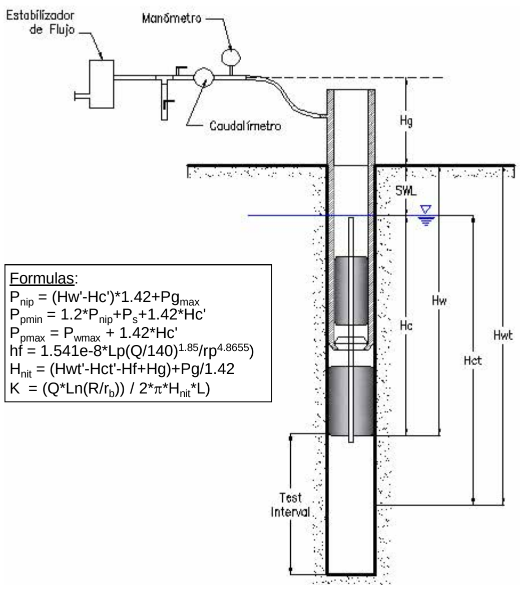
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	9.00	**To**	12.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	12.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

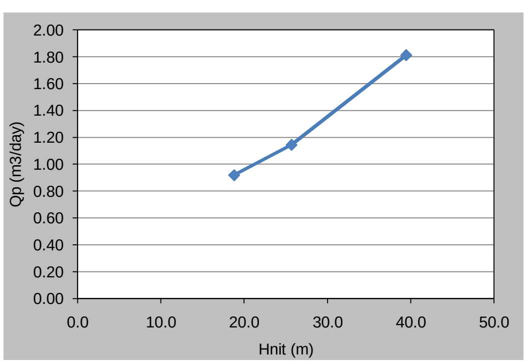
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	9.00	m
Hwt	Water column over test midpoint	10.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	4.00	m
Hct	Hydrostatic head on test midpoint	5.50	m
Hw'	Water column over packer (corrected)	9.00	m
Hwt'	Water column over test midpoint (corrected)	10.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	4.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	5.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	9.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	194	psi
Ppmax	Maximum packer inflation pressure	506	psi

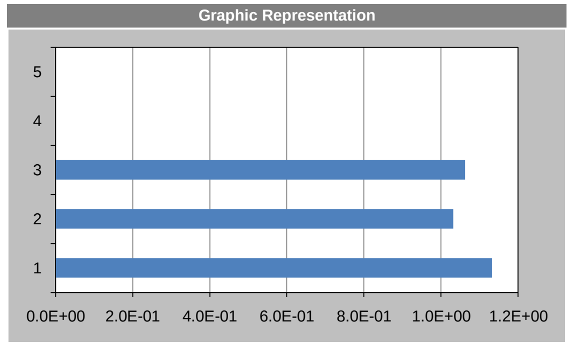
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.98	0.95	1.44		
2	0.68	0.79	1.36		
3	0.64	0.76	1.29		
4	0.64	0.74	1.17		
5	0.55	0.74	1.10		
6	0.47		1.19		
7	0.49				
8					
9					
10					
Q_P (lit/min)	0.64	0.79	1.26		
Q_P (m^3/day)	0.92	1.14	1.81		
Hf (m)	1.6E-06	2.4E-06	5.6E-06		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.1E-02	9.8E-03	1.0E-02		
K (cm/sec)	1.2E-05	1.1E-05	1.2E-05		
UL	1.1E+00	1.0E+00	1.1E+00		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



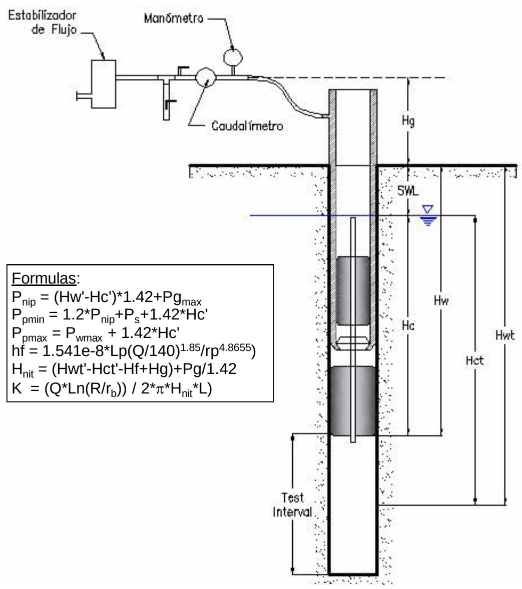
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	12.00	**To**	15.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	3
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	15.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

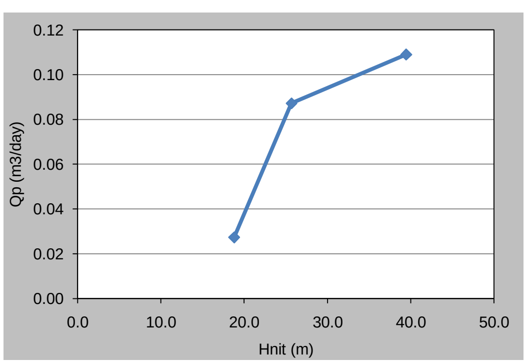
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	12.00	m
Hwt	Water column over test midpoint	13.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	7.00	m
Hct	Hydrostatic head on test midpoint	8.50	m
Hw'	Water column over packer (corrected)	12.00	m
Hwt'	Water column over test midpoint (corrected)	13.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	7.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	8.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	12.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	198	psi
Ppmax	Maximum packer inflation pressure	510	psi

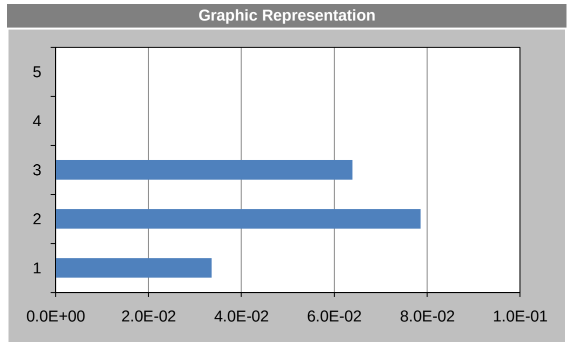
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.08	0.08	0.04		
2	0.00	0.08	0.08		
3	0.00	0.08	0.09		
4	0.00	0.04	0.08		
5		0.04	0.09		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.02	0.06	0.08		
Q_P (m^3/day)	0.03	0.09	0.11		
Hf (m)	3.2E-09	2.7E-08	4.1E-08		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	3.2E-04	7.4E-04	6.1E-04		
K (cm/sec)	3.7E-07	8.6E-07	7.0E-07		
UL	3.4E-02	7.9E-02	6.4E-02		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

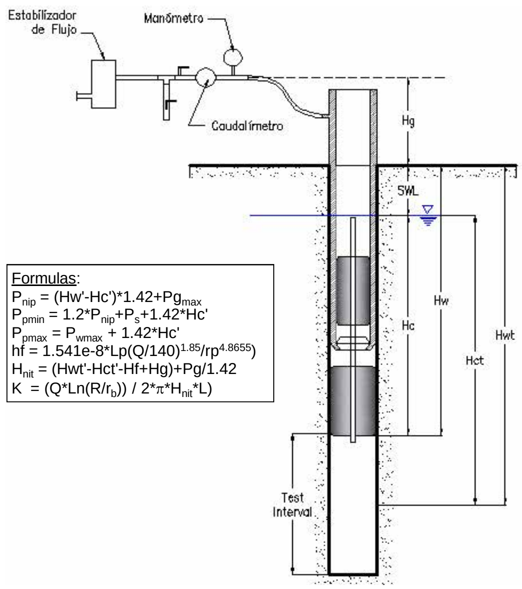
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 15.00	**To** 18.00	**Borehole :**	CH-3
Area:	**Date :**	**Start:**	**Test Number :**	4
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	18.00
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**	



Formulas:

$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$

$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$

$P_{pmax} = P_{wmax} + 1.42*Hc'$

$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$

$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$

$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

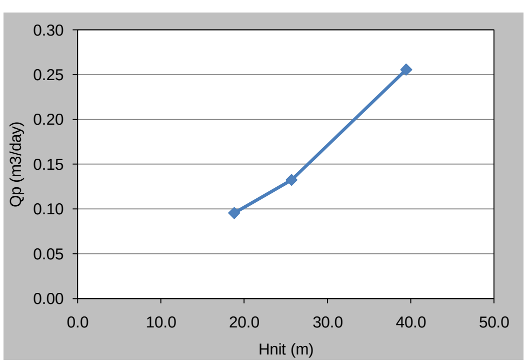
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	15.00	m
Hwt	Water column over test midpoint	16.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	10.00	m
Hct	Hydrostatic head on test midpoint	11.50	m
Hw'	Water column over packer (corrected)	15.00	m
Hwt'	Water column over test midpoint (corrected)	16.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	10.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	11.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	15.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	203	psi
Ppmax	Maximum packer inflation pressure	514	psi

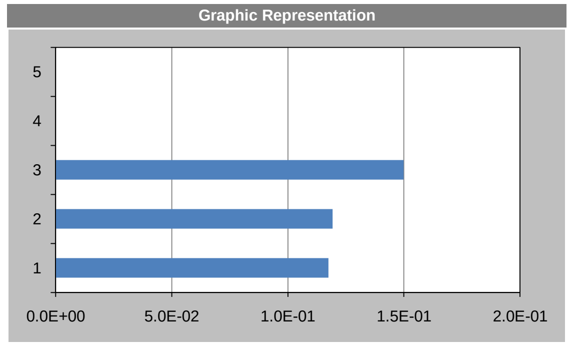
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.08	0.11	0.11		
2	0.11	0.04	0.23		
3	0.11	0.11	0.15		
4	0.04	0.11	0.26		
5	0.04	0.08	0.15		
6	0.02	0.09	0.19		
7		0.09	0.17		
8			0.15		
9					
10					
Q_P (lit/min)	0.07	0.09	0.18		
Q_P (m^3/day)	0.10	0.13	0.26		
Hf (m)	4.0E-08	7.4E-08	2.5E-07		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.1E-03	1.1E-03	1.4E-03		
K (cm/sec)	1.3E-06	1.3E-06	1.6E-06		
UL	1.2E-01	1.2E-01	1.5E-01		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

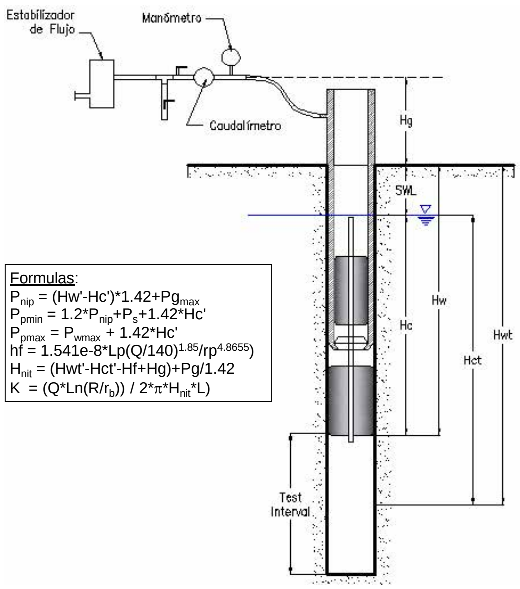
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	18.00	**To**	21.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	21.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

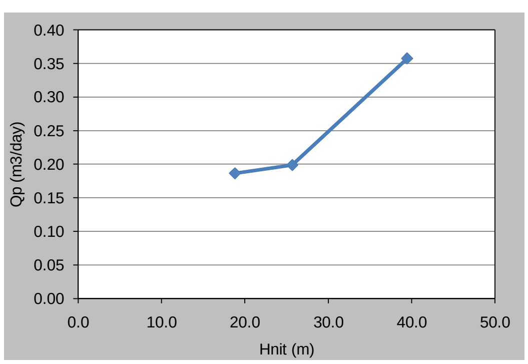
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	18.00	m
Hwt	Water column over test midpoint	19.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	13.00	m
Hct	Hydrostatic head on test midpoint	14.50	m
Hw'	Water column over packer (corrected)	18.00	m
Hwt'	Water column over test midpoint (corrected)	19.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	13.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	14.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	18.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	207	psi
Ppmax	Maximum packer inflation pressure	518	psi

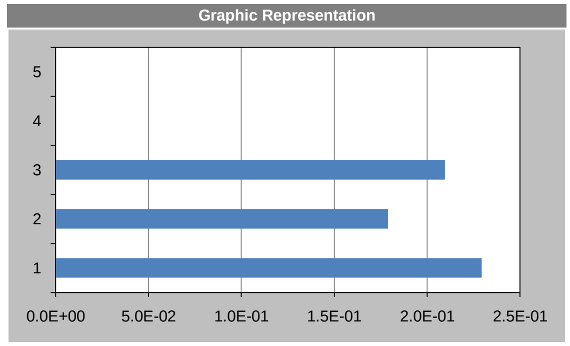
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.26	0.30	0.38		
2	0.15	0.19	0.15		
3	0.11	0.11	0.49		
4	0.15	0.11	0.23		
5	0.06	0.11	0.30		
6	0.04	0.06	0.23		
7		0.08	0.15		
8			0.17		
9			0.13		
10					
Q_P (lit/min)	0.13	0.14	0.25		
Q_P (m^3/day)	0.19	0.20	0.36		
Hf (m)	1.7E-07	1.9E-07	5.5E-07		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	2.2E-03	1.7E-03	2.0E-03		
K (cm/sec)	2.5E-06	2.0E-06	2.3E-06		
UL	2.3E-01	1.8E-01	2.1E-01		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

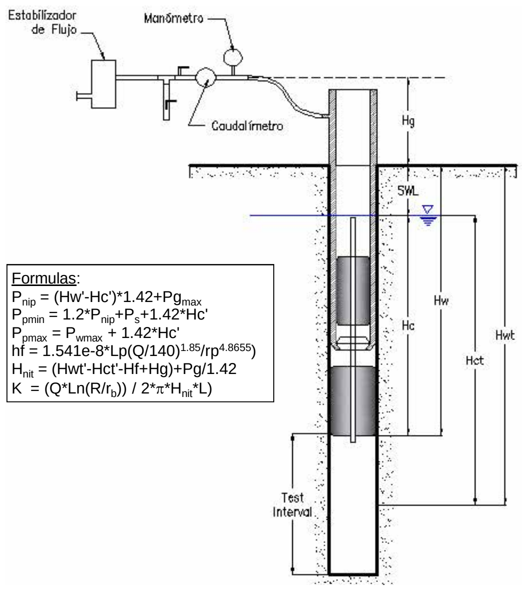
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :** 21.00	**To** 24.00	**Borehole :**	CH-3
Area:		**Date :**	**Start:**	**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	24.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

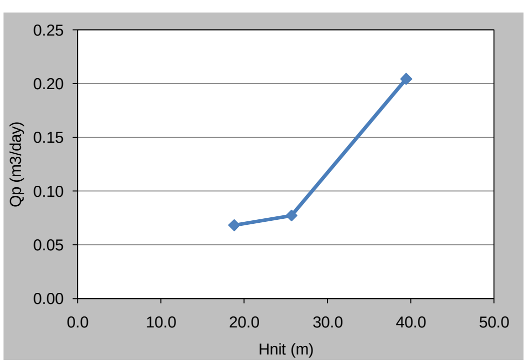
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	21.00	m
Hwt	Water column over test midpoint	22.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	16.00	m
Hct	Hydrostatic head on test midpoint	17.50	m
Hw'	Water column over packer (corrected)	21.00	m
Hwt'	Water column over test midpoint (corrected)	22.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	16.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	17.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	21.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	211	psi
Ppmax	Maximum packer inflation pressure	523	psi

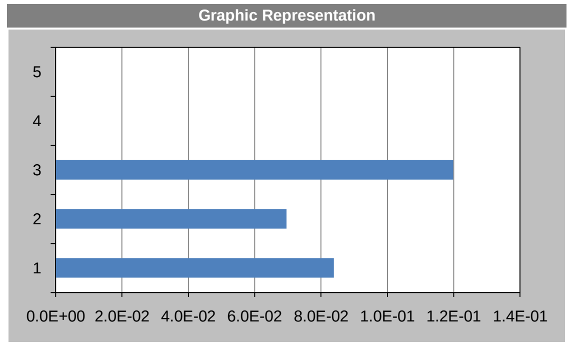
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.11	0.04	0.19		
2	0.08	0.08	0.15		
3	0.04	0.08	0.15		
4	0.04	0.06	0.11		
5	0.02	0.06	0.11		
6	0.00	0.02	0.13		
7					
8					
9					
10					
Q_P (lit/min)	0.05	0.05	0.14		
Q_P (m^3/day)	0.07	0.08	0.20		
Hf (m)	3.0E-08	3.8E-08	2.3E-07		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	8.0E-04	6.6E-04	1.1E-03		
K (cm/sec)	9.2E-07	7.6E-07	1.3E-06		
UL	8.4E-02	7.0E-02	1.2E-01		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



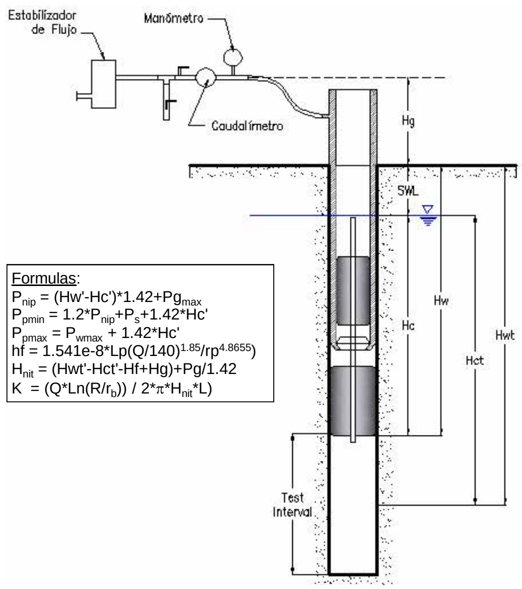
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	24.00	**To**	27.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	7
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	27.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

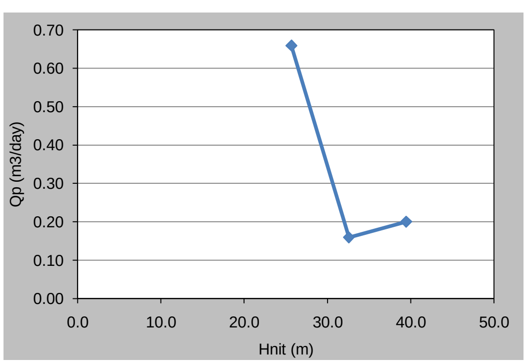
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	24.00	m
Hwt	Water column over test midpoint	25.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	19.00	m
Hct	Hydrostatic head on test midpoint	20.50	m
Hw'	Water column over packer (corrected)	24.00	m
Hwt'	Water column over test midpoint (corrected)	25.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	19.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	20.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	24.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	216	psi
Ppmax	Maximum packer inflation pressure	527	psi

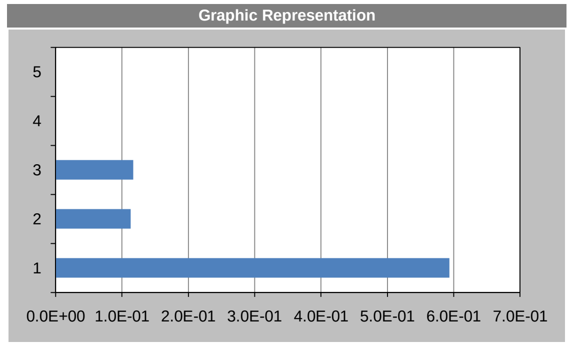
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	30.0	40.0	50.0		
1	2.35	0.19	0.15		
2	0.11	0.11	0.15		
3	0.08	0.08	0.15		
4	0.08	0.09	0.11		
5	0.06	0.09	0.13		
6	0.08	0.09	0.13		
7					
8					
9					
10					
Q_P (lit/min)	0.46	0.11	0.14		
Q_P (m^3/day)	0.66	0.16	0.20		
Hf (m)	2.3E-06	1.7E-07	2.5E-07		
Hnit (m)	25.7	32.6	39.5		
K (m/day)	5.6E-03	1.1E-03	1.1E-03		
K (cm/sec)	6.5E-06	1.2E-06	1.3E-06		
UL	5.9E-01	1.1E-01	1.2E-01		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

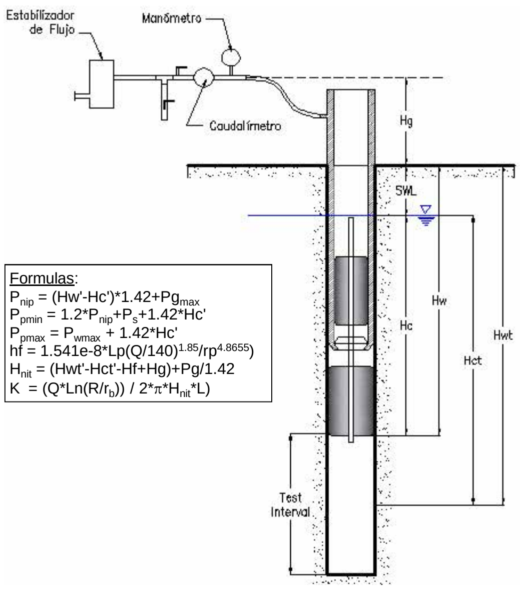
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	27.00	**To**	30.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	8
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	30.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

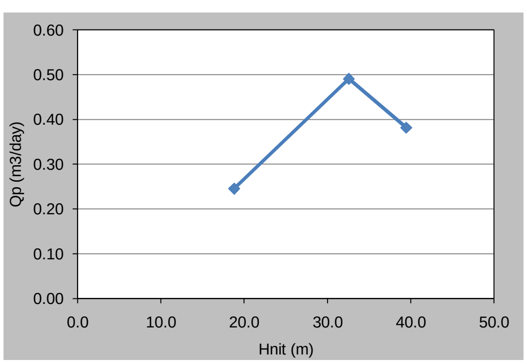
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	27.00	m
Hwt	Water column over test midpoint	28.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	22.00	m
Hct	Hydrostatic head on test midpoint	23.50	m
Hw'	Water column over packer (corrected)	27.00	m
Hwt'	Water column over test midpoint (corrected)	28.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	22.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	23.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	27.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	220	psi
Ppmax	Maximum packer inflation pressure	531	psi

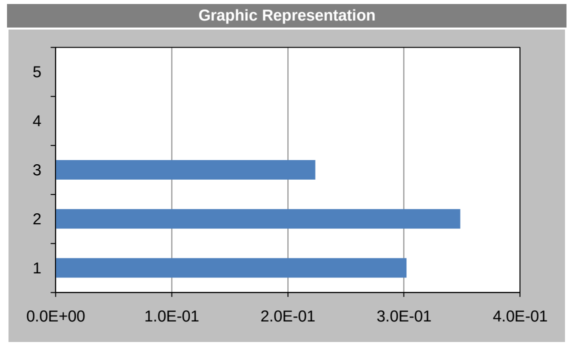
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	50.0		
1	0.38	0.49	0.26		
2	0.19	0.26	0.30		
3	0.09	0.30	0.26		
4	0.09	0.25	0.26		
5	0.09	0.32	0.23		
6		0.42	0.28		
7			0.25		
8					
9					
10					
Q_P (lit/min)	0.17	0.34	0.26		
Q_P (m^3/day)	0.25	0.49	0.38		
Hf (m)	4.1E-07	1.5E-06	9.4E-07		
Hnit (m)	18.8	32.6	39.5		
K (m/day)	2.9E-03	3.3E-03	2.1E-03		
K (cm/sec)	3.3E-06	3.8E-06	2.5E-06		
UL	3.0E-01	3.5E-01	2.2E-01		
K Sensitivity :		8.00E-05 (m/day)		9.26E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

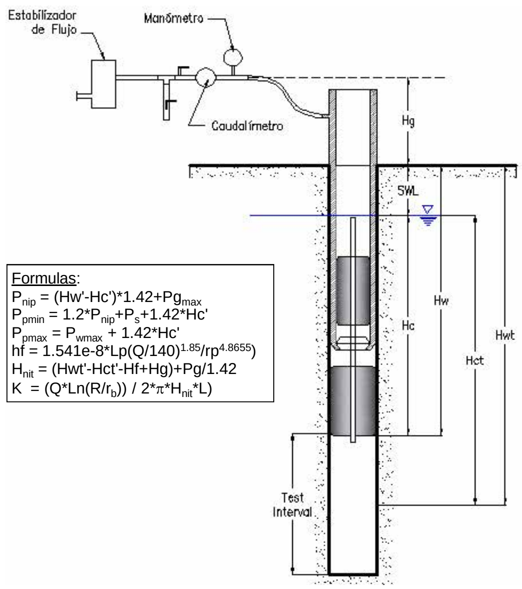
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	30.00 **To** 31.00	**Borehole :**	CH-3
Area:		**Date :**	**Start:**	**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	31.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:

$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$

$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$

$P_{pmax} = P_{wmax} + 1.42*Hc'$

$hf = 1.541e-8*Lp(Q/140)^{1.85}/rp^{4.8655})$

$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$

$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

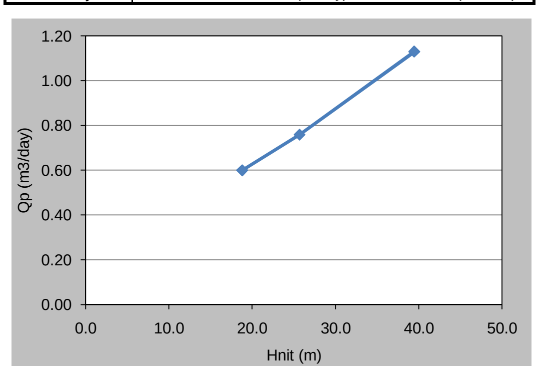
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	30.00	m
Hwt	Water column over test midpoint	30.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	25.00	m
Hct	Hydrostatic head on test midpoint	25.50	m
Hw'	Water column over packer (corrected)	30.00	m
Hwt'	Water column over test midpoint (corrected)	30.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	25.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	25.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	30.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	224	psi
Ppmax	Maximum packer inflation pressure	536	psi

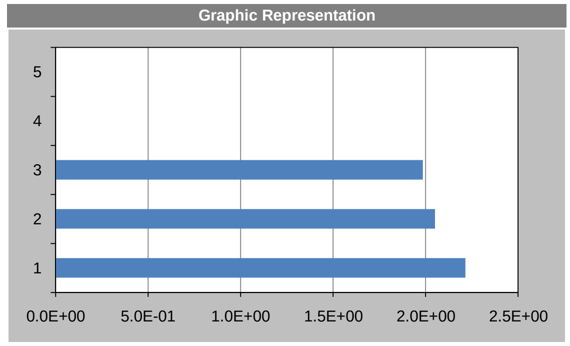
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.53	0.91	1.14		
2	0.30	0.61	0.95		
3		0.49	0.76		
4		0.45	0.68		
5		0.38	0.64		
6		0.32	0.66		
7			0.66		
8					
9					
10					
Q_P (lit/min)	0.42	0.53	0.78		
Q_P (m^3/day)	0.60	0.76	1.13		
Hf (m)	2.4E-06	3.7E-06	7.8E-06		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.5E-02	1.4E-02	1.4E-02		
K (cm/sec)	1.8E-05	1.7E-05	1.6E-05		
UL	2.2E+00	2.1E+00	2.0E+00		
K Sensitivity :		1.76E-04 (m/day)		2.04E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

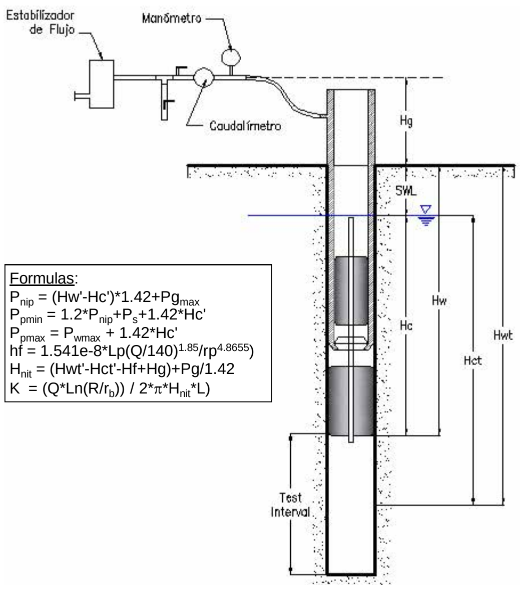
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	32.00	**To**	33.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	10
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	33.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

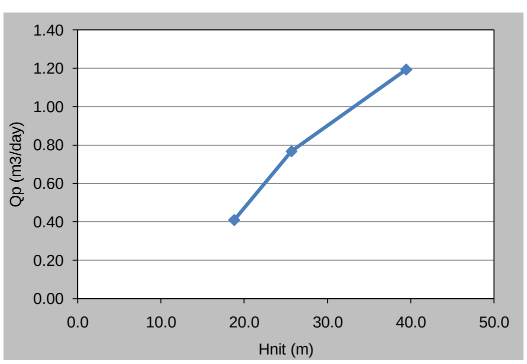
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	32.00	m
Hwt	Water column over test midpoint	32.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	27.00	m
Hct	Hydrostatic head on test midpoint	27.50	m
Hw'	Water column over packer (corrected)	32.00	m
Hwt'	Water column over test midpoint (corrected)	32.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	27.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	27.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	32.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	227	psi
Ppmax	Maximum packer inflation pressure	538	psi

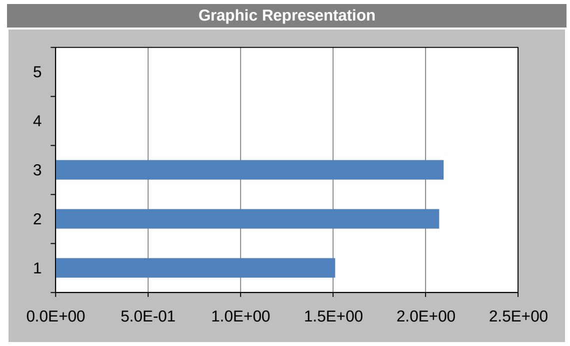
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.30	0.87	1.32		
2	0.26	0.61	1.14		
3		0.45	0.87		
4		0.53	0.83		
5		0.45	0.76		
6		0.44	0.57		
7		0.38	0.57		
8			0.57		
9					
10					
Q_P (lit/min)	0.28	0.53	0.83		
Q_P (m^3/day)	0.41	0.77	1.19		
Hf (m)	1.3E-06	4.0E-06	9.2E-06		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.1E-02	1.4E-02	1.5E-02		
K (cm/sec)	1.2E-05	1.7E-05	1.7E-05		
UL	1.5E+00	2.1E+00	2.1E+00		
K Sensitivity :	1.76E-04 (m/day)		2.04E-07 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

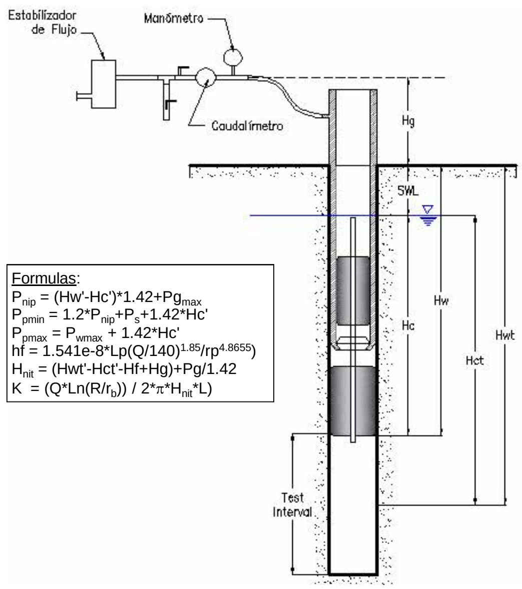
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	35.00	**To**	36.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	11
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	36.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

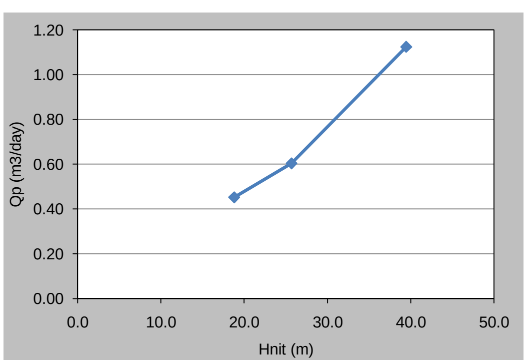
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	35.00	m
Hwt	Water column over test midpoint	35.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	30.00	m
Hct	Hydrostatic head on test midpoint	30.50	m
Hw'	Water column over packer (corrected)	35.00	m
Hwt'	Water column over test midpoint (corrected)	35.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	30.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	30.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	35.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	231	psi
Ppmax	Maximum packer inflation pressure	543	psi

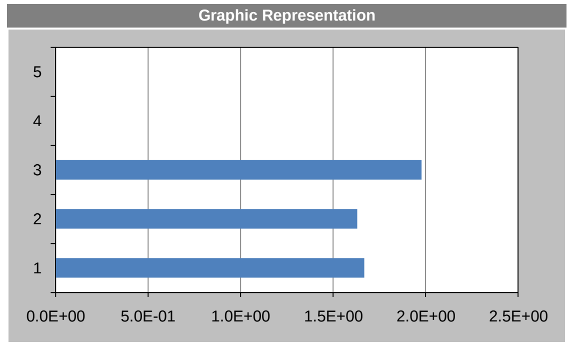
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.57	0.61	1.51		
2	0.45	0.49	0.95		
3	0.30	0.42	0.79		
4	0.19	0.38	0.72		
5	0.28	0.38	0.66		
6	0.23	0.34	0.57		
7	0.17	0.32	0.57		
8			0.47		
9					
10					
Q_P (lit/min)	0.31	0.42	0.78		
Q_P (m^3/day)	0.45	0.60	1.12		
Hf (m)	1.7E-06	2.8E-06	9.0E-06		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.2E-02	1.1E-02	1.4E-02		
K (cm/sec)	1.3E-05	1.3E-05	1.6E-05		
UL	1.7E+00	1.6E+00	2.0E+00		
K Sensitivity :		1.76E-04 (m/day)		2.04E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

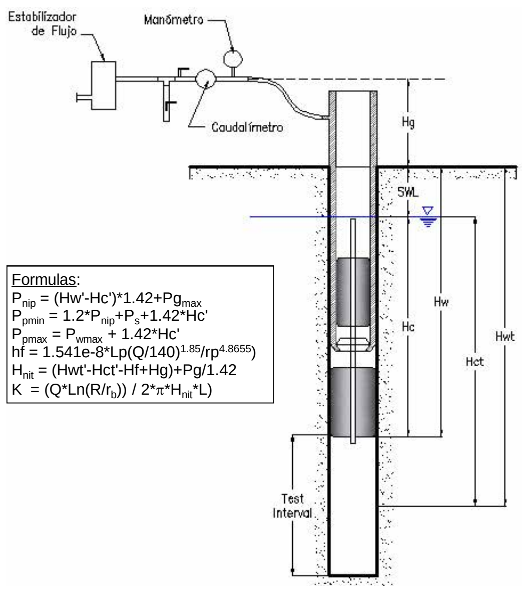
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	50.00	**To**	51.00	**Borehole :**	CH-3
Area:		**Date :**		**Start:**		**Test Number :**	12
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	51.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

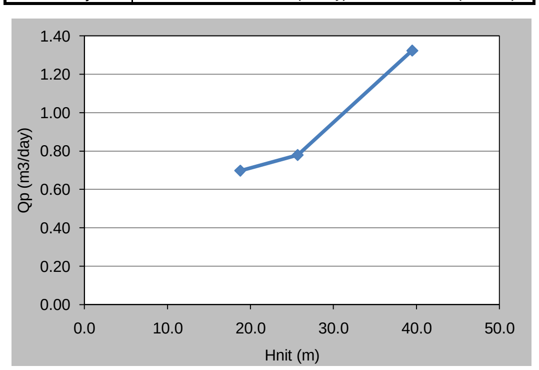
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	50.00	m
Hwt	Water column over test midpoint	50.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	45.00	m
Hct	Hydrostatic head on test midpoint	45.50	m
Hw'	Water column over packer (corrected)	50.00	m
Hwt'	Water column over test midpoint (corrected)	50.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	45.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	45.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	50.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	252	psi
Ppmax	Maximum packer inflation pressure	564	psi

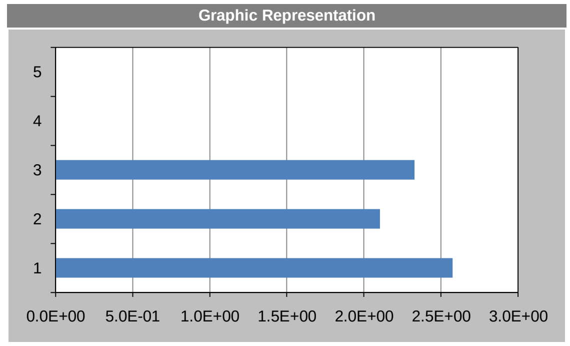
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.76	0.76	1.32		
2	0.68	0.68	1.06		
3	0.53	0.53	1.02		
4	0.53	0.49	0.76		
5	0.36	0.47	0.76		
6	0.28	0.42	0.76		
7	0.25	0.44	0.76		
8					
9					
10					
Q_P (lit/min)	0.48	0.54	0.92		
Q_P (m^3/day)	0.70	0.78	1.32		
Hf (m)	5.3E-06	6.5E-06	1.7E-05		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.8E-02	1.5E-02	1.6E-02		
K (cm/sec)	2.1E-05	1.7E-05	1.9E-05		
UL	2.6E+00	2.1E+00	2.3E+00		
K Sensitivity :		1.76E-04 (m/day)		2.04E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

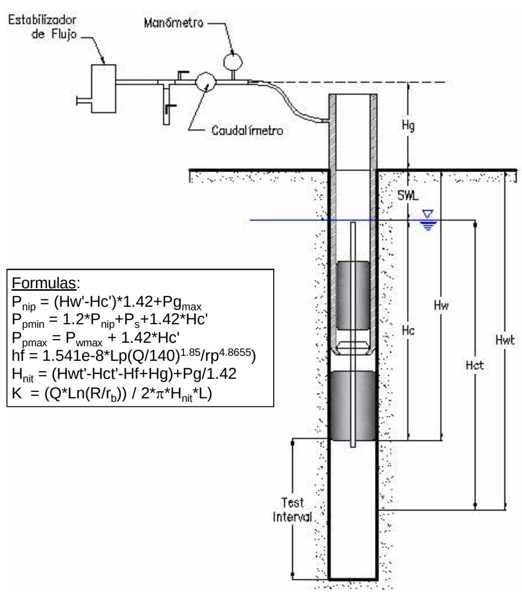
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	Test Depth :	65.00	To	66.00	Borehole :	CH-3
Area:		Date :		Start:		Test Number :	13
Coordinates (m):		Altura Caudalímetro:		End:		Total Depth (m) :	66.00
Elevation (msnm):		Interval Lithology :				Supervisor :	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

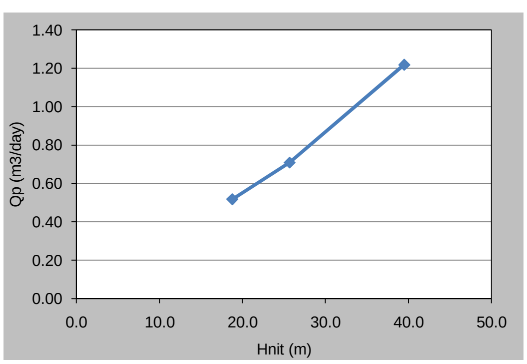
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	65.00	m
Hwt	Water column over test midpoint	65.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	60.00	m
Hct	Hydrostatic head on test midpoint	60.50	m
Hw'	Water column over packer (corrected)	65.00	m
Hwt'	Water column over test midpoint (corrected)	65.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	60.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	60.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	65.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	274	psi
Ppmax	Maximum packer inflation pressure	585	psi

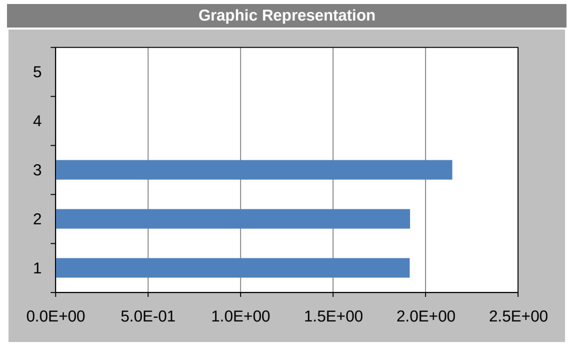
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.57	0.64	1.14		
2	0.38	0.49	1.06		
3	0.45	0.38	0.83		
4	0.25	0.57	0.76		
5	0.38	0.38	0.81		
6	0.25		0.70		
7	0.25		0.62		
8					
9					
10					
Q_P (lit/min)	0.36	0.49	0.85		
Q_P (m^3/day)	0.52	0.71	1.22		
Hf (m)	4.0E-06	7.1E-06	1.9E-05		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.3E-02	1.3E-02	1.5E-02		
K (cm/sec)	1.5E-05	1.5E-05	1.7E-05		
UL	1.9E+00	1.9E+00	2.1E+00		
K Sensitivity :	1.76E-04 (m/day)			2.04E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



