# PHASE 2 INITIAL BOREHOLE DRILLING AND TESTING, IGNACE AREA

## *WP02 Data Report - Drilling and Coring for IG_BH06*

**APM-REP-01332-0244** **November 2022**

**Golder Associates Ltd.**

nwmo
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**REPORT**

# PHASE 2 INITIAL BOREHOLE DRILLING AND TESTING AT IG_BH04/05/06, IGNACE AREA

*WP02 Data Report - Borehole Drilling and Coring for IG_BH06*

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# WP02 DATA REPORT
# BOREHOLE DRILLING AND CORING FOR IG_BH06

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Technical Memo – Correction to Reference Ground Surface Elevation Datum – IG_BH06 – Phase 2 Initial Borehole Drilling and Testing at IG_BH04/05/06, Ignace Area

# 1.0 INTRODUCTION

The Phase 2 Initial Borehole Drilling and Testing at IG_BH04/05/06 project in the Ignace area of Ontario, is part of the Phase 2 Geoscientific Preliminary Field Investigations of the NWMO's Adaptive Phased Management (APM) Site Selection Phase.

This project involves testing of deep borehole IG_BH04 and the drilling and testing of deep boreholes IG_BH05 and IG_BH06 in the Ignace area within the identified Potential Repository Area (PRA). The sixth drilled borehole, IG_BH06, is located a direct distance of approximately 23 km southeast of the Wabigoon Lake Ojibway Nation and a direct distance of 42 km northwest of the Town of Ignace. Access to the IG_BH06 drill site is via Highway 17 and primary logging roads, as shown on Figure 1.

The work comprised of a total of eleven work packages and was carried out by a team led by Golder Associates Ltd. (Golder) on behalf of the NWMO. The IG_BH06 program is described in the Borehole Characterization Plan (BCP) for IG_BH06 (Golder 2021a).

This data report describes the methodology, activities and results for Work Package 2 (WP02): Borehole Drilling and Coring for IG_BH06, which includes: borehole drilling, coring and casing installation, borehole deviation, and drilling fluid management and use of tracers.

# 2.0 BACKGROUND INFORMATION

## 2.1 Geological Setting

The approximately 2.7 billion year old Revell batholith is located in the western part of the Wabigoon Subprovince of the Archean Superior Province. The batholith is roughly elliptical in shape trending northwest, is approximately 40 km in length, 15 km in width, and covers an area of approximately 455 km$^2$. Based on geophysical modelling, the batholith is approximately 2 km to 3 km thick through the centre of the northern portion (SGL 2015). The batholith is surrounded by supracrustal rocks of the Raleigh Lake (to the north and east) and Bending Lake (to the southwest) greenstone belts (Figure 2).

IG_BH06 is located within an investigation area of approximately 19 km$^2$ in size, situated in the northern portion of the Revell batholith. Bedrock exposure in the area is generally very good due to minimal overburden, few water bodies, and relatively recent logging activities. Ground elevations generally range from 400 to 450 m above sea level. The ground surface broadly slopes towards the northwest as indicated by the flow direction of the main rivers in the area. Local water courses tend to flow to the southwest towards Mennin Lake (Figure 1).

Four main rock units are identified in the supracrustal rock group: mafic metavolcanic rocks, intermediate to felsic metavolcanic rocks, metasedimentary rocks, and mafic intrusive rocks (Figure 2). Sedimentation within the supracrustal rock assemblage was largely synvolcanic, although sediment deposition in the Bending Lake area may have continued past the volcanic period (Stone 2009; Stone 2010a; Stone 2010b). All supracrustal rocks are affected, to varying degrees, by penetrative brittle-ductile to ductile deformation under greenschist- to amphibolite-facies metamorphic conditions (Blackburn and Hinz 1996; Stone et al. 1998). In some locations, primary features, such as pillow basalt or bedding in sedimentary rocks are preserved, in other locations, primary relationships are completely masked by penetrative deformation. Uranium-lead (U-Pb) geochronological analysis of the supracrustal rocks produced ages that range between 2734.6 +/-1.1 Ma and 2725 +/-5 Ma (Stone et al. 2010).

Three main suites of plutonic rock are recognized in the Revell batholith, including, from oldest to youngest: a Biotite Tonalite to Granodiorite suite, a Hornblende Tonalite to Granodiorite suite, and a Biotite Granite to Granodiorite suite (Figure 2). Plutonic rocks of the Biotite Tonalite to Granodiorite suite occur along the southwestern and northeastern margins of the Revell batholith. The principal type of rock within this suite is a white to grey, medium-grained, variably massive to foliated or weakly gneissic, biotite tonalite to granodiorite. One sample of foliated and medium-grained biotite tonalite produced a U-Pb age of 2734.2+/-0.8 Ma (Stone et al. 2010). The Hornblende Tonalite to Granodiorite suite occurs in two irregularly-shaped zones surrounding the central core of the Revell batholith. Rocks of the Hornblende Tonalite to Granodiorite suite range compositionally from tonalite through granodiorite to granite and also include significant proportions of quartz diorite and quartz monzodiorite. One sample of coarse-grained grey mesocratic hornblende tonalite produced a U-Pb age of 2732.3+/-0.8 Ma (Stone et al. 2010). Rocks of the Biotite Granite to Granodiorite suite underlie most of the northern, central and southern portions of the Revell batholith. Rocks of this suite are typically coarse-grained, massive to weakly foliated, and white to pink in colour. The Biotite Granite to Granodiorite suite ranges compositionally from granite through granodiorite to tonalite. A distinct potassium (K)-Feldspar Megacrystic Granite phase of the Biotite Granite to Granodiorite suite occurs as an oval-shaped body in the central portion of the Revell batholith (Figure 2). One sample of coarse-grained, pink, massive K-feldspar megacrystic biotite granite produced a U-Pb age of 2694.0+/-0.9 Ma (Stone et al. 2010).

The bedrock surrounding IG_BH06 is composed mainly of massive to weakly foliated felsic intrusive rocks that vary in composition between granodiorite and tonalite, and together form a relatively homogeneous intrusive complex. Bedrock identified as tonalite transitions gradationally into granodiorite and no distinct contact relationships between these two rock types are typically observed (SRK and Golder 2015; Golder and PGW 2017). Massive to weakly foliated granite is identified at the ground surface to the northwest of the feldspar-megacrystic granite. The granite is observed to intrude into the granodiorite-tonalite bedrock, indicating it is distinct from, and younger than, the intrusive complex (Golder and PGW 2017).

West-northwest trending mafic dykes interpreted from aeromagnetic data extend across the northern portion of the Revell batholith and into the surrounding greenstone belts. One mafic dyke occurrence, located to the northwest of IG_BH01, is approximately 15-20 m wide (Figure 2). All of these mafic dykes have a similar character and are interpreted to be part of the Wabigoon dyke swarm. One sample from the same Wabigoon swarm produced a U-Pb age of 1887+/-13 Ma (Stone et al. 2010), indicating that these mafic dykes are Proterozoic in age. It is assumed based on surface measurements that these mafic dykes are sub-vertical (Golder and PGW 2017).

Long, narrow valleys are located along the western and southern limits of the investigation area (Figure 1). These local valleys host creeks and small lakes that drain to the southwest and may represent the surface expression of structural features that extend into the bedrock. A broad valley is located along the eastern limits of the investigation area and hosts a more continuous, un-named water body that flows to the south. The linear and segmented nature of this waterbody's shorelines may also represent the surface expression of structural features that extend into the bedrock.

Regional observations from mapping have indicated that structural features are widely spaced (typical 30 to 500 cm spacing range) and dominantly comprised of sub-vertical joints with two dominant orientations, northeast and northwest trending (Golder and PGW 2017). Interpreted bedrock lineaments generally follow these same dominant orientations in the northern portion of the Revell batholith (Figure 2; DesRoches et al., 2018). Minor sub-horizontal joints have been observed with minimal alteration, suggesting they are younger and perhaps related to glacial unloading. One mapped regional-scale fault, the Washeibemaga Lake fault, trends east and is located to the west of the Revell batholith (Figure 2).