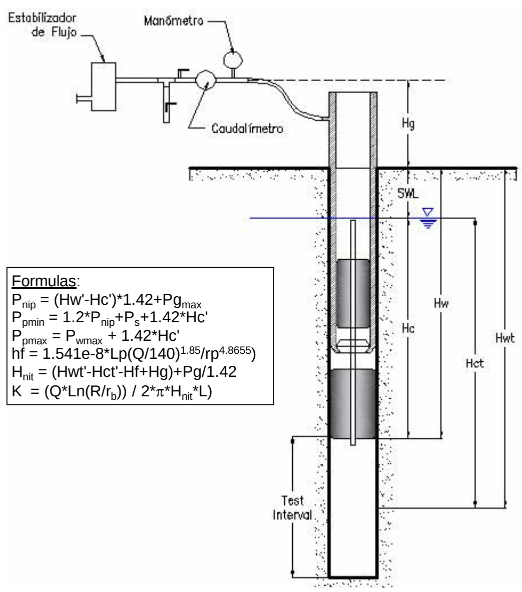
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 77.00	**To** 78.00	**Borehole :**	CH-3
Area:	**Date :**	**Start:**	**Test Number :**	14
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	78.00
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

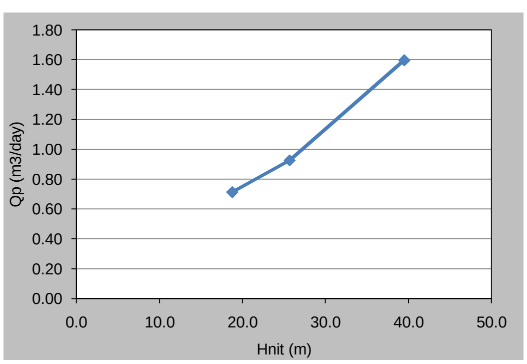
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	77.00	m
Hwt	Water column over test midpoint	77.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	72.00	m
Hct	Hydrostatic head on test midpoint	72.50	m
Hw'	Water column over packer (corrected)	77.00	m
Hwt'	Water column over test midpoint (corrected)	77.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	72.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	72.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	77.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	291	psi
Ppmax	Maximum packer inflation pressure	602	psi

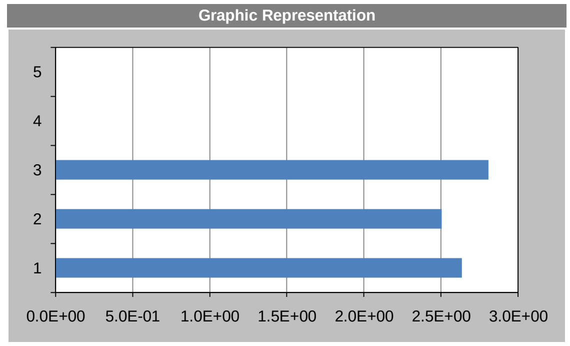
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.57	0.76	1.51		
2	0.57	0.76	1.14		
3	0.57	0.57	1.32		
4	0.47	0.57	0.95		
5	0.47	0.57	1.04		
6	0.32		0.95		
7			0.85		
8					
9					
10					
Q_P (lit/min)	0.50	0.64	1.11		
Q_P (m^3/day)	0.71	0.93	1.60		
Hf (m)	8.5E-06	1.4E-05	3.8E-05		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.8E-02	1.7E-02	2.0E-02		
K (cm/sec)	2.1E-05	2.0E-05	2.3E-05		
UL	2.6E+00	2.5E+00	2.8E+00		
K Sensitivity :	1.76E-04 (m/day)		2.04E-07 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

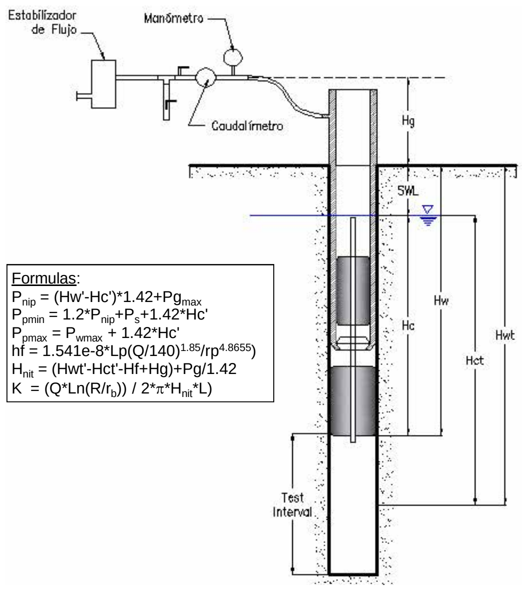
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 89.00	**To** 90.00	**Borehole :** CH-3		
Area:	**Date :**	**Start:**	**Test Number :** 15		
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 90.00		
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**		



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

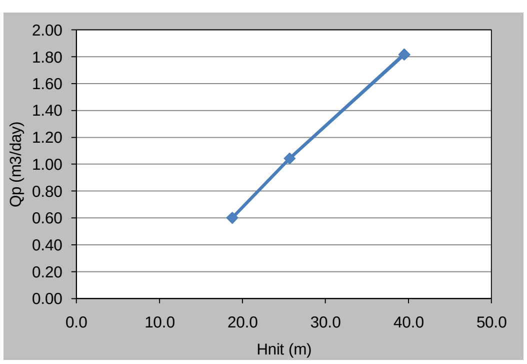
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	89.00	m
Hwt	Water column over test midpoint	89.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	84.00	m
Hct	Hydrostatic head on test midpoint	84.50	m
Hw'	Water column over packer (corrected)	89.00	m
Hwt'	Water column over test midpoint (corrected)	89.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	84.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	84.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	89.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	308	psi
Ppmax	Maximum packer inflation pressure	619	psi

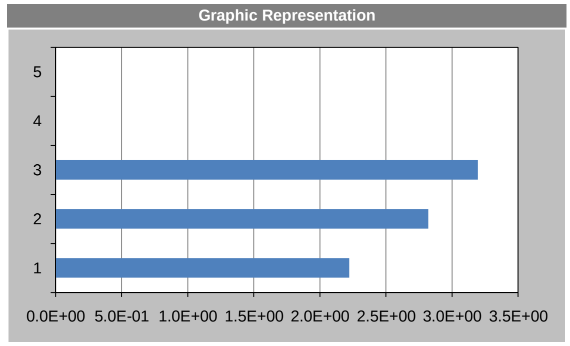
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	30.0	50.0		
1	0.38	0.76	1.51		
2	0.47	0.76	1.14		
3	0.43	0.76	1.14		
4	0.38	0.76			
5	0.57	0.76			
6	0.34	0.64			
7	0.36	0.64			
8					
9					
10					
Q_P (lit/min)	0.42	0.72	1.26		
Q_P (m^3/day)	0.60	1.04	1.82		
Hf (m)	7.2E-06	2.0E-05	5.5E-05		
Hnit (m)	18.8	25.7	39.5		
K (m/day)	1.5E-02	2.0E-02	2.2E-02		
K (cm/sec)	1.8E-05	2.3E-05	2.6E-05		
UL	2.2E+00	2.8E+00	3.2E+00		
K Sensitivity :	1.76E-04 (m/day)		2.04E-07 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

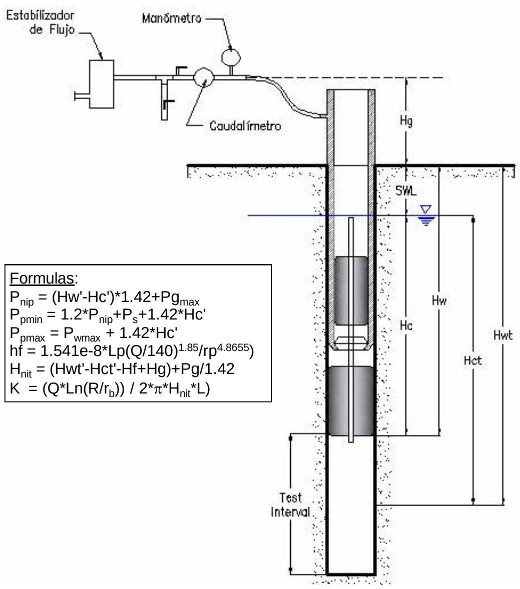
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	5.50	**To**	6.50	**Borehole :**	CH-4
Area:		**Date :**		**Start:**		**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	6.50
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

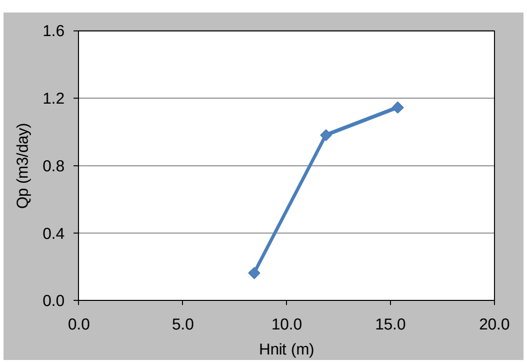
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	5.50	m
Hwt	Water column over test midpoint	6.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	0.50	m
Hct	Hydrostatic head on test midpoint	1.00	m
Hw'	Water column over packer (corrected)	5.50	m
Hwt'	Water column over test midpoint (corrected)	6.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	0.50	m
Hct'	Hydrostatic head on test midpoint (corrected)	1.00	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	5.50	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	189	psi
Ppmax	Maximum packer inflation pressure	501	psi

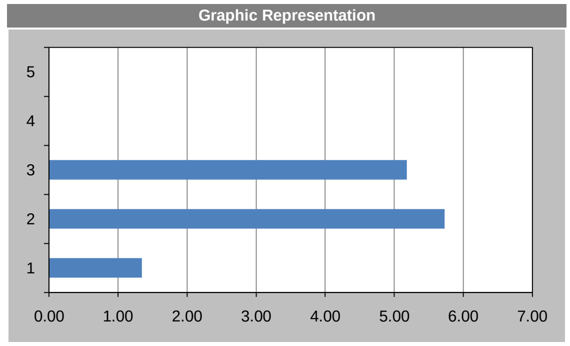
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	5.0	10.0	15.0		
1	0.00	0.91	0.45		
2	0.00	0.91	0.45		
3	0.00	0.45	0.91		
4	0.45	0.45	1.36		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.11	0.68	0.80		
Q_P (m^3/day)	0.2	1.0	1.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	8.4	11.9	15.3		
K (m/day)	9.4E-03	4.0E-02	3.6E-02		
K (cm/sec)	1.1E-05	4.6E-05	4.2E-05		
UL	1.35	5.73	5.18		
K Sensitivity :		4.54E-04 (m/day)		5.25E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

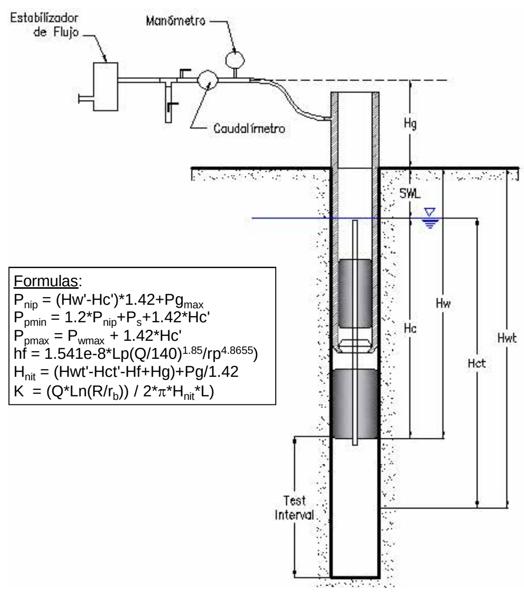
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	24.50	**To**	25.50	**Borehole :**	CH-4
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	25.50
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

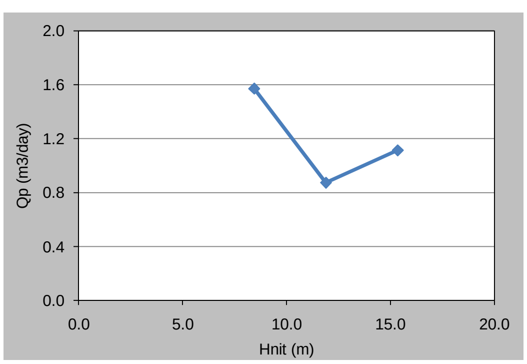
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	24.50	m
Hwt	Water column over test midpoint	25.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	19.50	m
Hct	Hydrostatic head on test midpoint	20.00	m
Hw'	Water column over packer (corrected)	24.50	m
Hwt'	Water column over test midpoint (corrected)	25.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	19.50	m
Hct'	Hydrostatic head on test midpoint (corrected)	20.00	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	24.50	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	216	psi
Ppmax	Maximum packer inflation pressure	528	psi

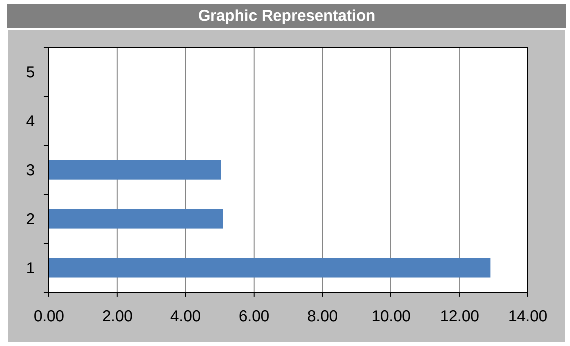
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	5.0	10.0	15.0		
1	0.00	0.91	0.00		
2	0.45	1.36	0.45		
3	0.91	0.91	0.91		
4	2.27	0.45	1.36		
5	1.82	0.00	1.36		
6		0.00	0.55		
7					
8					
9					
10					
Q_P (lit/min)	1.09	0.61	0.77		
Q_P (m^3/day)	1.6	0.9	1.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	8.4	11.9	15.3		
K (m/day)	9.0E-02	3.5E-02	3.5E-02		
K (cm/sec)	1.0E-04	4.1E-05	4.1E-05		
UL	12.91	5.10	5.04		
K Sensitivity :		4.54E-04 (m/day)		5.25E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



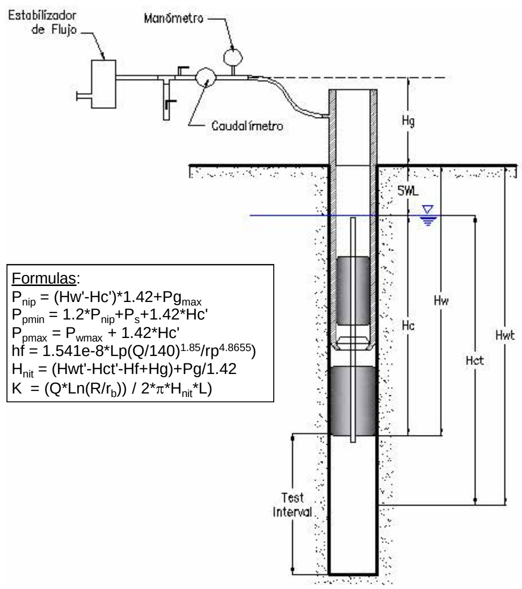
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	Test Depth :	45.50	To	46.50	Borehole :	CH-4
Area:		Date :		Start:		Test Number :	4
Coordinates (m):		Altura Caudalímetro:		End:		Total Depth (m) :	46.50
Elevation (msnm):		Interval Lithology :				Supervisor :	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e-8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

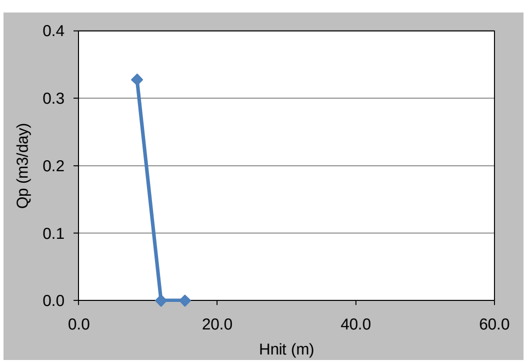
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	45.50	m
Hwt	Water column over test midpoint	46.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	40.50	m
Hct	Hydrostatic head on test midpoint	41.00	m
Hw'	Water column over packer (corrected)	45.50	m
Hwt'	Water column over test midpoint (corrected)	46.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	40.50	m
Hct'	Hydrostatic head on test midpoint (corrected)	41.00	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	45.50	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	246	psi
Ppmax	Maximum packer inflation pressure	558	psi

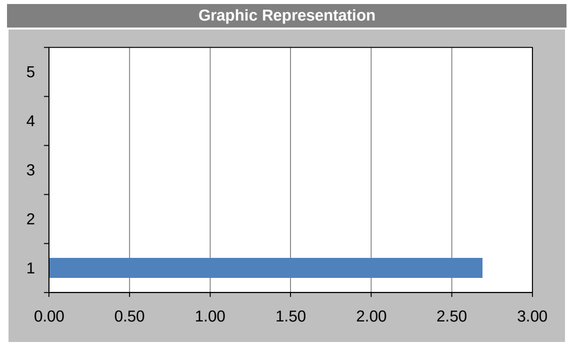
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	5.0	10.0	15.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3	0.45	0.00	0.00		
4	0.45	0.00	0.00		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.23	0.00	0.00		
Q_P (m^3/day)	0.3	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	8.4	11.9	15.3		
K (m/day)	1.9E-02	0.0E+00	0.0E+00		
K (cm/sec)	2.2E-05	0.0E+00	0.0E+00		
UL	2.69	0.00	0.00		
K Sensitivity :		4.54E-04 (m/day)		5.25E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

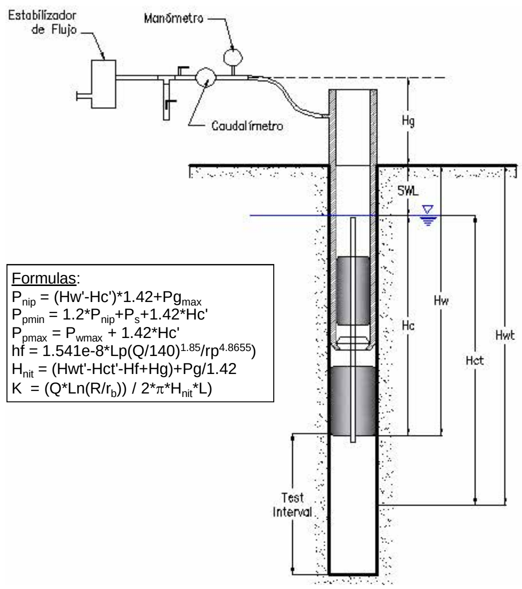
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	66.50	**To**	67.50	**Borehole :**	CH-4
Area:		**Date :**		**Start:**		**Test Number :**	3
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	67.50
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L$

Nota 1: If hole is dry enter SWL = depth.

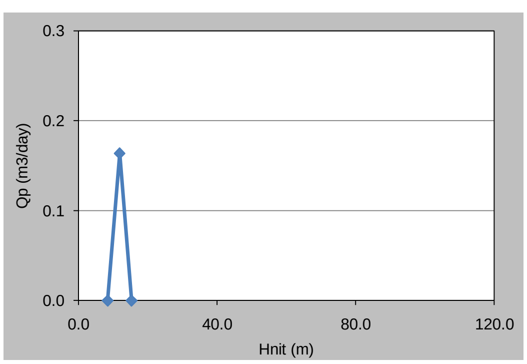
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	66.50	m
Hwt	Water column over test midpoint	67.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	61.50	m
Hct	Hydrostatic head on test midpoint	62.00	m
Hw'	Water column over packer (corrected)	66.50	m
Hwt'	Water column over test midpoint (corrected)	67.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	61.50	m
Hct'	Hydrostatic head on test midpoint (corrected)	62.00	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	66.50	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	276	psi
Ppmax	Maximum packer inflation pressure	587	psi

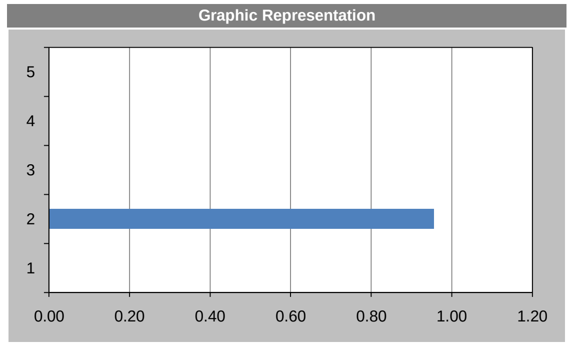
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	5.0	10.0	15.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3	0.00	0.45	0.00		
4	0.00	0.00	0.00		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.11	0.00		
Q_P (m^3/day)	0.0	0.2	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	8.4	11.9	15.3		
K (m/day)	0.0E+00	6.6E-03	0.0E+00		
K (cm/sec)	0.0E+00	7.7E-06	0.0E+00		
UL	0.00	0.96	0.00		
K Sensitivity :		4.54E-04 (m/day)		5.25E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

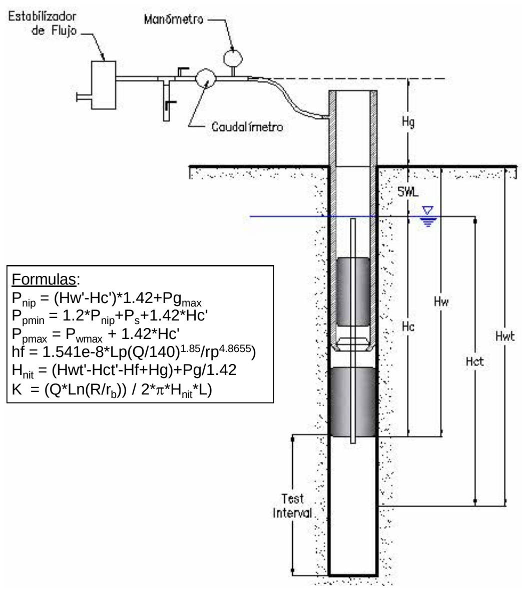
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	78.50 **To** 79.50	**Borehole :**	CH-4
Area:		**Date :**	**Start:**	**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	79.50
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp$(Q/140)^{1.85}/rp^{4.8655})$
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

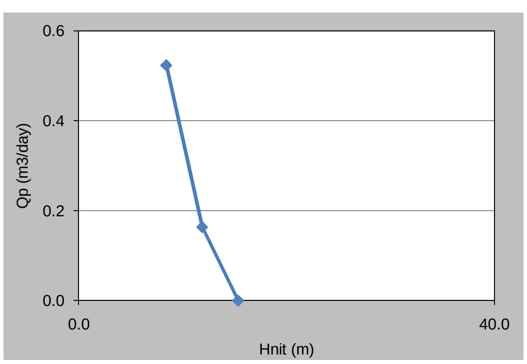
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	78.50	m
Hwt	Water column over test midpoint	79.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	73.50	m
Hct	Hydrostatic head on test midpoint	74.00	m
Hw'	Water column over packer (corrected)	78.50	m
Hwt'	Water column over test midpoint (corrected)	79.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	73.50	m
Hct'	Hydrostatic head on test midpoint (corrected)	74.00	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	78.50	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	293	psi
Ppmax	Maximum packer inflation pressure	604	psi

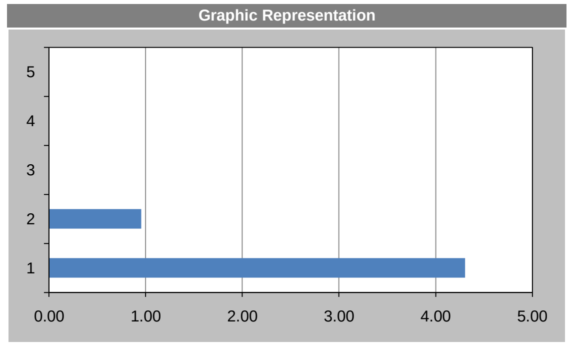
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	5.0	10.0	15.0		
1	0.91	0.00	0.00		
2	0.91	0.00	0.00		
3	0.00	0.00	0.00		
4	0.00	0.45	0.00		
5	0.00				
6					
7					
8					
9					
10					
Q_P (lit/min)	0.36	0.11	0.00		
Q_P (m^3/day)	0.5	0.2	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	8.4	11.9	15.3		
K (m/day)	3.0E-02	6.6E-03	0.0E+00		
K (cm/sec)	3.5E-05	7.7E-06	0.0E+00		
UL	4.30	0.96	0.00		
K Sensitivity :		4.54E-04 (m/day)		5.25E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



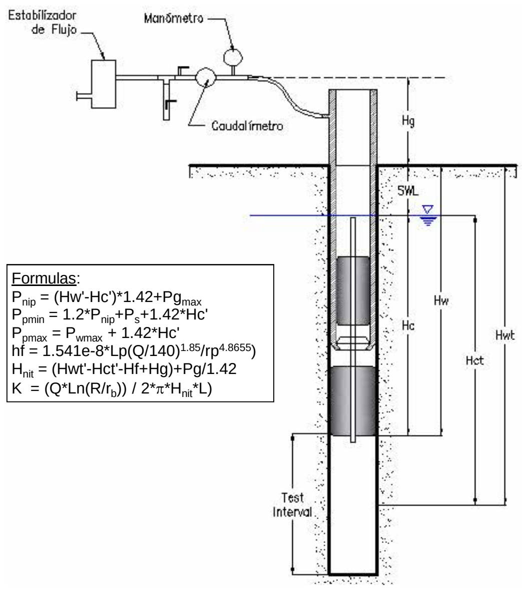
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :**	90.50	**To** 91.50	**Borehole :**	CH-4
Area:	**Date :**		**Start:**	**Test Number :**	1
Coordinates (m):	**Altura Caudalímetro:**		**End:**	**Total Depth (m) :**	91.50
Elevation (msnm):	**Interval Lithology :**			**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e-8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

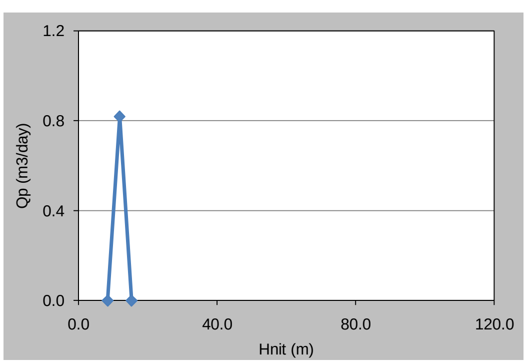
Test Data

SWL	Static water level (see note 1)	5.00 m
ß	Inclination from horizontal	90 º
Ps	Packer stretch pressure	60 psi
Pwmax	Maximum packer working pressure	500 psi
Pgmax	Maximum anticipated gauge pressure	100 psi
rb	Borehole radius	0.048 m
rp	Radius of discharge pipe	0.039 m
Hw	Water column over packer	90.50 m
Hwt	Water column over test midpoint	91.00 m
Hg	Gauge height	0.00 m
Hc	Hydrostatic head on packer	85.50 m
Hct	Hydrostatic head on test midpoint	86.00 m
Hw'	Water column over packer (corrected)	90.50 m
Hwt'	Water column over test midpoint (corrected)	91.00 m
SWL'	Static water level (corrected)	5.00 m
Hc'	Hydrostatic head on packer (corrected)	85.50 m
Hct'	Hydrostatic head on test midpoint (corrected)	86.00 m
L	Length of test section	1.00 m
Lp	Length of discharge pipe	90.50 m
R	Radius of influence	1.00 m

Packer Pressures

Pnip	Net injection pressure at packer	107 psi
Ppmin	Minimum packer inflation pressure	310 psi
Ppmax	Maximum packer inflation pressure	621 psi

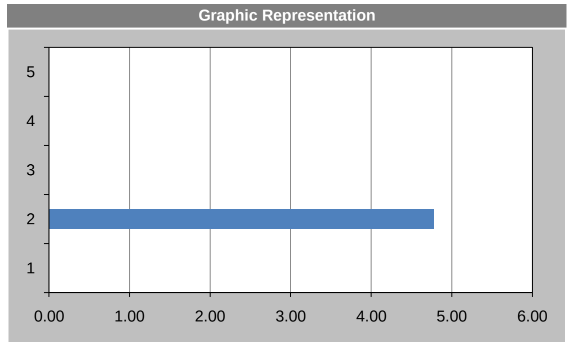
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	5.0	10.0	15.0		
1	0.00	0.45	0.00		
2	0.00	0.45	0.00		
3	0.00	0.45	0.00		
4	0.00	0.91	0.00		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.57	0.00		
Q_P (m^3/day)	0.0	0.8	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	8.4	11.9	15.3		
K (m/day)	0.0E+00	3.3E-02	0.0E+00		
K (cm/sec)	0.0E+00	3.8E-05	0.0E+00		
UL	0.00	4.78	0.00		
K Sensitivity :		4.54E-04 (m/day)		5.25E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



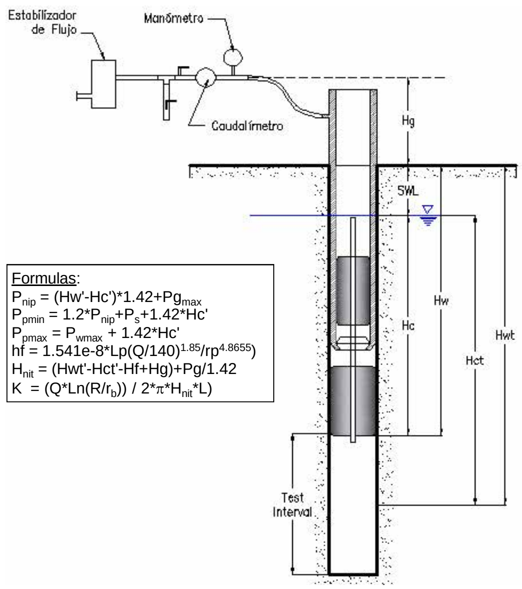
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :**	62.00	**To** 65.00	**Borehole :**	CH-5
Area:	**Date :**		**Start:**	**Test Number :**	9
Coordinates (m):	**Altura Caudalímetro:**		**End:**	**Total Depth (m) :**	65.00
Elevation (msnm):	**Interval Lithology :**			**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp$(Q/140)^{1.85}$/$rp^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

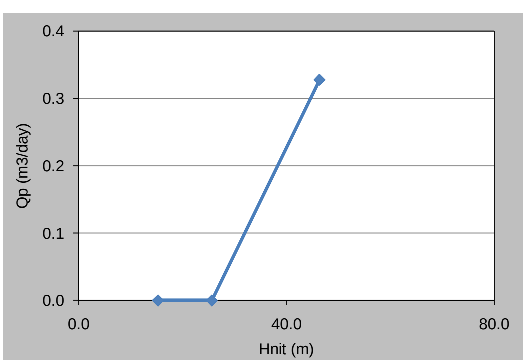
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	62.00	m
Hwt	Water column over test midpoint	63.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	57.00	m
Hct	Hydrostatic head on test midpoint	58.50	m
Hw'	Water column over packer (corrected)	62.00	m
Hwt'	Water column over test midpoint (corrected)	63.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	57.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	58.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	62.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	269	psi
Ppmax	Maximum packer inflation pressure	581	psi

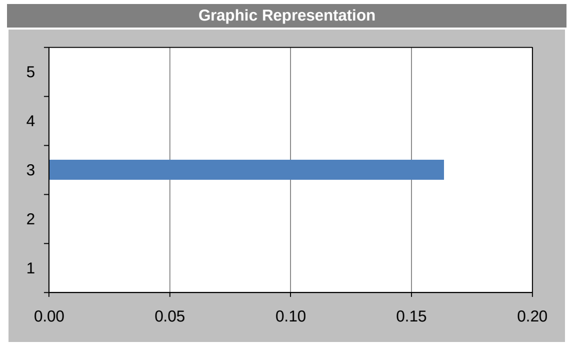
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	60.0		
1	0.00	0.00	0.23		
2	0.00	0.00	0.23		
3					
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.23		
Q_P (m^3/day)	0.0	0.0	0.3		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	46.4		
K (m/day)	0.0E+00	0.0E+00	1.5E-03		
K (cm/sec)	0.0E+00	0.0E+00	1.8E-06		
UL	0.00	0.00	0.16		
K Sensitivity :		6.81E-05 (m/day)		7.88E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



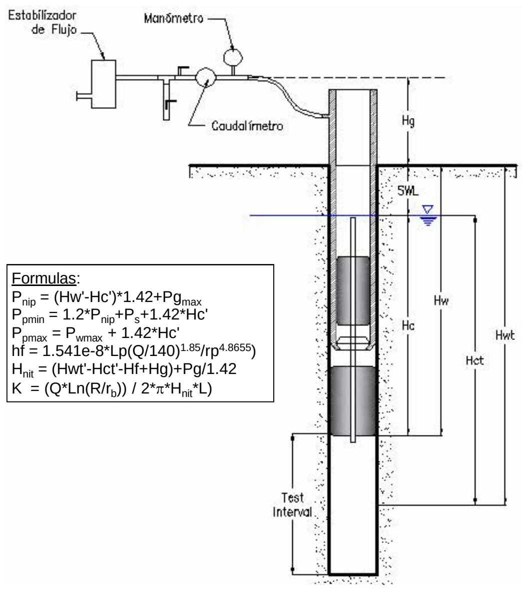
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	65.00	**To**	68.00	**Borehole :**	CH-5
Area:		**Date :**		**Start:**		**Test Number :**	8
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	68.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

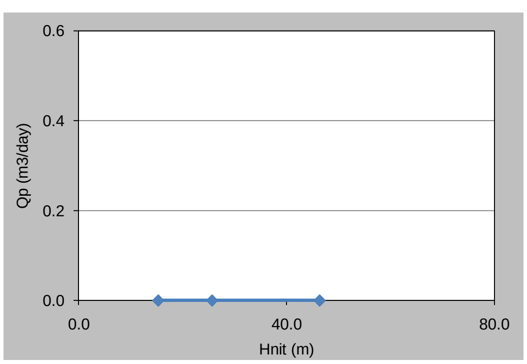
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	65.00	m
Hwt	Water column over test midpoint	66.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	60.00	m
Hct	Hydrostatic head on test midpoint	61.50	m
Hw'	Water column over packer (corrected)	65.00	m
Hwt'	Water column over test midpoint (corrected)	66.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	60.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	61.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	65.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	274	psi
Ppmax	Maximum packer inflation pressure	585	psi

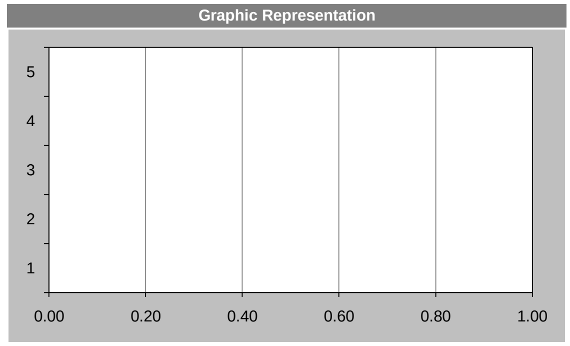
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3					
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		6.81E-05 (m/day)		7.88E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

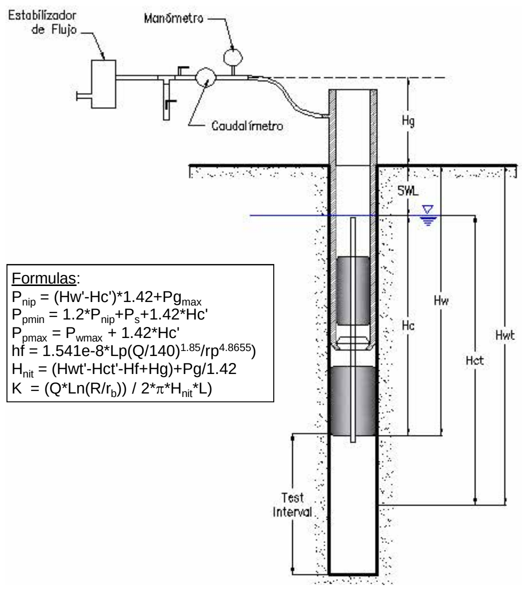
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	68.00	**To**	71.00	**Borehole :**	CH-5
Area:		**Date :**		**Start:**		**Test Number :**	7
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	71.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

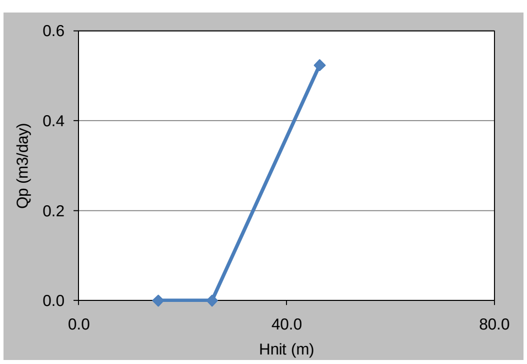
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	68.00	m
Hwt	Water column over test midpoint	69.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	63.00	m
Hct	Hydrostatic head on test midpoint	64.50	m
Hw'	Water column over packer (corrected)	68.00	m
Hwt'	Water column over test midpoint (corrected)	69.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	63.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	64.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	68.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	278	psi
Ppmax	Maximum packer inflation pressure	589	psi

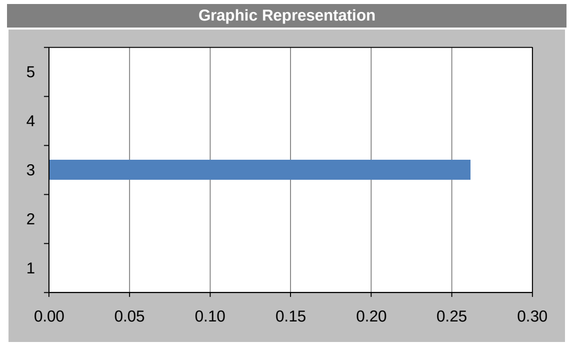
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	60.0		
1	0.00	0.00	0.36		
2	0.00	0.00	0.36		
3					
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.36		
Q_P (m^3/day)	0.0	0.0	0.5		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	46.4		
K (m/day)	0.0E+00	0.0E+00	2.5E-03		
K (cm/sec)	0.0E+00	0.0E+00	2.9E-06		
UL	0.00	0.00	0.26		
K Sensitivity :		6.81E-05 (m/day)		7.88E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

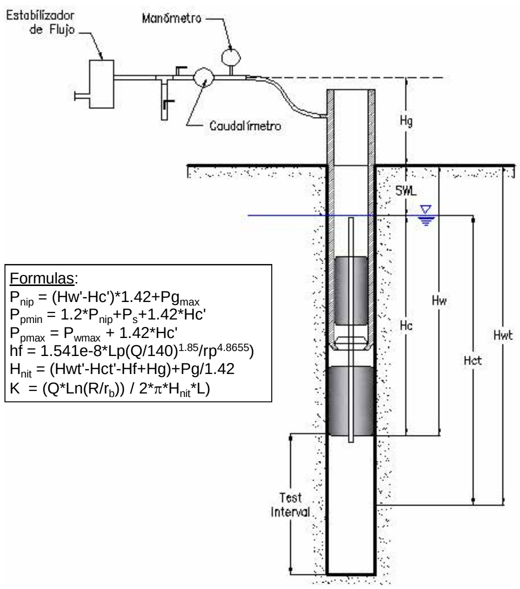
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	71.00	**To**	74.00	**Borehole :**	CH-5
Area:		**Date :**		**Start:**		**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	74.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp$(Q/140)^{1.85}/rp^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

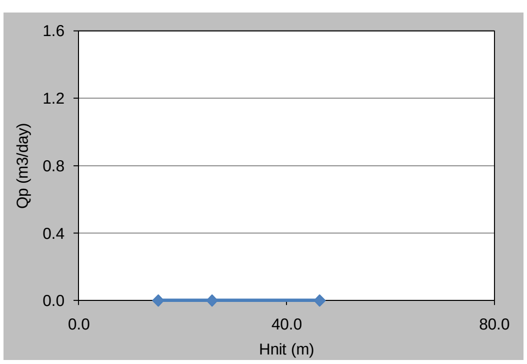
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	71.00	m
Hwt	Water column over test midpoint	72.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	66.00	m
Hct	Hydrostatic head on test midpoint	67.50	m
Hw'	Water column over packer (corrected)	71.00	m
Hwt'	Water column over test midpoint (corrected)	72.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	66.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	67.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	71.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	282	psi
Ppmax	Maximum packer inflation pressure	594	psi

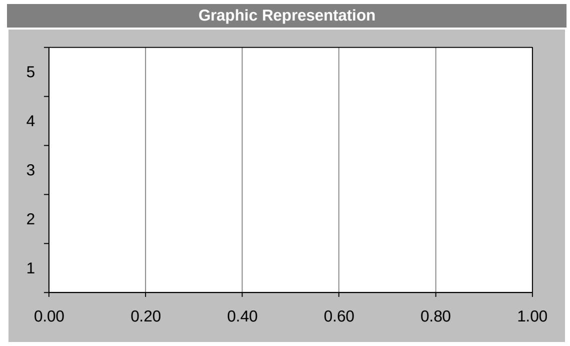
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3					
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		6.81E-05 (m/day)		7.88E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

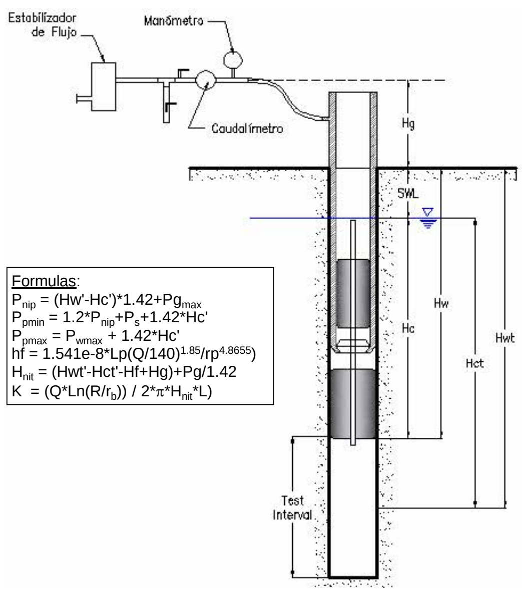
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	74.00	**To**	77.00	**Borehole :**	CH-5
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	77.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

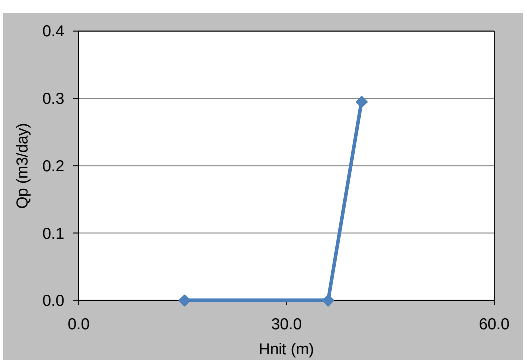
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	74.00	m
Hwt	Water column over test midpoint	75.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	69.00	m
Hct	Hydrostatic head on test midpoint	70.50	m
Hw'	Water column over packer (corrected)	74.00	m
Hwt'	Water column over test midpoint (corrected)	75.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	69.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	70.50	m
L	Length of test section	3.00	m
Lp	Length of discharge pipe	74.00	m
R	Radius of influence	3.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	287	psi
Ppmax	Maximum packer inflation pressure	598	psi

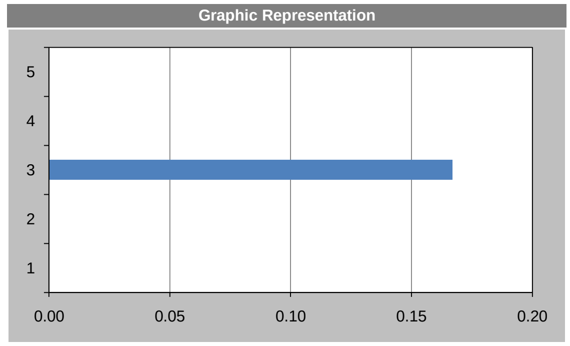
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	45.0	52.0		
1	0.00	0.00	0.23		
2	0.00	0.00	0.18		
3	0.00	0.00			
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.20		
Q_P (m^3/day)	0.0	0.0	0.3		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	36.0	40.9		
K (m/day)	0.0E+00	0.0E+00	1.6E-03		
K (cm/sec)	0.0E+00	0.0E+00	1.8E-06		
UL	0.00	0.00	0.17		
K Sensitivity :		7.73E-05 (m/day)		8.95E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

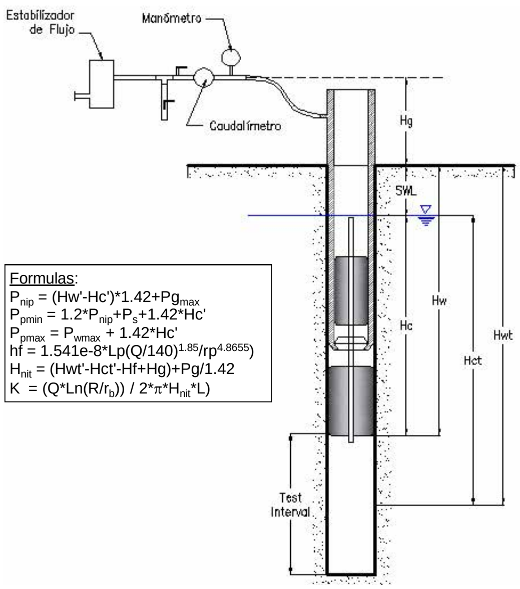
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	77.00	**To**	78.00	**Borehole :**	CH-5
Area:		**Date :**		**Start:**		**Test Number :**	4
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	78.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

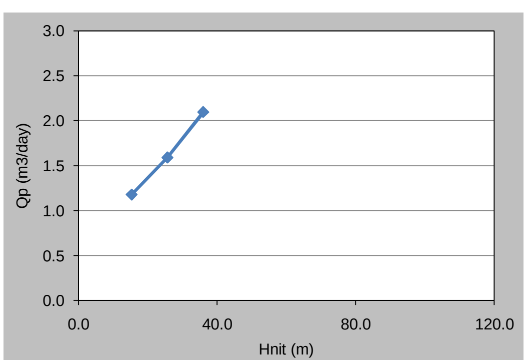
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	77.00	m
Hwt	Water column over test midpoint	77.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	72.00	m
Hct	Hydrostatic head on test midpoint	72.50	m
Hw'	Water column over packer (corrected)	77.00	m
Hwt'	Water column over test midpoint (corrected)	77.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	72.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	72.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	77.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	291	psi
Ppmax	Maximum packer inflation pressure	602	psi

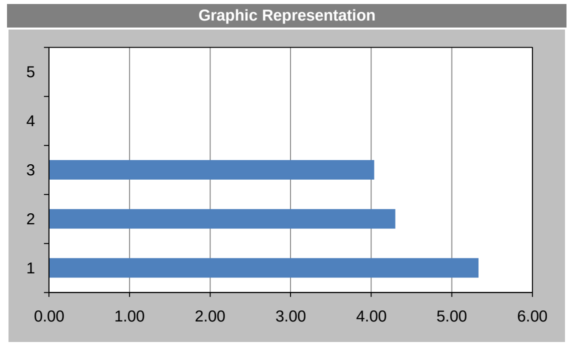
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	45.0		
1	1.05	1.36	1.59		
2	0.91	1.36	1.55		
3	0.77	1.14	1.59		
4	0.68	1.14	1.45		
5	0.68	0.91	1.36		
6		0.91	1.36		
7		0.91	1.36		
8			1.36		
9					
10					
Q_P (lit/min)	0.82	1.10	1.45		
Q_P (m^3/day)	1.2	1.6	2.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	36.0		
K (m/day)	3.7E-02	3.0E-02	2.8E-02		
K (cm/sec)	4.3E-05	3.5E-05	3.3E-05		
UL	5.33	4.30	4.04		
K Sensitivity :		1.93E-04 (m/day)		2.24E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



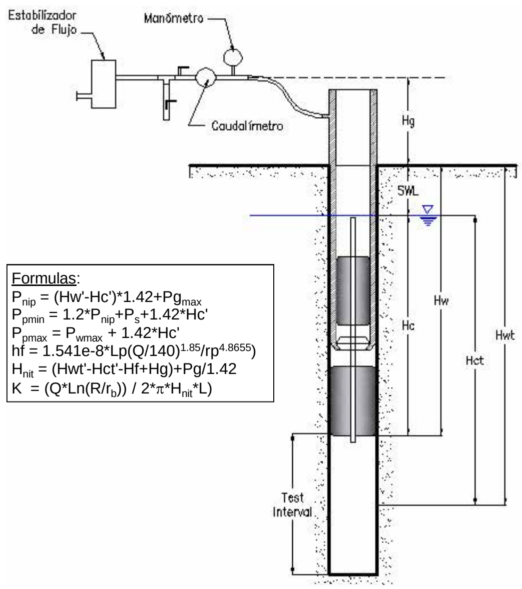
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	89.00	**To**	90.00	**Borehole :**	CH-5
Area:		**Date :**		**Start:**		**Test Number :**	3
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	90.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	89.00	m
Hwt	Water column over test midpoint	89.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	84.00	m
Hct	Hydrostatic head on test midpoint	84.50	m
Hw'	Water column over packer (corrected)	89.00	m
Hwt'	Water column over test midpoint (corrected)	89.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	84.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	84.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	89.00	m
R	Radius of influence	1.00	m

Packer Pressures

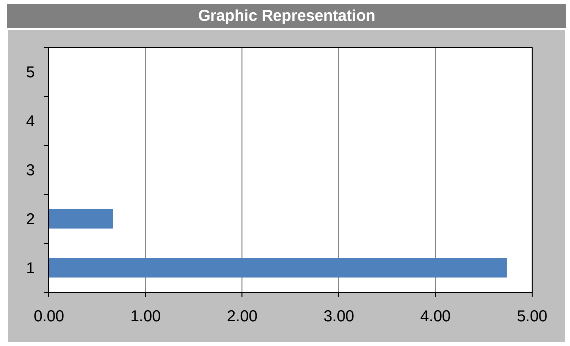
Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	308	psi
Ppmax	Maximum packer inflation pressure	619	psi

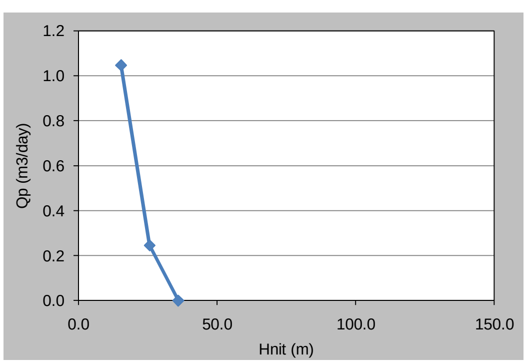
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	45.0		
1	0.86	0.68	0.00		
2	0.68	0.00	0.00		
3	0.68	0.00	0.00		
4	0.68	0.00			
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.73	0.17	0.00		
Q_P (m^3/day)	1.0	0.2	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	36.0		
K (m/day)	3.3E-02	4.6E-03	0.0E+00		
K (cm/sec)	3.8E-05	5.3E-06	0.0E+00		
UL	4.74	0.66	0.00		
K Sensitivity :		1.93E-04 (m/day)		2.24E-07 (cm/sec)	

Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation





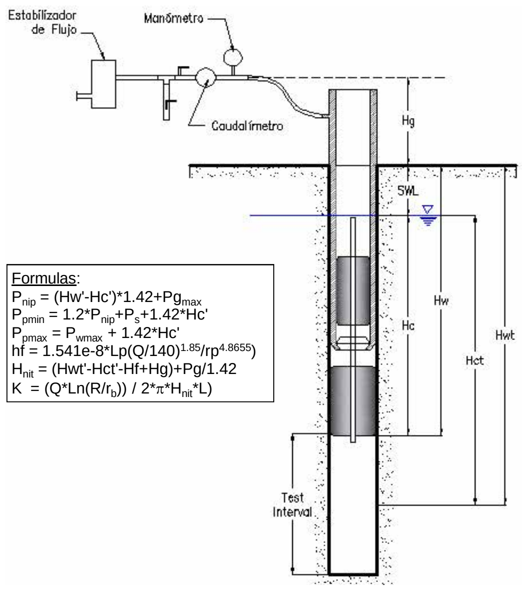
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	101.00	**To**	102.00	**Borehole :**	CH-5
Area:		**Date :**		**Start:**		**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	102.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

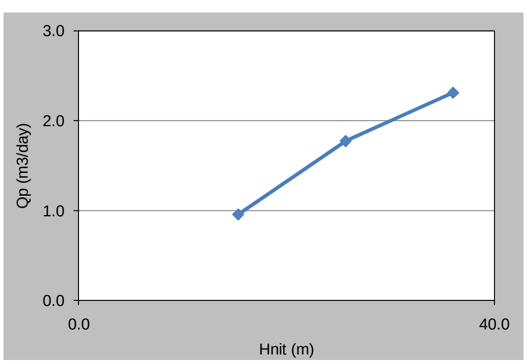
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	101.00	m
Hwt	Water column over test midpoint	101.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	96.00	m
Hct	Hydrostatic head on test midpoint	96.50	m
Hw'	Water column over packer (corrected)	101.00	m
Hwt'	Water column over test midpoint (corrected)	101.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	96.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	96.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	101.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	325	psi
Ppmax	Maximum packer inflation pressure	636	psi

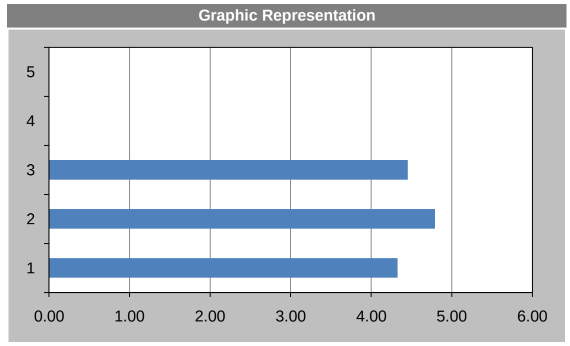
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	45.0		
1	0.68	1.48	1.82		
2	0.68	1.36	1.59		
3	0.68	1.14	1.48		
4	0.59	1.14	1.55		
5	0.68	1.14	1.59		
6		1.14			
7					
8					
9					
10					
Q_P (lit/min)	0.66	1.23	1.60		
Q_P (m^3/day)	1.0	1.8	2.3		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	36.0		
K (m/day)	3.0E-02	3.3E-02	3.1E-02		
K (cm/sec)	3.5E-05	3.9E-05	3.6E-05		
UL	4.33	4.79	4.45		
K Sensitivity :		1.93E-04 (m/day)		2.24E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



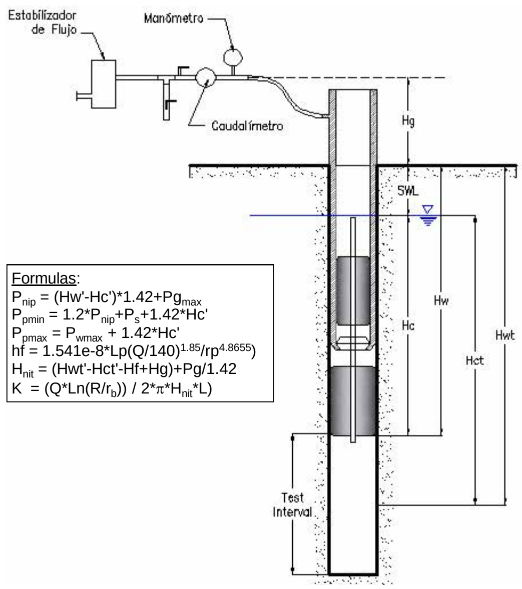
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 113.00	**To** 114.00		**Borehole :**	CH-5
Area:	**Date :**	**Start:**		**Test Number :**	1
Coordinates (m):	**Altura Caudalímetro:**	**End:**		**Total Depth (m) :**	114.00
Elevation (msnm):	**Interval Lithology :**			**Supervisor :**	



Formulas:

$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

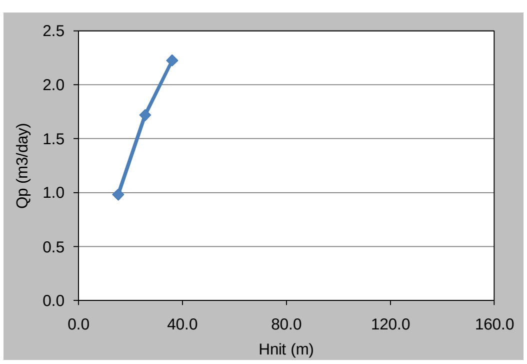
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	113.00	m
Hwt	Water column over test midpoint	113.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	108.00	m
Hct	Hydrostatic head on test midpoint	108.50	m
Hw'	Water column over packer (corrected)	113.00	m
Hwt'	Water column over test midpoint (corrected)	113.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	108.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	108.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	113.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	342	psi
Ppmax	Maximum packer inflation pressure	653	psi

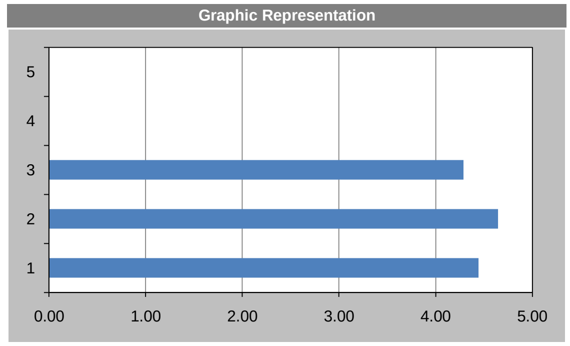
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	15.0	30.0	45.0		
1	0.68	1.36	1.73		
2	0.68	1.14	1.59		
3		1.14	1.48		
4		1.14	1.59		
5			1.48		
6			1.41		
7					
8					
9					
10					
Q_P (lit/min)	0.68	1.19	1.55		
Q_P (m^3/day)	1.0	1.7	2.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	15.3	25.7	36.0		
K (m/day)	3.1E-02	3.2E-02	3.0E-02		
K (cm/sec)	3.6E-05	3.7E-05	3.5E-05		
UL	4.44	4.65	4.29		
K Sensitivity :		1.93E-04 (m/day)		2.24E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



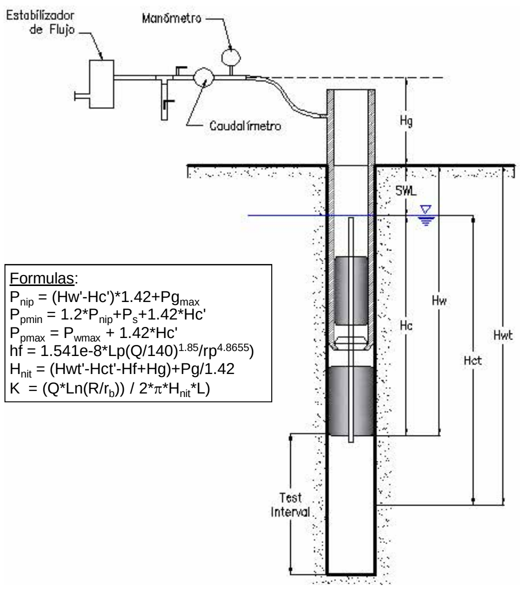
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 5.00	**To** 6.00	**Borehole :** CH-6		
Area:	**Date :**	**Start:**	**Test Number :** 9		
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 6.00		
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**		



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

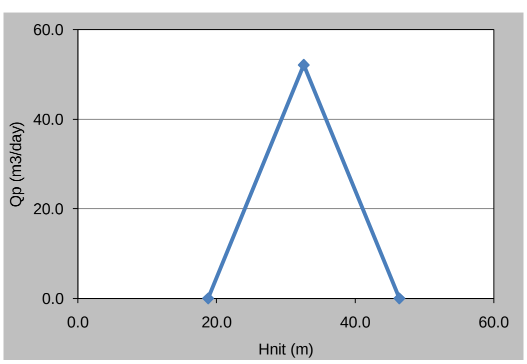
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	5.00	m
Hwt	Water column over test midpoint	5.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	0.00	m
Hct	Hydrostatic head on test midpoint	0.50	m
Hw'	Water column over packer (corrected)	5.00	m
Hwt'	Water column over test midpoint (corrected)	5.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	0.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	0.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	5.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	189	psi
Ppmax	Maximum packer inflation pressure	500	psi

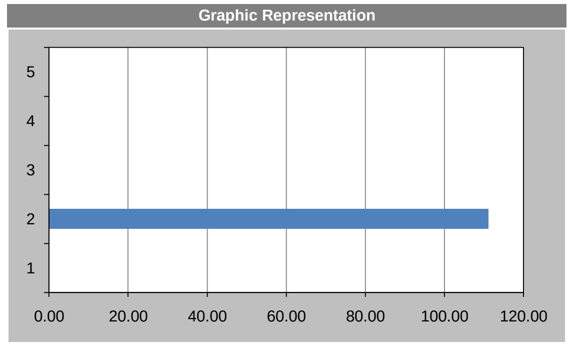
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	42.28	0.00		
2	0.00	38.19	0.00		
3	0.00	44.10	0.00		
4	0.00	20.23	0.00		
5			0.00		
6			0.00		
7					
8					
9					
10					
Q_P (lit/min)	0.00	36.20	0.00		
Q_P (m^3/day)	0.0	52.1	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	7.7E-01	0.0E+00		
K (cm/sec)	0.0E+00	8.9E-04	0.0E+00		
UL	0.00	111.09	0.00		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

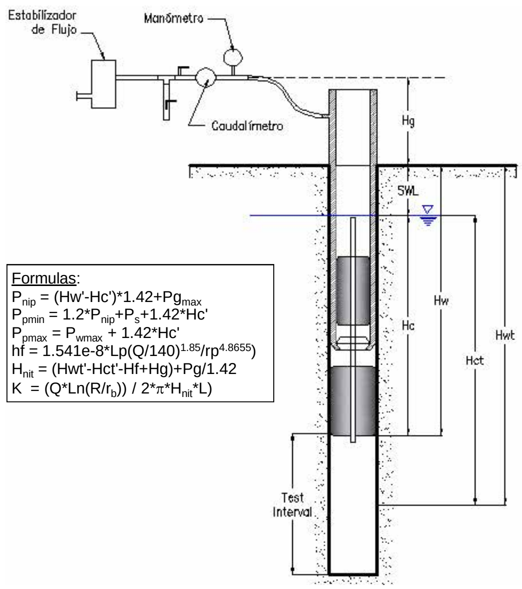
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	6.00	**To**	17.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	17.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:

$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$

$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$

$P_{pmax} = P_{wmax} + 1.42*Hc'$

$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$

$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$

$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

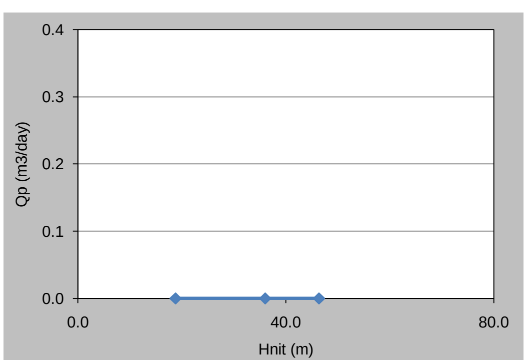
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	°
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	6.00	m
Hwt	Water column over test midpoint	11.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	1.00	m
Hct	Hydrostatic head on test midpoint	6.50	m
Hw'	Water column over packer (corrected)	6.00	m
Hwt'	Water column over test midpoint (corrected)	11.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	1.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	6.50	m
L	Length of test section	11.00	m
Lp	Length of discharge pipe	6.00	m
R	Radius of influence	11.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	190	psi
Ppmax	Maximum packer inflation pressure	501	psi

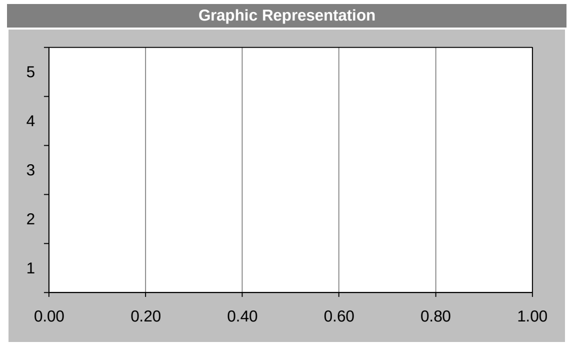
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	45.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3		0.00	0.00		
4		0.00	0.00		
5		0.00	0.00		
6			0.00		
7			0.00		
8			0.00		
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	36.0	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		2.44E-05 (m/day)		2.83E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



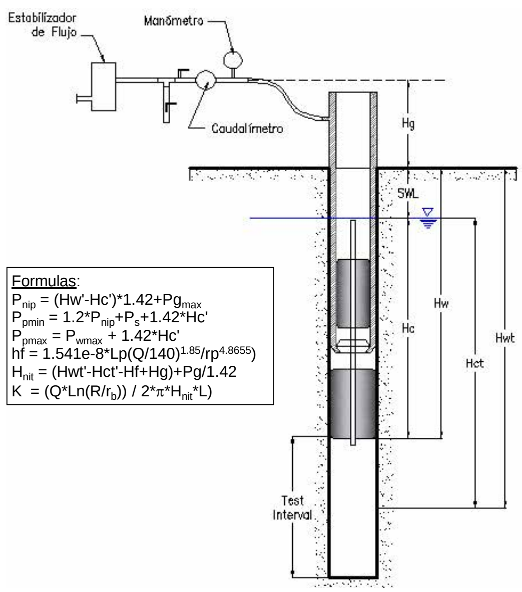
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 17.00	**To** 32.00	**Borehole :** CH-6		
Area:	**Date :**	**Start:**	**Test Number :** 9		
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 32.00		
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**		



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

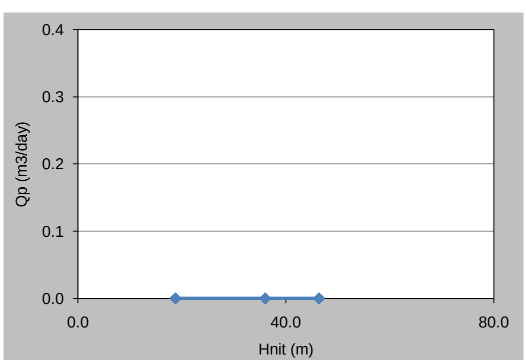
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	17.00	m
Hwt	Water column over test midpoint	24.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	12.00	m
Hct	Hydrostatic head on test midpoint	19.50	m
Hw'	Water column over packer (corrected)	17.00	m
Hwt'	Water column over test midpoint (corrected)	24.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	12.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	19.50	m
L	Length of test section	15.00	m
Lp	Length of discharge pipe	17.00	m
R	Radius of influence	15.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	206	psi
Ppmax	Maximum packer inflation pressure	517	psi

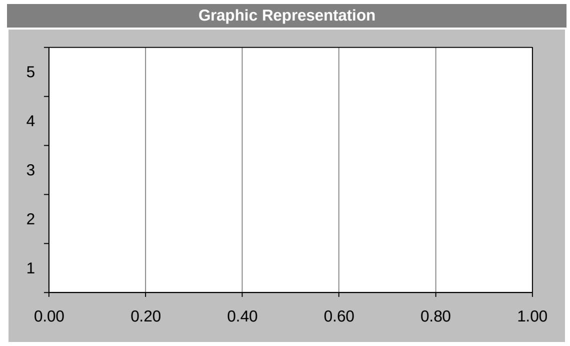
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	45.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3		0.00	0.00		
4		0.00	0.00		
5		0.00	0.00		
6			0.00		
7			0.00		
8			0.00		
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	36.0	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		1.89E-05 (m/day)		2.19E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



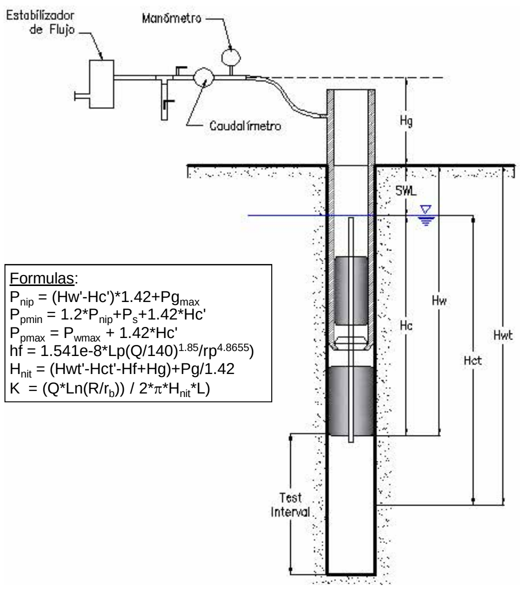
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	32.00	**To**	44.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	44.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

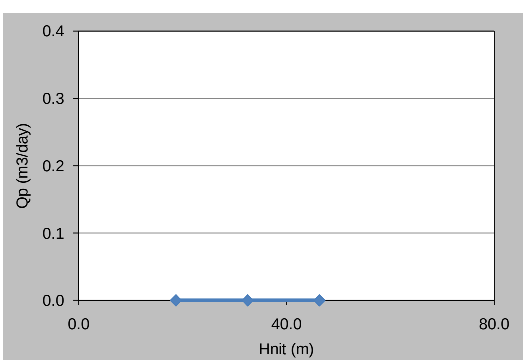
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	32.00	m
Hwt	Water column over test midpoint	38.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	27.00	m
Hct	Hydrostatic head on test midpoint	33.00	m
Hw'	Water column over packer (corrected)	32.00	m
Hwt'	Water column over test midpoint (corrected)	38.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	27.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	33.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	32.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	227	psi
Ppmax	Maximum packer inflation pressure	538	psi

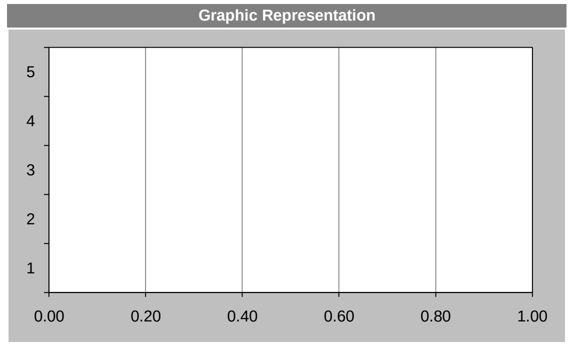
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3	0.00	0.00	0.00		
4	0.00	0.00	0.00		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

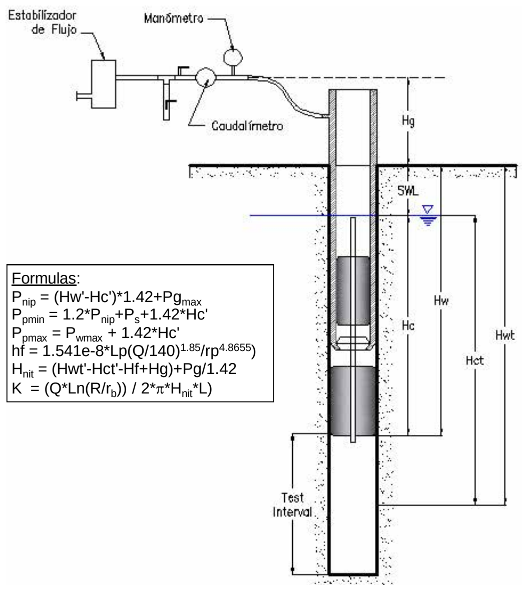
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 45.00	**To** 56.00	**Borehole :** CH-6
Area:	**Date :**	**Start:**	**Test Number :** 8
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 56.00
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

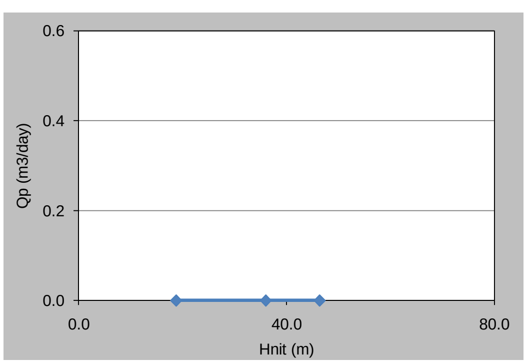
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	45.00	m
Hwt	Water column over test midpoint	50.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	40.00	m
Hct	Hydrostatic head on test midpoint	45.50	m
Hw'	Water column over packer (corrected)	45.00	m
Hwt'	Water column over test midpoint (corrected)	50.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	40.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	45.50	m
L	Length of test section	11.00	m
Lp	Length of discharge pipe	45.00	m
R	Radius of influence	11.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	245	psi
Ppmax	Maximum packer inflation pressure	557	psi

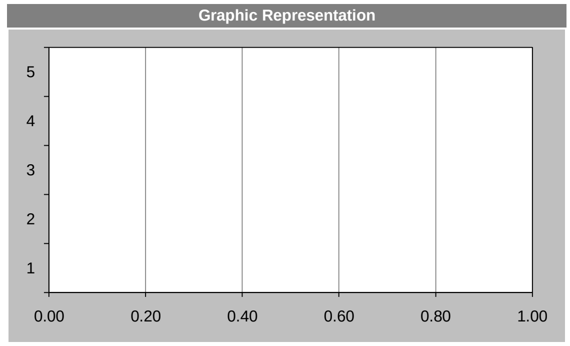
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	45.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3		0.00	0.00		
4		0.00	0.00		
5		0.00	0.00		
6			0.00		
7			0.00		
8			0.00		
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	36.0	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		2.44E-05 (m/day)		2.83E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

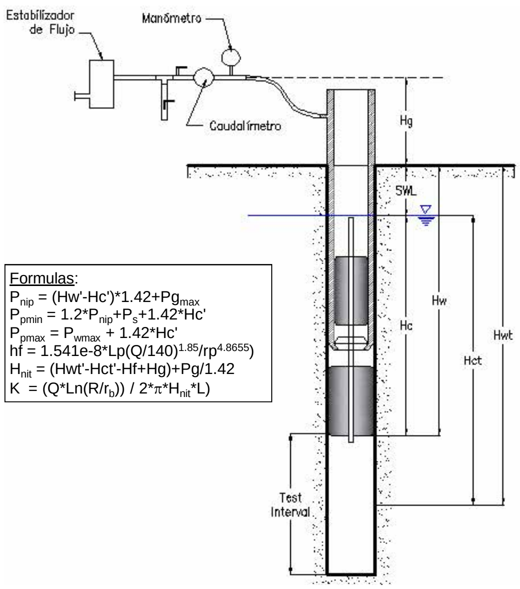
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	56.00	**To**	68.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	7
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	68.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

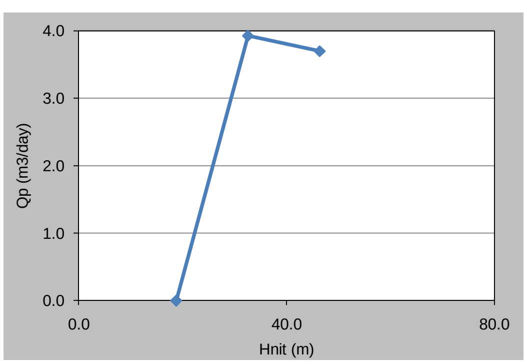
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	56.00	m
Hwt	Water column over test midpoint	62.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	51.00	m
Hct	Hydrostatic head on test midpoint	57.00	m
Hw'	Water column over packer (corrected)	56.00	m
Hwt'	Water column over test midpoint (corrected)	62.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	51.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	57.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	56.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	261	psi
Ppmax	Maximum packer inflation pressure	572	psi

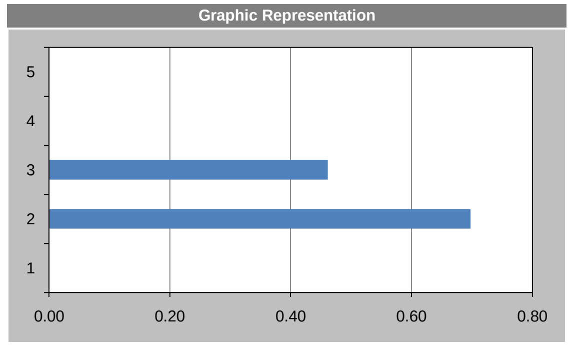
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	2.73	2.73		
2	0.00	2.73	2.73		
3			2.50		
4			2.39		
5			2.50		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	2.73	2.57		
Q_P (m^3/day)	0.0	3.9	3.7		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	8.8E-03	5.8E-03		
K (cm/sec)	0.0E+00	1.0E-05	6.8E-06		
UL	0.00	0.70	0.46		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



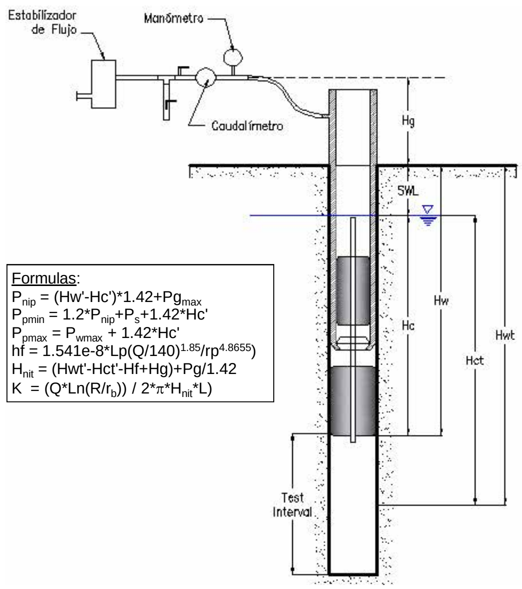
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	68.00	**To**	80.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	80.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

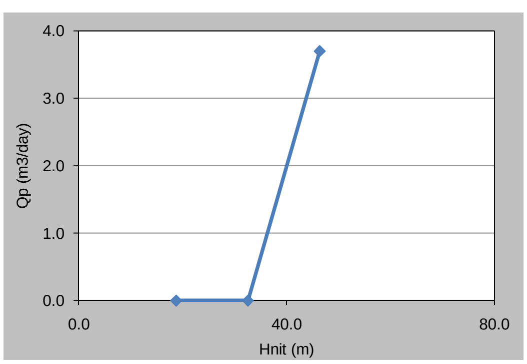
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	68.00	m
Hwt	Water column over test midpoint	74.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	63.00	m
Hct	Hydrostatic head on test midpoint	69.00	m
Hw'	Water column over packer (corrected)	68.00	m
Hwt'	Water column over test midpoint (corrected)	74.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	63.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	69.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	68.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	278	psi
Ppmax	Maximum packer inflation pressure	589	psi

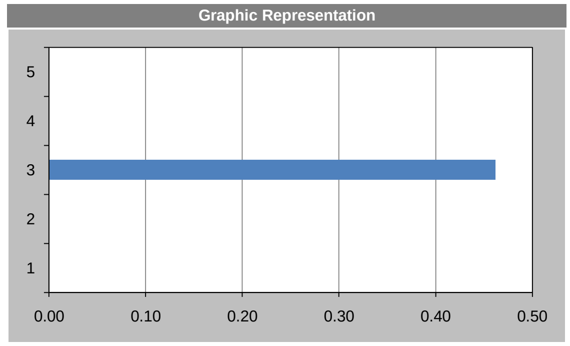
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	2.73		
2	0.00	0.00	2.73		
3		0.00	2.50		
4		0.00	2.39		
5			2.50		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	2.57		
Q_P (m^3/day)	0.0	0.0	3.7		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	5.8E-03		
K (cm/sec)	0.0E+00	0.0E+00	6.8E-06		
UL	0.00	0.00	0.46		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

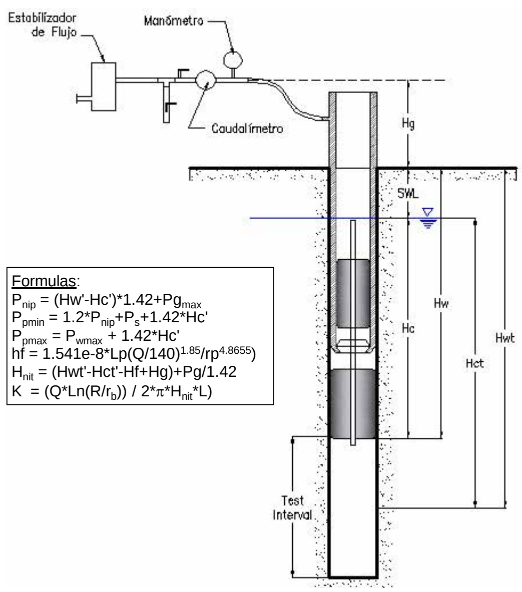
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	80.00	**To**	92.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	92.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

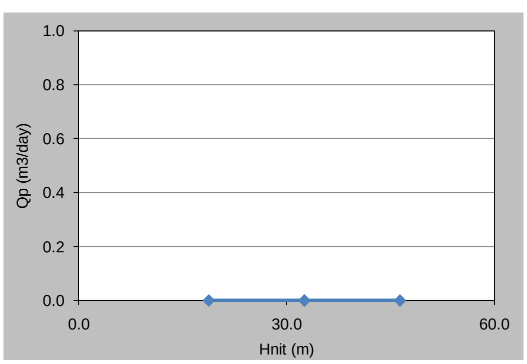
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	80.00	m
Hwt	Water column over test midpoint	86.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	75.00	m
Hct	Hydrostatic head on test midpoint	81.00	m
Hw'	Water column over packer (corrected)	80.00	m
Hwt'	Water column over test midpoint (corrected)	86.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	75.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	81.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	80.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	295	psi
Ppmax	Maximum packer inflation pressure	607	psi

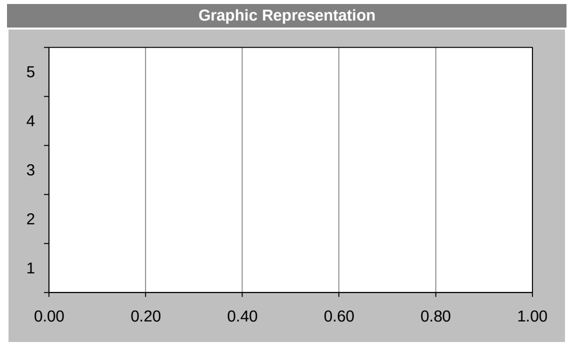
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.00		
2	0.00	0.00	0.00		
3		0.00	0.00		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.00		
Q_P (m^3/day)	0.0	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	0.0E+00		
K (cm/sec)	0.0E+00	0.0E+00	0.0E+00		
UL	0.00	0.00	0.00		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

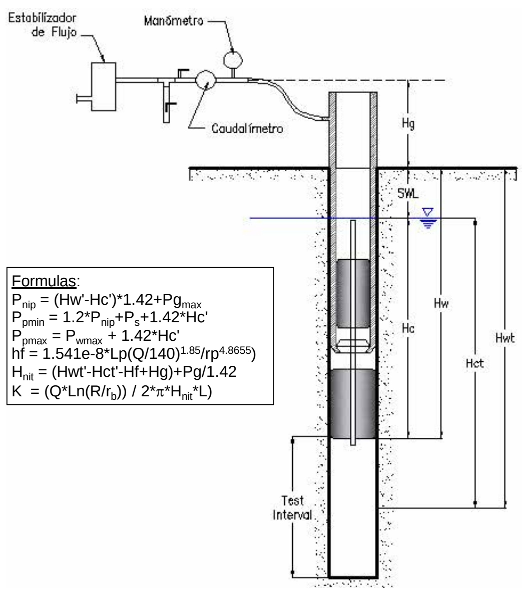
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	92.00	**To**	104.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	4
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	104.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

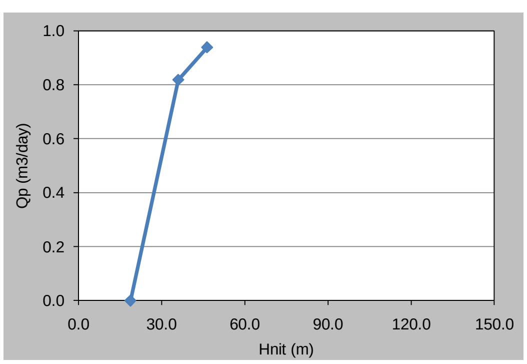
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	92.00	m
Hwt	Water column over test midpoint	98.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	87.00	m
Hct	Hydrostatic head on test midpoint	93.00	m
Hw'	Water column over packer (corrected)	92.00	m
Hwt'	Water column over test midpoint (corrected)	98.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	87.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	93.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	92.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	312	psi
Ppmax	Maximum packer inflation pressure	624	psi