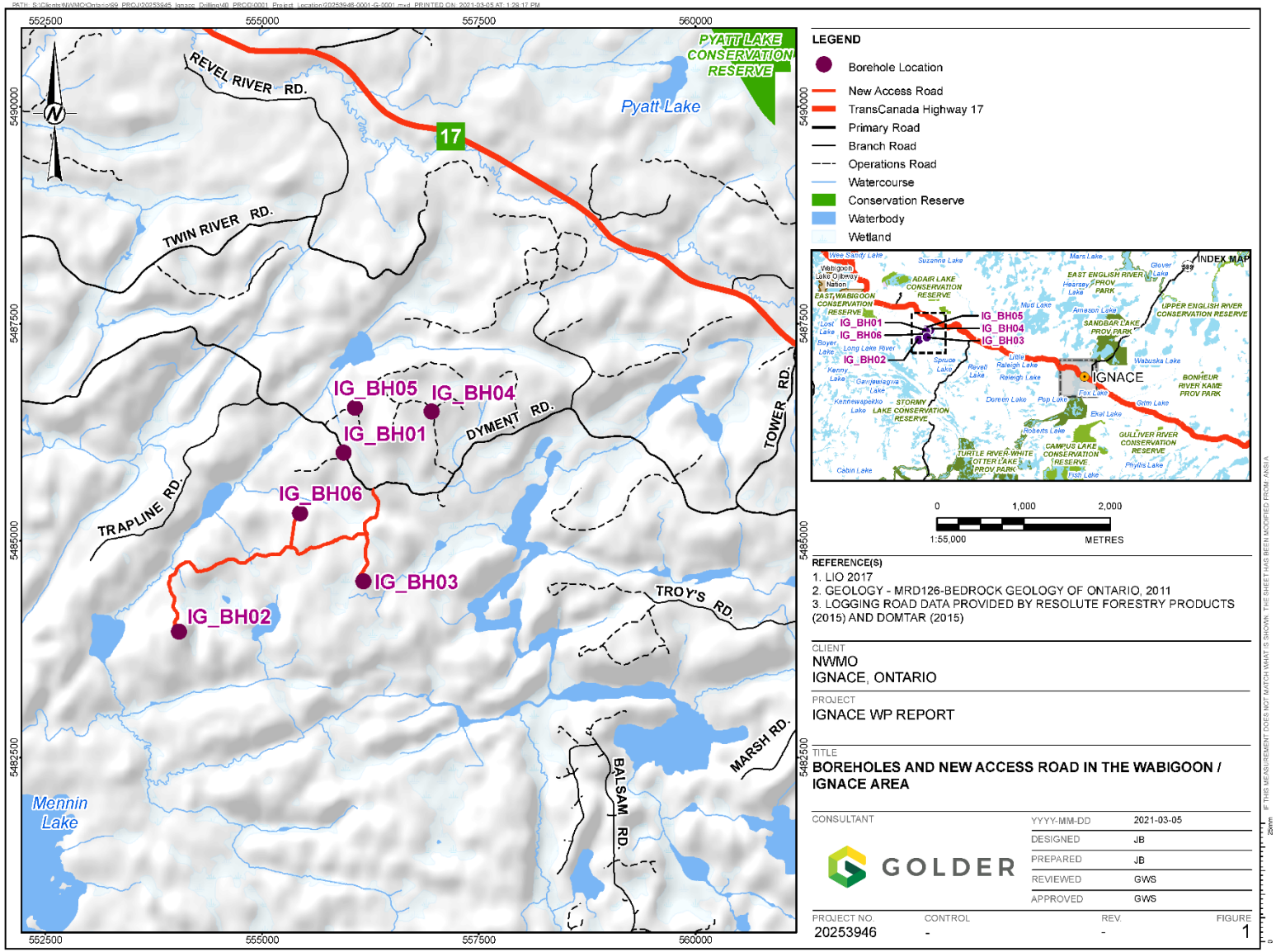



**Figure 1: Location of IG_BH06 in Relation to the Ignace Area**

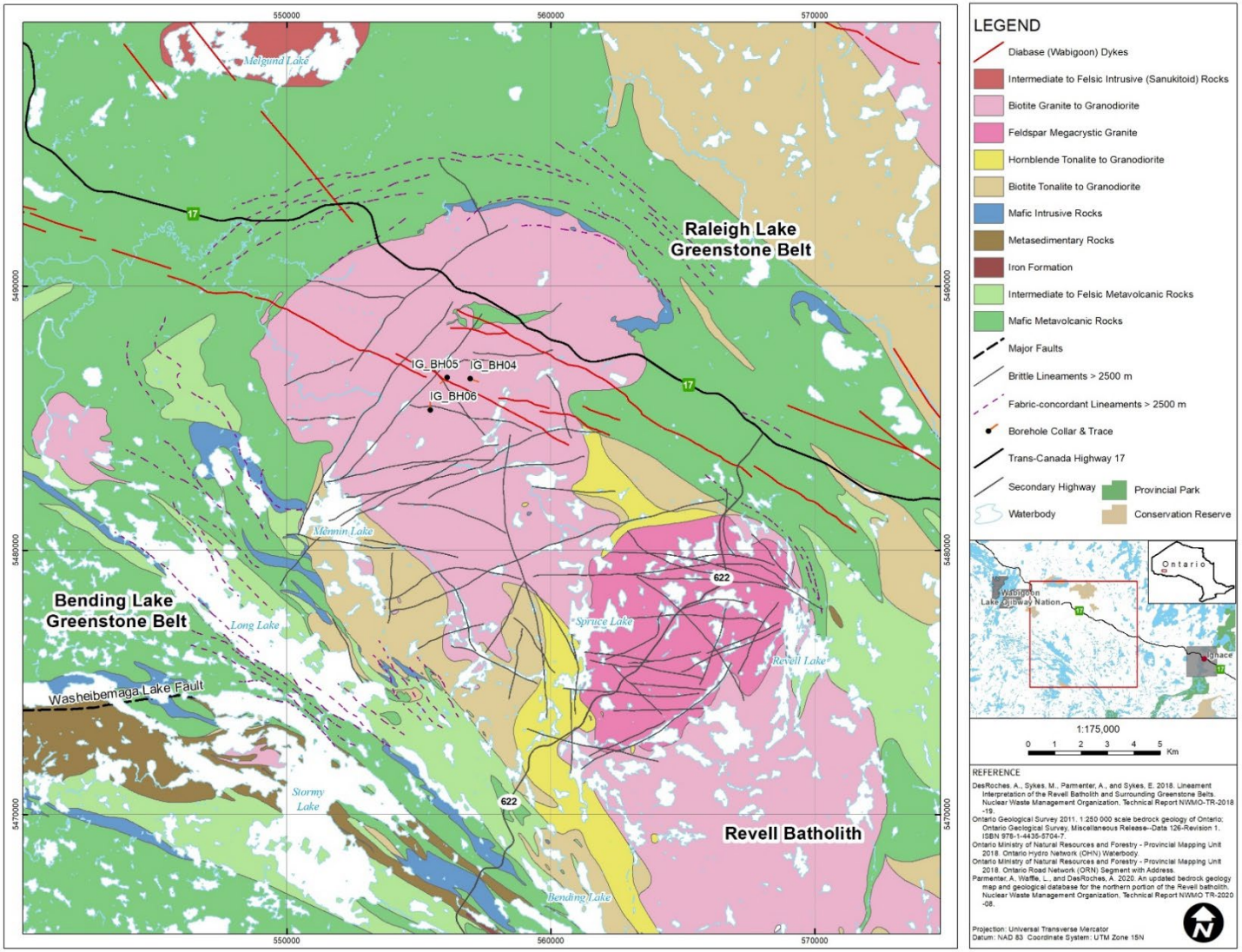



**Figure 2: Geological Setting and Location of Boreholes IG_BH04, IG_BH05, and IG_BH06 in the Northern Portion of the Revell Batholith**

Ductile lineaments, also shown on Figure 2, follow the trend of foliation mapped in the surrounding greenstone belts. Additional details of the lithological units and structures found at surface within the investigation area are reported in Golder and PGW (2017).

## 2.2 Technical Objectives

The technical objectives of the borehole drilling, coring and casing installation activities are:

- The collection of high quality bedrock core, which will allow geological and geotechnical core logging and the collection of core samples. Core samples will be used for laboratory testing programs to characterize the bedrock environment;
- To provide opportunity to complete supplementary studies such as borehole geophysical logging, hydraulic testing and opportunistic groundwater sampling while drilling; and
- To provide stable borehole walls to allow for future testing and monitoring.

The main objectives of the Drilling Fluid Management and Use of Tracers activities are:

- Optimize drilling to minimize borehole deterioration;
- Effectively remove any cuttings to maintain efficient drilling; and
- Trace the drilling fluids using a fluorescein tracer and measure fluid parameters (e.g., temperature, density and electric conductance) in order to recognize drilling fluid contamination of groundwater (to be discussed in the WP07 Report – Opportunistic Groundwater Sampling for IG_BH06, Golder 2022b) and porewater extraction samples (to be discussed in the WP04C Report – Porewater Extraction and Analysis for Petrographic Analysis for IG_BH06, Golder 2022a).

# 3.0 DESCRIPTION OF ACTIVITIES

Activities were overseen by Lead Contractor Golder with Rodren Drilling Ltd. (Rodren), based in Winnipeg, Manitoba, contracted by Golder to carry out the drilling for IG_BH06.

Permission to drill was obtained from the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) on September 24th, 2019 and formal notification given to Golder from the NWMO on February 11th, 2021 with the understanding that the drilling would begin in May 2021 at IG_BH05 and continue at IG_BH06 immediately afterwards. Drilling of IG_BH06 commenced immediately following completion of WP01 activities at IG_BH06.

Drilling was carried out on a 24 hour, 7 days per week basis. Day shifts ran from 7 am to 7 pm, with night shifts from 7 pm to 7 am. A driller and helper were on site for each day and night shift, and a drilling foreman was typically present during the day shifts, or as required. A Golder drilling supervisor was present on site for all drilling activities. Both the Golder drilling supervisor and the Golder core logger from WP03 followed the same shift schedule as the drillers. Shifts were shortened to manage fatigue once per week where the number of site hours was reduced to 20 for a 24 hour period, that is, a 10 hour day shift and a 10 hour night shift. The Golder site supervisors (WP01) were on site during the 4 hour rest window, however the drillers also adhered to the fatigue management schedule. When the Golder site supervisor was not on site, the drilling supervisor took over this role. This was documented in the daily tailgate sign-in sheet located in the Golder trailer at the site entrance.

The Golder drilling supervisor's responsibilities were divided between two main activities: (1) Drilling, Coring and Casing (2) Drilling Fluid Management and Use of Tracers. These activities included the following actions:

### *Drilling, Coring and Casing*

- Verifying drill rig setup;
- Tracking and recording borehole deviation;
- Supervising installation and cementing casing(s);
- Tracking depth of the borehole;
- Monitoring drilling parameters during drilling; and
- Managing drill cutting collection and disposal.

### *Drilling Fluid Management and Use of Tracers*

- Testing all fresh source water added to the drill fluid system;
- Monitoring and recording drill fluid parameters and volume changes during drilling;
- Identifying any triggers for an opportunistic ground water sample;
- Collecting and archiving drill fluid samples every 50 m;
- Supervising borehole flushing prior to geophysical survey (WP05)
- Recording observed drilling parameters and measured volume changes, drill fluid parameters and borehole depth for each run.

## 3.1 Health and Safety

The Ignace drilling and testing program conformed to applicable health and safety standards for the duration of the program. A comprehensive "pre-drill" drill rig inspection was originally completed by Rodren under Golder supervision prior to the start of drilling IG_BH06 on August 31st, 2021. This inspection included the following checks:

- Emergency switches are in working order;
- Equipment and protective guards are in place;
- Cables, chains, pulleys, cable winches, latches / lifting devices are in proper working order;
- Drill string (coring rods) are manufacturer recommended;
- Mast is unmodified from manufacturer and regularly inspected;
- Drill controls are appropriate and free from obstructions;
- Hydraulic lines are secure and not bent or pinched;
- Pump lines (water hoses) are in good condition with whip checks, where required;
- Fire prevention supplies are present;

- Exhaust piping is directed appropriately;
- Fuel is properly stored; and
- Other general items including maintenance logs to confirm inspections were available.

Rodren continued to complete daily rig inspections to ensure that rig safety was maintained throughout the drilling program.

Once drilling commenced, a Casella Sound Level Meter was used to establish zones where hearing protection was required, that is, all areas with an equivalent sound exposure level exceeding 83 dBA (O.Reg. 851/139) due to the prolonged exposure of 12-hour shifts. The area inside of the drill rig and surrounding support shacks was established as requiring hearing protection.

An RKI Model GX-2012, 4-Gas Monitor was installed in the drill rig and used to monitor for levels of oxygen, carbon monoxide, hydrogen sulphide and combustible gases during drilling. The gas monitor was bump checked by the Golder site supervisor daily. No exceedances of safe limits of these gases were encountered during drilling of IG_BH06.

Health and safety toolbox meetings were held at the beginning of each shift (day and night), where attendance of all site personnel was mandatory. The meeting reviewed all activities to be completed during that shift and identified the hazards and mitigation efforts to reduce risk of injury. Any visitors on site, who did not participate in the toolbox meetings, were required to review and acknowledge the toolbox report before allowed to perform work on site.

## 3.2 Quality Confirmation

Cross-shifts between day and night shift were carried out to transfer knowledge and information about the previous shift activities. These were typically 10-15 minutes, but longer when more specific knowledge needed to be relayed. When the crews did not cross on site, during shortened fatigue management shifts, the knowledge transfer was done in Ignace or over the phone. Cross-shifts were also carried out between crews switching rotations and typically involved spending an entire shift together on site to ensure procedures were kept consistent.

Quality Confirmation was completed for each 24-hour period by the drilling supervisors and included tracking of the drilled depth at the start and end of each day and night shift, verification of the drilling parameters recorded, verification and comments for drill fluid parameter triggers and volume loss observations, as well as drill fluid samples collected, and borehole orientation surveys conducted.

Drilling supervisors ensured all tools were properly calibrated before the start of the project and performed daily calibration checks of all instruments to be used at the start of each 24-hour period. If a tool not anticipated to be used became necessary during the shift, it was calibration checked as required prior to use.

# 4.0 SUMMARY OF DRILLING, CORING AND CASING

Drilling of IG_BH06 commenced on September 4th, 2021 and was completed on November 5th, 2021. The overall drilling progress and key activities are shown on Figure 3.