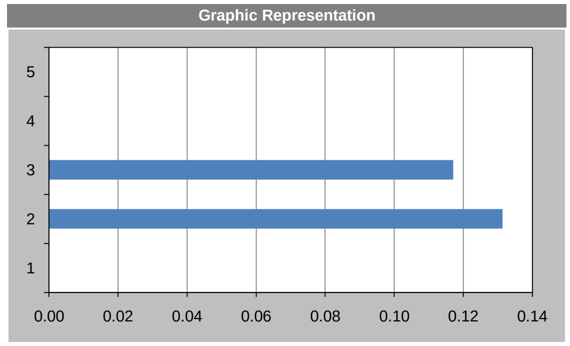
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	45.0	60.0		
1	0.00	0.55	0.55		
2	0.00	0.55	0.68		
3		0.64	0.73		
4		0.55			
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.57	0.65		
Q_P (m^3/day)	0.0	0.8	0.9		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	36.0	46.4		
K (m/day)	0.0E+00	1.7E-03	1.5E-03		
K (cm/sec)	0.0E+00	1.9E-06	1.7E-06		
UL	0.00	0.13	0.12		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



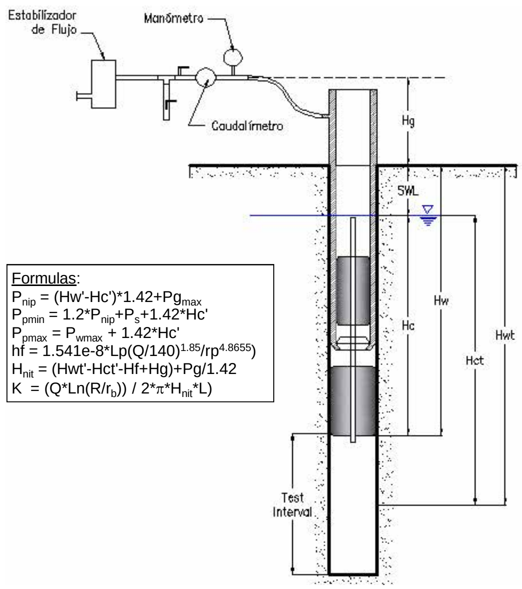
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 104.00	**To** 116.00	**Borehole :** CH-6		
Area:	**Date :**	**Start:**	**Test Number :** 3		
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 116.00		
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**		



Formulas:

$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$

$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$

$P_{pmax} = P_{wmax} + 1.42*Hc'$

$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$

$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$

$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

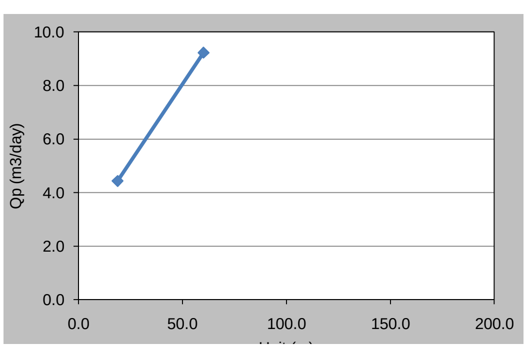
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	104.00	m
Hwt	Water column over test midpoint	110.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	99.00	m
Hct	Hydrostatic head on test midpoint	105.00	m
Hw'	Water column over packer (corrected)	104.00	m
Hwt'	Water column over test midpoint (corrected)	110.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	99.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	105.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	104.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	329	psi
Ppmax	Maximum packer inflation pressure	641	psi

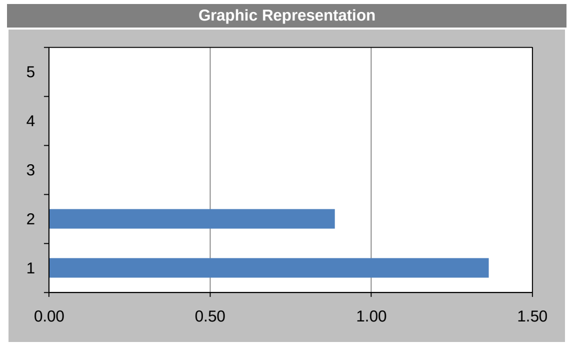
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	80.0			
0.5	7.27	10.91			
1	4.64	9.64			
1.5	3.91	4.91			
2	0.91	13.77			
3	1.50	9.41			
4	2.00	3.07			
6	1.32	1.32			
		3.00			
		5.41			
		4.55			
		4.51			
Q_P (lit/min)	3.08	6.41			
Q_P (m^3/day)	4.4	9.2			
Hf (m)	0.00	0.00			
Hnit (m)	18.8	60.2			
K (m/day)	1.7E-02	1.1E-02			
K (cm/sec)	2.0E-05	1.3E-05			
UL	1.37	0.89			
K Sensitivity :		#DIV/0! (m/day)		#DIV/0! (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



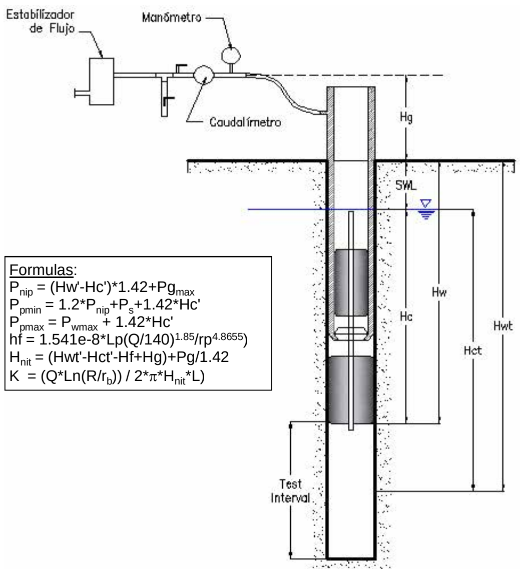
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	116.00	**To**	128.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	128.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp$(Q/140)^{1.85}$/$rp^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

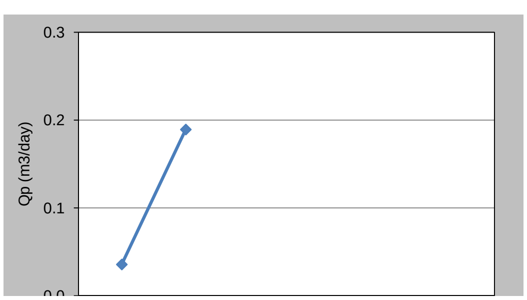
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	°
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	116.00	m
Hwt	Water column over test midpoint	122.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	111.00	m
Hct	Hydrostatic head on test midpoint	117.00	m
Hw'	Water column over packer (corrected)	116.00	m
Hwt'	Water column over test midpoint (corrected)	122.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	111.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	117.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	116.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	346	psi
Ppmax	Maximum packer inflation pressure	658	psi

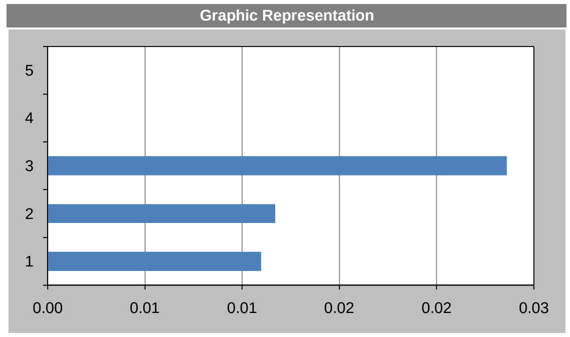
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	45.0	60.0		
1	0.09	0.03	0.18		
2	0.00	0.05	0.27		
3	0.00	0.05	0.09		
4	0.00	0.07	0.00		
5	0.00	0.06	0.09		
6	0.05		0.27		
7	0.02		0.05		
8	0.04		0.09		
9	0.03				
6					
7					
10.5					
11					
12					
17					
Q_P (lit/min)	0.02	0.05	0.13		
Q_P (m^3/day)	0.0	0.1	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	36.0	46.4		
K (m/day)	1.4E-04	1.5E-04	3.0E-04		
K (cm/sec)	1.6E-07	1.7E-07	3.5E-07		
UL	0.01	0.01	0.02		
K Sensitivity :		1.34E-05 (m/day)		1.55E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

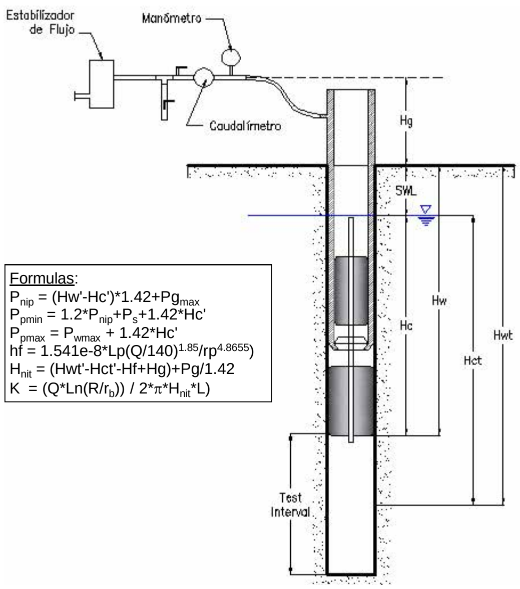
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	128.00	**To**	140.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	1
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	140.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

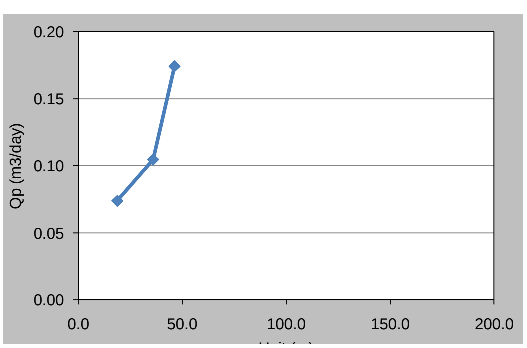
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	128.00	m
Hwt	Water column over test midpoint	134.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	123.00	m
Hct	Hydrostatic head on test midpoint	129.00	m
Hw'	Water column over packer (corrected)	128.00	m
Hwt'	Water column over test midpoint (corrected)	134.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	123.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	129.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	128.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	363	psi
Ppmax	Maximum packer inflation pressure	675	psi

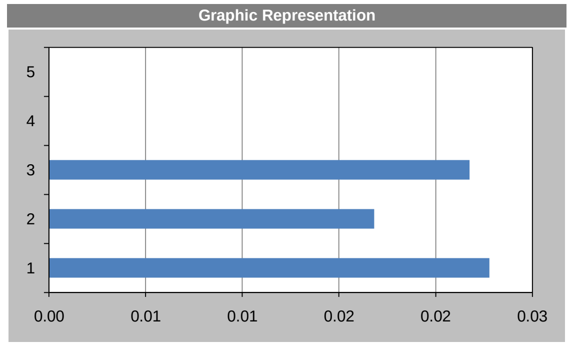
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	45.0	60.0		
0.5	0.09	0.00	0.09		
1	0.00	0.09	0.09		
1.5	0.09	0.09	0.09		
2	0.09	0.09	0.36		
2.5	0.00	0.09	0.09		
3	0.09	0.09	0.09		
4	0.05	0.09	0.11		
6	0.07	0.04	0.04		
11	0.04				
12	0.00				
13					
Q_P (lit/min)	0.05	0.07	0.12		
Q_P (m^3/day)	0.1	0.1	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	36.0	46.4		
K (m/day)	2.9E-04	2.1E-04	2.8E-04		
K (cm/sec)	3.3E-07	2.5E-07	3.2E-07		
UL	0.02	0.02	0.02		
K Sensitivity :		1.75E-05 (m/day)		2.02E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



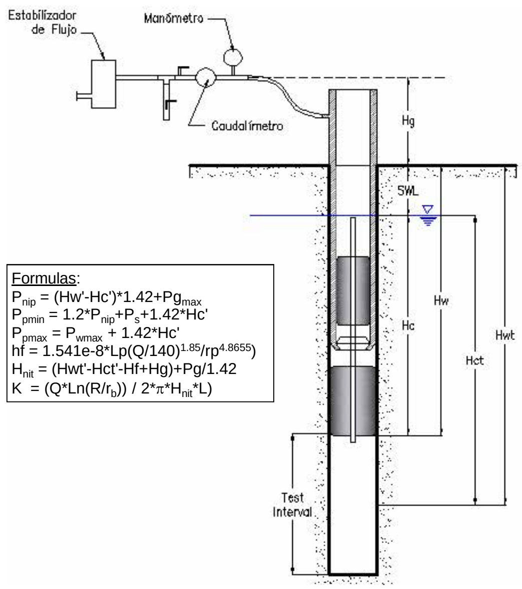
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	15.00	**To**	16.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	7
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	16.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp$(Q/140)^{1.85}$/$rp^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

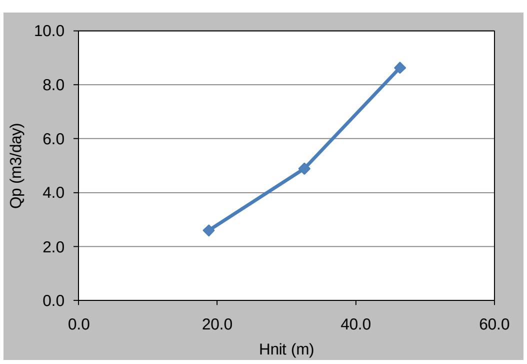
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	15.00	m
Hwt	Water column over test midpoint	15.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	10.00	m
Hct	Hydrostatic head on test midpoint	10.50	m
Hw'	Water column over packer (corrected)	15.00	m
Hwt'	Water column over test midpoint (corrected)	15.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	10.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	10.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	15.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	203	psi
Ppmax	Maximum packer inflation pressure	514	psi

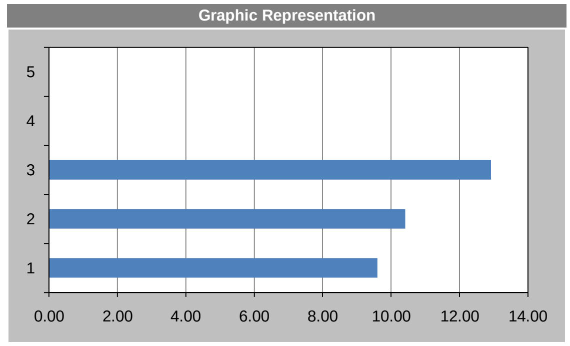
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	1.77	3.36	5.68		
2	1.77	3.32	6.00		
3	1.68	3.41	6.18		
4	1.66	3.45	6.02		
5	2.18	3.41	6.05		
6	1.75	3.41	6.02		
7					
8					
9					
10					
Q_P (lit/min)	1.80	3.39	5.99		
Q_P (m^3/day)	2.6	4.9	8.6		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	6.7E-02	7.2E-02	9.0E-02		
K (cm/sec)	7.7E-05	8.4E-05	1.0E-04		
UL	9.60	10.42	12.92		
K Sensitivity :		1.50E-04 (m/day)		1.74E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

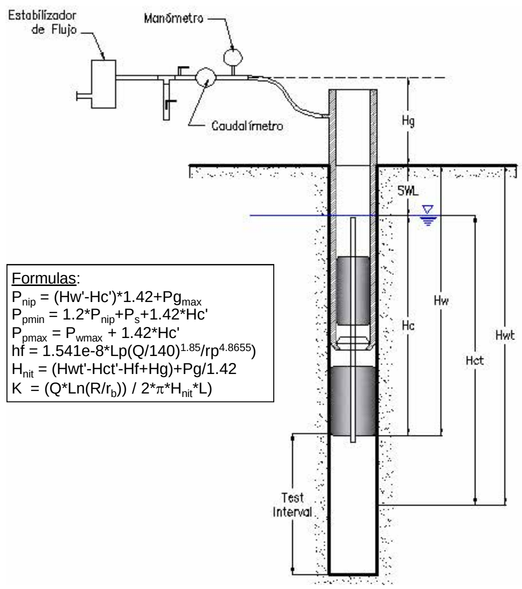
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 16.00	**To** 25.00		**Borehole :**	CH-6
Area:	**Date :**	**Start:**		**Test Number :**	6
Coordinates (m):	**Altura Caudalímetro:**	**End:**		**Total Depth (m) :**	25.00
Elevation (msnm):	**Interval Lithology :**			**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp$(Q/140)^{1.85}$/$rp^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

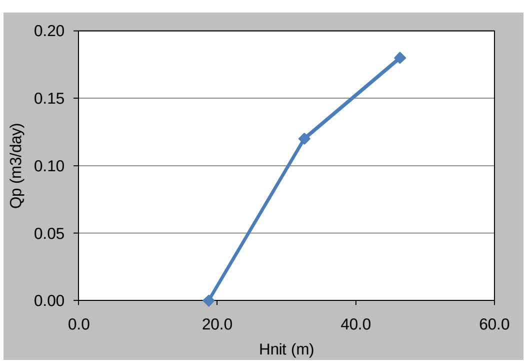
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	16.00	m
Hwt	Water column over test midpoint	20.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	11.00	m
Hct	Hydrostatic head on test midpoint	15.50	m
Hw'	Water column over packer (corrected)	16.00	m
Hwt'	Water column over test midpoint (corrected)	20.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	11.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	15.50	m
L	Length of test section	9.00	m
Lp	Length of discharge pipe	16.00	m
R	Radius of influence	9.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	204	psi
Ppmax	Maximum packer inflation pressure	516	psi

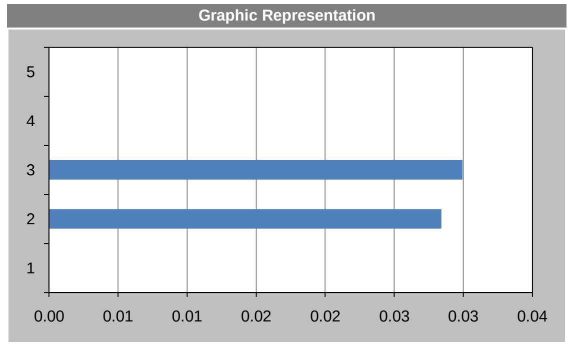
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.09	0.14		
2	0.00	0.09	0.09		
3	0.00	0.09	0.14		
4	0.00	0.09	0.14		
5	0.00	0.09	0.11		
6	0.00	0.05	0.14		
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.08	0.13		
Q_P (m^3/day)	0.0	0.1	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	3.4E-04	3.6E-04		
K (cm/sec)	0.0E+00	3.9E-07	4.2E-07		
UL	0.00	0.03	0.03		
K Sensitivity :		2.87E-05 (m/day)		3.33E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

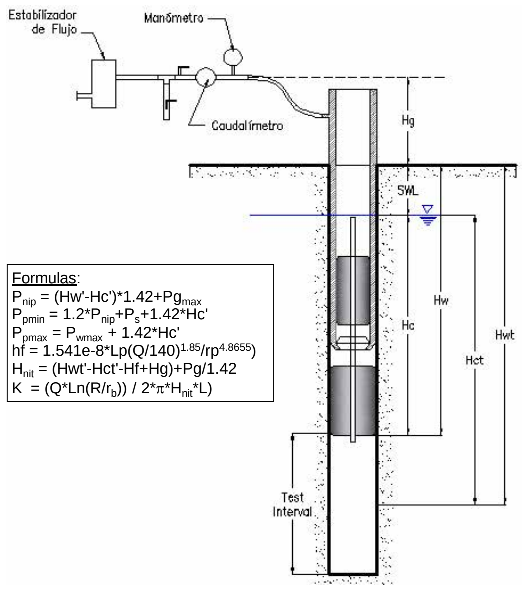
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	25.00	**To**	37.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	37.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

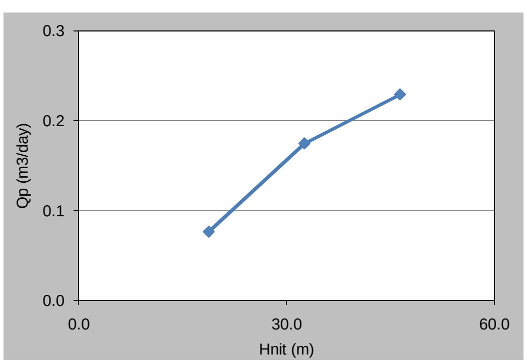
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	25.00	m
Hwt	Water column over test midpoint	31.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	20.00	m
Hct	Hydrostatic head on test midpoint	26.00	m
Hw'	Water column over packer (corrected)	25.00	m
Hwt'	Water column over test midpoint (corrected)	31.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	20.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	26.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	25.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	217	psi
Ppmax	Maximum packer inflation pressure	528	psi

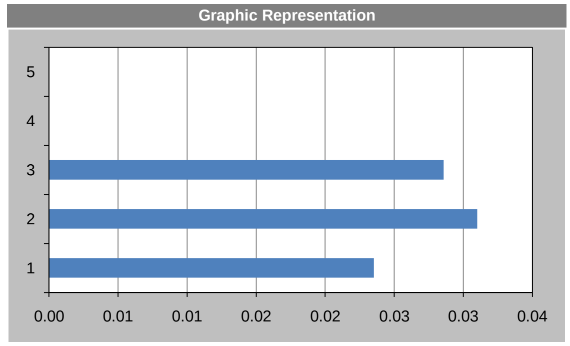
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.09	0.14	0.23		
2	0.05	0.14	0.14		
3	0.05	0.09	0.14		
4	0.07	0.11	0.14		
5	0.05	0.14	0.14		
6	0.02	0.11	0.18		
7					
8					
9					
10					
Q_P (lit/min)	0.05	0.12	0.16		
Q_P (m^3/day)	0.1	0.2	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	3.0E-04	3.9E-04	3.6E-04		
K (cm/sec)	3.4E-07	4.5E-07	4.2E-07		
UL	0.02	0.03	0.03		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



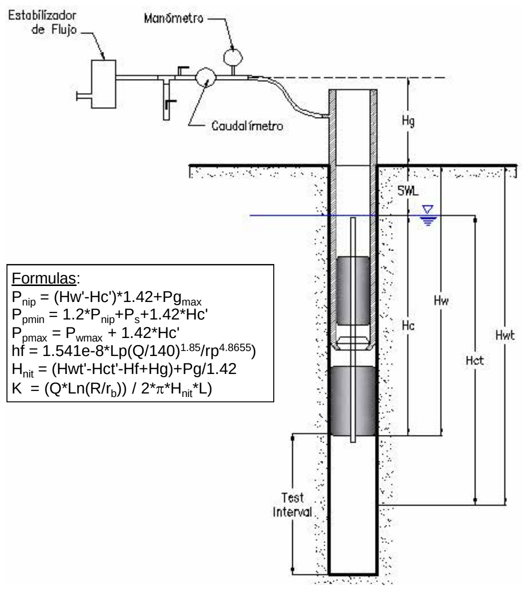
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	37.00	**To**	49.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	4
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	49.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

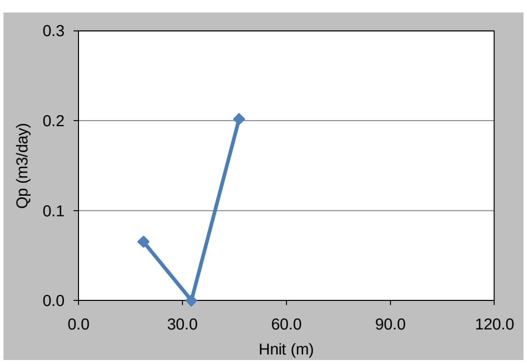
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	37.00	m
Hwt	Water column over test midpoint	43.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	32.00	m
Hct	Hydrostatic head on test midpoint	38.00	m
Hw'	Water column over packer (corrected)	37.00	m
Hwt'	Water column over test midpoint (corrected)	43.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	32.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	38.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	37.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	234	psi
Ppmax	Maximum packer inflation pressure	545	psi

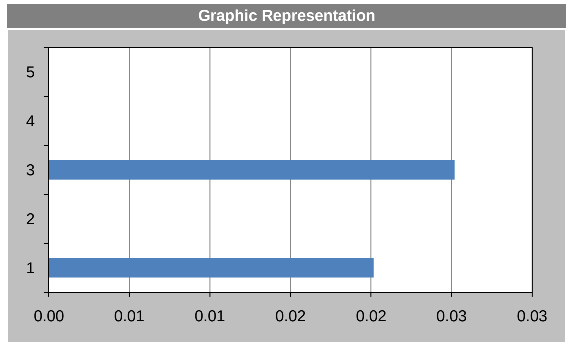
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.14		
2	0.05	0.00	0.14		
3	0.05	0.00	0.14		
4	0.07	0.00	0.16		
5	0.05	0.00	0.14		
6	0.07	0.00	0.14		
7					
8					
9					
10					
Q_P (lit/min)	0.05	0.00	0.14		
Q_P (m^3/day)	0.1	0.0	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	2.6E-04	0.0E+00	3.2E-04		
K (cm/sec)	3.0E-07	0.0E+00	3.7E-07		
UL	0.02	0.00	0.03		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

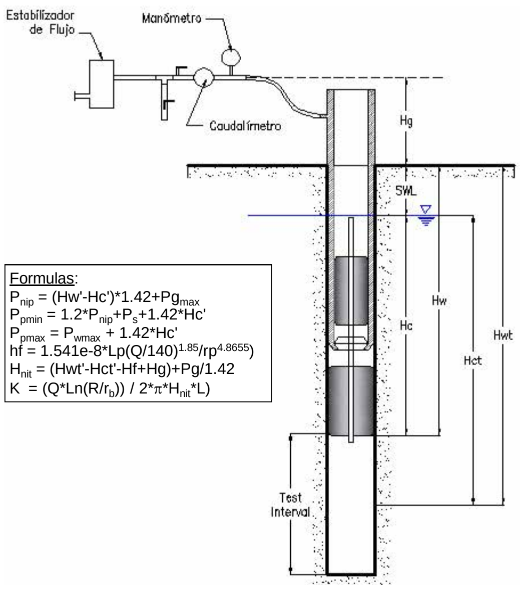
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	Test Depth :	49.00	To	61.00	Borehole :	CH-6
Area:		Date :		Start:		Test Number :	3
Coordinates (m):		Altura Caudalímetro:		End:		Total Depth (m) :	61.00
Elevation (msnm):		Interval Lithology :				Supervisor :	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

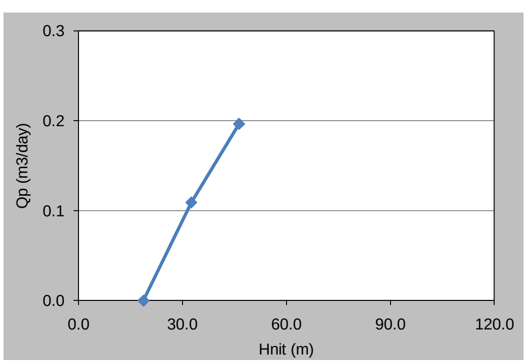
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	49.00	m
Hwt	Water column over test midpoint	55.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	44.00	m
Hct	Hydrostatic head on test midpoint	50.00	m
Hw'	Water column over packer (corrected)	49.00	m
Hwt'	Water column over test midpoint (corrected)	55.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	44.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	50.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	49.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	251	psi
Ppmax	Maximum packer inflation pressure	562	psi

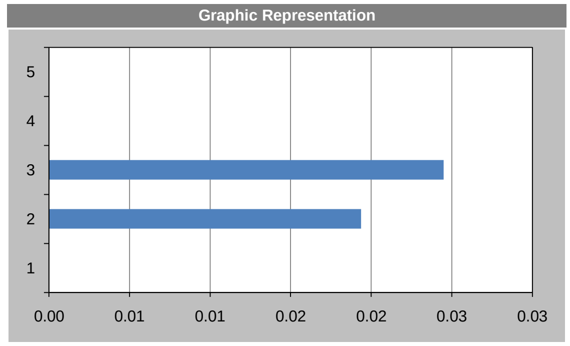
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.05	0.14		
2	0.00	0.09	0.09		
3	0.00	0.09	0.23		
4	0.00	0.07	0.14		
5	0.00	0.09	0.09		
6	0.00	0.07			
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.08	0.14		
Q_P (m^3/day)	0.0	0.1	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	2.5E-04	3.1E-04		
K (cm/sec)	0.0E+00	2.8E-07	3.6E-07		
UL	0.00	0.02	0.02		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



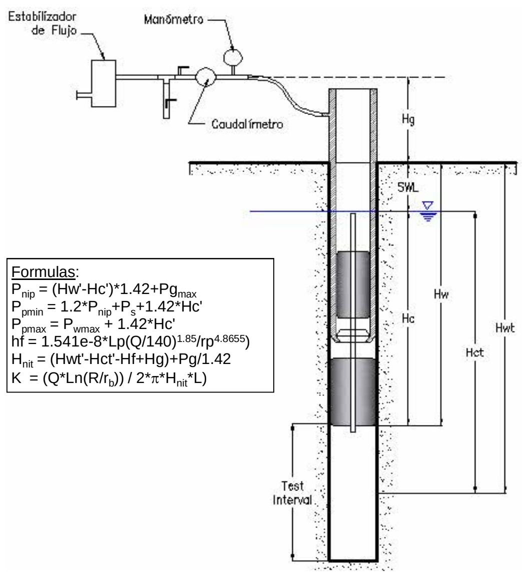
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	61.00	**To**	73.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	73.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

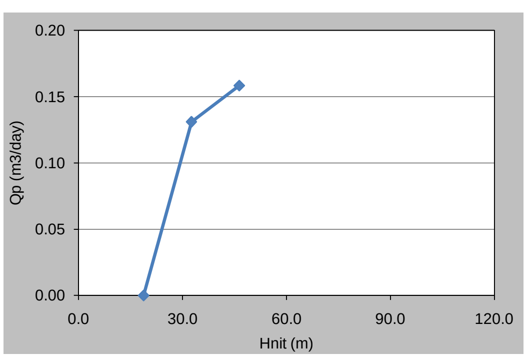
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	61.00	m
Hwt	Water column over test midpoint	67.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	56.00	m
Hct	Hydrostatic head on test midpoint	62.00	m
Hw'	Water column over packer (corrected)	61.00	m
Hwt'	Water column over test midpoint (corrected)	67.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	56.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	62.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	61.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	268	psi
Ppmax	Maximum packer inflation pressure	580	psi

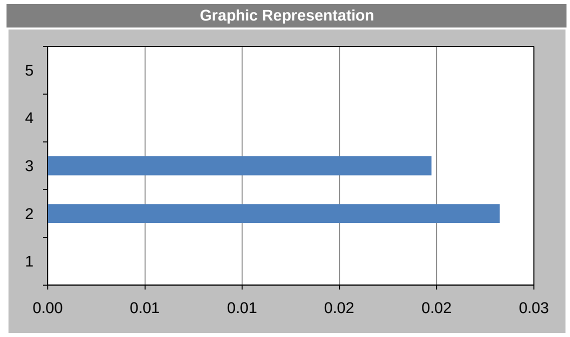
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.09	0.09		
2	0.00	0.09	0.09		
3	0.00	0.09	0.14		
4	0.00	0.09	0.11		
5	0.00	0.09	0.11		
6	0.00		0.11		
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.09	0.11		
Q_P (m^3/day)	0.0	0.1	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	2.9E-04	2.5E-04		
K (cm/sec)	0.0E+00	3.4E-07	2.9E-07		
UL	0.00	0.02	0.02		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

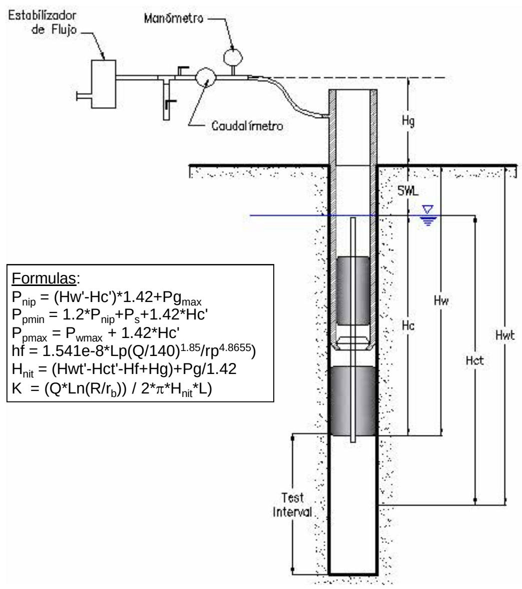
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	73.00	**To**	85.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	1
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	85.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

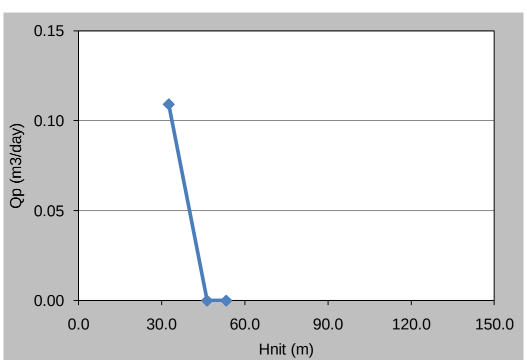
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	73.00	m
Hwt	Water column over test midpoint	79.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	68.00	m
Hct	Hydrostatic head on test midpoint	74.00	m
Hw'	Water column over packer (corrected)	73.00	m
Hwt'	Water column over test midpoint (corrected)	79.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	68.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	74.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	73.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	285	psi
Ppmax	Maximum packer inflation pressure	597	psi

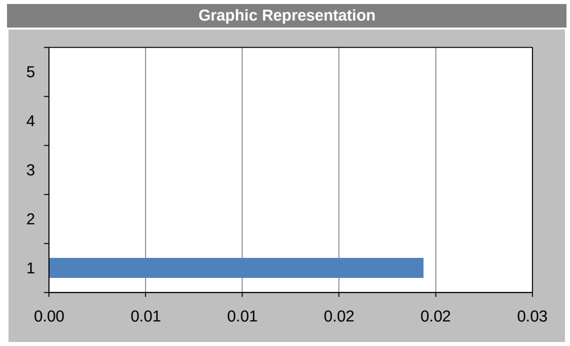
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	40.0	60.0	70.0		
1	0.00	0.00	0.00		
2	0.23	0.00	0.00		
3	0.00	0.00	0.00		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.08	0.00	0.00		
Q_P (m^3/day)	0.1	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	32.6	46.4	53.3		
K (m/day)	2.5E-04	0.0E+00	0.0E+00		
K (cm/sec)	2.8E-07	0.0E+00	0.0E+00		
UL	0.02	0.00	0.00		
K Sensitivity :	1.98E-05 (m/day)		2.29E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



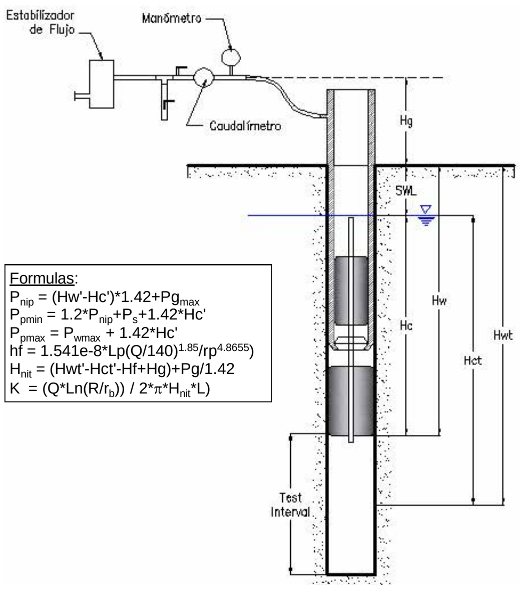
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 11.00	**To** 12.00	**Borehole :**	CH-6
Area:	**Date :**	**Start:**	**Test Number :**	9
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	12.00
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

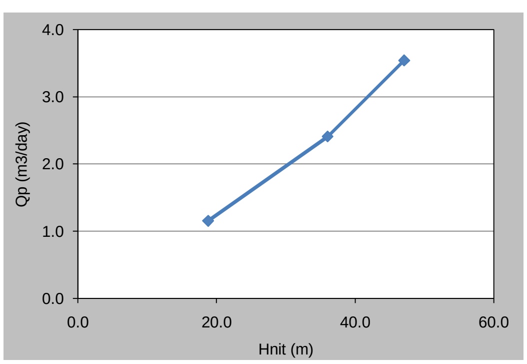
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	11.00	m
Hwt	Water column over test midpoint	11.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	6.00	m
Hct	Hydrostatic head on test midpoint	6.50	m
Hw'	Water column over packer (corrected)	11.00	m
Hwt'	Water column over test midpoint (corrected)	11.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	6.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	6.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	11.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	197	psi
Ppmax	Maximum packer inflation pressure	509	psi

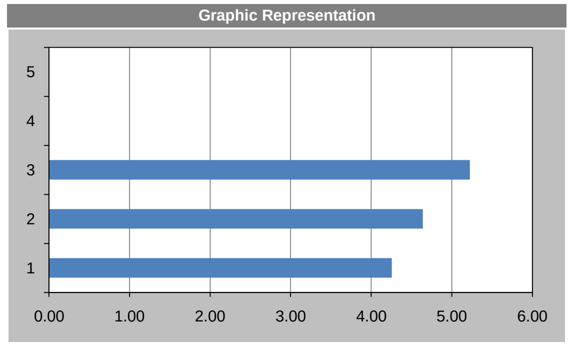
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	45.0	61.0		
1	1.14	2.00	2.95		
2	0.73	1.68	2.50		
3	0.77	1.68	2.50		
4	0.73	1.75	2.20		
5	0.64	1.25	2.14		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.80	1.67	2.46		
Q_P (m^3/day)	1.2	2.4	3.5		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	36.0	47.1		
K (m/day)	3.0E-02	3.2E-02	3.6E-02		
K (cm/sec)	3.4E-05	3.7E-05	4.2E-05		
UL	4.26	4.64	5.23		
K Sensitivity :		1.48E-04 (m/day)		1.71E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

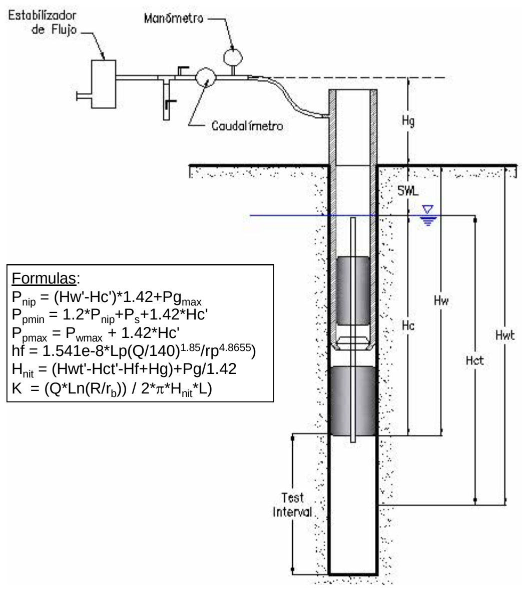
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	18.00	**To**	19.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	19.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

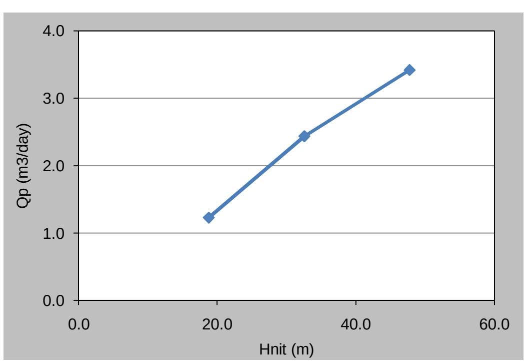
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	18.00	m
Hwt	Water column over test midpoint	18.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	13.00	m
Hct	Hydrostatic head on test midpoint	13.50	m
Hw'	Water column over packer (corrected)	18.00	m
Hwt'	Water column over test midpoint (corrected)	18.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	13.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	13.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	18.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	207	psi
Ppmax	Maximum packer inflation pressure	518	psi

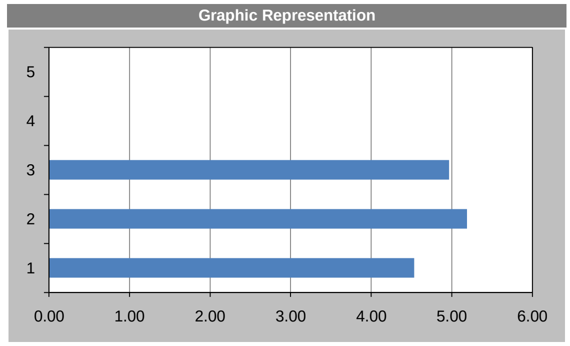
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	62.0		
1	1.27	2.18	3.00		
2	0.95	1.73	2.45		
3	0.82	1.73	2.14		
4	0.84	1.43	2.11		
5	0.64	1.39	2.16		
6	0.59				
7					
8					
9					
10					
Q_P (lit/min)	0.85	1.69	2.37		
Q_P (m^3/day)	1.2	2.4	3.4		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	47.8		
K (m/day)	3.2E-02	3.6E-02	3.5E-02		
K (cm/sec)	3.7E-05	4.2E-05	4.0E-05		
UL	4.54	5.19	4.97		
K Sensitivity :		1.46E-04 (m/day)		1.69E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

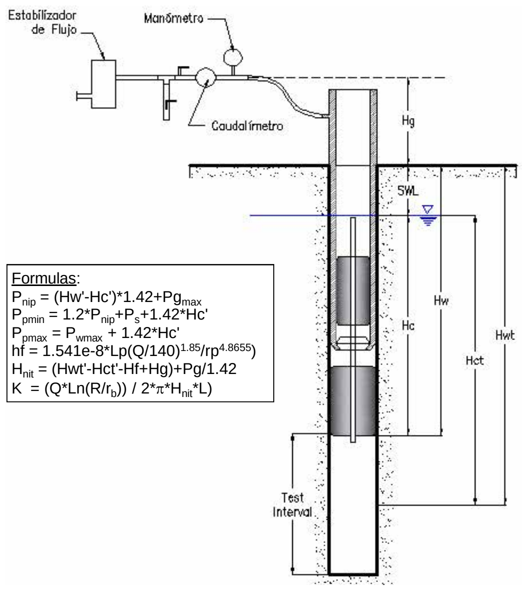
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	19.00	**To**	28.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	8
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	28.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	19.00	m
Hwt	Water column over test midpoint	23.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	14.00	m
Hct	Hydrostatic head on test midpoint	18.50	m
Hw'	Water column over packer (corrected)	19.00	m
Hwt'	Water column over test midpoint (corrected)	23.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	14.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	18.50	m
L	Length of test section	9.00	m
Lp	Length of discharge pipe	19.00	m
R	Radius of influence	9.00	m

Packer Pressures

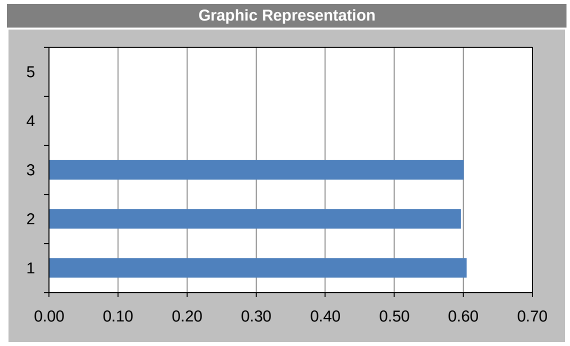
Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	208	psi
Ppmax	Maximum packer inflation pressure	520	psi

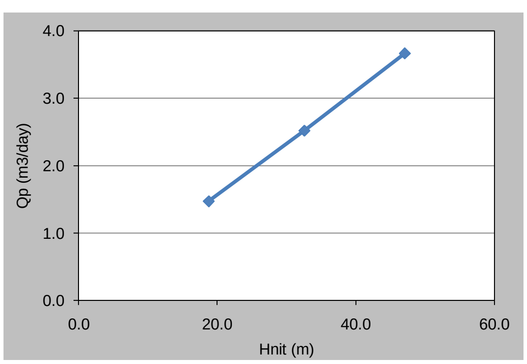
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	61.0		
1	1.41	1.91	2.73		
2	1.09	1.95	2.59		
3	0.91	1.82	2.86		
4	0.89	1.59	2.32		
5	0.82	1.48	2.23		
6					
7					
8					
9					
10					
Q_P (lit/min)	1.02	1.75	2.55		
Q_P (m^3/day)	1.5	2.5	3.7		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	47.1		
K (m/day)	7.3E-03	7.2E-03	7.2E-03		
K (cm/sec)	8.4E-06	8.3E-06	8.3E-06		
UL	0.60	0.60	0.60		
K Sensitivity :		2.83E-05 (m/day)		3.28E-08 (cm/sec)	

Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation





Field Observations

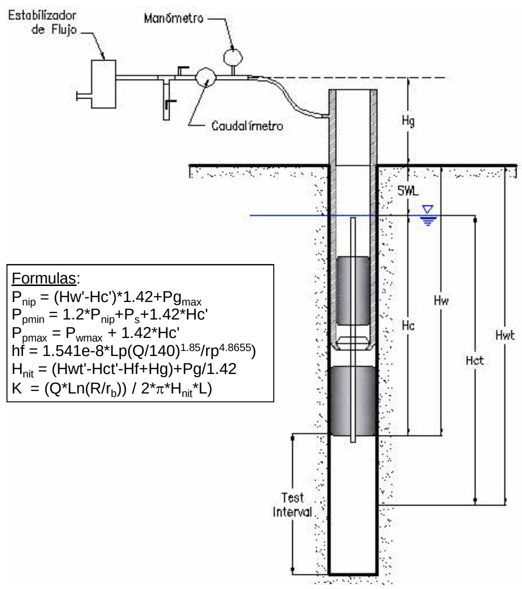
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	28.00	**To**	40.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	7
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	40.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

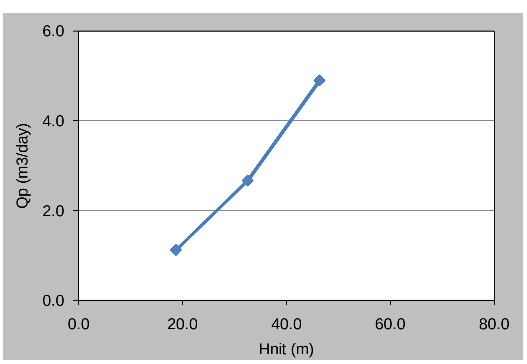
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	28.00	m
Hwt	Water column over test midpoint	34.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	23.00	m
Hct	Hydrostatic head on test midpoint	29.00	m
Hw'	Water column over packer (corrected)	28.00	m
Hwt'	Water column over test midpoint (corrected)	34.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	23.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	29.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	28.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	221	psi
Ppmax	Maximum packer inflation pressure	533	psi

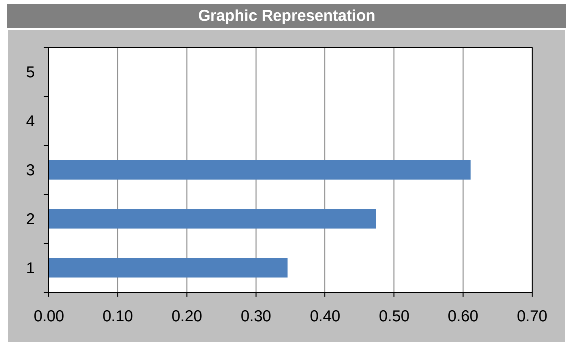
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.95	2.27	3.27		
2	0.95	2.00	5.64		
3	0.86	2.05	2.68		
4	0.89	1.57	2.50		
5	0.70	1.68	2.50		
6	0.32	1.55	4.86		
7			2.34		
8					
9					
10					
Q_P (lit/min)	0.78	1.85	3.40		
Q_P (m^3/day)	1.1	2.7	4.9		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	4.4E-03	6.0E-03	7.7E-03		
K (cm/sec)	5.1E-06	6.9E-06	8.9E-06		
UL	0.35	0.47	0.61		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



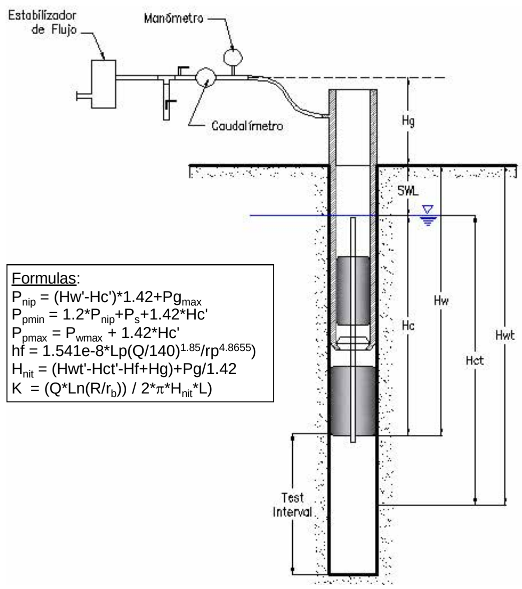
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	40.00	**To**	52.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	52.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

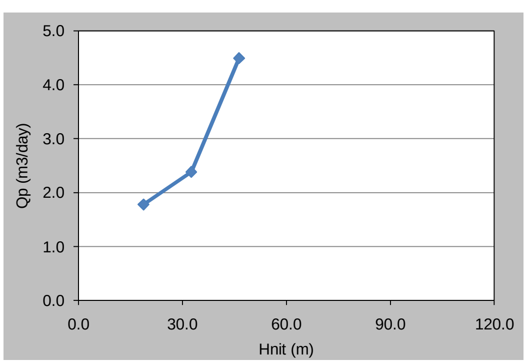
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	40.00	m
Hwt	Water column over test midpoint	46.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	35.00	m
Hct	Hydrostatic head on test midpoint	41.00	m
Hw'	Water column over packer (corrected)	40.00	m
Hwt'	Water column over test midpoint (corrected)	46.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	35.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	41.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	40.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	238	psi
Ppmax	Maximum packer inflation pressure	550	psi

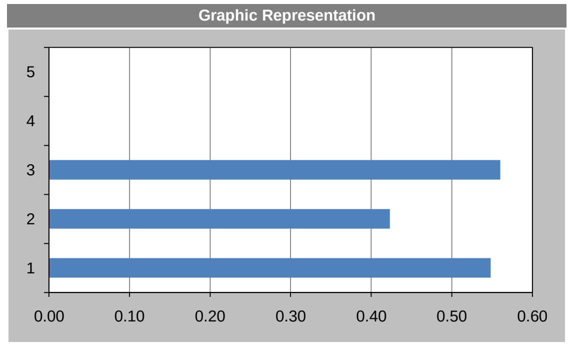
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	1.59	2.95	3.23		
2	1.14	2.45	3.41		
3	1.05	2.05	3.36		
4	1.05	0.57	2.98		
5	1.36	1.86	2.61		
6		0.05			
7					
8					
9					
10					
Q_P (lit/min)	1.24	1.66	3.12		
Q_P (m^3/day)	1.8	2.4	4.5		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	6.9E-03	5.4E-03	7.1E-03		
K (cm/sec)	8.0E-06	6.2E-06	8.2E-06		
UL	0.55	0.42	0.56		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

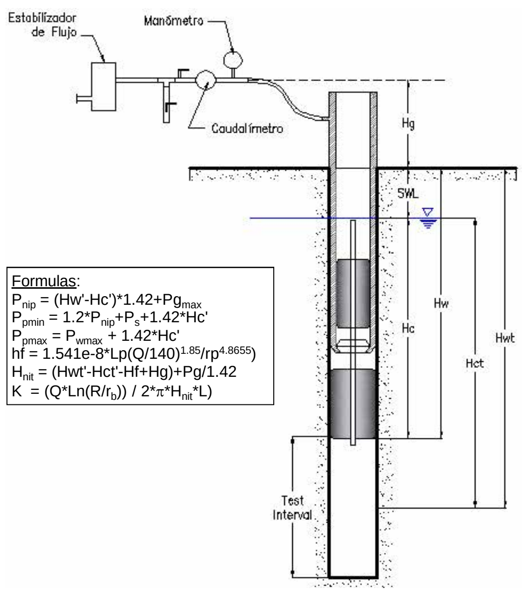
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	52.00	**To**	64.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	64.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:

$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$

$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$

$P_{pmax} = P_{wmax} + 1.42*Hc'$

$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$

$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$

$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

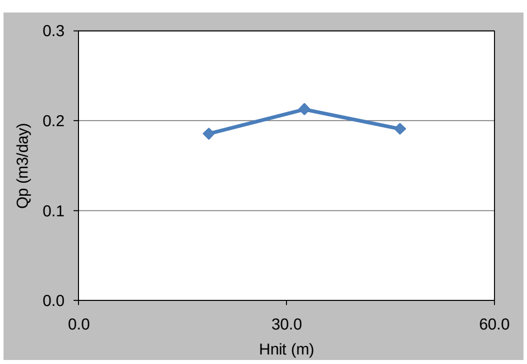
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	°
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	52.00	m
Hwt	Water column over test midpoint	58.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	47.00	m
Hct	Hydrostatic head on test midpoint	53.00	m
Hw'	Water column over packer (corrected)	52.00	m
Hwt'	Water column over test midpoint (corrected)	58.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	47.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	53.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	52.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	255	psi
Ppmax	Maximum packer inflation pressure	567	psi

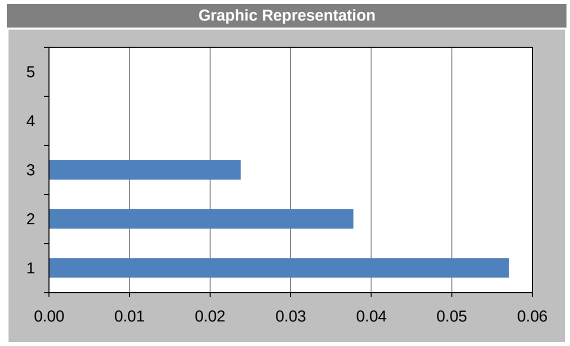
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.41	0.18	0.27		
2	0.09	0.18	0.23		
3	0.09	0.18	0.18		
4	0.07	0.11	0.11		
5	0.05	0.11	0.00		
6	0.07	0.11	0.00		
7					
8					
9					
10					
Q_P (lit/min)	0.13	0.15	0.13		
Q_P (m^3/day)	0.2	0.2	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	7.2E-04	4.8E-04	3.0E-04		
K (cm/sec)	8.4E-07	5.5E-07	3.5E-07		
UL	0.06	0.04	0.02		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



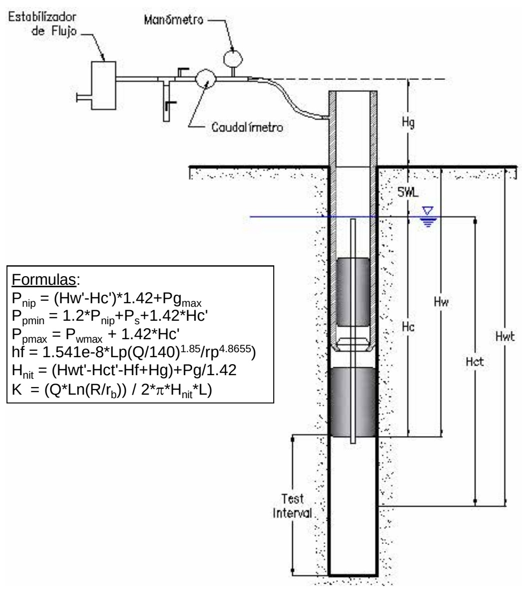
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project: Arnaud	**Test Depth :**	64.00	**To** 76.00	**Borehole :**	CH-6
Area:	**Date :**		**Start:**	**Test Number :**	4
Coordinates (m):	**Altura Caudalímetro:**		**End:**	**Total Depth (m) :**	76.00
Elevation (msnm):	**Interval Lithology :**			**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

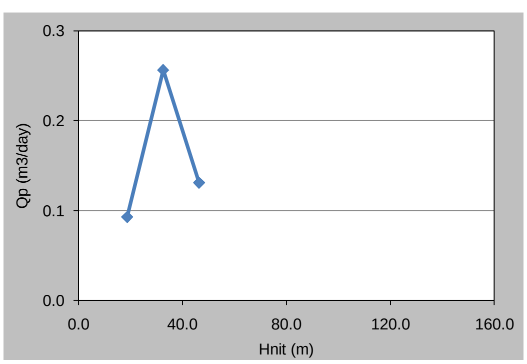
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	64.00	m
Hwt	Water column over test midpoint	70.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	59.00	m
Hct	Hydrostatic head on test midpoint	65.00	m
Hw'	Water column over packer (corrected)	64.00	m
Hwt'	Water column over test midpoint (corrected)	70.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	59.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	65.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	64.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	272	psi
Ppmax	Maximum packer inflation pressure	584	psi

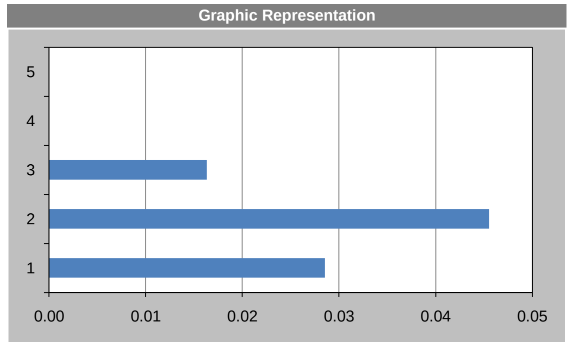
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.05	0.23	0.27		
2	0.05	0.18	0.27		
3	0.09	0.18	0.00		
4	0.07	0.16	0.00		
5	0.07	0.16	0.00		
6	0.07	0.16	0.00		
7					
8					
9					
10					
Q_P (lit/min)	0.06	0.18	0.09		
Q_P (m^3/day)	0.1	0.3	0.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	3.6E-04	5.8E-04	2.1E-04		
K (cm/sec)	4.2E-07	6.7E-07	2.4E-07		
UL	0.03	0.05	0.02		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



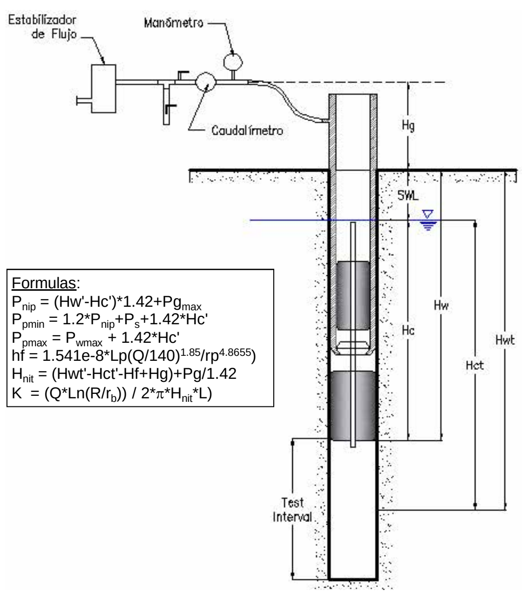
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	76.00	**To**	88.00	**Borehole :**	CH-6
Area:		**Date :**		**Start:**		**Test Number :**	3
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	88.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

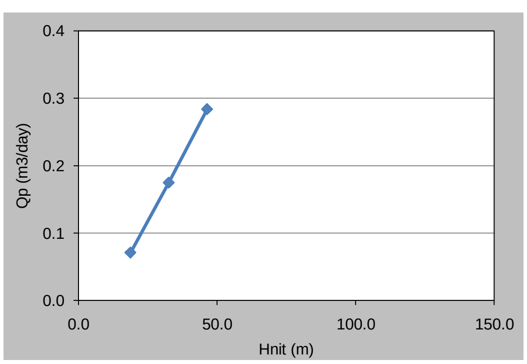
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	76.00	m
Hwt	Water column over test midpoint	82.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	71.00	m
Hct	Hydrostatic head on test midpoint	77.00	m
Hw'	Water column over packer (corrected)	76.00	m
Hwt'	Water column over test midpoint (corrected)	82.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	71.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	77.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	76.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	289	psi
Ppmax	Maximum packer inflation pressure	601	psi

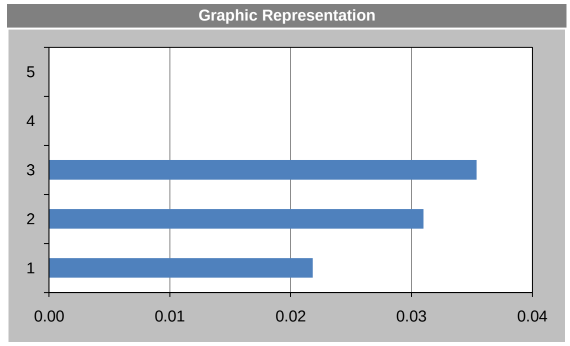
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.05	0.14	0.23		
2	0.05	0.14	0.18		
3	0.05	0.09	0.23		
4	0.07	0.14	0.18		
5	0.05	0.11	0.18		
6	0.05	0.11	0.18		
7					
8					
9					
10					
Q_P (lit/min)	0.05	0.12	0.20		
Q_P (m^3/day)	0.1	0.2	0.3		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	2.8E-04	3.9E-04	4.5E-04		
K (cm/sec)	3.2E-07	4.5E-07	5.2E-07		
UL	0.02	0.03	0.04		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



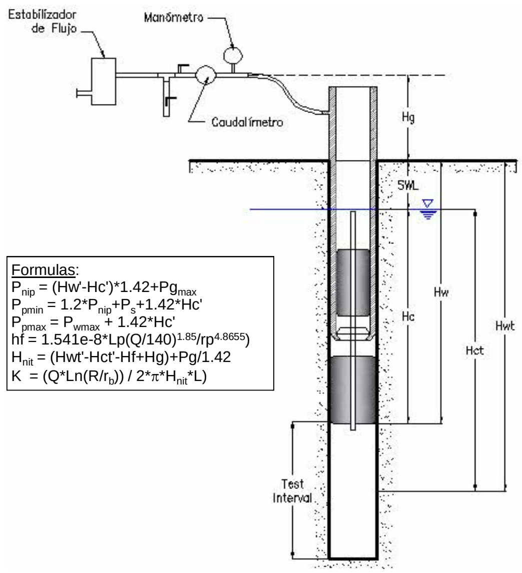
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :** 88.00	**To** 100.00	**Borehole :**	CH-6
Area:		**Date :**	**Start:**	**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	100.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:

P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

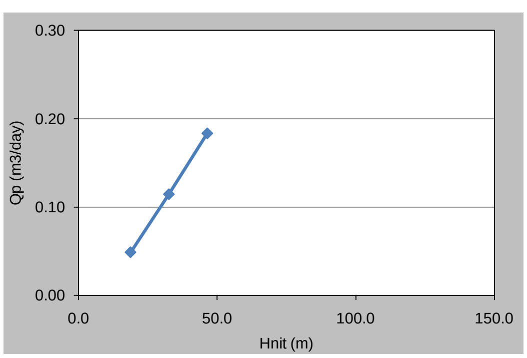
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	88.00	m
Hwt	Water column over test midpoint	94.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	83.00	m
Hct	Hydrostatic head on test midpoint	89.00	m
Hw'	Water column over packer (corrected)	88.00	m
Hwt'	Water column over test midpoint (corrected)	94.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	83.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	89.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	88.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	306	psi
Ppmax	Maximum packer inflation pressure	618	psi

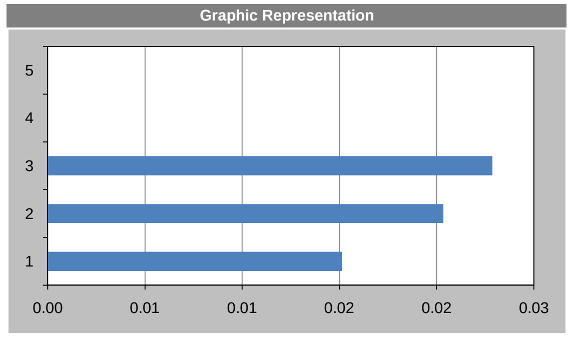
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.09	0.18		
2	0.05	0.09	0.14		
3	0.05	0.05	0.05		
4	0.05	0.09	0.14		
5	0.05	0.07	0.14		
6	0.02	0.09			
7					
8					
9					
10					
Q_P (lit/min)	0.03	0.08	0.13		
Q_P (m^3/day)	0.0	0.1	0.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.9E-04	2.6E-04	2.9E-04		
K (cm/sec)	2.2E-07	3.0E-07	3.3E-07		
UL	0.02	0.02	0.02		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



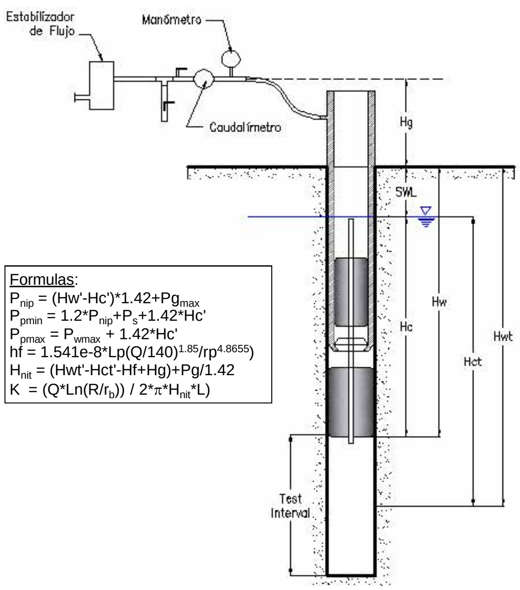
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	110.00 **To** 112.00	**Borehole :**	CH-6
Area:		**Date :**	**Start:**	**Test Number :**	1
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	112.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



<u>Formulas</u>:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

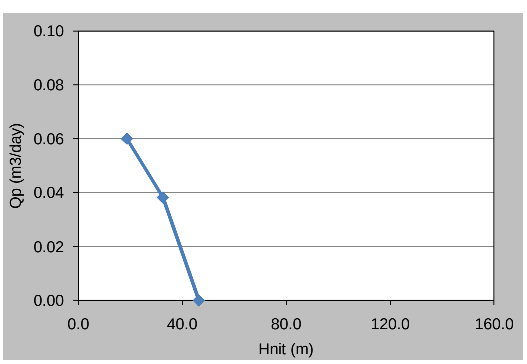
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	110.00	m
Hwt	Water column over test midpoint	111.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	105.00	m
Hct	Hydrostatic head on test midpoint	106.00	m
Hw'	Water column over packer (corrected)	110.00	m
Hwt'	Water column over test midpoint (corrected)	111.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	105.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	106.00	m
L	Length of test section	2.00	m
Lp	Length of discharge pipe	110.00	m
R	Radius of influence	2.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	338	psi
Ppmax	Maximum packer inflation pressure	649	psi

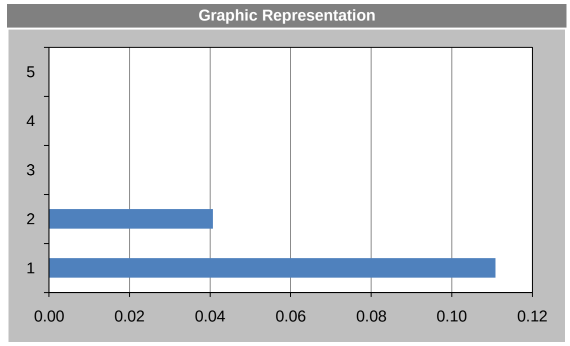
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.05	0.00	0.00		
2	0.05	0.00	0.00		
3	0.05	0.00	0.00		
4	0.02	0.05	0.00		
5	0.05	0.05	0.00		
6	0.05	0.07	0.00		
7					
8					
9					
10					
Q_P (lit/min)	0.04	0.03	0.00		
Q_P (m^3/day)	0.1	0.0	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	9.5E-04	3.5E-04	0.0E+00		
K (cm/sec)	1.1E-06	4.0E-07	0.0E+00		
UL	0.11	0.04	0.00		
K Sensitivity :		9.22E-05 (m/day)		1.07E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

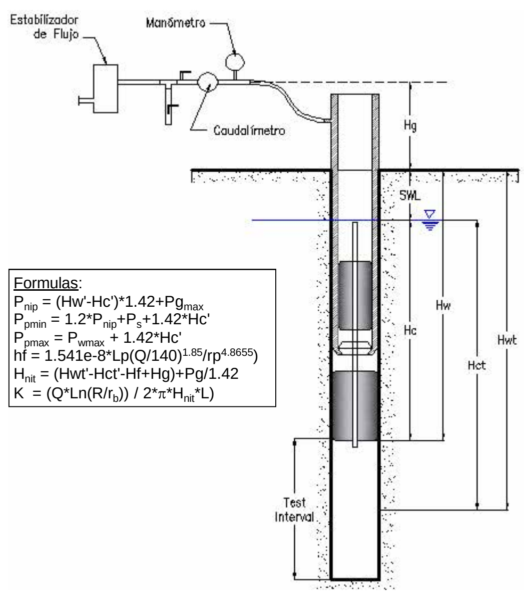
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project: Arnaud	**Test Depth :** 30.00	**To** 31.00	**Borehole :** CPW-1		
Area:	**Date :**	**Start:**	**Test Number :** 9		
Coordinates (m):	**Altura Caudalímetro:**	**End:**	**Total Depth (m) :** 31.00		
Elevation (msnm):	**Interval Lithology :**		**Supervisor :**		



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

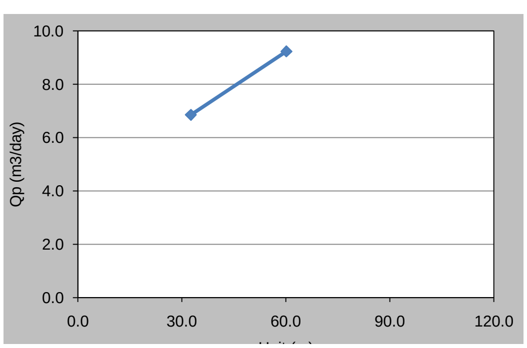
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	30.00	m
Hwt	Water column over test midpoint	30.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	25.00	m
Hct	Hydrostatic head on test midpoint	25.50	m
Hw'	Water column over packer (corrected)	30.00	m
Hwt'	Water column over test midpoint (corrected)	30.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	25.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	25.50	m
L	Length of test section	1.00	m
Lp	Length of discharge pipe	30.00	m
R	Radius of influence	1.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	224	psi
Ppmax	Maximum packer inflation pressure	536	psi

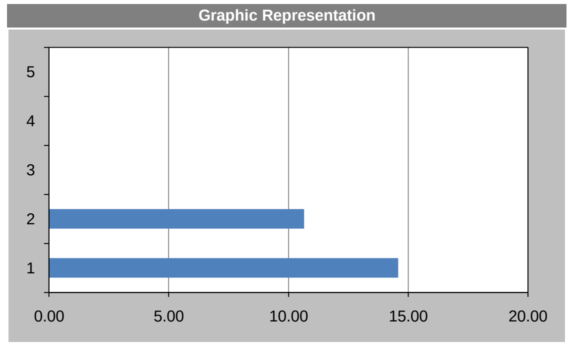
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	40.0	80.0			
1	3.64	10.91			
2	2.32	9.64			
3	1.95	4.91			
4	0.23	13.77			
5	1.75	9.41			
6	1.32	3.07			
7	22.07	1.32			
8		3.00			
9		5.41			
10		4.55			
11		4.51			
Q_P (lit/min)	4.75	6.41			
Q_P (m^3/day)	6.8	9.2			
Hf (m)	0.00	0.00			
Hnit (m)	32.6	60.2			
K (m/day)	1.0E-01	7.4E-02			
K (cm/sec)	1.2E-04	8.6E-05			
UL	14.59	10.65			
K Sensitivity :		1.05E-04 (m/day)		1.22E-07 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

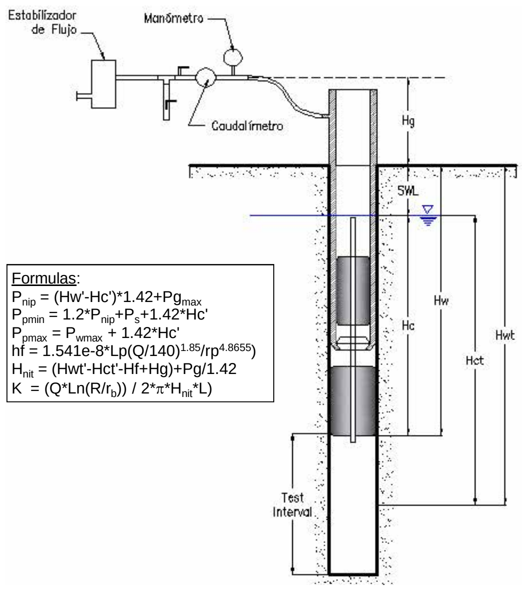
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	31.00 **To** 46.00	**Borehole :**	CPW-1
Area:		**Date :**	**Start:**	**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	46.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp$(Q/140)^{1.85}/rp^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

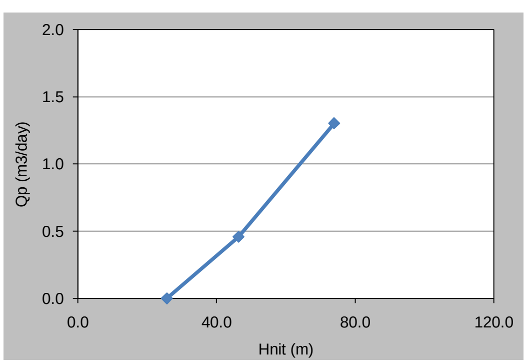
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	31.00	m
Hwt	Water column over test midpoint	38.50	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	26.00	m
Hct	Hydrostatic head on test midpoint	33.50	m
Hw'	Water column over packer (corrected)	31.00	m
Hwt'	Water column over test midpoint (corrected)	38.50	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	26.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	33.50	m
L	Length of test section	15.00	m
Lp	Length of discharge pipe	31.00	m
R	Radius of influence	15.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	225	psi
Ppmax	Maximum packer inflation pressure	537	psi

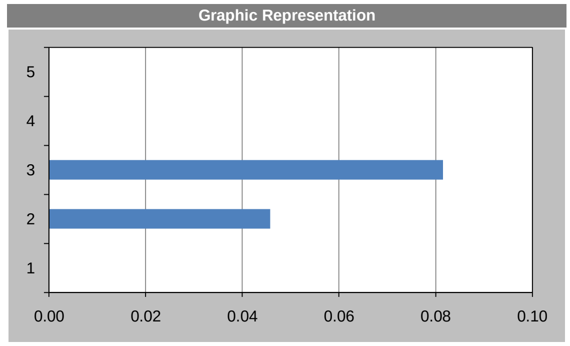
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	30.0	60.0	100.0		
1	0.00	0.32	1.36		
2	0.00	0.32	1.05		
3	0.00	0.32	0.73		
4			0.70		
5			0.68		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.32	0.90		
Q_P (m^3/day)	0.0	0.5	1.3		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	25.7	46.4	74.0		
K (m/day)	0.0E+00	6.0E-04	1.1E-03		
K (cm/sec)	0.0E+00	7.0E-07	1.2E-06		
UL	0.00	0.05	0.08		
K Sensitivity :		1.19E-05 (m/day)		1.37E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



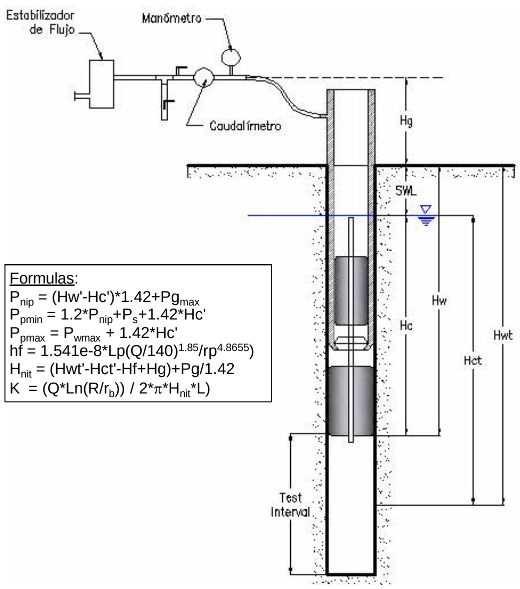
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :** 46.00	**To** 58.00	**Borehole :**	CPW-1
Area:		**Date :**	**Start:**	**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	58.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

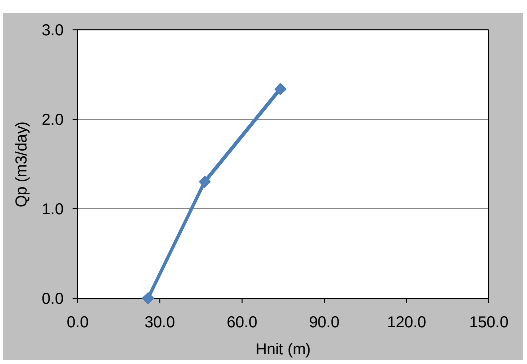
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	46.00	m
Hwt	Water column over test midpoint	52.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	41.00	m
Hct	Hydrostatic head on test midpoint	47.00	m
Hw'	Water column over packer (corrected)	46.00	m
Hwt'	Water column over test midpoint (corrected)	52.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	41.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	47.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	46.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	247	psi
Ppmax	Maximum packer inflation pressure	558	psi

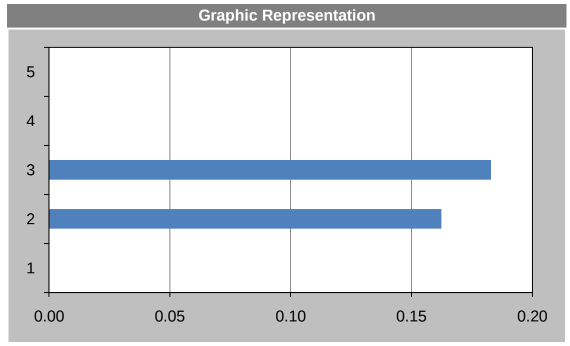
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	30.0	60.0	100.0		
1	0.00	1.23	2.18		
2	0.00	0.91	1.82		
3	0.00	0.86	1.50		
4		0.61	1.36		
5			1.25		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.90	1.62		
Q_P (m^3/day)	0.0	1.3	2.3		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	25.7	46.4	74.0		
K (m/day)	0.0E+00	2.1E-03	2.3E-03		
K (cm/sec)	0.0E+00	2.4E-06	2.7E-06		
UL	0.00	0.16	0.18		
K Sensitivity :		1.43E-05 (m/day)		1.65E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

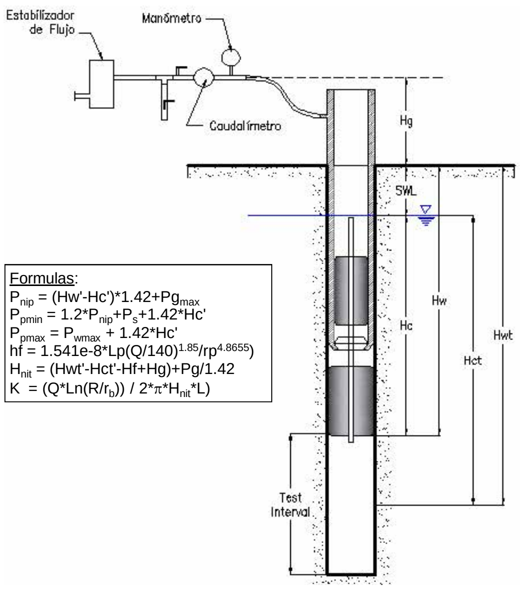
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	58.00	**To**	70.00	**Borehole :**	CPW-1
Area:		**Date :**		**Start:**		**Test Number :**	9
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	70.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

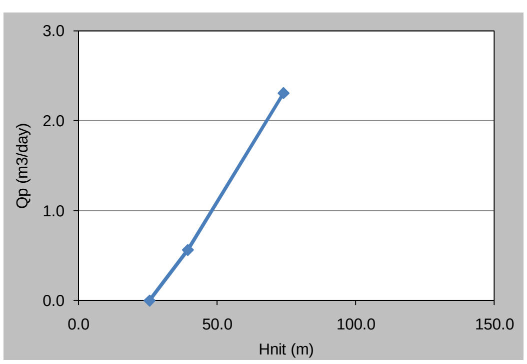
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	58.00	m
Hwt	Water column over test midpoint	64.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	53.00	m
Hct	Hydrostatic head on test midpoint	59.00	m
Hw'	Water column over packer (corrected)	58.00	m
Hwt'	Water column over test midpoint (corrected)	64.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	53.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	59.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	58.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	264	psi
Ppmax	Maximum packer inflation pressure	575	psi

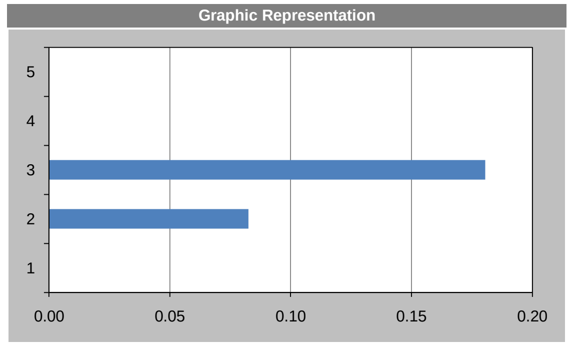
Time (min)	Q (L/min)				
	P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	30.0	50.0	100.0		
1	0.00	0.45	1.86		
2	0.00	0.36	1.73		
3	0.00	0.36	1.41		
4		0.34	1.41		
5		0.43			
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.39	1.60		
Q_P (m^3/day)	0.0	0.6	2.3		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	25.7	39.5	74.0		
K (m/day)	0.0E+00	1.0E-03	2.3E-03		
K (cm/sec)	0.0E+00	1.2E-06	2.6E-06		
UL	0.00	0.08	0.18		
K Sensitivity :		1.43E-05 (m/day)		1.65E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



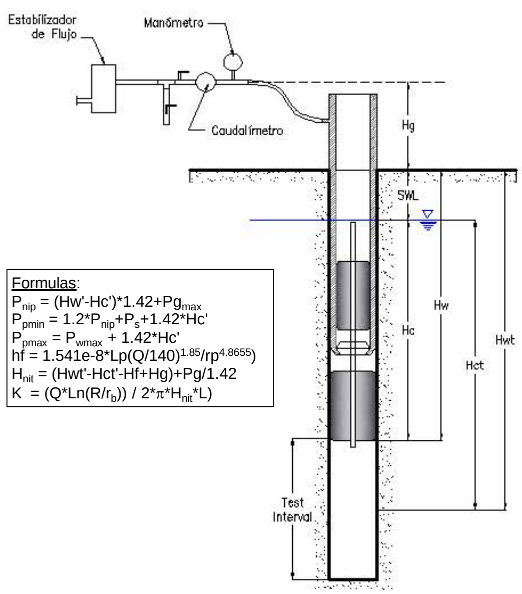
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :** 70.00	**To** 82.00	**Borehole :**	CPW-1
Area:		**Date :**	**Start:**	**Test Number :**	8
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	82.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

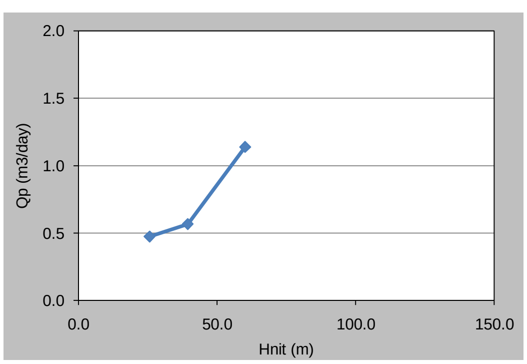
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	70.00	m
Hwt	Water column over test midpoint	76.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	65.00	m
Hct	Hydrostatic head on test midpoint	71.00	m
Hw'	Water column over packer (corrected)	70.00	m
Hwt'	Water column over test midpoint (corrected)	76.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	65.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	71.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	70.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	281	psi
Ppmax	Maximum packer inflation pressure	592	psi