The borehole was advanced to 1000.83 metres below ground surface (mbgs) drilled depth (along hole) based on the rod count and measured stickup of the drill rods on the final drill run. The final true vertical depth of the borehole,

calculated using the measured actual orientation of the borehole, is 929.26 mbgs. Further details of the borehole orientation are discussed in Section 4.44.5.

Coring progress over the program was variable due to bit changes or other drilling related maintenance including drill cuttings management. The overall progress is shown graphically on Figure 3, and the daily progress by shift is shown on Figure 4. The maximum meterage attained for a single shift was 24.00 m on September 6th, 2021 day shift, but the average rate per shift was 20.03 m (excluding conductor and surface casing installation and cementing, and extended drill maintenance period).

Drilling of IG_BH06 was completed on the day shift of November 5$^{th}$, 2021. This was followed by the final borehole Reflex SPRINT-IQ™ gyro survey, borehole flushing, rod removal and preparation for geophysical logging. The core logging and sampling supplies were organized and packaged for future shipment, though some duplicate monitoring equipment related to WP02 remained accessible at IG_BH06 site to allow for continued monitoring of drilling fluid during WP05 and WP06 activities.

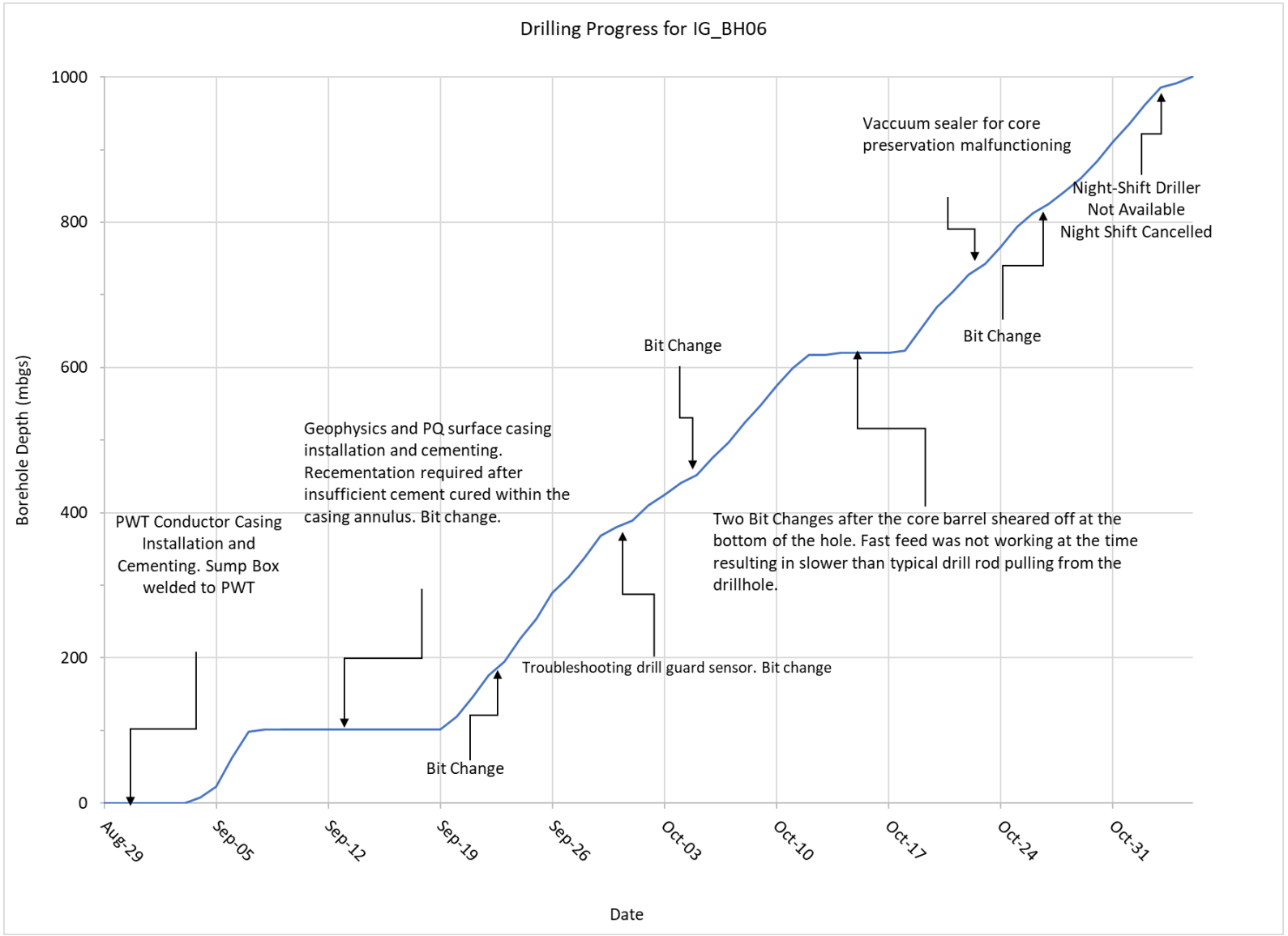



**Figure 3: IG_BH06 Drilling Progress and Activities**

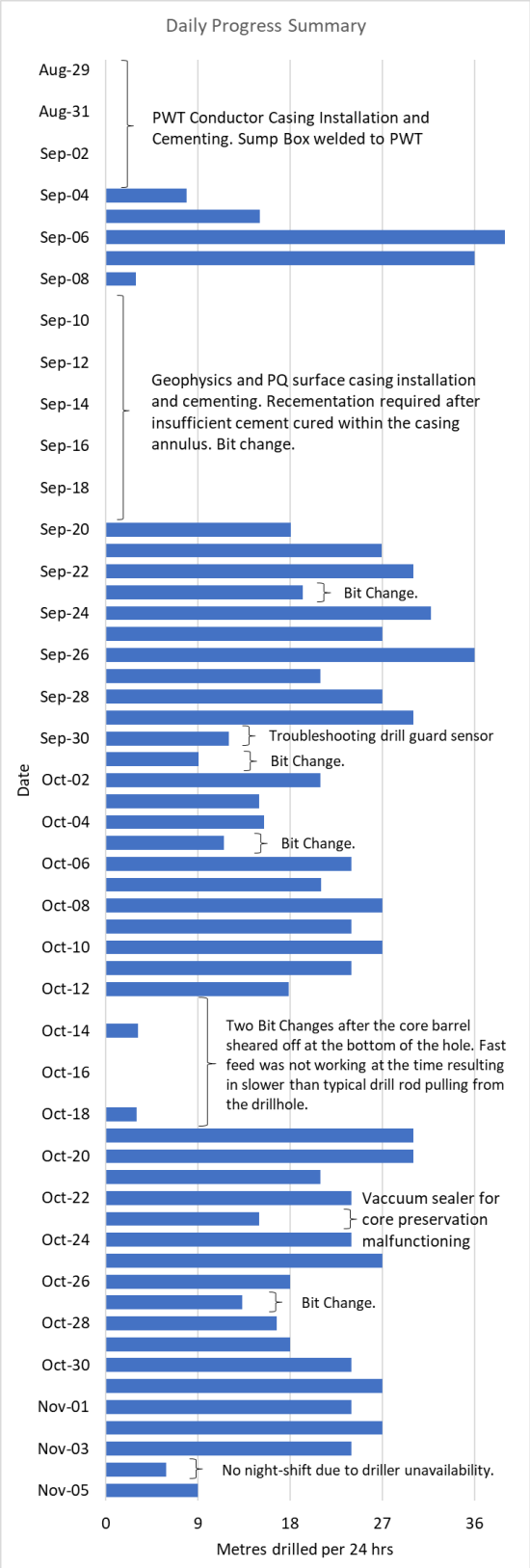



**Figure 4: IG_BH06 Daily Progress**

## 4.1 Drilling Details

### 4.1.1 Drill Rig Setup

A skid mounted Discovery Diamond Drill model EF-100 was used for the program, set up with secondary containment to minimize drill fluid entering the environment. Drilling was carried out with a constant water flush (as necessary), with the drill water (drill fluid) recycled using a Solids Removal System™ (SRU) from Australian Mud Company Pty Ltd. (AMC). This system utilized a centrifuge to remove cuttings from the return drill fluid and is shown in Figure 5.




**Figure 5: Solids Removal Unit – Centrifuge Used to Remove Cuttings from Drill Fluid Return**

Set-up of the drill rig commenced once the drill pad was prepared as described in the WP01 Commissioning Report (Golder 2021b). The construction of the drill pad included lining an area of approximately 195 $m^2$ to provide secondary containment beneath the drill and all support equipment including the centrifuge, the wastewater and fluorescein water tanks, as well as all connecting hoses and lines. The drill pad was prepared with a gentle slope towards the borehole collar, so that all fluid contained by the liner was directed to the borehole collar (i.e., the “lower sump”), where it was pumped to a wastewater tank via a submersible sump pump. Prior to the commencement of drilling, an “upper” metal sump box was welded to the outside of the PWT casing at the collar of the hole, further

described in Section 4.2. The metal sump box is used to contain the return drill fluid from the casing during drilling and flushing activities.

The as-built collar azimuth and dip for IG_BH06 was 360˚/-70˚. Once the drill pad was constructed and the rig matting in place, the drill was moved into place using an excavator and sighted into alignment using surveyor stakes set in the ground. The stakes were positioned by surveyors using the coordinates of the borehole to set a stake to the north of the rig and two stakes to the south of the rig at 180˚ from each other. This allowed the WP02 staff to use the stakes and the drill mast to sight the azimuth (Figure 6). The dip of the borehole was set by confirming the mast dip at -70˚ using both digital and analogue angle finders, as shown in Figure 6.