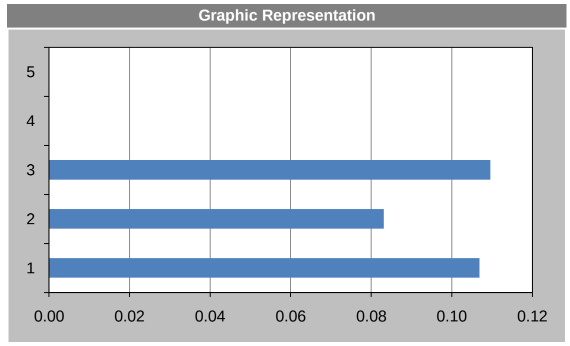
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	30.0	50.0	80.0		
1	0.45	0.45	1.05		
2	0.23	0.36	0.86		
3	0.36	0.36	0.68		
4	0.27		0.68		
5			0.68		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.33	0.39	0.79		
Q_P (m^3/day)	0.5	0.6	1.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	25.7	39.5	60.2		
K (m/day)	1.4E-03	1.1E-03	1.4E-03		
K (cm/sec)	1.6E-06	1.2E-06	1.6E-06		
UL	0.11	0.08	0.11		
K Sensitivity :		1.75E-05 (m/day)		2.03E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

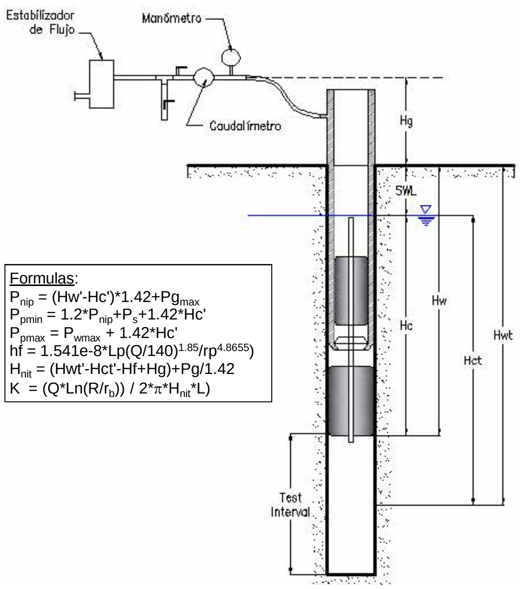
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	82.00	**To**	94.00	**Borehole :**	CPW-1
Area:		**Date :**		**Start:**		**Test Number :**	7
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	94.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

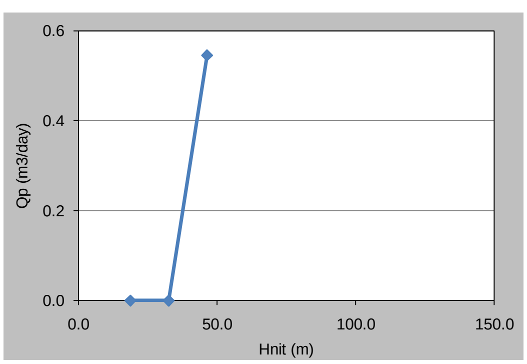
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	82.00	m
Hwt	Water column over test midpoint	88.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	77.00	m
Hct	Hydrostatic head on test midpoint	83.00	m
Hw'	Water column over packer (corrected)	82.00	m
Hwt'	Water column over test midpoint (corrected)	88.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	77.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	83.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	82.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	298	psi
Ppmax	Maximum packer inflation pressure	609	psi

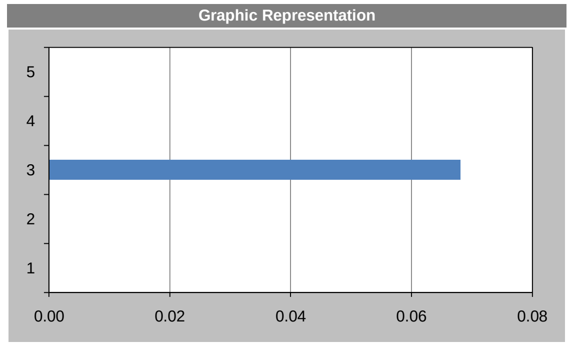
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.41		
2	0.00	0.00	0.41		
3	0.00	0.00	0.32		
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.38		
Q_P (m^3/day)	0.0	0.0	0.5		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	8.6E-04		
K (cm/sec)	0.0E+00	0.0E+00	1.0E-06		
UL	0.00	0.00	0.07		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

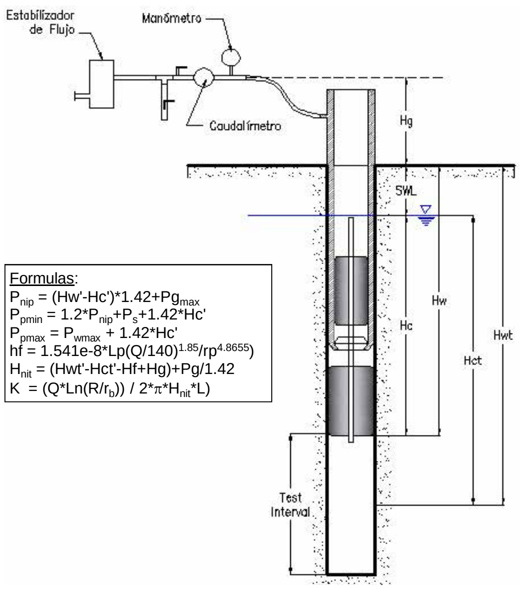
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	94.00	**To**	106.00	**Borehole :**	CPW-1
Area:		**Date :**		**Start:**		**Test Number :**	6
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	106.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

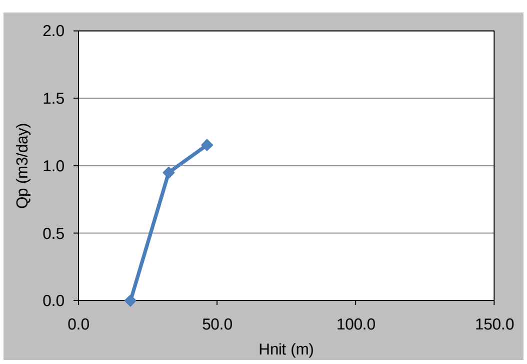
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	94.00	m
Hwt	Water column over test midpoint	100.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	89.00	m
Hct	Hydrostatic head on test midpoint	95.00	m
Hw'	Water column over packer (corrected)	94.00	m
Hwt'	Water column over test midpoint (corrected)	100.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	89.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	95.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	94.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	315	psi
Ppmax	Maximum packer inflation pressure	626	psi

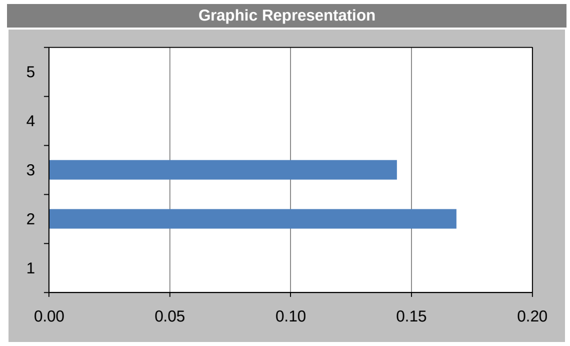
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.68	0.91		
2	0.00	0.64	0.82		
3	0.00	0.82	0.82		
4		0.50	0.66		
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.66	0.80		
Q_P (m^3/day)	0.0	0.9	1.2		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	2.1E-03	1.8E-03		
K (cm/sec)	0.0E+00	2.5E-06	2.1E-06		
UL	0.00	0.17	0.14		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

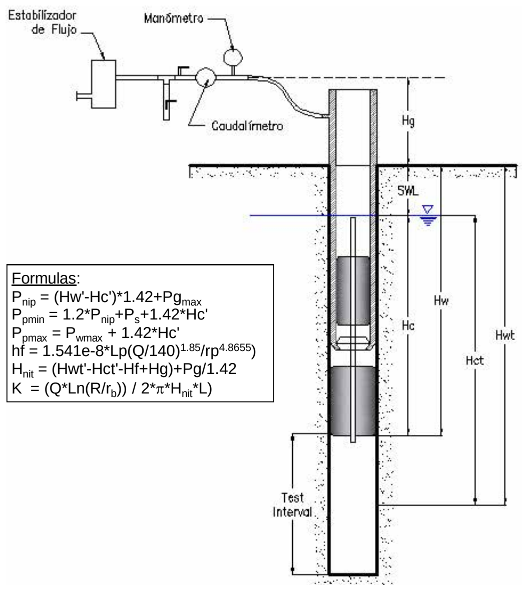
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	106.00	**To**	118.00	**Borehole :**	CPW-1
Area:		**Date :**		**Start:**		**Test Number :**	5
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	118.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

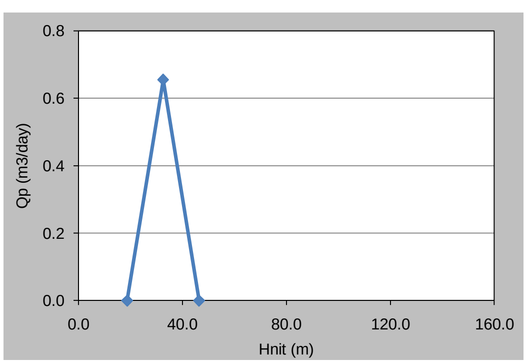
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	106.00	m
Hwt	Water column over test midpoint	112.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	101.00	m
Hct	Hydrostatic head on test midpoint	107.00	m
Hw'	Water column over packer (corrected)	106.00	m
Hwt'	Water column over test midpoint (corrected)	112.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	101.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	107.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	106.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	332	psi
Ppmax	Maximum packer inflation pressure	643	psi

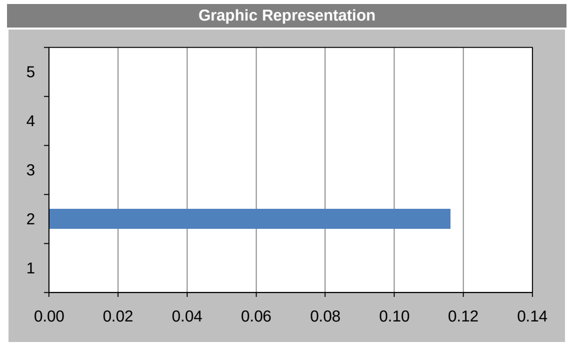
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.45	0.00		
2	0.00	0.45	0.00		
3	0.00	0.45	0.00		
4		0.45	0.00		
5			0.00		
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.45	0.00		
Q_P (m^3/day)	0.0	0.7	0.0		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	1.5E-03	0.0E+00		
K (cm/sec)	0.0E+00	1.7E-06	0.0E+00		
UL	0.00	0.12	0.00		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



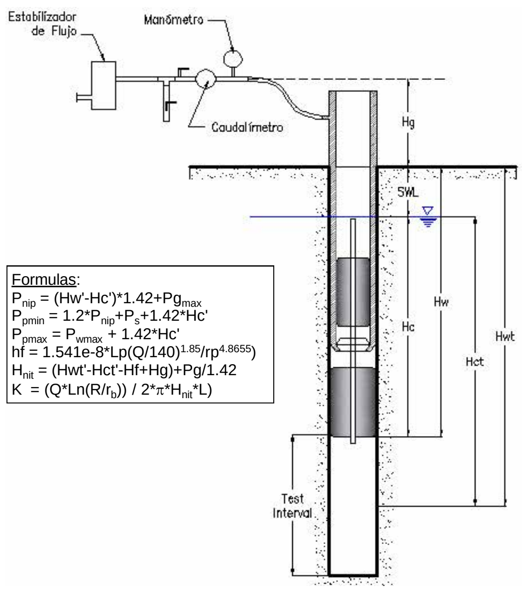
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	118.00	**To**	130.00	**Borehole :**	CPW-1
Area:		**Date :**		**Start:**		**Test Number :**	4
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	130.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

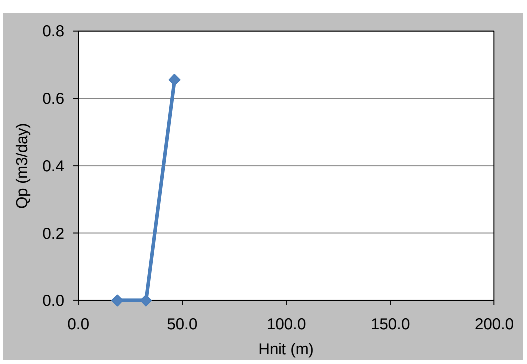
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	118.00	m
Hwt	Water column over test midpoint	124.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	113.00	m
Hct	Hydrostatic head on test midpoint	119.00	m
Hw'	Water column over packer (corrected)	118.00	m
Hwt'	Water column over test midpoint (corrected)	124.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	113.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	119.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	118.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	349	psi
Ppmax	Maximum packer inflation pressure	660	psi

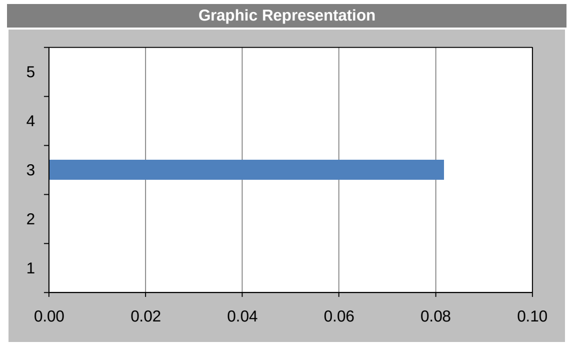
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.00	0.73		
2	0.00	0.00	0.18		
3	0.00	0.00			
4					
5					
6					
7					
8					
9					
10					
Q_P (lit/min)	0.00	0.00	0.45		
Q_P (m^3/day)	0.0	0.0	0.7		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	0.0E+00	0.0E+00	1.0E-03		
K (cm/sec)	0.0E+00	0.0E+00	1.2E-06		
UL	0.00	0.00	0.08		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

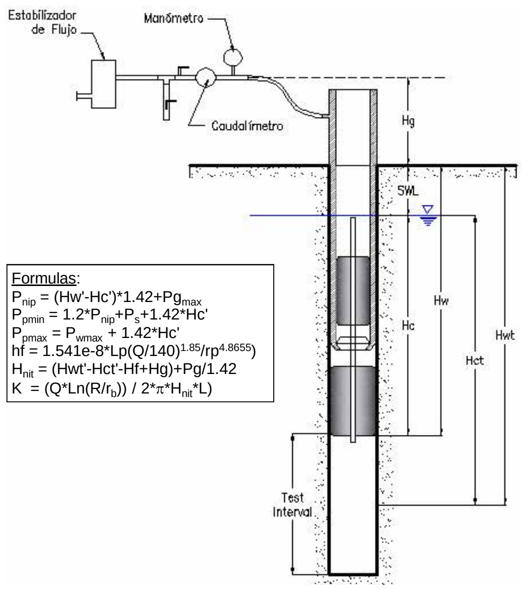
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	130.00	**To**	142.00	**Borehole :**	CPW-1
Area:		**Date :**		**Start:**		**Test Number :**	3
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	142.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
P_{nip} = (Hw'-Hc')*1.42+Pg_{max}
P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'
P_{pmax} = P_{wmax} + 1.42*Hc'
hf = 1.541e-8*Lp(Q/140)$^{1.85}$/rp$^{4.8655}$)
H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42
K = (Q*Ln(R/r_b)) / 2*π*H_{nit}*L)

Nota 1: If hole is dry enter SWL = depth.

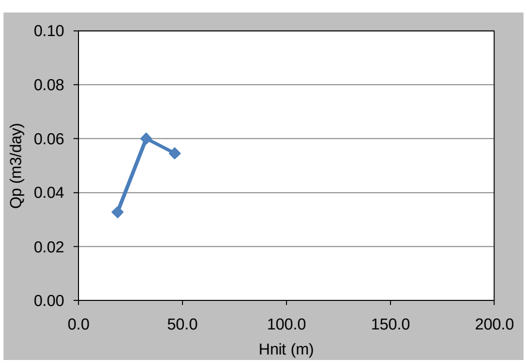
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	130.00	m
Hwt	Water column over test midpoint	136.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	125.00	m
Hct	Hydrostatic head on test midpoint	131.00	m
Hw'	Water column over packer (corrected)	130.00	m
Hwt'	Water column over test midpoint (corrected)	136.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	125.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	131.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	130.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	366	psi
Ppmax	Maximum packer inflation pressure	678	psi

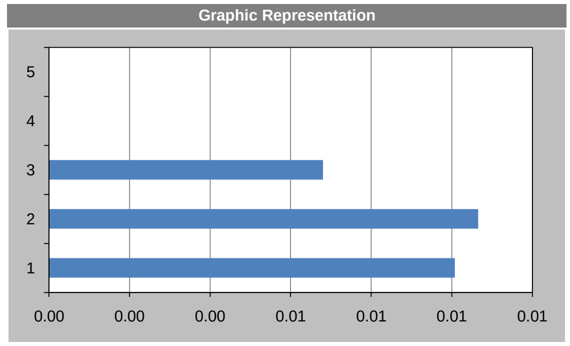
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.05	0.05	0.05		
2	0.00	0.05	0.05		
3	0.05	0.05	0.05		
4	0.02	0.05	0.02		
5	0.00	0.02	0.05		
6	0.02	0.05	0.02		
7					
8					
9					
10					
Q_P (lit/min)	0.02	0.04	0.04		
Q_P (m^3/day)	0.0	0.1	0.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.3E-04	1.3E-04	8.6E-05		
K (cm/sec)	1.5E-07	1.6E-07	1.0E-07		
UL	0.01	0.01	0.01		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



Field Observations

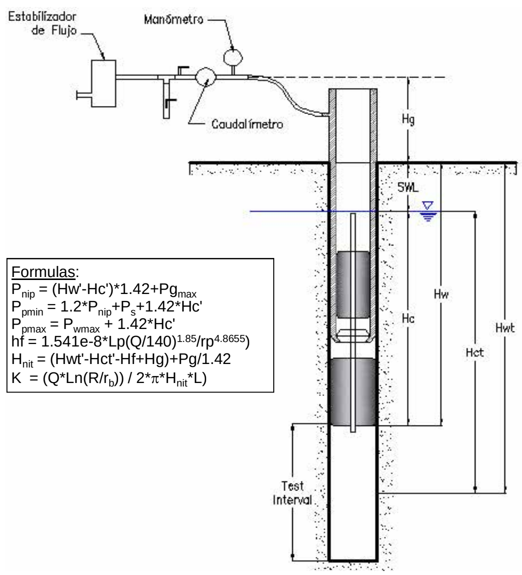
Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Ausenco Vector

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	142.00 **To** 154.00	**Borehole :**	CPW-1
Area:		**Date :**	**Start:**	**Test Number :**	2
Coordinates (m):		**Altura Caudalímetro:**	**End:**	**Total Depth (m) :**	154.00
Elevation (msnm):		**Interval Lithology :**		**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e-8*Lp(Q/140)^{1.85}/rp^{4.8655})$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

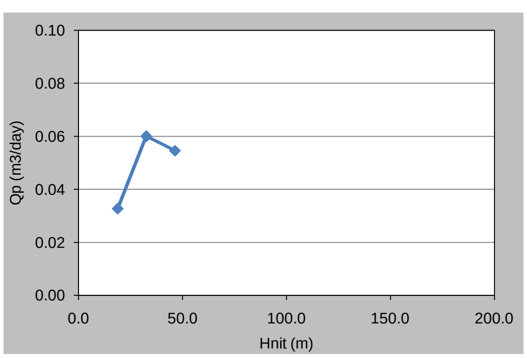
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	142.00	m
Hwt	Water column over test midpoint	148.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	137.00	m
Hct	Hydrostatic head on test midpoint	143.00	m
Hw'	Water column over packer (corrected)	142.00	m
Hwt'	Water column over test midpoint (corrected)	148.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	137.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	143.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	142.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	383	psi
Ppmax	Maximum packer inflation pressure	695	psi

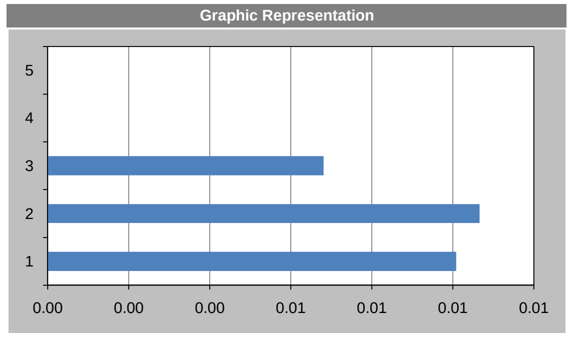
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.05	0.05	0.05		
2	0.00	0.05	0.05		
3	0.05	0.05	0.05		
4	0.02	0.05	0.02		
5	0.00	0.02	0.05		
6	0.02	0.05	0.02		
7					
8					
9					
10					
Q_P (lit/min)	0.02	0.04	0.04		
Q_P (m^3/day)	0.0	0.1	0.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.3E-04	1.3E-04	8.6E-05		
K (cm/sec)	1.5E-07	1.6E-07	1.0E-07		
UL	0.01	0.01	0.01		
K Sensitivity :	2.27E-05 (m/day)		2.63E-08 (cm/sec)		



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

Graphic Representation



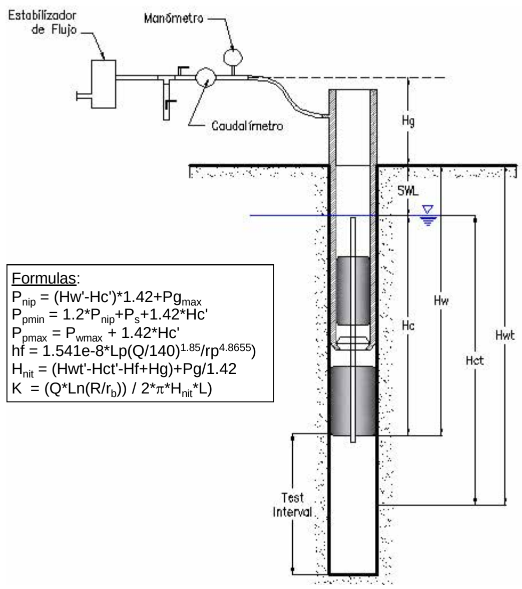
Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions

Packer Test - Injection Type

Project:	Arnaud	**Test Depth :**	154.00	**To**	166.00	**Borehole :**	CPW-1
Area:		**Date :**		**Start:**		**Test Number :**	1
Coordinates (m):		**Altura Caudalímetro:**		**End:**		**Total Depth (m) :**	166.00
Elevation (msnm):		**Interval Lithology :**				**Supervisor :**	



Formulas:
$P_{nip} = (Hw'-Hc')*1.42+Pg_{max}$
$P_{pmin} = 1.2*P_{nip}+P_s+1.42*Hc'$
$P_{pmax} = P_{wmax} + 1.42*Hc'$
$hf = 1.541e\text{-}8*Lp(Q/140)^{1.85}/rp^{4.8655}$
$H_{nit} = (Hwt'-Hct'-Hf+Hg)+Pg/1.42$
$K = (Q*Ln(R/r_b)) / 2*\pi*H_{nit}*L)$

Nota 1: If hole is dry enter SWL = depth.

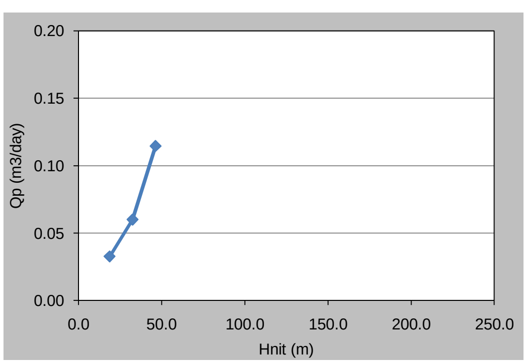
Test Data

SWL	Static water level (see note 1)	5.00	m
ß	Inclination from horizontal	90	º
Ps	Packer stretch pressure	60	psi
Pwmax	Maximum packer working pressure	500	psi
Pgmax	Maximum anticipated gauge pressure	100	psi
rb	Borehole radius	0.048	m
rp	Radius of discharge pipe	0.039	m
Hw	Water column over packer	154.00	m
Hwt	Water column over test midpoint	160.00	m
Hg	Gauge height	0.00	m
Hc	Hydrostatic head on packer	149.00	m
Hct	Hydrostatic head on test midpoint	155.00	m
Hw'	Water column over packer (corrected)	154.00	m
Hwt'	Water column over test midpoint (corrected)	160.00	m
SWL'	Static water level (corrected)	5.00	m
Hc'	Hydrostatic head on packer (corrected)	149.00	m
Hct'	Hydrostatic head on test midpoint (corrected)	155.00	m
L	Length of test section	12.00	m
Lp	Length of discharge pipe	154.00	m
R	Radius of influence	12.00	m

Packer Pressures

Pnip	Net injection pressure at packer	107	psi
Ppmin	Minimum packer inflation pressure	400	psi
Ppmax	Maximum packer inflation pressure	712	psi

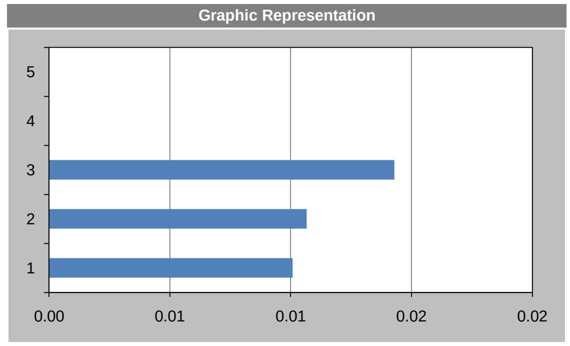
Time (min)	Q (L/min) P_g (psi) Low	P_g (psi) Medium	P_g (psi) High	P_g (psi) Medium	P_g (psi) Low
	20.0	40.0	60.0		
1	0.00	0.05	0.09		
2	0.05	0.05	0.09		
3	0.00	0.05	0.09		
4	0.02	0.05	0.07		
5	0.05	0.05	0.07		
6	0.02	0.02	0.07		
7					
8					
9					
10					
Q_P (lit/min)	0.02	0.04	0.08		
Q_P (m^3/day)	0.0	0.1	0.1		
Hf (m)	0.00	0.00	0.00		
Hnit (m)	18.8	32.6	46.4		
K (m/day)	1.3E-04	1.3E-04	1.8E-04		
K (cm/sec)	1.5E-07	1.6E-07	2.1E-07		
UL	0.01	0.01	0.01		
K Sensitivity :		2.27E-05 (m/day)		2.63E-08 (cm/sec)	



Convertion Factors

10.2 m of water = 1 bar = 1kg/cm2 = 14.5 psi
1 m = 3.281 feet = 39.37 inches
1 liter/sec = 15.85 gpm =86.38 m3/day = 60 l/min

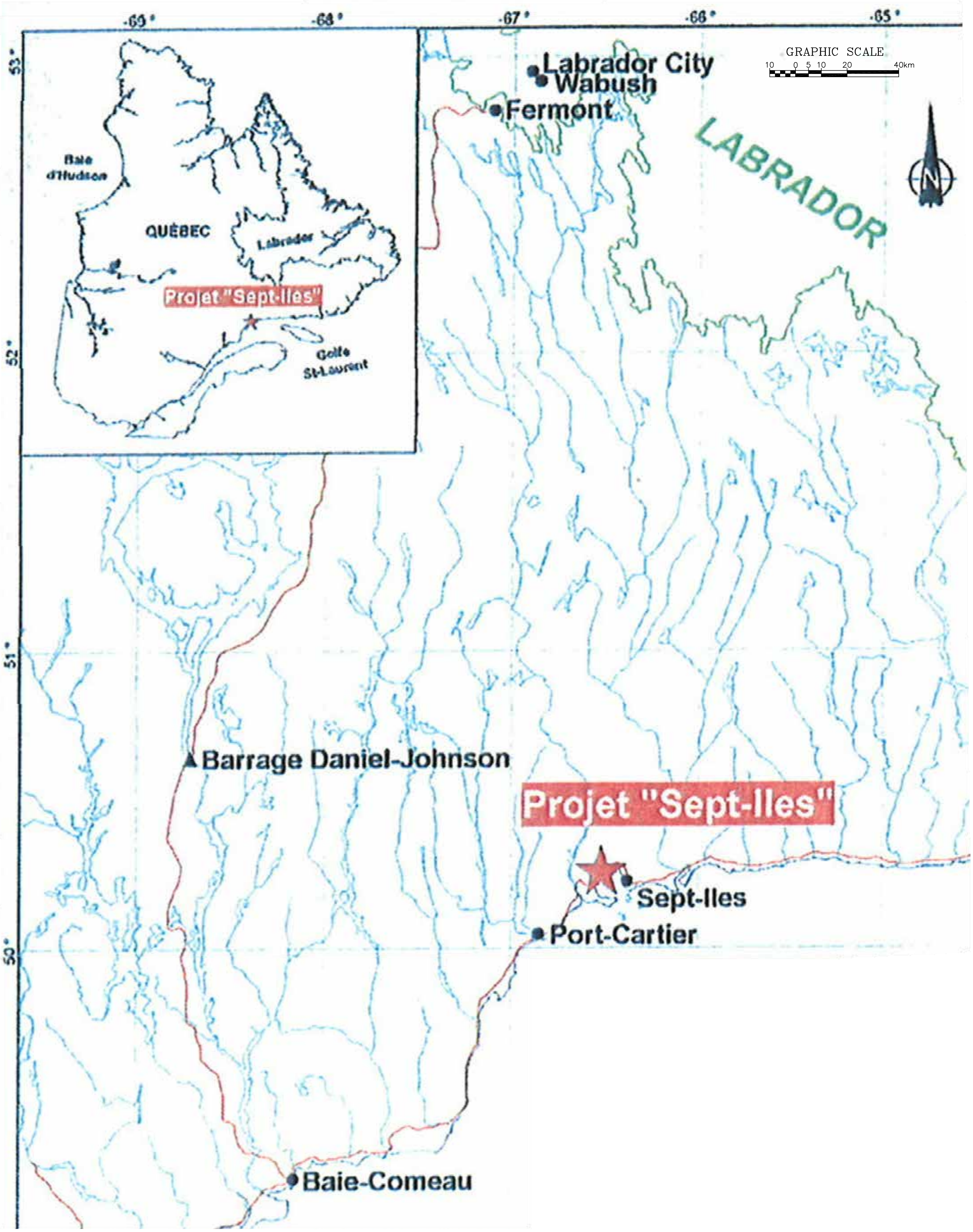
Graphic Representation



Field Observations

Packer Pressure = 300 PSI
The test made with HQ rods

Results and Conclusions



LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. FIGURES 1-1,2-1,2-3.dwg DATE: 7/6/2011 10:32 AM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN

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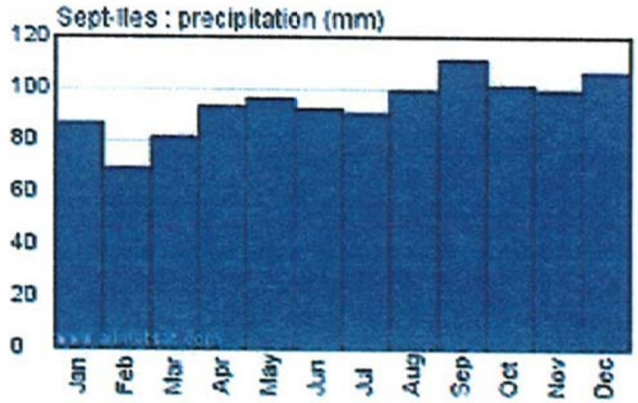
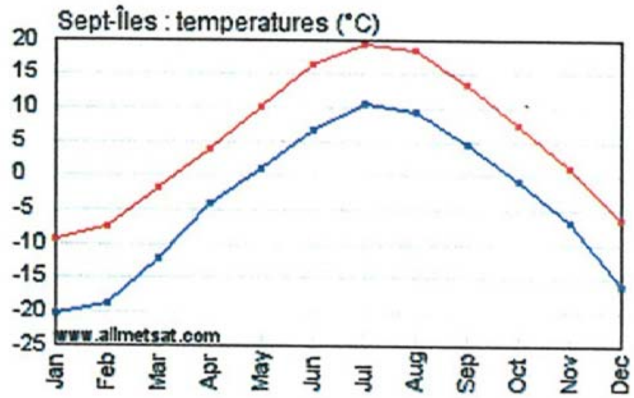
ARNAUD MINE
HYDROGEOLOGIC STUDY
QUEBEC, CANADA

LOCATION OF THE MINE ARNAUD SITE (FROM GEIVAR, 2008)

FIGURE NO.
1-1

PROJECT NO.
USVC00046





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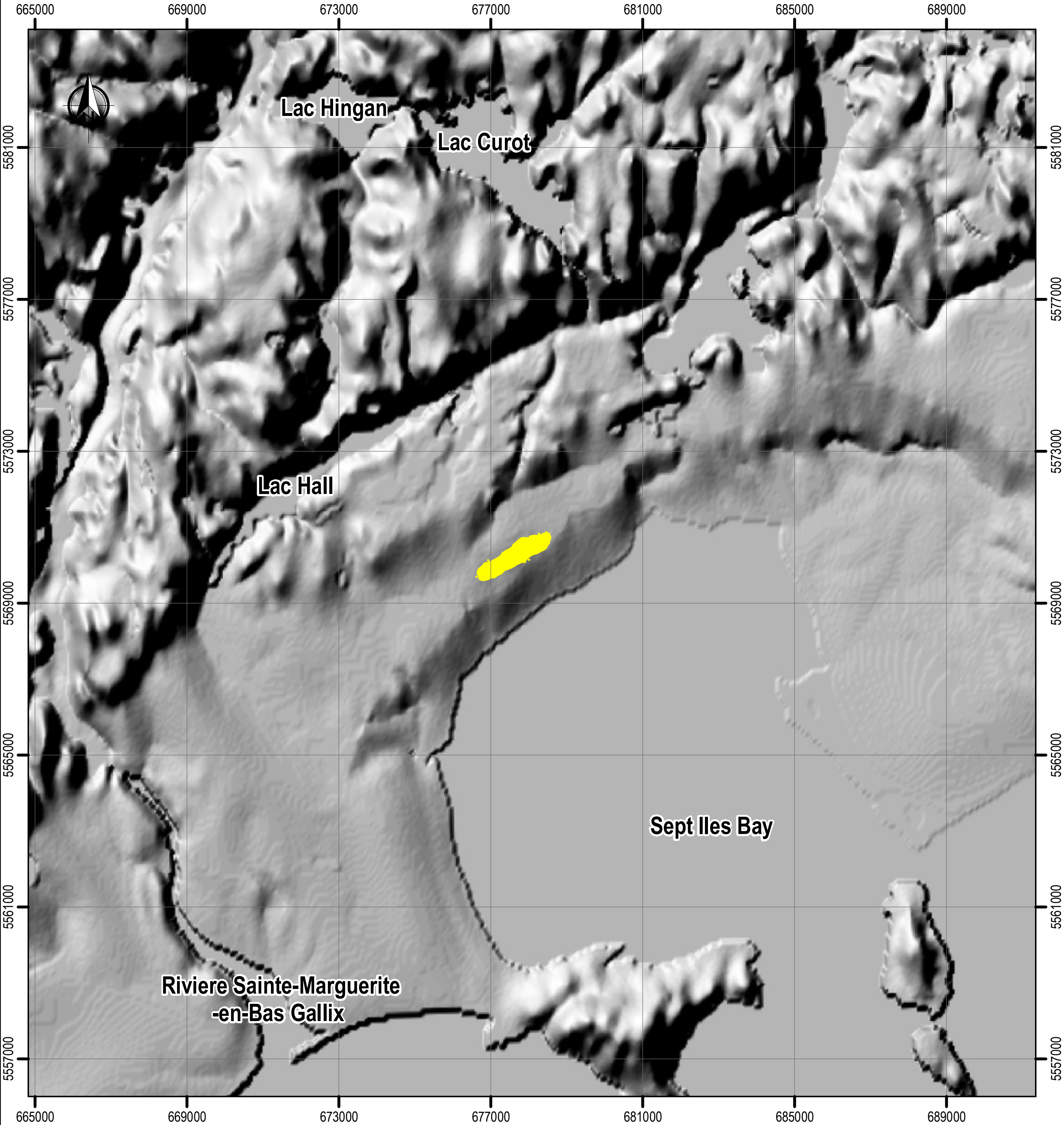
LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. FIGURES 1-1,2-1,2-3.dwg DATE: 7/6/2011 10:35 AM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN



LEGEND

Proposed Open Pit

NOTES:

1. THE TOPOGRAPHY WAS PROVIDED GEOBASE FROM THE CANADIAN DIGITAL ELEVATION DATA SET.

1000 0 1000 2000

(METERS)

1:150,000

FIGURE 2-2

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DATUM:	NAD 83
SOURCE:	---

CLIENT:
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TITLE:
DIGITAL ELEVATION MODEL OF THE AREA SURROUNDING THE PROPOSED MINE

SCALE:	PROJECT No:	SIZE:	DRAWING No:	REV:
1:150,000	99.82.01.72	A3	PEV C00000-00-000-001	A

REV.	DATE	DESCRIPTION	DRAWN	DESIGNED	CHECKED	APPROVED	DRAWING No.	REFERENCE DRAWING TITLE

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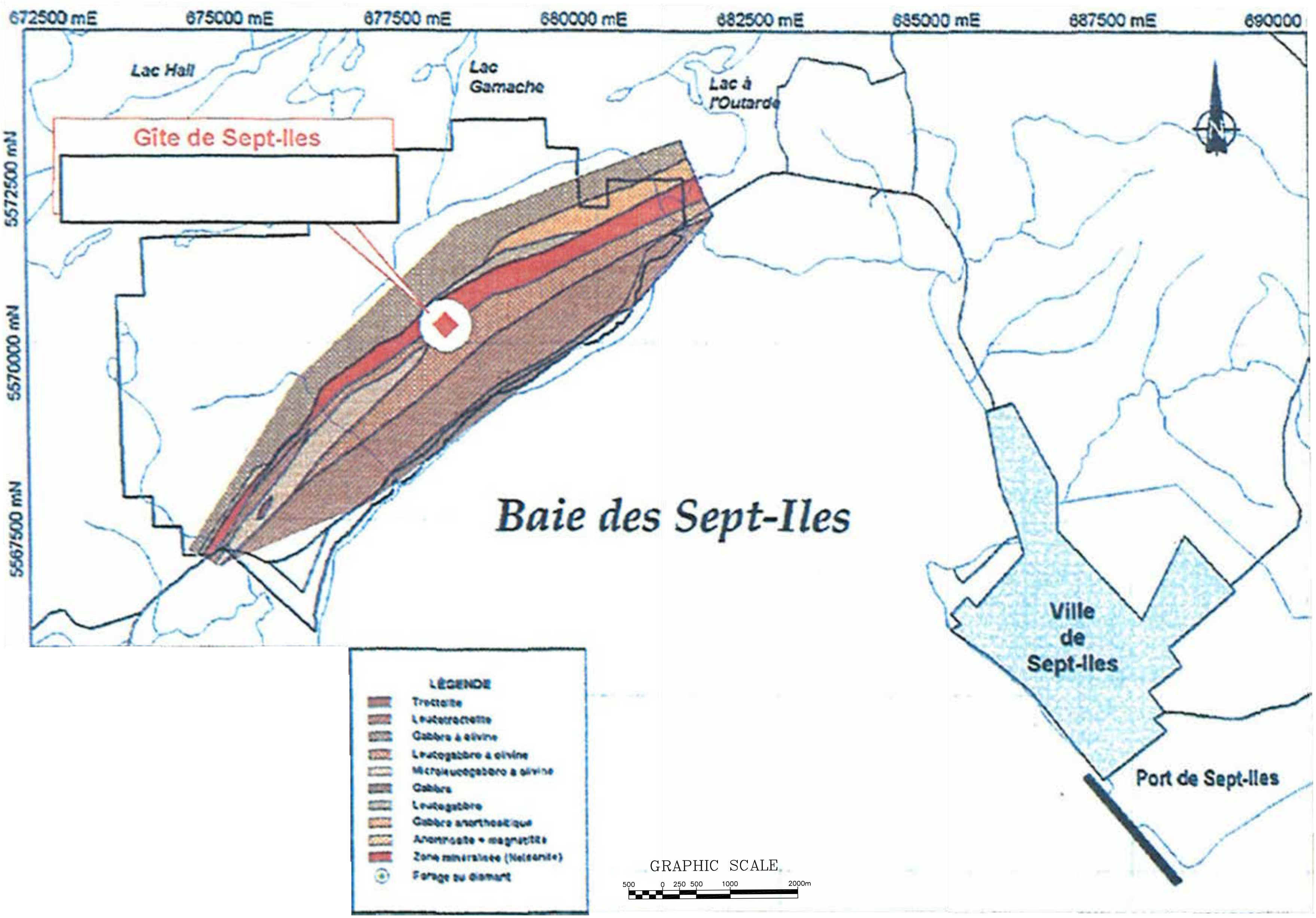

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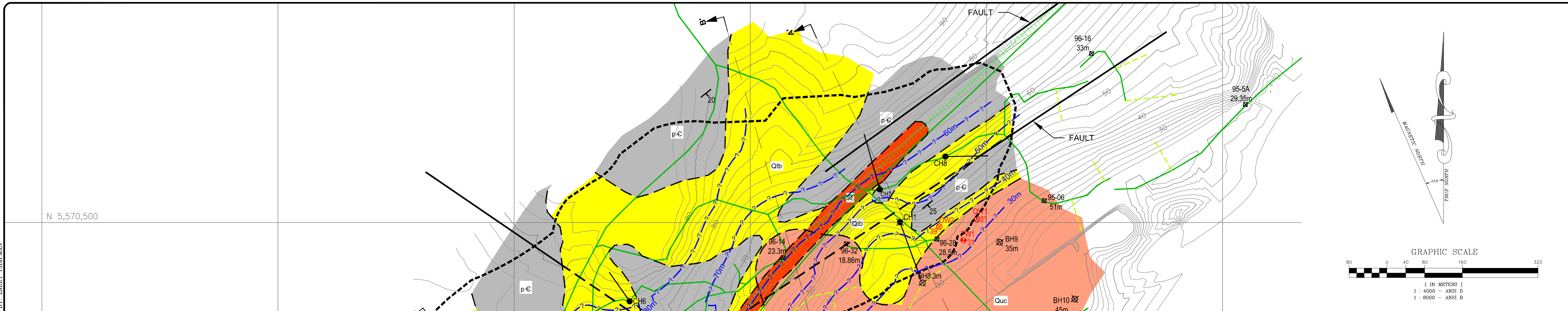
GEOLOGIC MAP OF PIT (FROM GENIVAR, 2008)

FIGURE NO. 2-3

PROJECT NO. USVC00046

LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. FIGURES 1-1.2-1.2-3.dwg DATE: 7/6/2011 10:36 AM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN



LEGEND

78	EXISTING 10m CONTOUR MJR
	EXISTING 2m CONTOUR MJR
	2010 PIT LIMIT
	FAULTS, DASHED WHERE BURIED WITH OVERBURDEN (FROM RPA 2011)
?	GEOLOGIC CONTACT, DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN
? 80m	GROUNDWATER SURFACE ELEVATION, DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN
	EXISTING RAIL LOCATION
	EXISTING MAIN ROAD
	EXISTING SECONDARY ROAD
CH1	ORIENTED CORE HOLE LOCATION
PW 75	PUMPING WELL WITH APPROXIMATE GROUNDWATER ELEVATIONS.
OW 75	OBSERVATION WELL WITH APPROXIMATE GROUNDWATER ELEVATIONS.
BH4 45m	GEOTECHNICAL BOREHOLE INDICATES THICKNESS OF OVERBURDEN
95-08 45m	PREVIOUS EXPLORATION BOREHOLE SHOWING DEPTH TO BEDROCK
af	FILL ALONG RAILROAD EMBANKMENT
Qtb	BOULDER TILL, TYPICALLY < 3m THICK, OVERLYING BEDROCK
Quc	UNCONSOLIDATED SAND, SILT, AND CLAY UP TO 40m THICK
p-€	PRECAMBRIAN MAGNETITE, NELSONITE, AND ASSOCIATED ROCKS OF SEPT-ILES COMPLEX
B B'	GEOLOGIC CROSS SECTIONS (SEE FIGURE 3)
45	STRIKE AND DIPS OF LAYERING WITHIN THE SEPT-ILES COMPLET

NOTES:
1. EXISTING TOPOGRAPHY BASED ON SURVEY SUPPLIED BY CLIENT ON 2010.