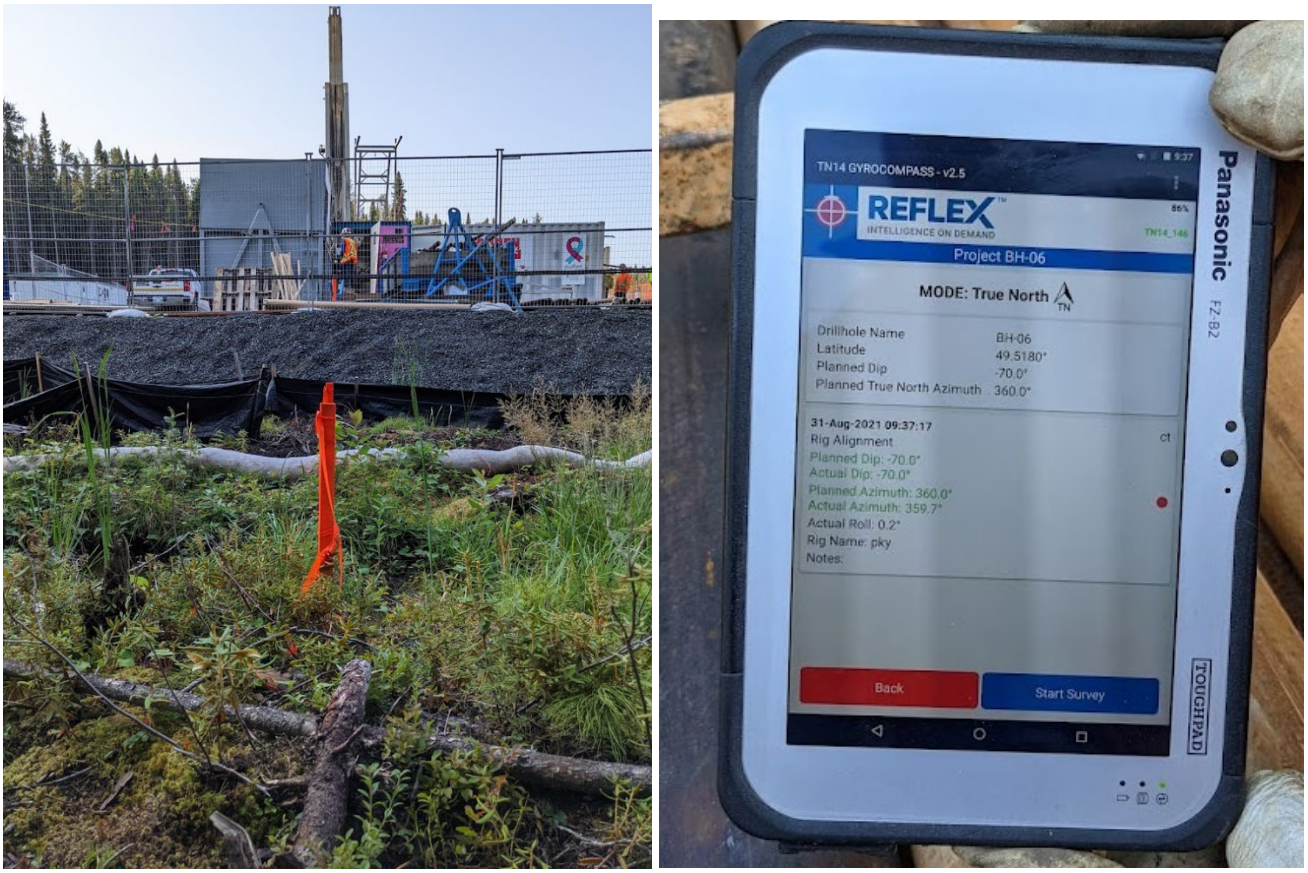



**Figure 6: Confirming Azimuth and Dip of the Drill Prior to Drilling.**

Golder WP02 staff mobilized to site around August 29th, 2021. During the initial days on site, Golder unpacked and set up the site trailers and carried out equipment calibrations, while Rodren prepared their support equipment. The overall view of the IG_BH06 site is shown in Figure 7, and an image of the drill rig shown in Figure 8.



**Figure 7: View of IG_BH06 Drill Site Facing East**



**Figure 8: Select Photographs of the Rodren Drill Rig. Left: Inside of Drill Rig Verifying the Borehole Alignment; Right: Rodren Core Extraction and Support Shack**

### 4.1.2 Drill Rig and Equipment Maintenance

Throughout the drilling and advancement of IG_BH06 several operational issues were encountered, leading to extended delays. The issues encountered are detailed in Table 1.

**Table 1: Operational Issues Encountered during the Advancement of IG_BH06**

| Category | Date | Description |
|---|---|---|
| Inadequate Surface Casing Cementing | September 15 – September 20 | During the surface casing cementing, the driller reacted to a spike in water pressure during the installation of the displacement plug. The driller assumed the plug had reached the end of the casing and stopped pumping. The collected grout samples from the annular return did not set to the proper strength and upon further investigation, it was determined that the rubber displacement plug did not displace enough cement into the annulus to successfully secure the surface casing. The surface casing was removed, and the cement was reamed/ flushed from the borehole and recemented. |
| Bit Change | October 13 | The fast feed on the drill was not operational, extending the timeline for a typical drill string retrieval.<br>■ Bit Change due to typical drilling wear. Water pressure spiking during drilling. |
| Difficulty Retrieving Core | October 14 | The fast feed on the drill was not operational, extending the timeline for a typical drill string retrieval.<br>■ Inner tube broke resulting in the drill rods being pulled. Opportunistic bit change after the drill string was on surface. |
| Drill String Dropped Downhole | October 15 | The fast feed on the drill was not operational, extending the timeline for a typical drill string retrieval.<br>■ The water ports on the core barrel were plugged preventing the passage of water. The drillers removed the drill rods from the borehole. The foot clamp jaws then failed, releasing the rods downhole. |
| Core Barrel Sheared Downhole | October 16 – October 17 | Recover the drill rods. During the recovery, the core barrel was stuck and in the process of retrieval, sheared the core barrel off downhole. The core barrel was then retrieved with a rod tap. |

### 4.1.3 Tracking Borehole Depth

The depth of the borehole was monitored on a per run basis by the drilling supervisors. This was done by measuring the stickup of the drill rods from a fixed reference point at the completion of each run plus the fixed stick up of that reference point from the ground surface, which was subtracted from the length of the drill string (core barrel plus the drill rods). The chosen reference point was the base of the drill rig mast, which was 0.84 m above ground surface (along hole). During drilling, the depth of the borehole was monitored as meters below ground surface along the hole and throughout this report depths are referred to as mbgs (along hole).

The core barrel assembly was measured as 4.14 m long and included the barrel, a reaming shell and the drill bit. All drill rods on site were confirmed as 3.0 m long (metric) HQ rods. No rod grease was used during the coring process; however, thread lubricant was used on the rod threads as they were added to the drill string. As described above, the borehole depth was tracked by the number of rods added to the drill string

A rod count was performed by WP02 supervisors during the final rod pull, where the total number of HQ coring rods used was verified as 333.

### 4.1.4 Drill Cuttings Management and Disposal

At the outset of the field program, the drill fluid recycling system was set up using the SRU™ (centrifuge). The drill fluid return containing cuttings from the borehole was pumped directly to the centrifuge, where the fine solids were separated from the water and directed to buckets that were emptied into plastic lined containment bags to await disposal. The performance of the centrifuge was observed to vary throughout drilling of IG_BH06, with the drill cuttings frequently containing more drill fluid and contributing to fluid losses. During the drilling, there were frequent periods of inactivity due to a backlog in WP03 activities and operational issues that may have contributed to the inefficiencies of the SRU™.

These solid drill cuttings were sampled on October 3rd, 2021 and sent to Bureau Veritas Laboratories in Mississauga to be analyzed according to Ontario Regulation 558. The results indicated that the drill cuttings were safe for disposal and were accepted by the Ignace landfill.

## 4.2 Casing Installation and Cementing Details

Prior to commencing coring activities, PWT conductor casing was installed and cemented to a depth of 10.27 mbgs (along hole), to prevent drill fluid from escaping through the fractured upper bedrock. While fill materials from construction of the drill pad were present at the borehole collar, none was recovered during the casing installation process. In order to contain the return drill fluid, a metal sump box was then welded to the PWT casing at the collar of the hole as the cement cured.

The PQ surface casing was then advanced just beyond the PWT conductor casing to provide smaller diameter casing to stabilize the HQ sized drill rods during coring. As coring advanced, it was necessary to continue to ream the PQ casing to an intermediate depth of 11.60 mbgs (along hole). This was done to add more weight to the PQ string, helping to mitigate spinning of the PQ, while also providing additional stabilization for the HQ coring.

Routine coring activities then commenced and were halted when the borehole was advanced to 100.86 mbgs (along hole). At this depth, the borehole was flushed and prepared for the televiewer survey. Once the parameters of the flush water were within acceptable criteria (see Section 4.6), the HQ drill rods were removed from the borehole and optical and acoustic televiewer surveys were completed.

The PQ surface casing installation depth was determined, in coordination with NWMO, once the first 100 m of geophysical survey images were reviewed. This depth was selected so that core runs with drill fluid volume measurements > 100 L were cased and cemented to seal them from the rest of the hole. Additionally, this casing installation depth covered features observed in the core logging and televiewer surveys with iron staining and aperture. The installation and cementing of the surface casing served to prevent mixing of the ground water from these shallow zones with the rest of the borehole. Golder supervised Rodren throughout the installation of the PQ surface casing and cementing activities.

The surface casing installation process involved first reaming the borehole with a PQ advancer bit to the desired depth of 80.54 mbgs (along hole). The PQ casing rods were then removed from the borehole and a Van Ruth plug

installed in the HQ hole below the planned casing depth. The advancer bit was replaced with a casing shoe bit, and the rods re-lowered. The PQ casing was lifted slightly in order to create space for the cement mixture to flow between the PQ casing shoe and the borehole wall.

The cement mixture was batched on surface and approximately 300 litres pumped down the inside of the PQ casing. Rodren provided Type HS High Sulphate resistant cement by Lafarge, which is a hydraulic cement that provides high sulphate resistance. The grout was pumped down the hole and chased with a wiper (displacement) plug.

During the cementing, the driller reacted to a spike in water pressure during the installation of the wiper plug assuming the plug had reached the end of the casing and stopped pumping. The collected grout samples from the annular return did not set to the proper strength and upon further investigation, it was determined that the rubber displacement plug did not displace enough cement into the annulus to successfully secure the surface casing. The surface casing was removed, and the cement was reamed and flushed from the borehole.

An additional cement mixture was batched on surface and approximately 500 litres pumped down the inside of the PQ casing. The HQ drill rods were used to push down the wiper plug to the bottom of the PQ rods, at which point the grout mixture could be observed returning to surface through the annular space between the outside of the PQ casing and the inside of the PWT conductor casing (Figure 9). A sample of the cement mixture was collected from the mixing tank and from the annular return in order to confirm proper curing of the cement at surface. During the curing process, the grout was observed to settle slightly in the annular space, and an additional grout mix was batched and used to top up the annular space from surface. Providing this confinement to surface was considered important to protect the PQ casing from excess rattling and vibration from the HQ rods during coring.

The cement was left to cure for approximately 48 hours, at which time the Van Ruth plug was retrieved. The remainder of the HQ rods required to continue regular coring activities were then added to the drill string and coring resumed for the remainder of the borehole to 1000.83 mbgs (along hole). The final IG_BH06 borehole schematic is shown in Figure 10.



**Figure 9: Grout return through annulus of PWT and PQ casings**

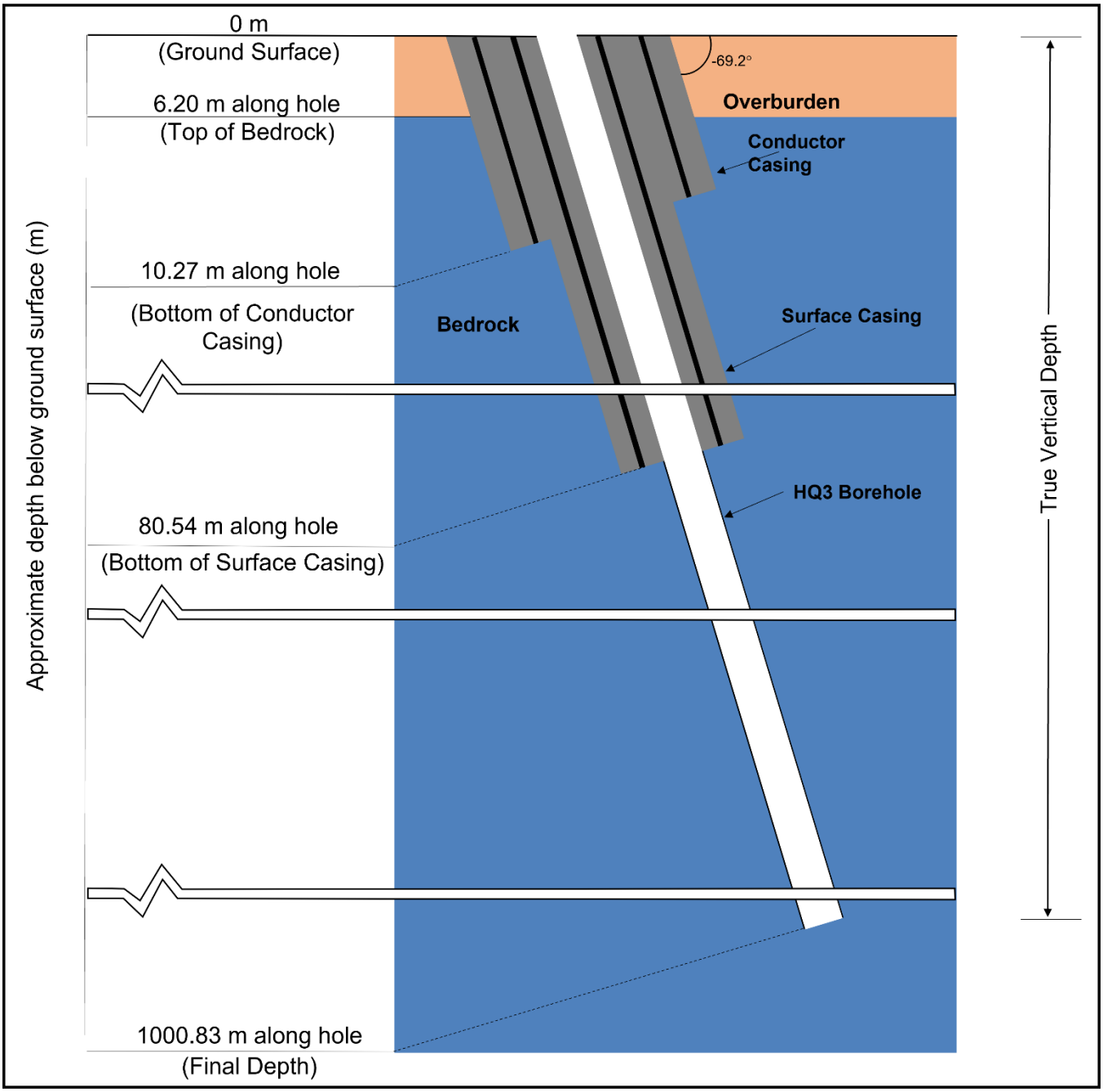



**Figure 10: Final IG_BH06 Schematic**

## 4.3 Coring Details

Three (3) metre long HQ sized drill rods were added manually to the drill string one rod at a time as drilling progressed. As with standard deep drilling programs, two core tubes were available at all times, so that when one was removed with a drilled run, the second could be lowered and locked in place while the core was extracted from the first tube. Core tubes were lowered and retrieved using a wireline system in which an overshot tool locked on to the top of the core tube. The core tube was pumped down and locked into the core barrel using the downhole pump; the drillers monitored when it was locked into place by observing a spike in the downhole fluid pressure. This

time required to pump and lock the core tube into place to continue coring increased with the depth of hole; having a second tube to start this process while the core was extracted from the first was valuable for efficiency.

After the conductor casing was installed, the borehole was advanced using a triple tube wireline drilling system for the entirety of the hole to minimize disturbance to the recovered drill core. Triple tube coring involves using steel, split core liners to line the inside of the core recovery tube which is locked within the core barrel during drilling. The core tube is recovered using the wireline at the completion of each drill run, with the split liners removed from the core tube on surface. The split liners help reduce the volume of drill fluid that can circulate within the core tube, helping to prevent the drilled core from being disturbed and to retain fine grained materials encountered. Table 2 presents the details of the casing and coring rods used to complete IG_BH06, while Table 3 presents the borehole diameter details.

**Table 2: Details of Casing and Coring Rods used by Rodren for IG_BH06**

| Casing Type | Outer Diameter (mm) | Inner Diameter (mm) | Joint Torque (Nm) | Weight (kg/m) |
|---|---|---|---|---|
| Conductor (PWT) Casing | 139.7 | 127.0 | N/A | 21.4 |
| Surface (PQ) Casing | 114.3 | 101.6 | N/A | 17.4 |
| PQ Advancing Bit | 121.0 | 94.2 | N/A | N/A |
| PQ Shoe Bit | 117.5 | 100.5 | N/A | N/A |
| HQ Drill Rods | 88.9 | 77.8 | 2000 | 11.44 |
| HQ3 Drill Bit | 96.0[1] | 61.1[2] | N/A | N/A |

[1]Open borehole diameter. [2]HQ3 core diameter size.

**Table 3: IG_BH06 Borehole Diameter Details**

| Depth from (mbgs along hole) | Depth to (mbgs along hole) | Casing Type | Outer Borehole Diameter (mm) | Inner Diameter Within Casing (mm) |
|---|---|---|---|---|
| 0 | 10.27 | Conductor (PWT) Casing and Surface (PQ) Casing | 143.76 | 101.6 |
| 10.27 | 80.54 | Surface (PQ) Casing | 121.0 | 101.6 |
| 80.54 | 1000.83 | Open Borehole (HQ size) | 96.0 | 96.0 |

### 4.3.1 Ground Conditions

In general, ground conditions were good and did not cause problems with the drilling process.

### 4.3.2 Core Quality

In IG_BH06, there were no lost core or naturally occurring broken core zones.

Instances of mechanically broken core were also occasionally encountered. These typically occurred where the presence of sand sized ground core within the split tube resulted in the drill core becoming jammed in the core tube.

When this occurred, drillers had to use mechanical force on surface to remove the inner split tube, causing damage to the rock core in the process. Ribbing (uneven or wavy core diameter) of the core tends to occur as the drill bit becomes worn down and increased torque is required to continue coring. Drillers were typically aware when this occurred due to noticeably reduced rates of penetration and verified suspicions by inspecting the core for these signs. Bit sharpening involved momentarily increasing torque or cutting off the water supply to sharpen the drill bit by exposing fresh diamonds, but results in increased ribbing. Drillers commonly carry out bit sharpening to maintain performance during the life of the bit. Efforts were made to restrict bit sharpening to the start or end of a drill run so that uneven diameter core was not present within the central part of a core run (mainly for aesthetic purposes).

### 4.3.3 Drill Bit Changes

Drill bit changes were required as coring advanced, and the drill bit became worn down. Bit changes involved removing the core tube from the rods, then using the rod handler on the drill rig to remove all the drill rods from the borehole, typically two at time. These stands of rods were stacked in the drill shack during the bit change so that they were easily accessed by the rod handler to go back down the borehole. When all the rods were removed, the core barrel was inspected for damage and signs of wear, and the bit replaced. Drilling in this relatively hard rock required frequent bit changes (approximately 1 every 100 m of drilling). A summary of the drill bit types used during the drilling program are shown in Table 4.

**Table 4: Summary of Drill Bits used for Coring of IG_BH06**

| Drill Bit Name | Depth used from (mbgs) | Depth used to (mbgs) | Total drilled length used (m) | Reason for Bit Change |
|---|---|---|---|---|
| Pilot Series 300 | 0 | 100.86 | 100.86 | Changed while rods were pulled for geophysics |
| Pilot Series 300 | 100.86 | 195.18 | 94.32 | Water pressure spiking |
| Pilot Series 300 | 195.18 | 385.92 | 190.74 | Water pressure spiking |
| Pilot Series 300 | 385.92 | 440.40 | 54.48 | Water pressure spiking |
| Pilot Series 300 | 440.40 | 616.79 | 176.39 | Water pressure spiking |
| Pilot Series 300 | 616.79 | 619.94 | 3.15 | Inner tube broke during core retrieval. Drill bit was changed while rods were on the surface. |
| Pilot Series 300 | 619.94 | 825.28 | 205.34 | Core run blocked, water pressure spiking |
| Pilot Series 300 | 825.28 | 1000.83 | 175.55 | End of borehole |

## 4.4 Borehole Location and Orientation Details

The planned drill site for IG_BH06 was surveyed Rugged Geomatics Inc.. This original site survey involved the use of a local reference points (ORPs) derived from GPS observations using the Precise Point Positioning service from Natural Resources Canada.

The as-built borehole points were surveyed on March 2nd, 2021 by Rugged Geomatics Inc. Elevation data was measured for the various tops of casings, the sump weld (the point on the conductor (PWT) casing where the sump box was installed) as well as a ground surface point.

Given the as-built coordinates of the top of the surface (PQ) casing, the along hole distance between the top of the PQ and the reference ground level (from WP02 field notes, see Figure 11) as well as the casing orientation of 360˚ / -70˚, the following relationships were used to translate the Northing, Easting and elevation of the PQ casing to the PWT, sump weld and the reference ground level:

Northing: cos(70˚)*cos(360˚)
Easting: cos(70˚)*sin(360˚)
Elevation: -sin(70˚)

The calculated and provided as-built coordinates of IG_BH06 are presented in Table 5. The borehole collar reference ground level was initially calculated incorrectly. The details of the miscalculation and the correction are described in Appendix D.

**Table 5: IG_BH06 Final Surveyed Collar and Casing Coordinates**

| Point | Northing (m) | Easting (m) | Elevation (m) | Comment |
|---|---|---|---|---|
| Borehole Collar - Reference Ground Level (Ref. Pt. for drilling) | 5485328.11 | 555440.35 | 417.74 | Calculated E, N & Elev |
| Sump weld | 5485328.12 | 555440.47 | 417.87 | Provided E, N & Elev |
| Top of surface (PQ) casing | 5485327.95 | 555440.36 | 418.17 | Calculated E, N & Elev |

Note: Elevations are Geodetic and referred to the CGVD2013 Datum and coordinates are referred to UTM Zone 15, NAD 83 (CSRS).
Borehole Collar – Reference Ground Level refers to the pre-drilling ground surface level and has since been regraded