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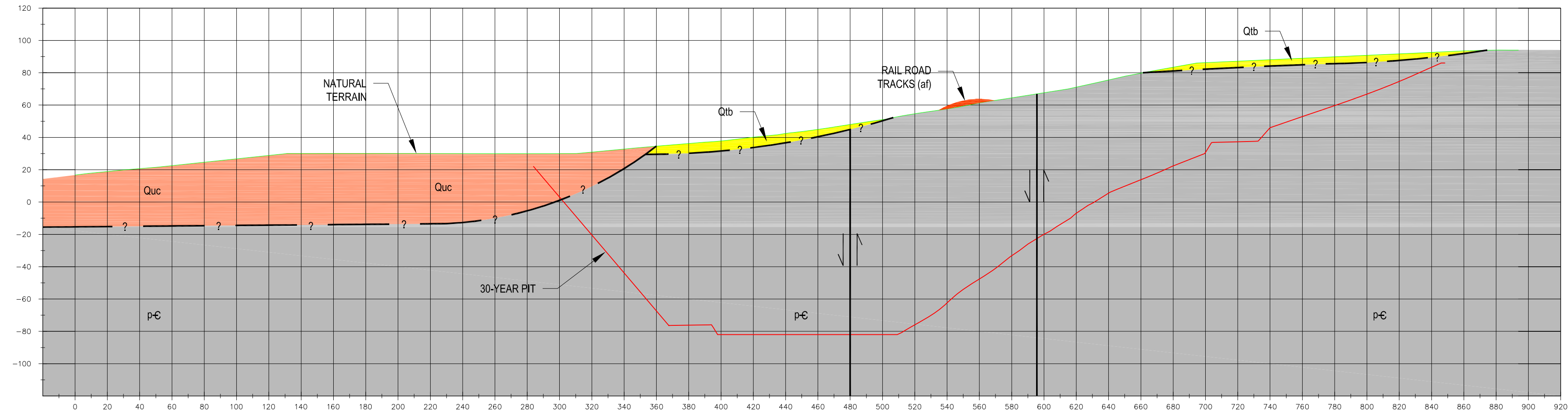
QUEBEC, CANADA

GEOLOGIC MAP

FIGURE NO. 2–4

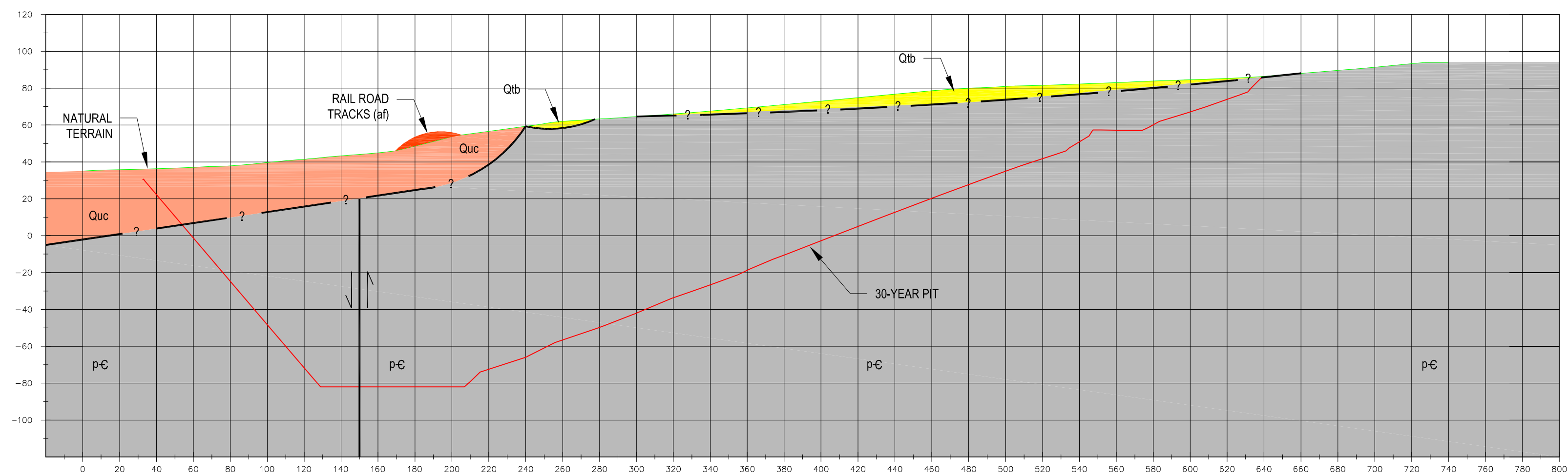
PROJECT NO. USVC–0004602

LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. MAP (updated UTM) 070111.dwg DATE: 7/6/2011 10:15 AM PLOT SCALE = 1:2 PLOTTED BY: LARRY CHAPMAN



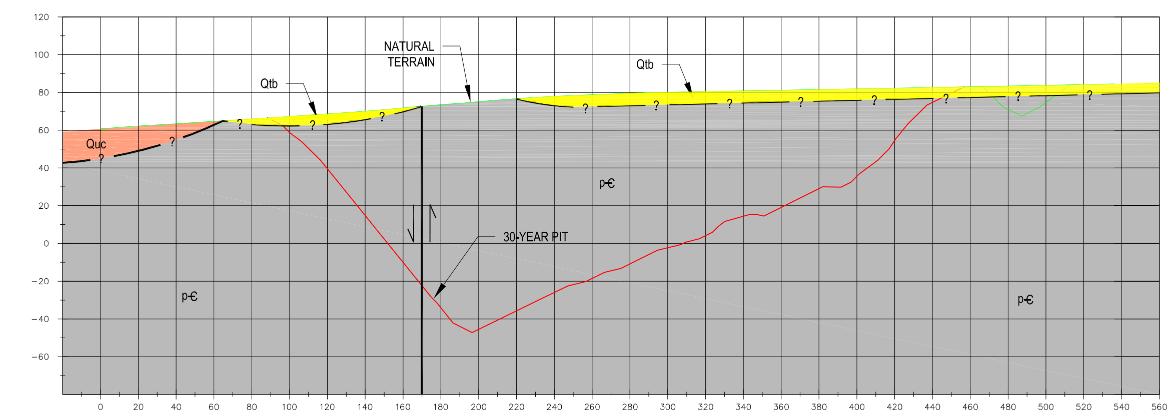
SECTION A-A'

1 : 2000



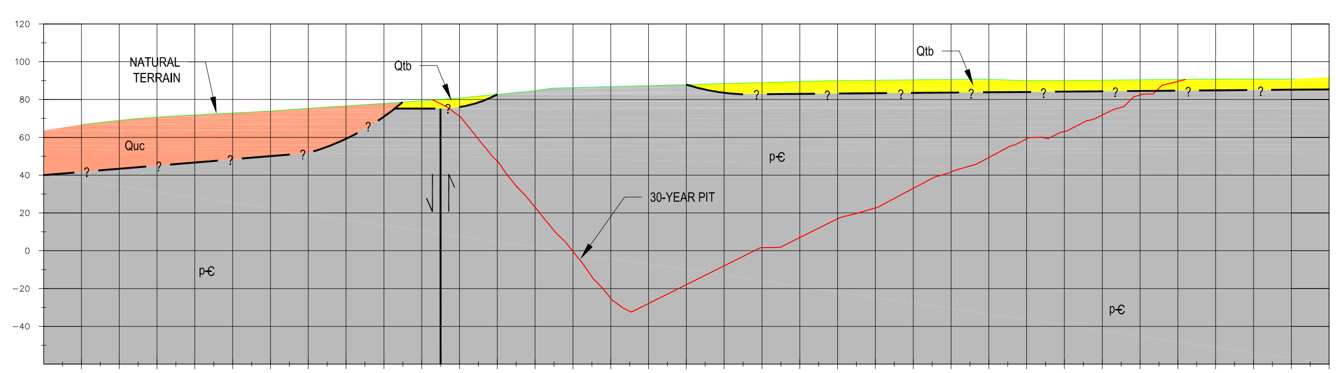
SECTION B-B'

1 : 2000



SECTION C-C'

1 : 2000



SECTION D-D'

1 : 2000

LEGEND

- EXISTING TOPOGRAPHY
- 30-YEAR PIT EXCAVATION
- GEOLOGIC CONTACT, DASHED WHERE APPROXIMATED, QUERIED WHERE UNCERTAIN
- Quc — UNCONSOLIDATED SAND, SILT, AND CLAY UP TO 40m THICK
- p-€ — PRECAMBRIAN MAGNETITE, NELSONITE, AND ASSOCIATED ROCKS OF SEPT-ILES COMPLEX
- af — FILL ALONG RAILROAD EMBANKMENT
- Qtb — BOULDER TILL, TYPICALLY < 3m THICK, OVERLYING BEDROCK
- FAULT (FROM RPA 2011)

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ARNAUD MINE
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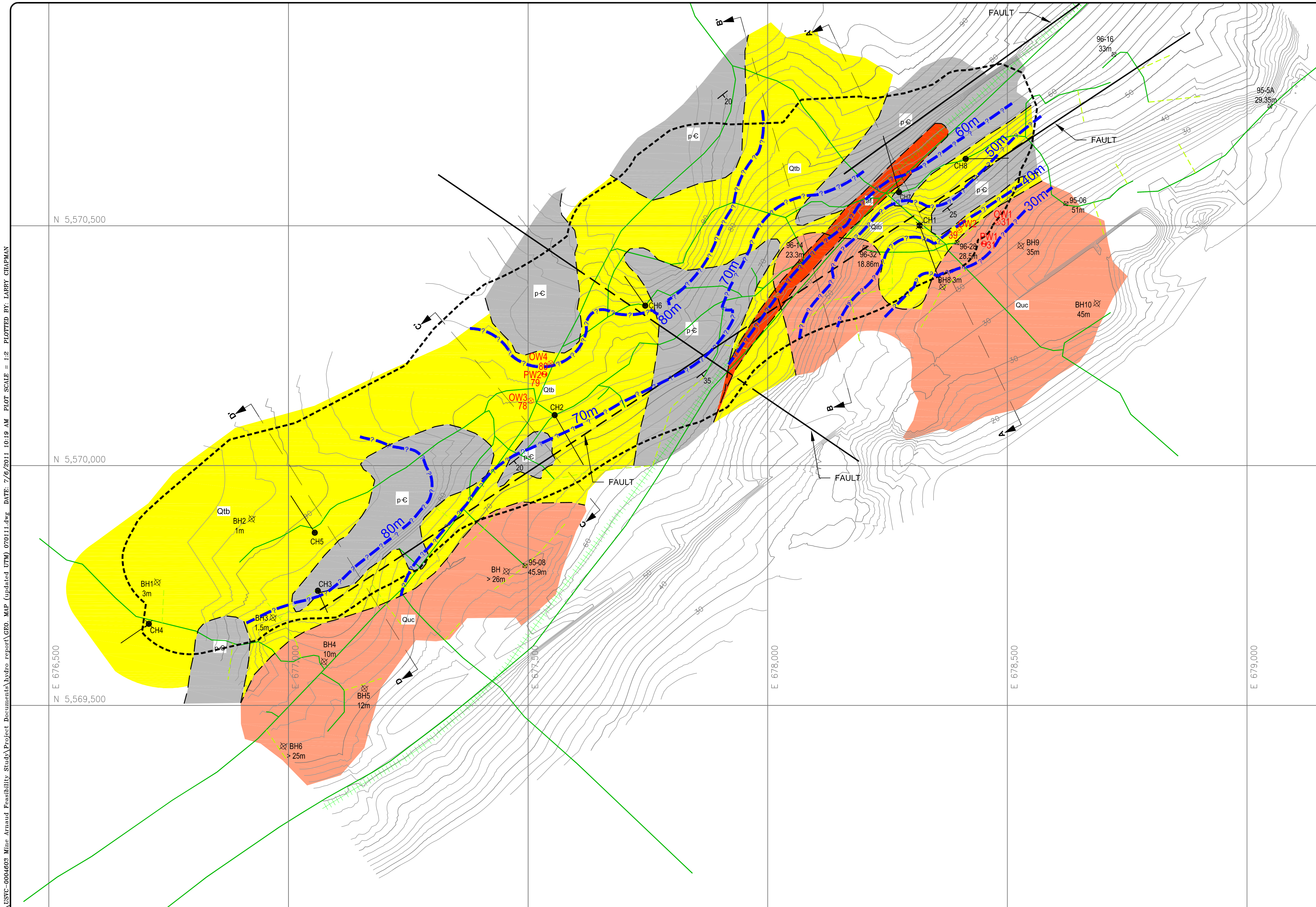
GEOLOGIC MAP SECTIONS

FIGURE NO. 2-5

PROJECT NO. USVC-0004602



GRAPHIC SCALE

80 0 40 80 160 320

(IN METERS)
1 : 4000 – ANSI D
1 : 8000 – ANSI B

LEGEND

78	EXISTING 10m CONTOUR MJR
	EXISTING 2m CONTOUR MJR
	2010 PIT LIMIT
	FAULTS, DASHED WHERE BURIED WITH OVERBURDEN (FROM RPA 2011)
?	GEOLOGIC CONTACT, DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN
80m ? ?	GROUNDWATER SURFACE ELEVATION, DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN
	EXISTING RAIL LOCATION
	EXISTING MAIN ROAD
	EXISTING SECONDARY ROAD
CH1	ORIENTED CORE HOLE LOCATION
PW 75	PUMPING WELL WITH APPROXIMATE GROUNDWATER ELEVATIONS.
OW 75	OBSERVATION WELL WITH APPROXIMATE GROUNDWATER ELEVATIONS.
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Quc	UNCONSOLIDATED SAND, SILT, AND CLAY UP TO 40m THICK
p-€	PRECAMBRIAN MAGNETITE, NELSONITE, AND ASSOCIATED ROCKS OF SEPT-ILES COMPLEX
B B'	GEOLOGIC CROSS SECTIONS (SEE FIGURE 3)
45	STRIKE AND DIPS OF LAYERING WITHIN THE SEPT-ILES COMPLET

NOTES:
1. EXISTING TOPOGRAPHY BASED ON SURVEY SUPPLIED BY CLIENT ON 2010.

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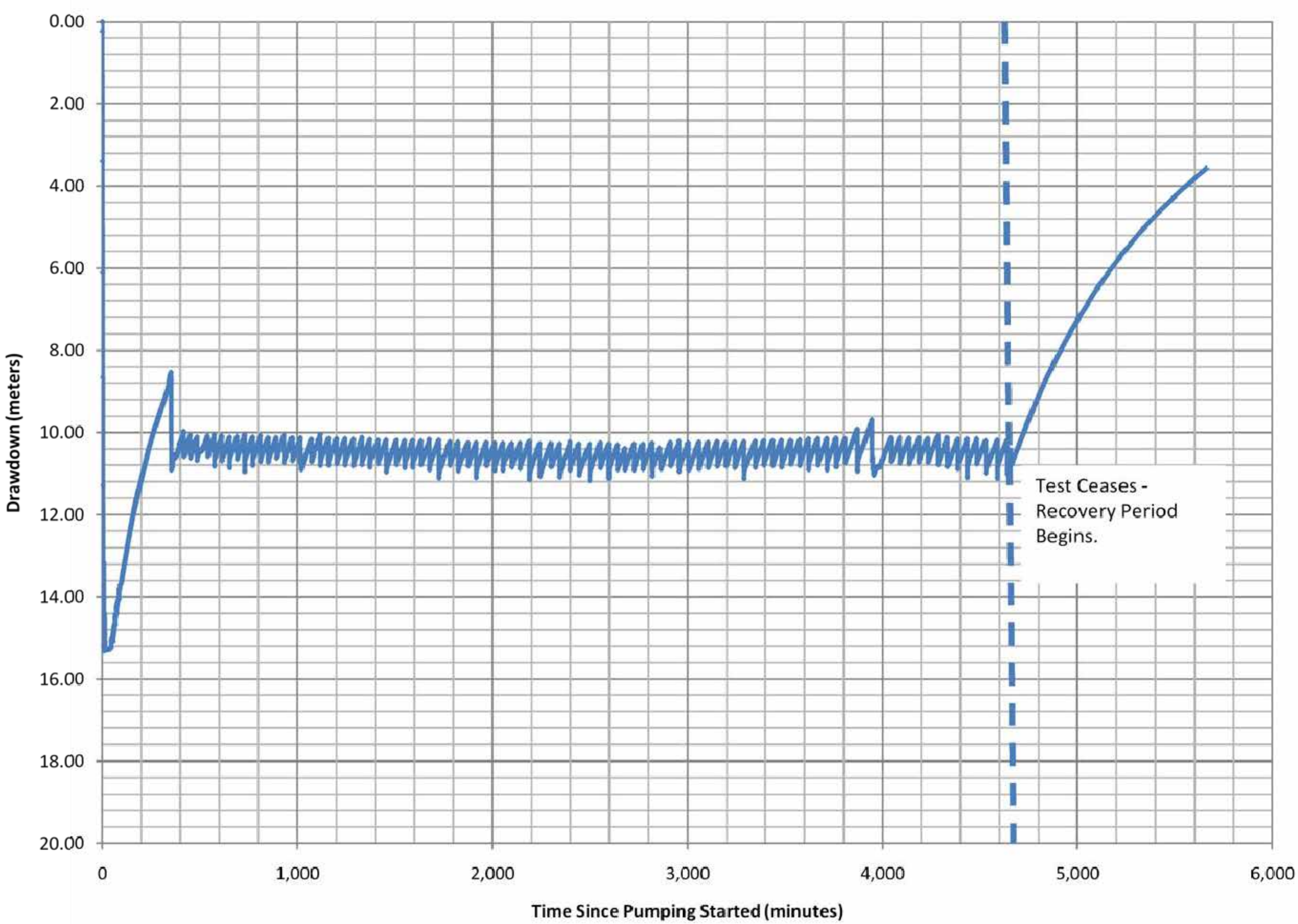
GROUNDWATER ELEVATION MAP

FIGURE NO. 3–1

PROJECT NO. USVC–0004602

LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. MAP (updated UTM) 070111.dwg DATE: 7/6/2011 10:19 AM PLOT SCALE = 1:2 PLOTTED BY: LARRY CHAPMAN



LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\Time Drawdown Figures.dwg DATE: 7/7/2011 11:36 AM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN

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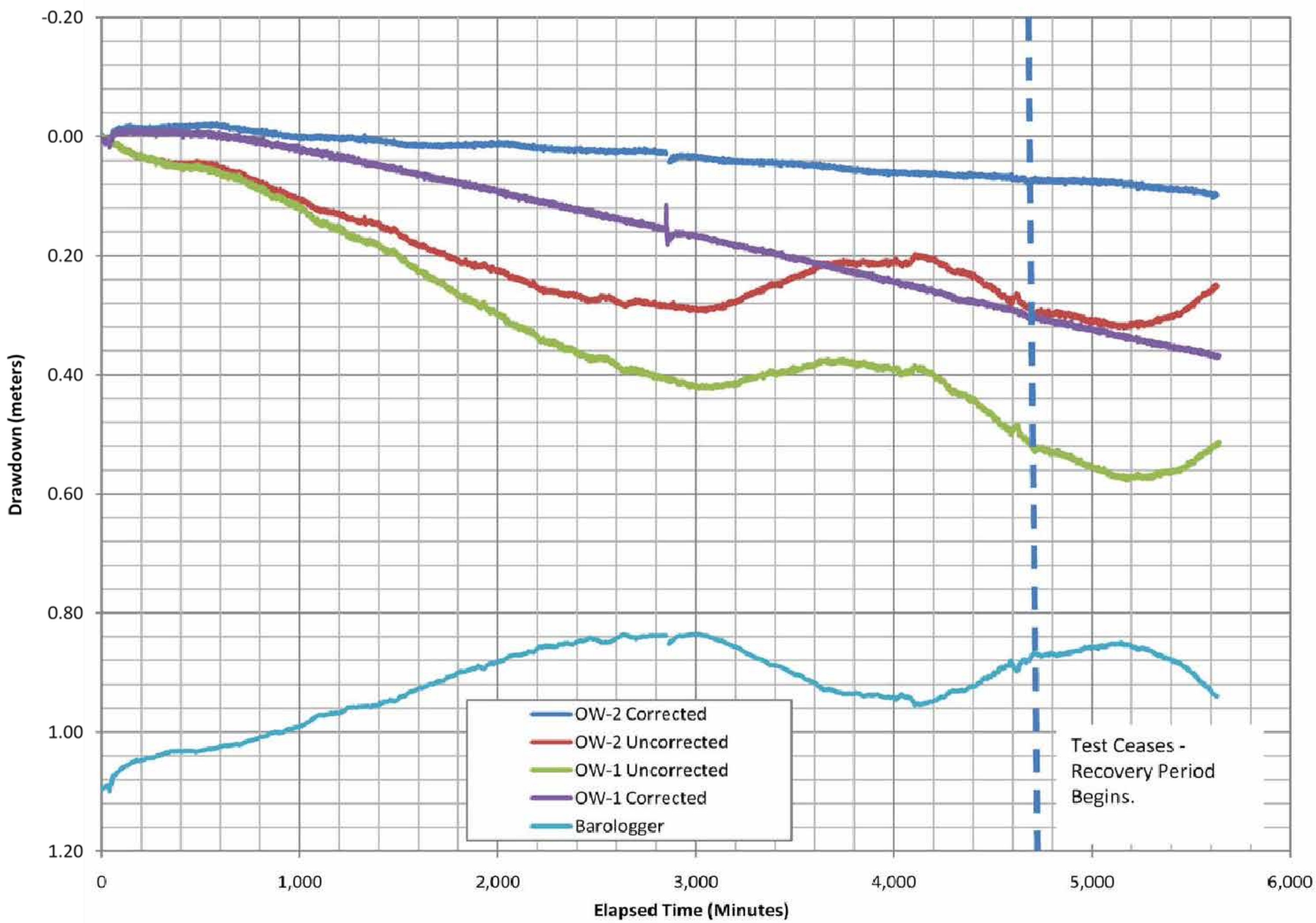
TIME-DRAWDOWN DATA FOR PW-1

FIGURE NO.
3-2

PROJECT NO.
USVC00046



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ARNAUD MINE
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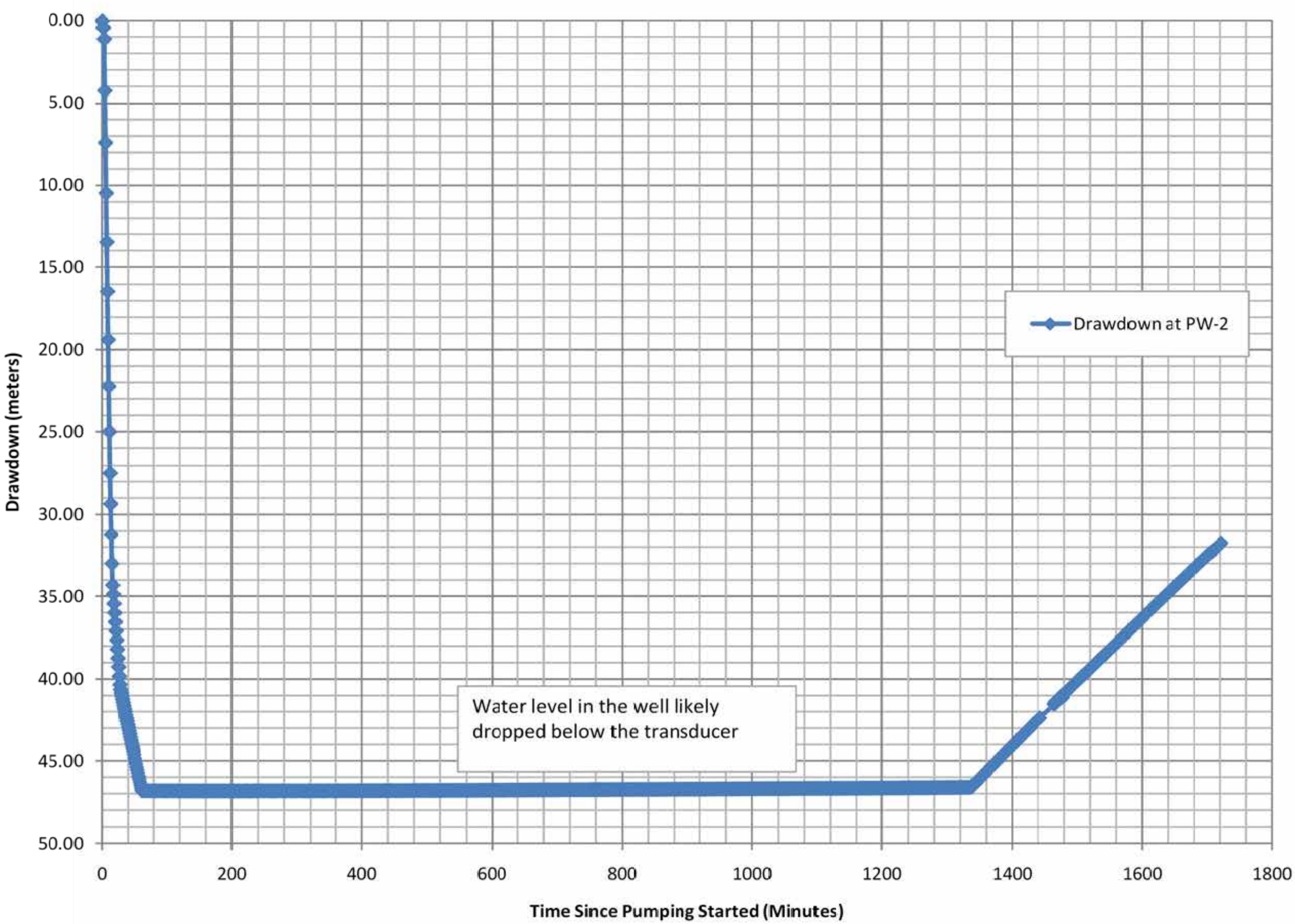
TIME-DRAWDOWN DATA FOR OBSERVATION WELLS DURING PW-1 PUMPING TEST

FIGURE NO.
3-3
PROJECT NO.
USVC00046



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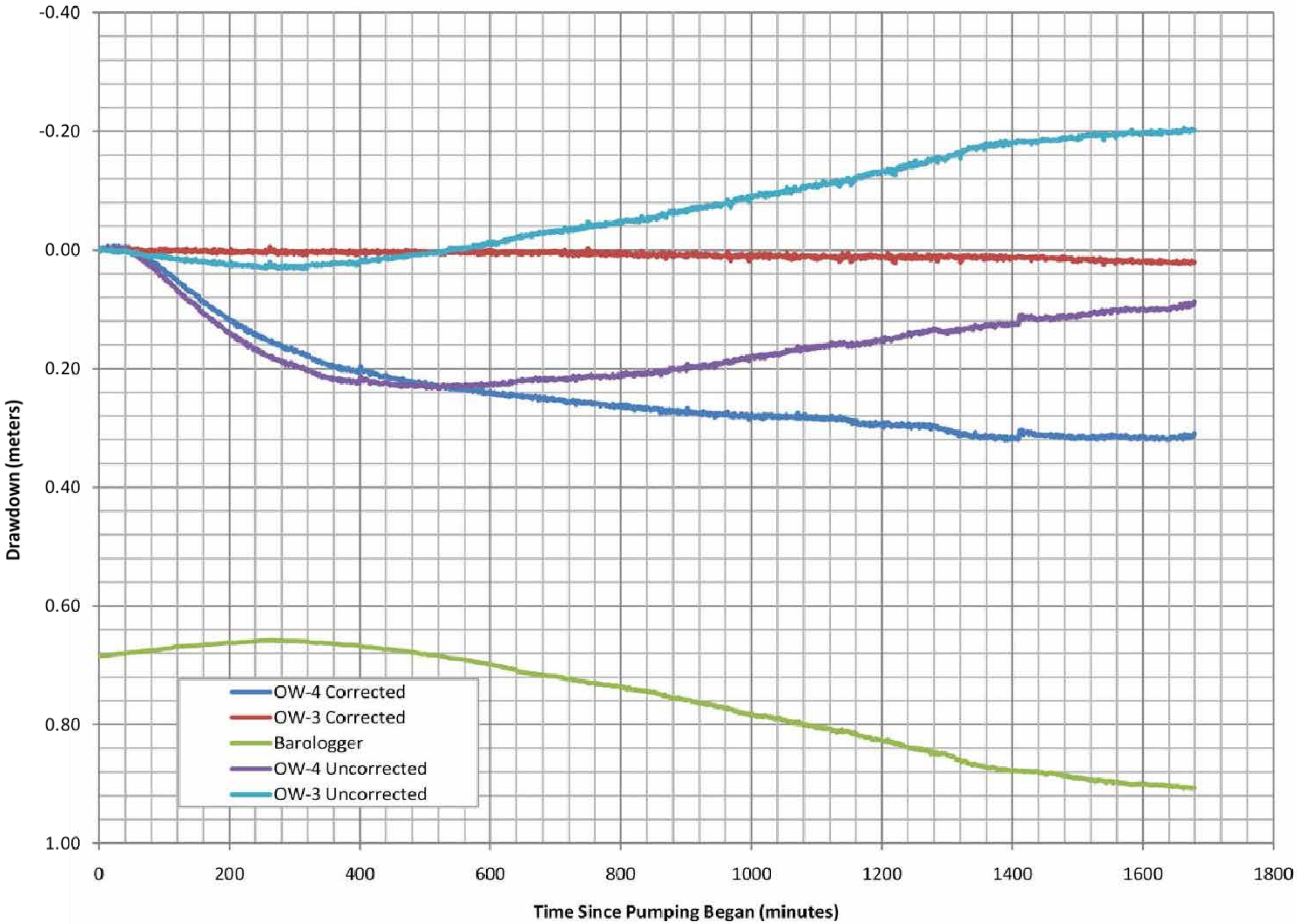

LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\Time Drawdown Figures.dwg DATE: 7/7/2011 11:48 AM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN

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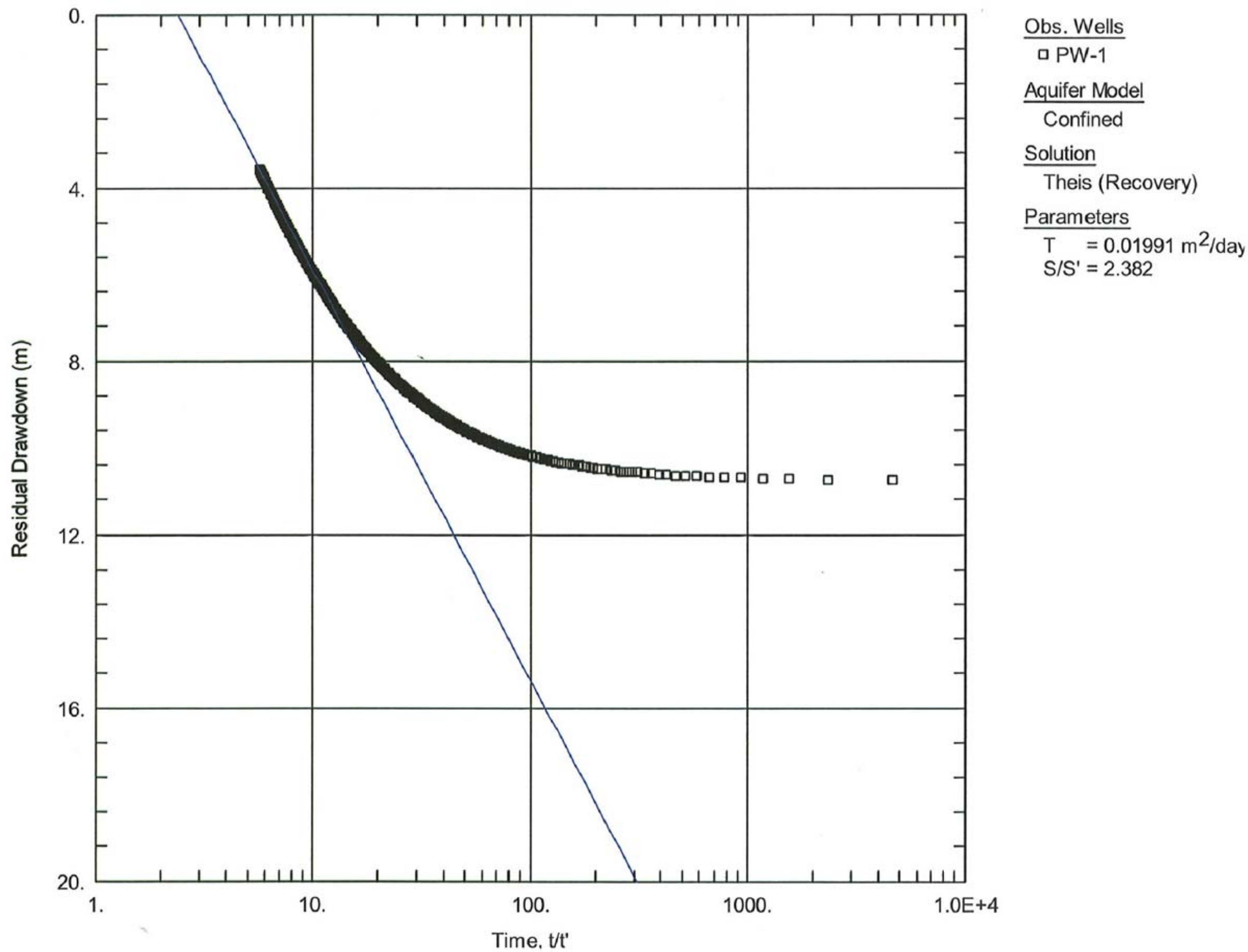
TIME-DRAWDOWN DATA FOR OBSERVATION WELLS DURING PW-2 PUMPING TEST

FIGURE NO.
3-5

PROJECT NO.
USVC00046

LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. FIGURES 3-7 to 3-13 070111.dwg DATE: 7/7/2011 11:58 AM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN



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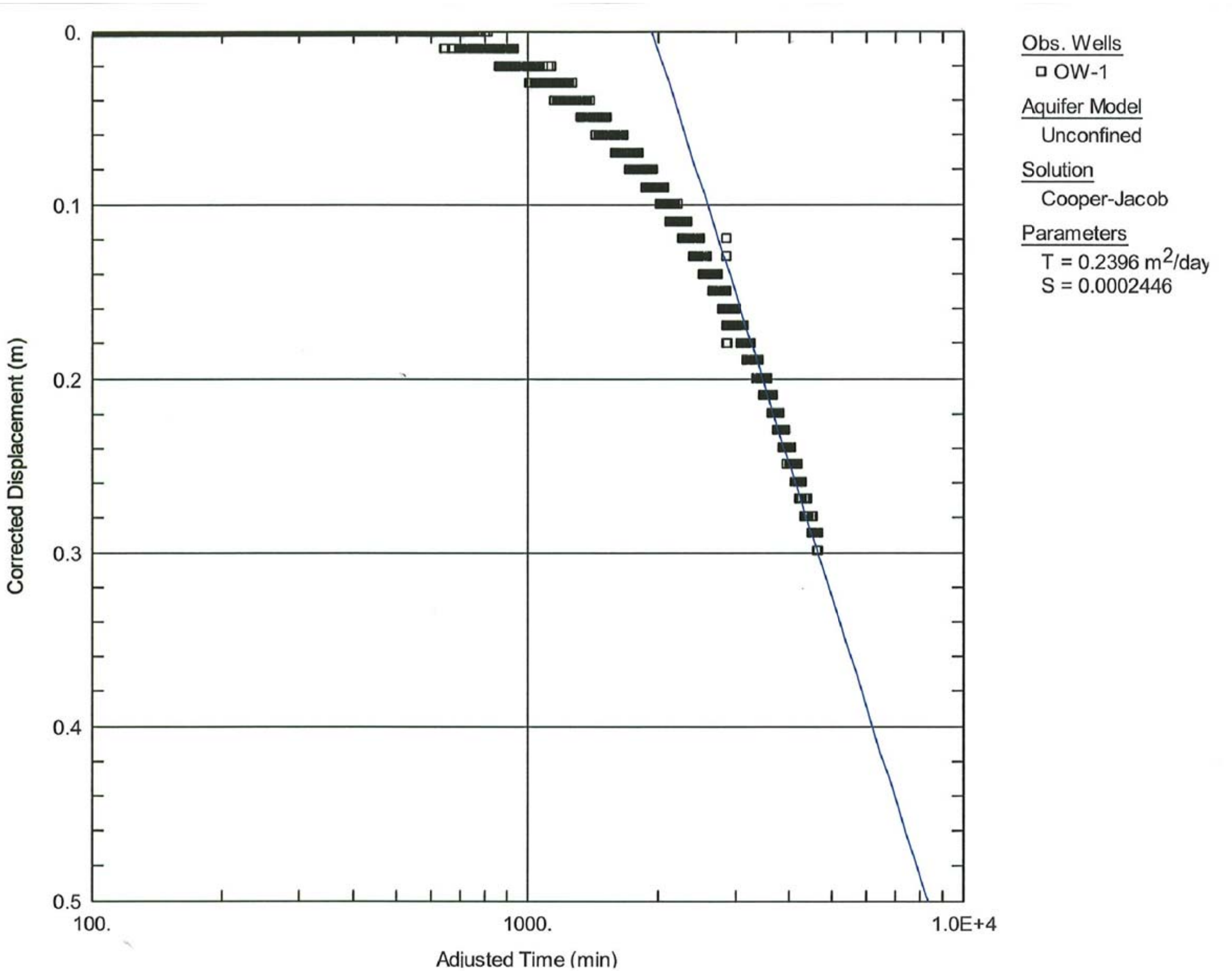