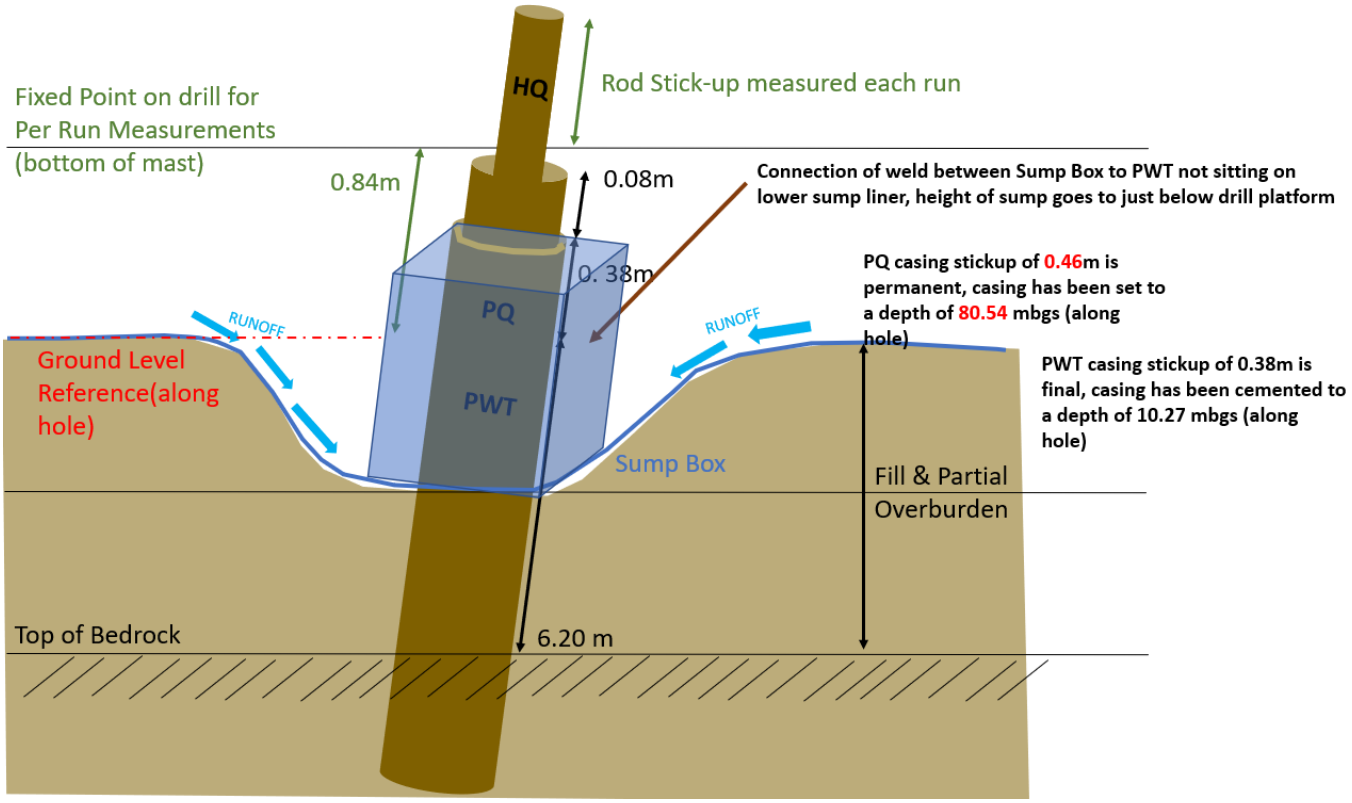



**Figure 11: Borehole Construction Schematic.**

### 4.4.1 Borehole Orientation

The borehole was planned to be drilled with an azimuth and inclination of 360˚ / -70˚ with no correction made for deviation as the drilling progressed.

The borehole was surveyed approximately every 9 m during drilling with a Reflex Gyro Sprint-IQ™ survey tool. The Sprint-IQ tool sits approximately 3.63 m above the drilled depth, as it cannot pass beyond the core barrel landing ring. The recorded depth was then taken at the mid-point of the survey tool, an additional 0.7 m for a total of 4.33 m from the drilled depth, shown in Figure 12.

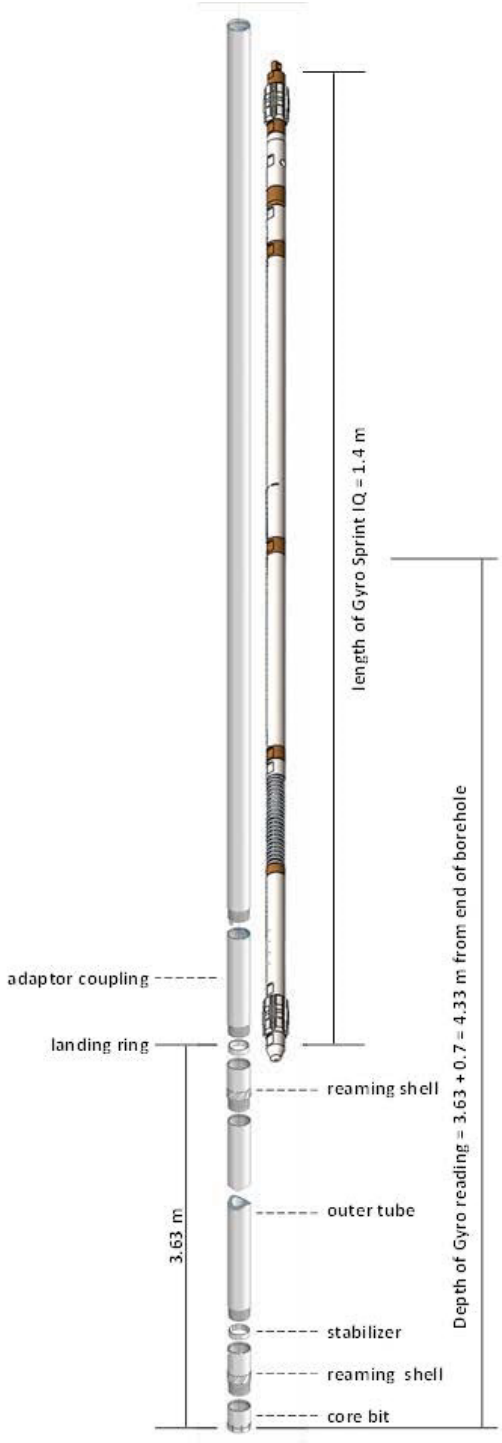



**Figure 12: Gyro Sprint-IQTM Depth Measurement Schematic.**

The Sprint-IQ was calibration checked once every 24-hours on surface and the tool lowered into the borehole to perform the survey. Rodren then presented the survey results to Golder and they were entered into the acQuire database. The tool's accuracy from the manufacturer is listed as ±1° for azimuth and ±0.3° for dip.

A final borehole survey, using the Sprint-IQ was carried out upon completion of drilling, with a measurement point taken every 5 m. The tool was set to collect a reading every 5 m, collecting measurements both entering and exiting the borehole. The control unit of the tool automatically collects a measurement based on the wireline encoder depth tracker as the tool moves along the borehole.

The interim survey data collected during drilling at approximately 9 m increments and the final survey collected approximately every 5 m upon completion of drilling are consistent, and the final survey is presented in Table B-1 (Appendix B). Figure 13 presents the borehole deviation graphically, calculated using the minimum curvature method. Inspection of Figure 13 shows the borehole deviating 10.7 m to the West and 29.0 m to the North from the planned end location.

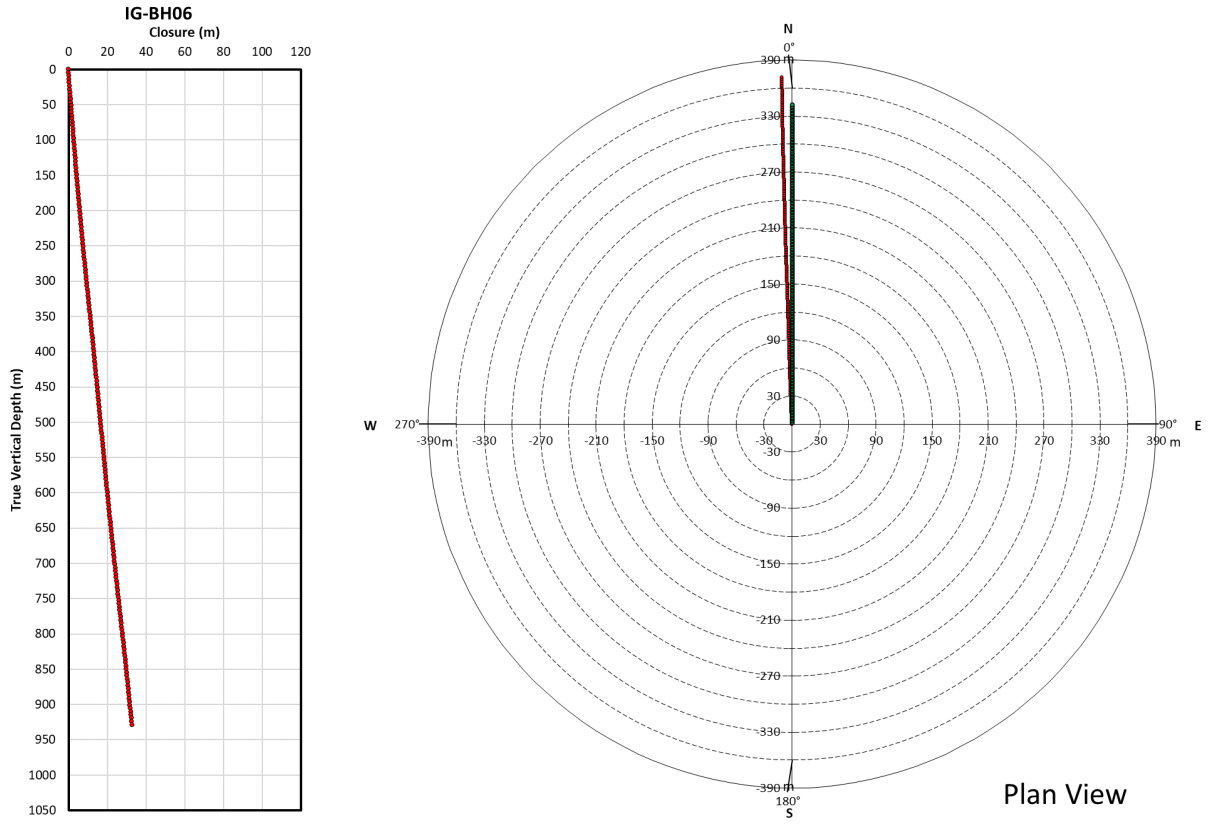



**Figure 13: Borehole Deviation (left) and Deviation Plan View (right) from Final SPRINT-IQ™ Survey: red plot lines show the actual borehole trajectory, and the black plot line (Right Plot) indicates the planned borehole trajectory**

## 4.5 Monitoring Drilling Parameters

Drilling supervisors were stationed at the rig during drilling, to observe the drilling parameters during drilling as well as any occurrences of drill fluid spills or maintenance related activities. The drill parameters included torque, thrust or down pressure, fluid injection pressure and downhole fluid flow. These parameters were observed from the gauges at the drill controls.

Results of the drilling parameters collected are presented in Table A-1 (Appendix A) and shown graphically in Figure B-1 (Appendix B). General observations are listed below.

- Rate of Penetration was observed to be relatively consistent at ~ 4 metres/hour, with a slight overall decreasing trend with depth. The rate of penetration increased between 620 mbgs and 683 mbgs, corresponding to a change in driller and the period immediately after a bit change.
- Bit Rotation Speed was observed to be consistent over the drilling of the entire borehole at ~600 rpm.
- Torque and down pressure remained consistent to a depth of approximately 600 mbgs (along hole), where they were observed to steadily increase for the remainder of the borehole.
- Pump pressure increased with depth as a higher pump rate was required to adequately flush the hole. The gauge for monitoring pump pressure malfunctioned and no values were collected for core run (CR) 110 through to CR114.
- Fluid injection rate was consistent throughout the program at ~40 L/min.

It should be noted for that day shift and night shift drillers had different approaches to their drilling technique and fluctuations in all observed parameters are a reflection of those differences.

## 4.6 Borehole Flushing

Borehole flushing was carried out on IG_BH06 on two occasions: prior to installation and cementing of the surface casing, and at the completion of drilling and prior to the geophysical surveys (WP05 activities).

The fresh water was pumped into the borehole through the drill rods until the return fluid was clear and had water quality indicator parameters that were targeted to be within 10% of the source water for turbidity, dissolved oxygen and electrical conductivity, within 20% of the source water fluorescein concentration (if traced water was used) and within 0.5 of pH of that of the fresh water used. After this point, drill rods were withdrawn from the borehole, and the flushed water in the borehole allowed to “settle”, targeting 12 hours before geophysical logging took place.

Prior to surface casing installation, flushing was carried out in two parts. Approximately 4000 L of traced, flocculant water was flushed through the borehole column on September 8$^{th}$, 2021, with the borehole at a depth of 100.86 mbgs (along hole). The flocculant water was left to settle and with an additional 4,000 litres of fresh, traced water (totalling over 10 borehole volumes with HQ rods in place) flushed through the borehole on September 9$^{th}$, 2021. The fluid parameters were consistently monitored to determine when they were within the specified indicator parameters of the fresh water. The final fluid parameters were within 20% of the source water for fluorescein and ph. Electrical conductivity, turbidity and dissolved oxygen were slightly over the specified tolerance of 10%. Since the electrical conductivity and dissolved oxygen would not affect the quality of the televiewer image, and turbidity was approaching 0 NTU, flushing was terminated with approval from the NWMO.

The final flushing of IG_BH06 prior to the completion of geophysics (WP05 activities) was carried out over a two-day period, from November 6$^{th}$ to 7$^{th}$, 2021. Approximately 69,000 litres representing over 9 borehole volumes (borehole volume without HQ rods) of 100 ppb traced water were flushed through the borehole. The final fluid parameters were within 20% of the source water for fluorescein, 10% of the source water for pH, electrical conductivity, ORP and dissolved oxygen, with a turbidity between 0 and 5 NTU. This signified a relatively homogeneous borehole column where flushing could be terminated.

Appendix C presents the water quality parameters for the borehole flushing completed prior to the geophysical surveys.

# 5.0 SUMMARY OF DRILL FLUID MANAGEMENT AND USE OF TRACERS

Monitoring of the drill fluid volume losses and gains during coring was planned and initially carried out through use of manual tank measurements and ultrasonic sensors, however the margin of error encountered through use of the sensors was found to be too large to identify actual drill fluid volume changes consistently. The sensors employed during the program were found to produce variable readings, and manual measurements of the volume of the drill fluid system components were observed to be the most reliable means of monitoring the drill fluid volume changes. The drill fluid recycling system and volume monitoring methods, as well as the results of the drill fluid parameter and volume monitoring are described in the subsequent sections.

## 5.1 Drill Fluid Closed System

The drill fluid system consisted of three components: a centrifuge (SRU™) tank, a plastic mixing tank in the rig and the borehole itself. The centrifuge tank (approximate capacity of 2.60 $m^3$) pumped water to the tank in the drill rig (approximate capacity of 0.65 $m^3$) using a submersible pump, from which water was pumped downhole using the rig's pump. The drill water returning to surface was pumped via a submersible pump, located in the steel sump box sealed at the collar of the hole to the centrifuge where the cuttings were removed, and the cleaned water fell back into the centrifuge tank. This provided a closed system where fresh water was only introduced after confirmation from the Golder drilling supervisor. A schematic representing this closed drill fluid system is shown in Figure 14.

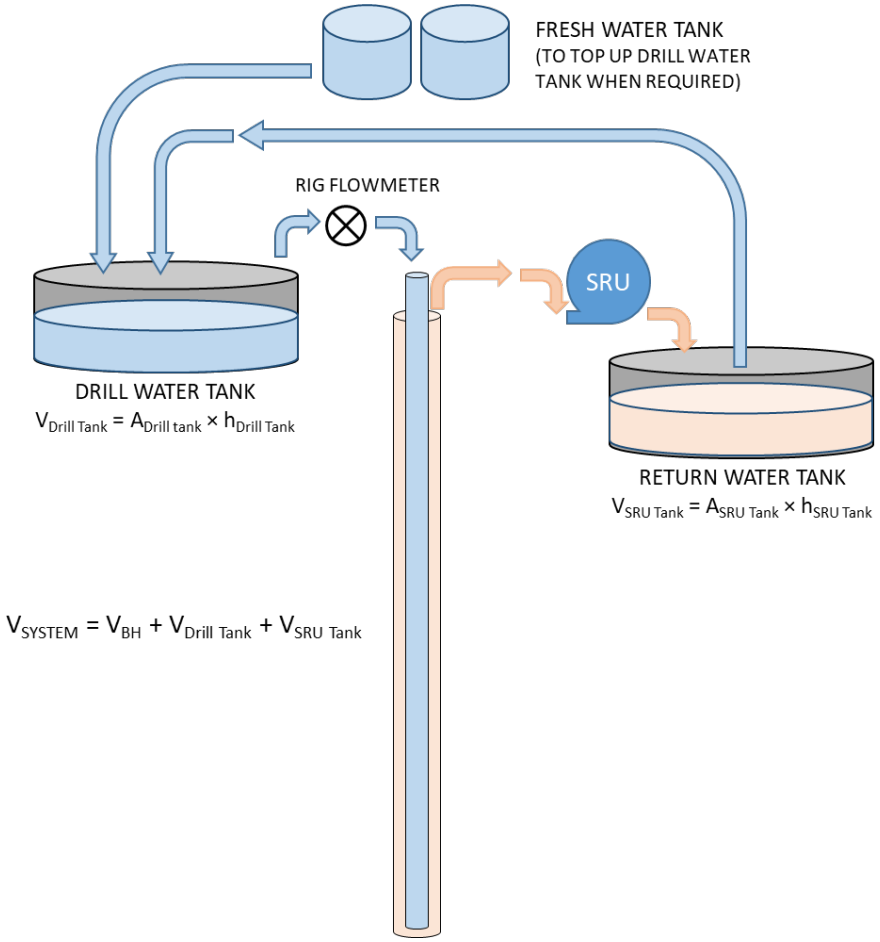



**Figure 14: Diagram of IG_BH06 Drill Fluid System**

### 5.1.1 Drill Fluid Volume Monitoring Methods

The volume of water used during drilling was tracked using manual tank readings collected throughout the drilling of IG_BH06. The volume of the system was monitored by measuring the depth of water in the borehole, the drill tank and the centrifuge tank, once all bypasses and pumps were temporarily off so that all water levels were steady. System volumes were measured at the end of each run, as well as at the start of every run. Fresh water was added to the drill system as water was lost to the formation and as the volume of the system increased relative to the volume of drill water in the system (that is, as the hole was deepened, the available volume of the system increased). A baseline reading of the new drill fluid volume in the system was recorded when this was done, so that subsequent fluid losses to the rock could be identified as potential groundwater sampling triggers. More details of the volume monitoring can be found in Section 5.5.

## 5.2 Fresh Water Management and Sampling

Fresh water was stored in two 28,350 litre Baker tanks located on the north side of the site. An additional approximately 24,000 litre baker tank was brought to site for the final borehole flushing. Fresh water was collected from a municipal source in Ignace and transported to site via a local water truck service. Ignace has a water treatment plant, and municipal water is treated to adhere to Ontario drinking water standards. The municipal water is sourced from Lake Michel, which is located approximately 1 km north of Ignace, and undergoes filtration and chlorination at the water treatment plant. Where possible, two individual tanks of fresh water were circulated together using a submersible pump, in order to mix them into a single batch of fresh water for sampling. Each batch of fresh water was individually sampled before being introduced to the drill water system and entering the borehole. All freshwater batches were termed “water source” and designated for sample collection as IG_BH06_WSXXX.

### 5.2.1 Water Source Samples and Testing

Water source samples were collected from all batches of fresh water delivered to site, prior to fluorescein addition and prior to introducing the water to the drill system. Water was collected from the storage tanks into a clean, triple rinsed 19 litre (5 gallon) bucket, and then transferred into labelled bottles using new syringes, or new tubing with a peristaltic pump. Samples were collected for submission to Bureau Veritas (BV), Isotope Tracer Technologies (IT2) and the University of Ottawa (UofO) as per Table 6, and in-field geochemistry analyses were carried out on the samples.

In-field geochemistry analyses methodologies are described in the WP07 Report – Opportunistic Groundwater Sampling for IG_BH06 (Golder 2022b) and include alkalinity, sulphide, ferrous iron and dissolved oxygen analyses.

**Table 6: Sample Preservation Requirements for Bureau Veritas, Isotope Tracer Technologies and the University of Ottawa**

| Parameter Group | Parameter List | Bottle Type Requirement | Sample Volume Requirement | Head Space Requirement | Field Filtering Requirement | Preservative Requirement |
|---|---|---|---|---|---|---|
| Major Elements & Metals (BV) | Na, K, Ca, Mg, Sr, Li, Si, Al, B, S Total, Fe Total Diss (Dissolved Metals by ICPMS) | HDPE plastic bottles | 120 mL | Fill Line | Yes, 0.45 µm filter | Trace grade nitric acid |

| Parameter Group | Parameter List | Bottle Type Requirement | Sample Volume Requirement | Head Space Requirement | Field Filtering Requirement | Preservative Requirement |
|---|---|---|---|---|---|---|
| Trace Elements, Anions & Nutrients (BV) | Cu, Ni, Zn, Pb, Cd, Al, As, Se, Bi, U, Cs, Rb, Ba, Cr, Co, Th, Zr | | | | | |
| | SiO2 & I | HDPE plastic bottles | 250 mL | None | Yes, 0.45 µm filter | None |
| | S2- | HDPE plastic bottles | 125 mL | Fill Line | Yes, 0.45 µm filter | Zinc acetate and sodium hydroxide solution |
| | NH4 (ammonium), NH3 + NH4 (total ammonia) | Clear glass vial | 40 mL | Fill to neck | Yes, 0.45 µm filter | Trace grade sulphuric acid |
| | N total, P total, TOC | HDPE plastic bottles | 120 mL | Fill Line | Yes, 0.45 µm filter | Trace grade sulphuric acid |
| | DOC | HDPE plastic bottles | 120 mL | None | Yes, 0.45 µm filter | None |
| | Br, F, Cl, I, SO4, PO4, NO3, NO2, HCO3 | HDPE plastic bottles | 500 mL | None | Yes, 0.45 µm filter | None |
| Physical – Chemical (BV) | pH, Alkalinity, TIC | | | | | |
| Rare Earth Elements (BV) | Ce to Y | HDPE plastic bottles | 2 X 1 L | None | Yes, 0.45 µm filter | None |
| Radioisotopes (BV) | 238U, 234U, 40K, 222Rn, 223Ra, 224Ra, 226Ra, 228Ra, 227Th, 232Th, 230Th, Gross Alpha & Beta, 210Po, 210Pb, 90Sr | | 5 X 1 L | Fill Line | Yes, 0.45 µm filter | Trace grade nitric acid |

| Parameter Group | Parameter List | Bottle Type Requirement | Sample Volume Requirement | Head Space Requirement | Field Filtering Requirement | Preservative Requirement |
|---|---|---|---|---|---|---|
| Stable Isotopes (IT2) | δ18O, δ2H | HDPE plastic bottles | 60 mL | No headspace | Yes, 0.45 µm filter | None |
| | 87Sr/86Sr | HDPE plastic bottle | 1000 mL | No headspace | Yes, 0.45 µm filter | None |
| | δ13C DIC | Amber glass vials, Teflon cap | 2 x 40 mL glass vials with septa caps (x2 per sample) | No headspace | Yes, 0.45 µm filter | Zinc chloride |
| | 37Cl | HDPE plastic bottle | 1000 mL | No headspace | Yes, 0.45 µm filter | None |
| Radioisotopes (IT2) | 36Cl | | | | | |
| | 129I | HDPE plastic bottle | 500 mL | No headspace | Yes, 0.45 µm filter | None |
| | 14C-DIC | Glass bottle | 1000 mL | No headspace | Yes, 0.45 µm filter | Zinc chloride |
| | E3H | HDPE plastic bottle | 500 mL | No headspace | Yes, 0.45 µm filter | None |
| Noble gas concentration & isotopic ratios (UofO) | He, Ar, Ne (3,4He, 20,22Ne, 21,22Ne, 40,36Ar) | Copper Tubing | - | - | None | None |

A total of 6 water source samples were collected during the drilling program as follows:

- IG_BH06_WS001, IG_BH06_WS002, IG_BH06_WS003, IG_BH06_WS005 and IG_BH06_WS006 were collected and used during regular drilling and flushing activities.
- IG_BH06_WS004 was assigned to account for extra water source transferred from IG_BH05.