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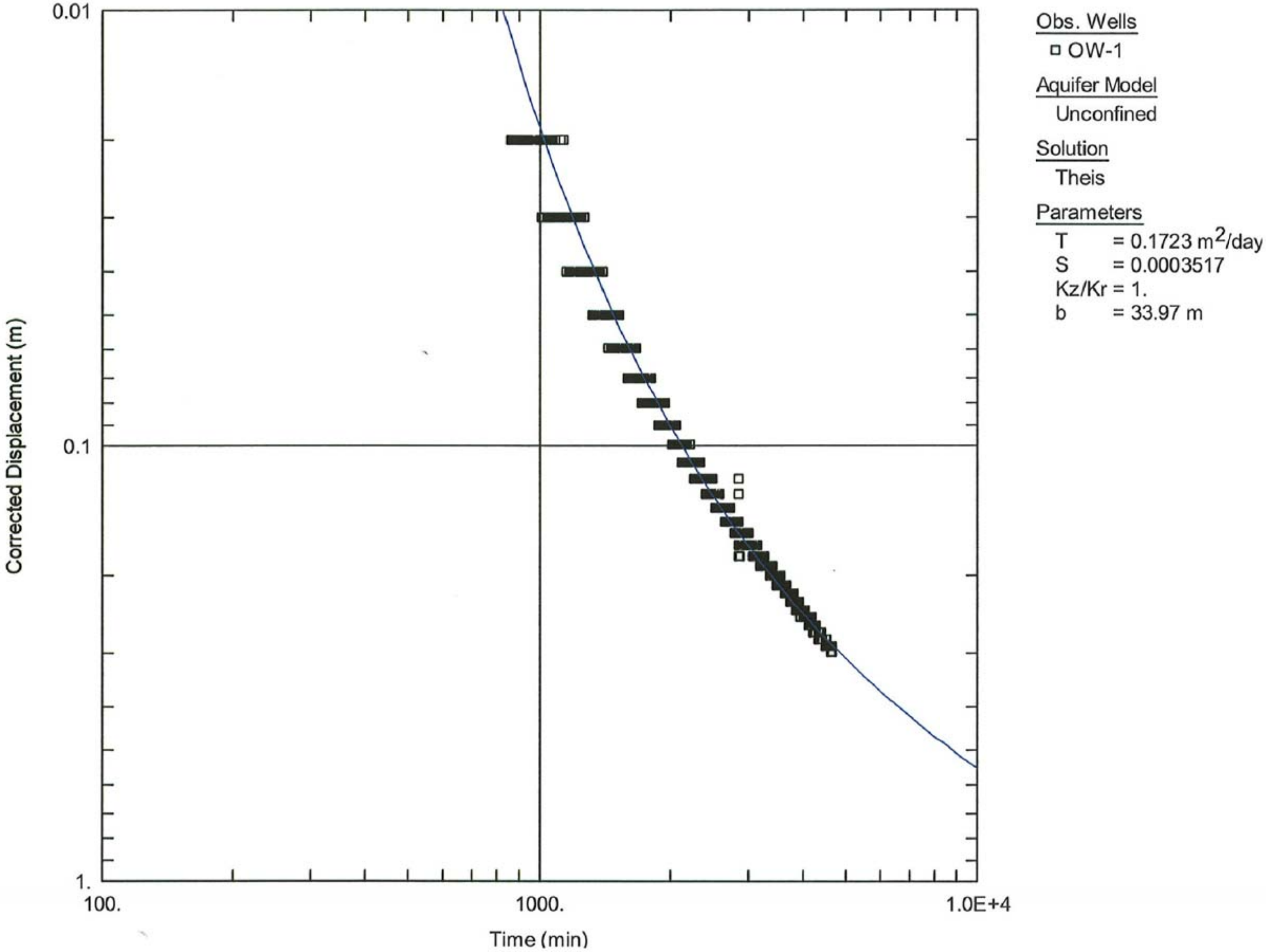

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ARNAUD MINE
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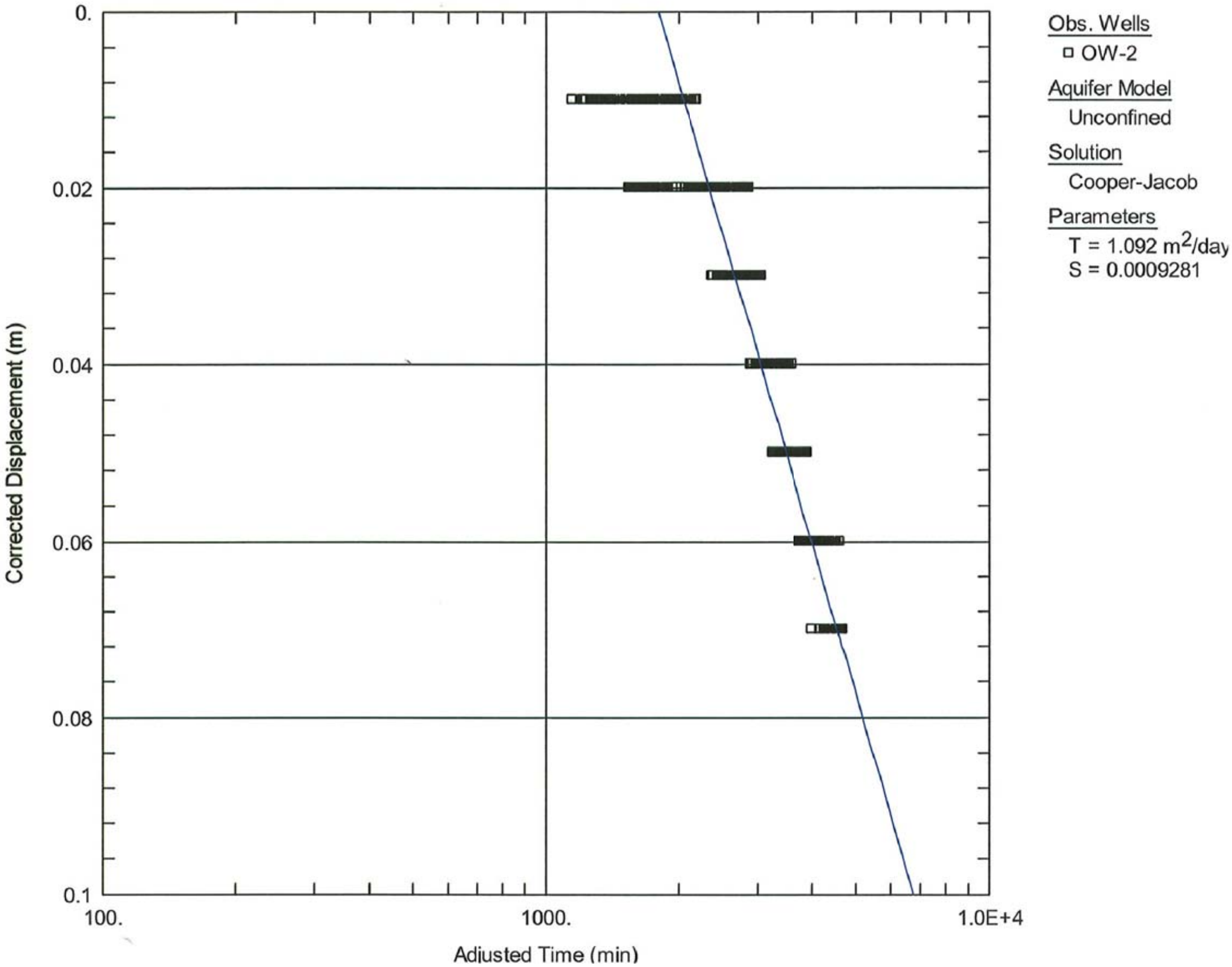
THEIS SOLUTION FOR OW-1

FIGURE NO. **3-8**

PROJECT NO. USVC00046



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ARNAUD MINE
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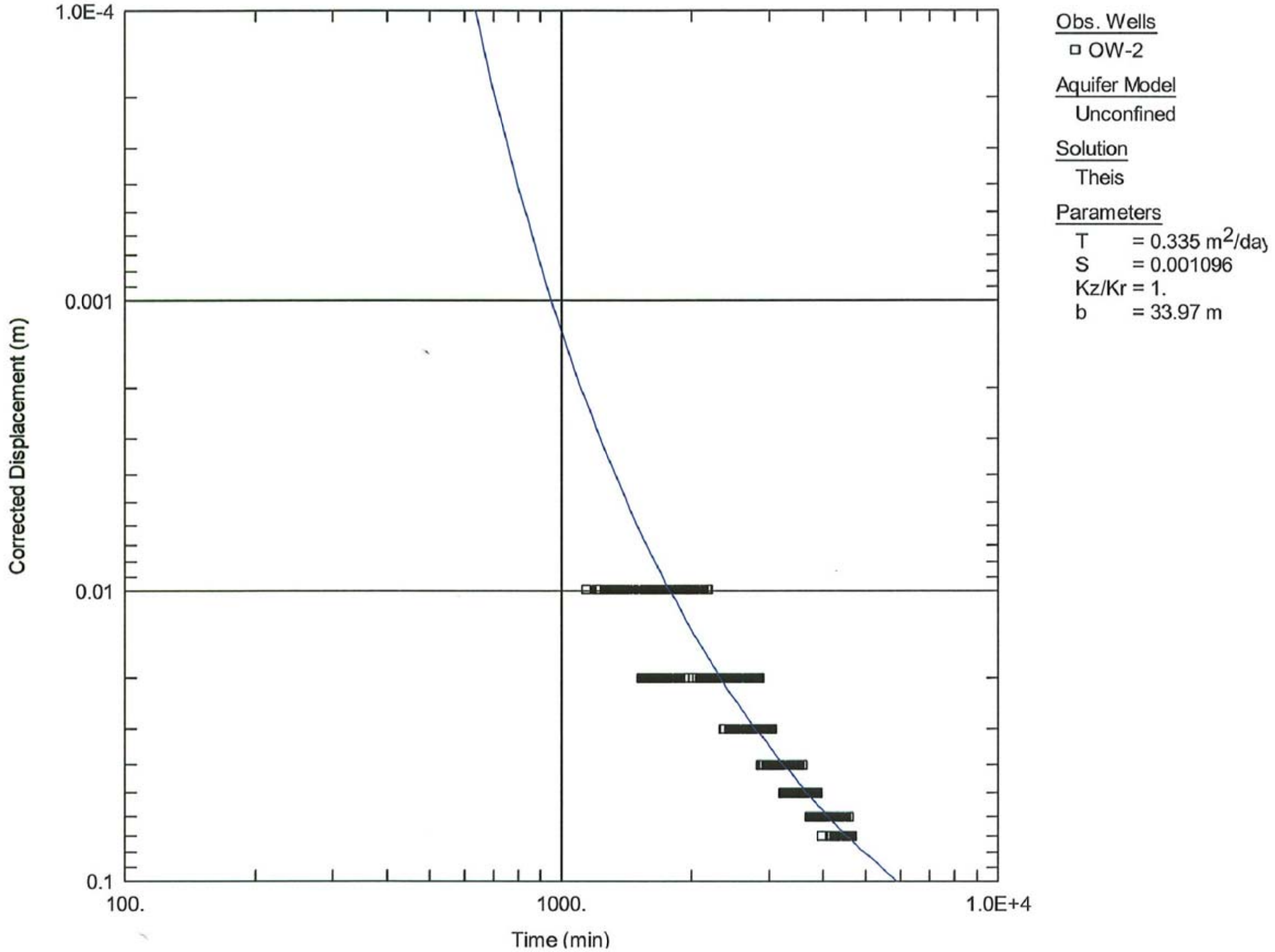
QUEBEC, CANADA

COOPER-JACOB SOLUTION FOR OW-2

FIGURE NO.
3-9

PROJECT NO.
USVC00046



LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. FIGURES 3-7 to 3-13 070111.dwg DATE: 7/7/2011 12:02 PM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN

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ARNAUD MINE
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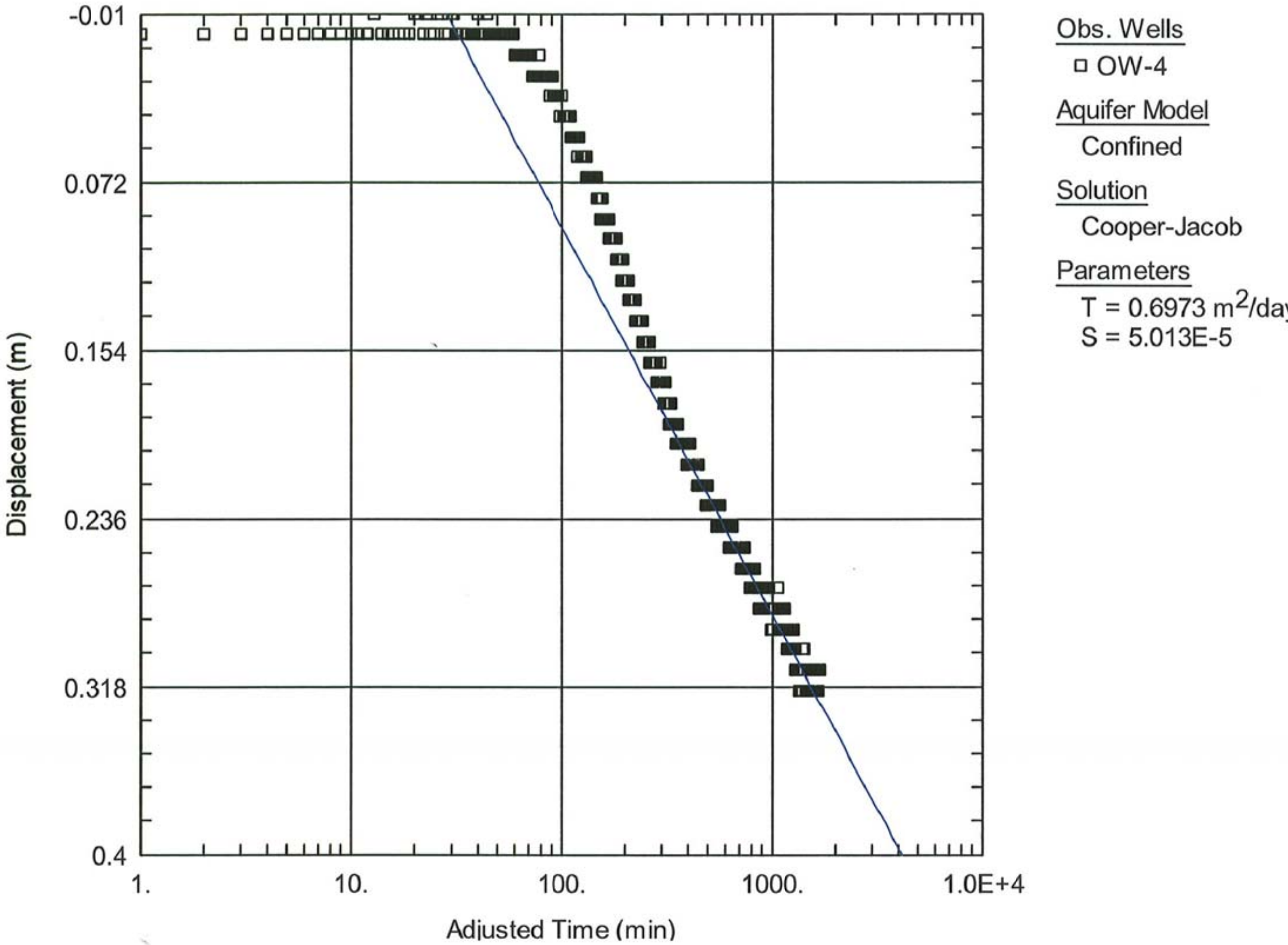
QUEBEC, CANADA

THEIS SOLUTION FOR OW-2

FIGURE NO. **3-10**

PROJECT NO. USVC00046



LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. FIGURES 3-7 to 3-13 070111.dwg DATE: 7/7/2011 12:03 PM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN

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ARNAUD MINE
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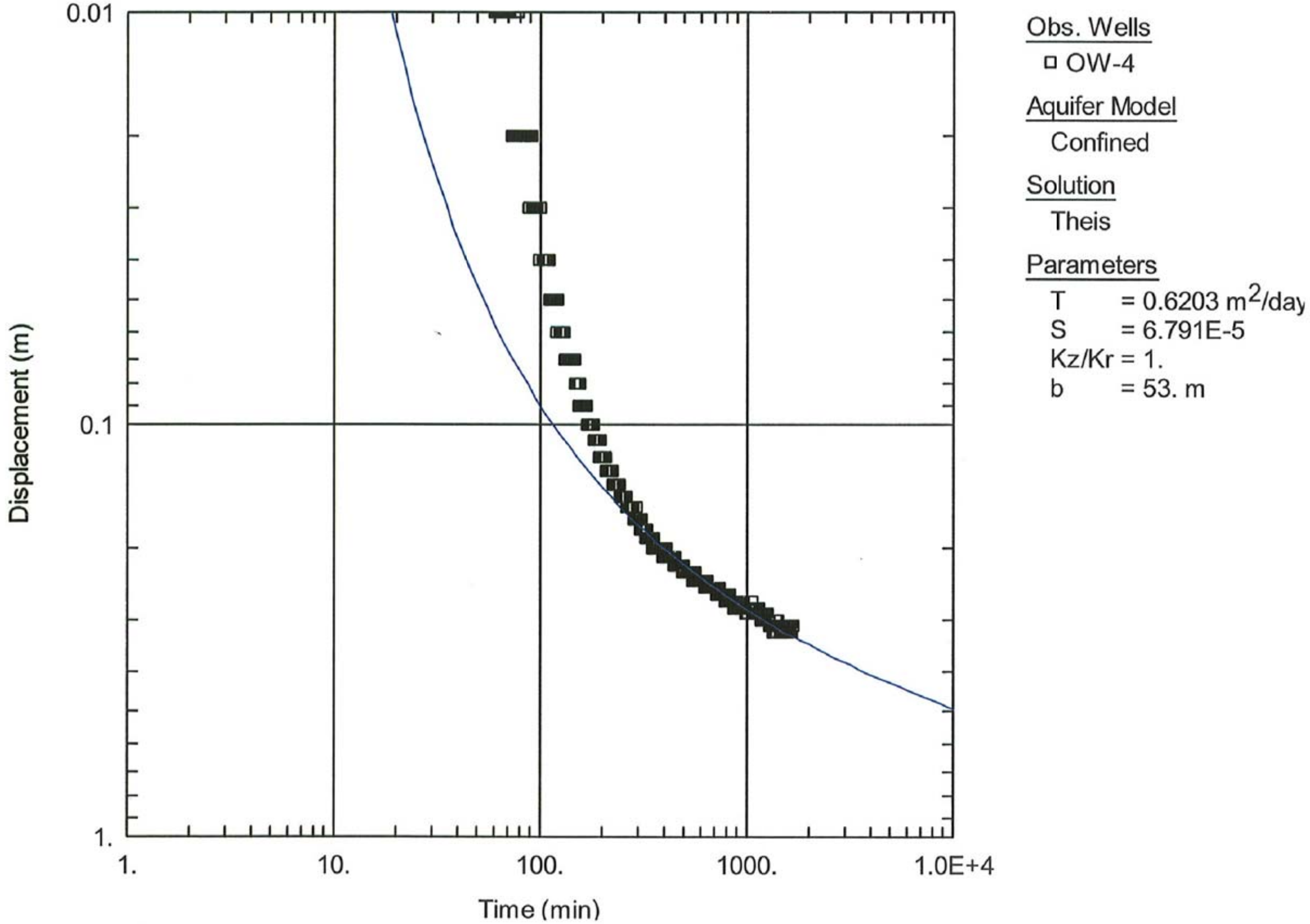
COOPER-JACOB SOLUTION FOR OW-4

FIGURE NO. **3-11**

PROJECT NO. USVC00046



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ARNAUD MINE
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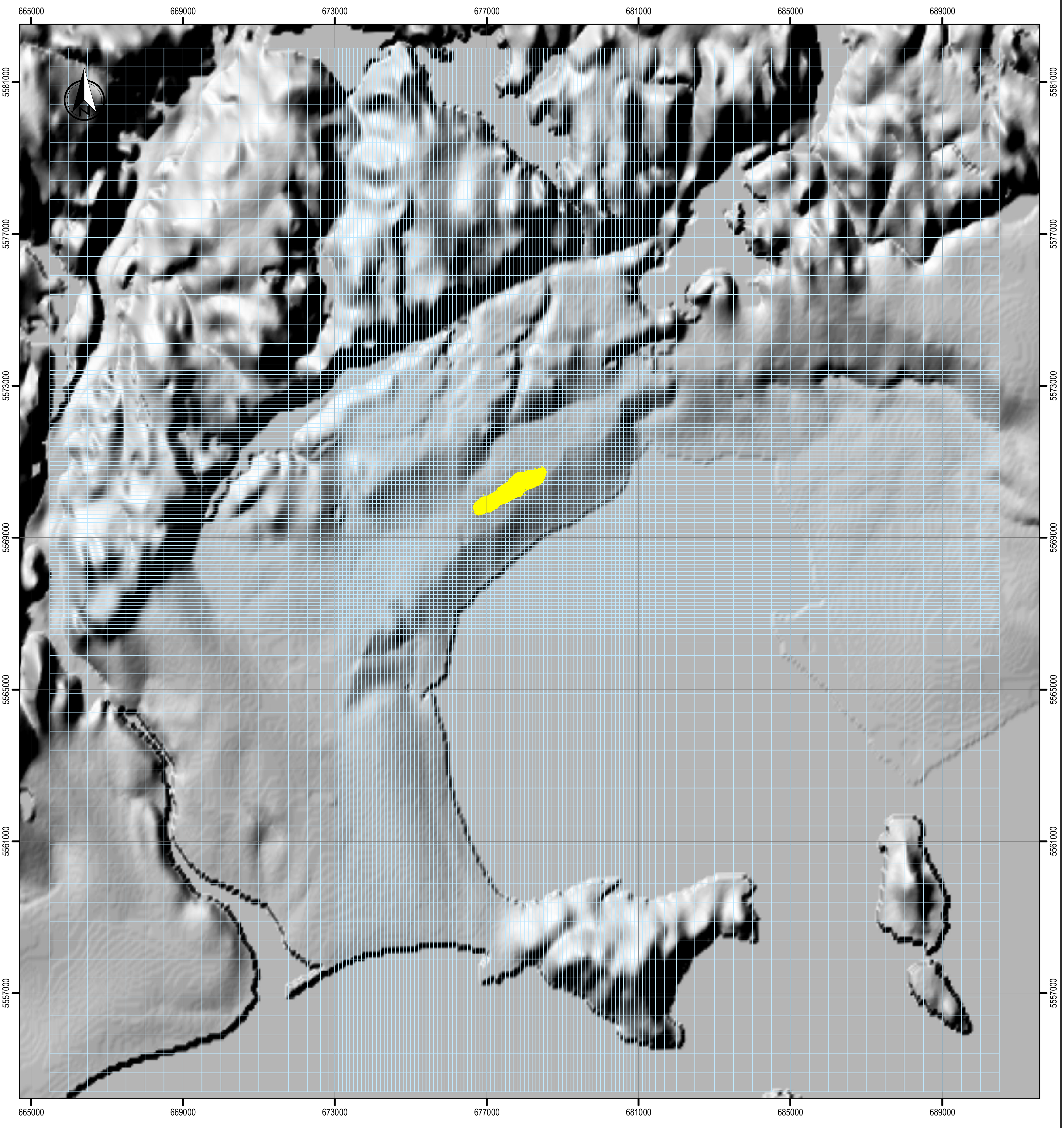
QUEBEC, CANADA

THEIS SOLUTION FOR OW-4

FIGURE NO.
3-12

PROJECT NO.
USVC00046

LOCATION: N:\Arnaud mine\USVC-0004603 Mine Arnaud Feasibility Study\Project Documents\hydro report\GEO. FIGURES 3-7 to 3-13 070111.dwg DATE: 7/7/2011 12:04 PM PLOT SCALE = 1:1 PLOTTED BY: LARRY CHAPMAN



LEGEND

- PROPOSED OPEN PIT
- MODEL GRID

NOTES:

1. THE TOPOGRAPHY WAS PROVIDED GEOBASE FROM THE CANADIAN DIGITIAL ELEVATION DATA SET.

1000 0 1000 2000
(METRES)
1:100,000

FIGURE 4-1

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PROJECTION:	UTM, ZONE 19N
DATUM:	NAD 83
SOURCE:	---

CLIENT:

ARNAUD MINE
HYDROGEOLOGIC STUDY

TITLE:

GROUNDWATER FLOW MODEL GRID

SCALE:	PROJECT No:	SIZE:	DRAWING No:	REV:
1:100,000	00.00.46.05	A3	USV C0000-00-000-001	A

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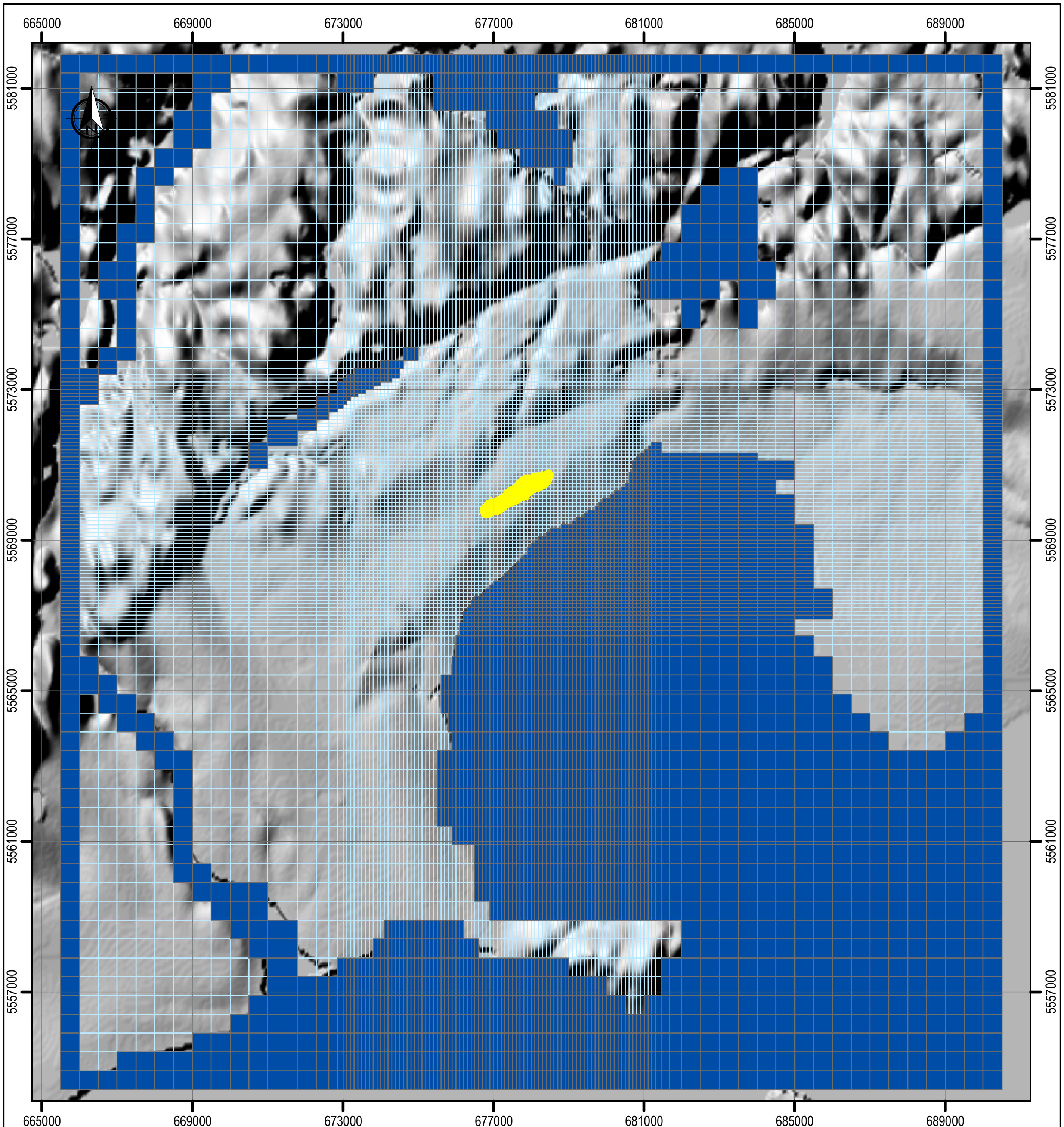

LEGEND

- PROPOSED OPEN PIT
- CONSTANT HEAD CELL
- MODEL GRID

NOTES:

1. THE TOPOGRAPHY WAS PROVIDED GEOBASE FROM THE CANADIAN DIGITIAL ELEVATION DATA SET.

1000 0 1000 2000
(METERS)
1:150,000

FIGURE 4-2

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SOURCE:	---

CLIENT:

ARNAUD MINE
HYDROGEOLOGIC STUDY

TITLE:

GROUNDWATER FLOW MODEL CONSTANT HEAD BOUNDARY CONDITONS - LAYER 1

SCALE:	PROJECT No:	SIZE:	DRAWING No:	REV:
1:150,000	00.00.46.05	A3	PEV C00000-00-000-001	A

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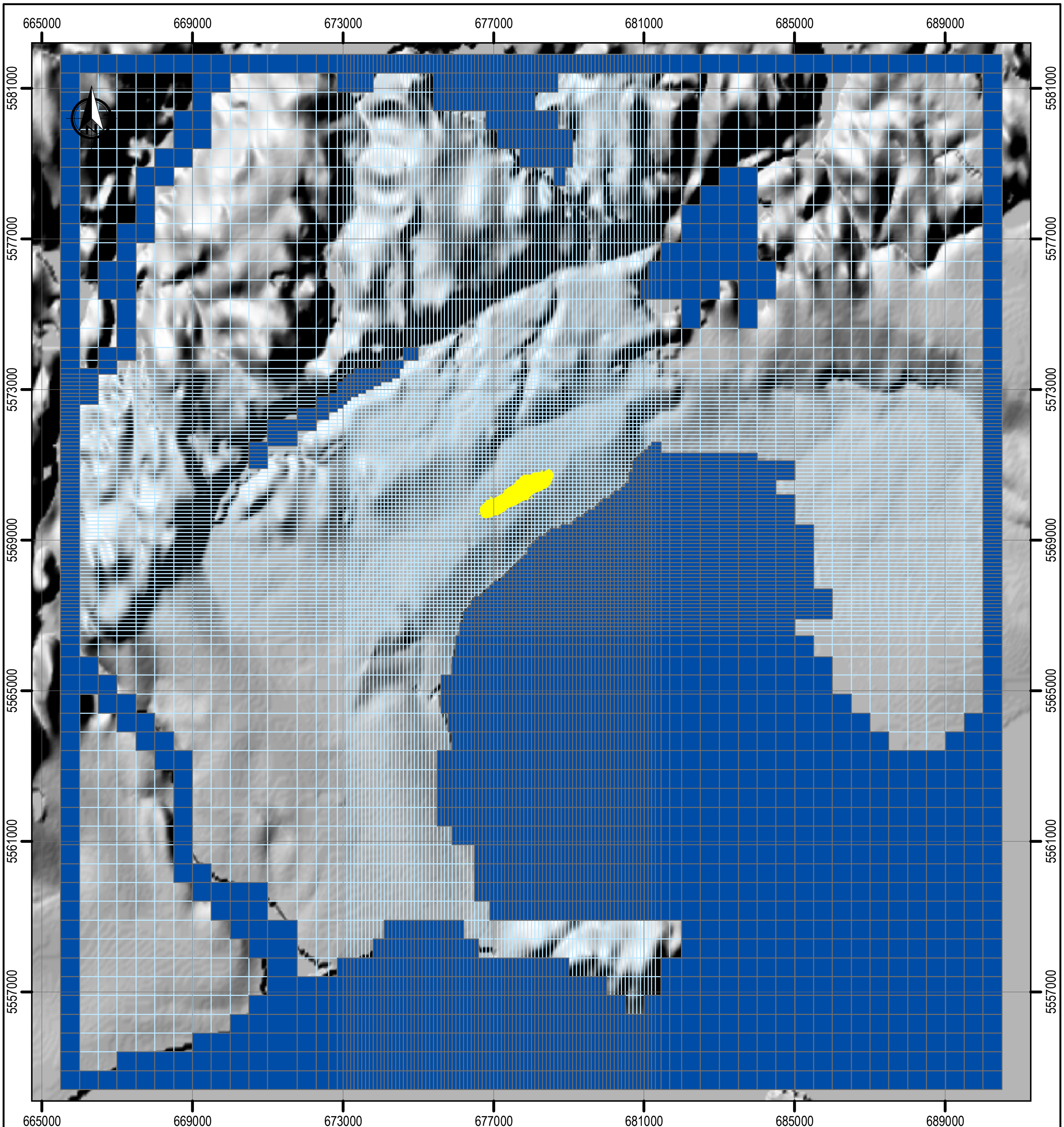

LEGEND

- PROPOSED OPEN PIT
- CONSTANT HEAD CELL
- MODEL GRID

NOTES:

1. THE TOPOGRAPHY WAS PROVIDED GEOBASE FROM THE CANADIAN DIGITIAL ELEVATION DATA SET.

1000 0 1000 2000 3000

(METERS)

1:150,000

FIGURE 4-3

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CLIENT:

ARNAUD MINE
HYDROGEOLOGIC STUDY

TITLE:

GROUNDWATER FLOW MODEL CONSTANT HEAD BOUNDARY CONDITONS - LAYERS 2 THROUGH 4

SCALE:	PROJECT No:	SIZE:	DRAWING No:	REV:
1:150,000	00.00.46.05	A3	PEV C00000-00-000-001	A

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LEGEND	
	PROPOSED OPEN PIT
	SIMULATED WATER TABLE

NOTES:

1. THE TOPOGRAPHY WAS PROVIDED GEOBASE FROM THE CANADIAN DIGITIAL ELEVATION DATA SET.
2. THE GROUNDWATER ELEVATION CONTOUR INTERVAL IS 10 METERS.

1000 0 1000
(METERS)
1:75,000

FIGURE 4-4

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HYDROGEOLOGIC STUDY

TITLE:

SIMULATED STEADY-STATE GROUNDWATER ELEVATIONS NEAR THE PROPOSED OPEN PIT

SCALE:	PROJECT No:	SIZE:	DRAWING No:	REV:
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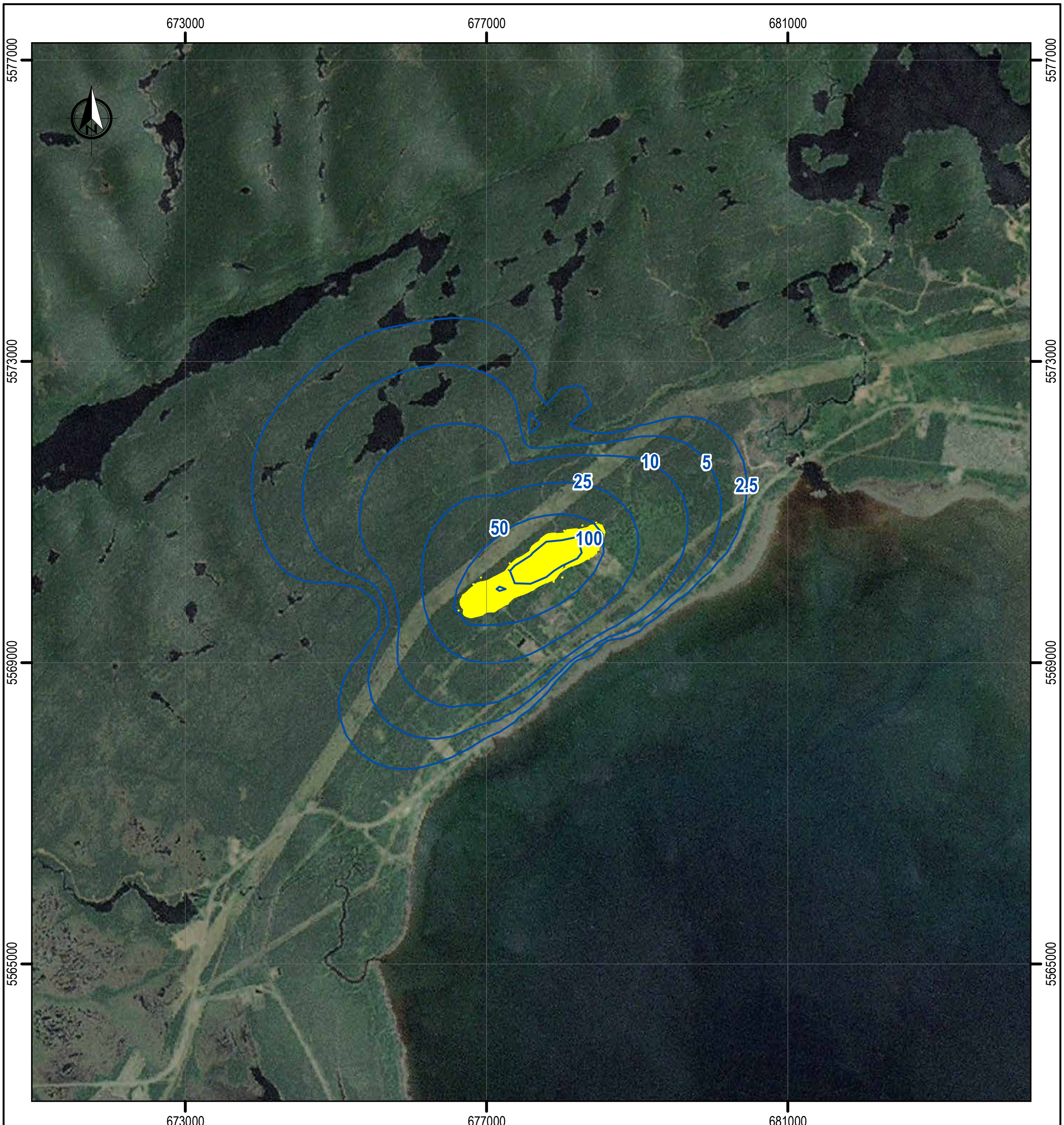

LEGEND
PROPOSED OPEN PIT
PREDICTED DRAWDOWN

NOTES:

1. THE TOPOGRAPHY WAS PROVIDED GEOBASE FROM THE CANADIAN DIGITIAL ELEVATION DATA SET.

2. THE GROUNDWATER ELEVATION CONTOUR INTERVAL IS 10 METERS.

1000 0 1000
(METERS)
1:75,000

FIGURE 4-5

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CLIENT:

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HYDROGEOLOGIC STUDY

TITLE:

PREDICTED GROUNDWATER LEVEL DRAWDOWN - YEAR 30

SCALE:	PROJECT No:	SIZE:	DRAWING No:	REV:
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REV.	DATE	DESCRIPTION	DRAWN	DESIGNED	CHECKED	APPROVED	DRAWING No.	REFERENCE DRAWING TITLE

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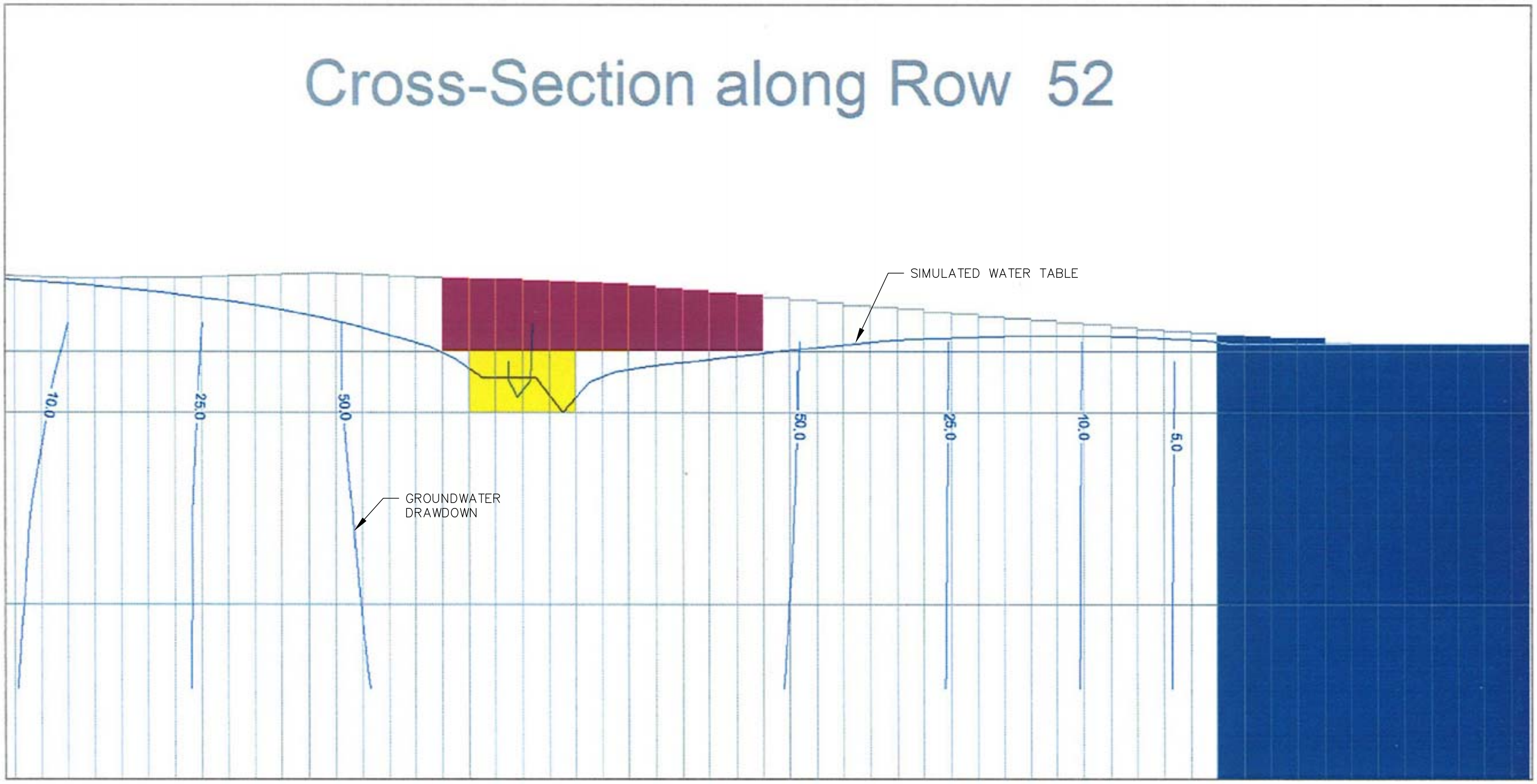

LEGEND

50.0	GROUNDWATER DRAWDOWNS (m)
(blue)	SEPT IIES BAY (CONSTANT HEAD CELLS)
(magenta)	CELLS THAT HAVE DRIED OUT FROM DEWATERING
(yellow)	DRAIN CELLS

DATE OF ISSUE: 07/01/2011
DESIGNED BY: MG
DRAWN BY: LDC
CHECKED BY: MC
APPROVED BY: MC

Ausenco Vector
143E Spring Hill Drive
Grass Valley, CA 95945
USA
T +1 530 272 2448
F +1 530 272 8533
W www.ausenco.com

ARNAUD MINE
HYDROGEOLOGIC STUDY
QUEBEC, CANADA

PREDICTED WATER TABLE AND DRAWDOWN AT ROW 52 CROSS SECTION–YEAR 30

FIGURE NO. **4–6**

PROJECT NO. USVC00046