All water source data (including in-field parameters, in-field analyses and laboratory results) are included in the Opportunistic Groundwater Sampling WP07 report for IG_BH06 (Golder 2022b).

### 5.2.2 Fluorescein Addition

After a sample was collected from the freshwater tank or tanks, water was transferred to a 5000 L poly tank. Fluorescein was measured using an analytical scale (due to the small mass of powdered fluorescein required for each tank) and added to the poly tank. The tank was continuously circulated to mix in the fluorescein using a submersible pump. The water was tested for fluorescein concentration using the AquaFluor fluorometer until the desired concentration was achieved. Once the fluorescein concentration was close to the specified target (100 ppb for all activities), the water was transferred to the drill system as required.

Given the large volume of water required for the end of borehole flushing, the three large baker tanks were traced with fluorescein. Due to their large capacity, the tanks were generally left to circulate and mix for the majority of a 12-hour shift, or until consistent concentration readings were collected. Figure 15 below shows the tracer being added to the source water in one of the freshwater tanks used in the drilling of a previous borehole.



**Figure 15: Fluorescein Tracer Being Added to the Source Water**

## 5.3 Drill Fluid Field Parameters

At the end of the core run, drilling supervisors communicated with the drillers to time the collection of drill fluid with the completion of the run, to pause to allow a rod stick-up measurement, followed by the temporary shutting off of pumps to measure the fluid volumes in the tanks and collect the ultrasonic sensor readings. Drillers and drill supervisors developed a workflow to communicate when the drillers could proceed to the next activity, that is, when measurements and sample collection were complete, and the drillers could lower the overshot to retrieve the inner tube.

Drill fluid field parameters were measured using a Horiba U-52 multiparameter water quality meter. A baseline reading was taken prior to the start of drilling, and all subsequent occasions when fresh water was added to the system. New baseline readings were typically from the centrifuge tank when the system was switched. At the end of each drill run, a sample of water for field parameters was collected from the return drill fluid from the outlet of the centrifuge that drained into the tank. This system allowed a sample of water directly from the borehole to be collected and tested, providing the most representative parameters possible for that run.

Fluorescein concentration was also measured from this sample. The presence of cuttings in the drill water was observed to mask the fluorescein concentration readings measured with the AquaFluor, and drill fluid samples were therefore filtered using an inline high volume 0.45 µm filter prior to collecting readings.

The field parameters of the drill fluid measured each run, and the corresponding triggers to initiate a WP07 opportunistic groundwater sample collection attempt, are presented in Table 7. These parameters were monitored each run, and if a trigger was considered valid, Golder and the NWMO would coordinate to initiate an opportunistic groundwater sample (WP07).

**Table 7: Drill Fluid Monitoring Parameters and WP07 Triggers**

| Field Parameter | Instrument | Trigger to Initiate WP07 / Target ranges for borehole flushing |
|---|---|---|
| Fluorescein dye (tracer) | Aquafluor Handheld Fluorometer/Turbidimeter | 20% change in concentration from previous drill fluid source<br>Note: Minimum detection limit of the fluorometer (0.4 ppb) |
| Turbidity | Horiba U52-2 multiparameter water quality meter | 10% change from the previous drill fluid source |
| Dissolved Oxygen | | 10% change from the previous drill fluid source |
| Electrical conductivity | | 10% change from the previous drill fluid source |
| pH | | change of at least 0.5 from previous drill fluid source |
| Temperature | | N/A |
| Density | Hydrometer | N/A |

### 5.3.1 Drill Fluid Parameter Data

The drill fluid parameter data is presented in Table A-2 (Appendix A) and shown graphically on Figures B-2 and B-3 (Appendix B). General observations and comments are listed below.

- Fluorescein concentration required frequent adjustment in the drill fluid system, with fluorescein added about every 10-15 runs. As the borehole depth and drill fluid system volume increased, the time for the fluorescein readings to equalize in the system when extra fluorescein was added increased, and concentration readings occasionally varied over 20% from run to run. In general, the fluorescein concentration of the drill fluid remained between 75 and 100 ppb. The fluorescein concentration began fluctuating an increasing amount beyond a depth of 600 mbgs. The addition of Pure-Vis made it difficult to filter the core run drill fluid samples. The resulting turbidity, on occasion had a significant effect on the measured fluorescein concentration.
- The frequent fluorescein adjustments were necessary as the concentration in the drill fluid decreased as the fluid was processed through the centrifuge and cuttings were removed.
- Density of the drill fluid increased as the saturation with cuttings increased. When the density is observed to drop back closer to 1 g/cm$^3$, this generally corresponds with the addition of fresh water to the system. At a depth of approximately 620 mbgs, a significant portion of the drill fluid in the borehole was removed while removing the drill rods from the borehole. The drill fluid was then replaced with fresh, traced water, bringing the density close to 1 g/cm$^3$.
- Turbidity remained above the Horiba's measurement range (1000 NTU) for the majority of the program as the drill fluid became saturated with drill cuttings.
- There are a few notable changes in the drill fluid electrical conductivity. There is a significant decrease occurring at the very top of the borehole, between 15 mbgs and 100 mbgs (along hole) and below 620 mbgs (along hole), related to the initial casing installation, and the removal of drill rods for a bit change. After each decrease, electrical conductivity returned to levels below 1 mS/cm.

- Dissolved oxygen (DO) fluctuated continuously in the sensor's range, with a sharp decrease around 620 mbgs.
- The temperature of the drill fluid system was generally between 10-20 ˚C.

## 5.4 Drill Fluid Additives

At a depth of 100.86 mbgs (along hole), prior to the completion of geophysics, a flocculant, INSTA-CLEAR™ DRY, was added to the flush water to remove particles out of suspension and create a clear borehole column for televiewer imagery. Given the characteristics of the flocculant water, the additive was denoted as a water source sample, IG_BH06_WS002.

After the borehole flushing at 100.86 mbgs, after the unsuccessful cementing of the PQ surface casing, the HQ rods experienced an increase in torque while drilling down to the Van Ruth plug. A bio-degradable polymer-based drilling additive, AMC Pure-Vis, was added to the drill fluid via the drill tank in the rig. This additive generally improves the ability of the fluid to lift cuttings from the drill bit and out of the borehole, helping to manage the drill bit binding with cuttings and causing spikes in the torque. This additive was the third drill fluid sample, IG_BH06_DW003, collected. This drill fluid sample underwent the full suite of analytical laboratory testing as part of WP07.

No other drill fluid additives were used besides AMC Pure-Vis and INSTA-CLEAR™ DRY.

## 5.5 Drill Fluid Return Volume Monitoring Data

Drill fluid volumes were monitored continuously during coring activities by manually checking the water levels in the centrifuge, drill tank and borehole. Ultrasonic sensors were also installed in the centrifuge and drill tank in an attempt to collect continuous readings and automate the volume monitoring process. When losses or gains greater than 100 litres were observed, the Golder WP07 lead was contacted following the opportunistic groundwater sampling protocol as described in WP07. If a volume change was observed, the drillers were instructed not to proceed with setting up for the next core run until the core was extracted and could be observed for indications of water bearing features. The system volume gradually increased as the hole was deepened, and water was occasionally lost on surface due to human error, as well as bound in the cuttings. Gradual system losses required occasional topping up of the system with fresh, fluorescein water. Table A-2 includes volume changes for each drill run and these can be observed graphically in Figure B-2.

Following cementing of the surface casing after a depth of 100 mbgs (along hole), typically, losses greater than 100 litres could be attributed to a system overflow or more fluid extracted in the cuttings.

## 5.6 Drill Fluid Archive Samples and Testing

Drill fluid samples were collected and archived in 1 litre amber bottles every 50 m during drilling. These samples were generally collected from the return drill fluid prior to entering the centrifuge outlet into a clean, triple rinsed 19 litre (5 gallon) bucket, which was taken to the sampling area and transferred into the labelled bottles using new syringes, or new tubing with a peristaltic pump.

A complete list of drill water sample field parameters collected under WP02 are provided in Table A-3.

# 6.0 OPPORTUNISTIC GROUNDWATER SAMPLE LOCATIONS

There were no opportunistic groundwater samples attempts during the drilling of IG_BH06.

# 7.0 REFERENCES

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**APPENDIX A**

# Table A-1: IG_BH06 Final and Interim Borehole Orientation Measurements

# Table A-2: IG_BH06 Drilling and Drill Fluid Parameters

# Table A-3: IG_BH06 Field Parameters of Archived Drill Water Samples

| Depth | [1]Survey Type | Azimuth (°) | Dip (°) |
|---|---|---|---|
| 0.00 | Planned | 359.7 | -70.0 |
| 6.56 | GyroSp-IQD | 359.5 | -69.1 |
| 15.60 | GyroSp-IQD | 358.3 | -68.6 |
| 24.51 | GyroSp-IQD | 358.0 | -68.7 |
| 33.54 | GyroSp-IQD | 358.6 | -68.6 |
| 42.54 | GyroSp-IQD | 358.2 | -68.7 |
| 51.61 | GyroSp-IQD | 358.0 | -68.7 |
| 60.52 | GyroSp-IQD | 357.8 | -68.7 |
| 69.53 | GyroSp-IQD | 358.0 | -68.7 |
| 78.55 | GyroSp-IQD | 358.4 | -68.7 |
| 87.60 | GyroSp-IQD | 358.3 | -68.6 |
| 96.53 | GyroSp-IQD | 358.0 | -68.7 |
| 105.56 | GyroSp-IQD | 358.3 | -68.7 |
| 114.62 | GyroSp-IQD | 359.2 | -68.7 |
| 123.55 | GyroSp-IQD | 358.1 | -68.7 |
| 132.61 | GyroSp-IQD | 358.5 | -68.7 |
| 141.59 | GyroSp-IQD | 358.3 | -68.7 |
| 150.56 | GyroSp-IQD | 358.7 | -68.6 |
| 159.60 | GyroSp-IQD | 358.8 | -68.6 |
| 168.60 | GyroSp-IQD | 358.8 | -68.5 |
| 177.56 | GyroSp-IQD | 358.6 | -68.5 |
| 186.61 | GyroSp-IQD | 357.5 | -68.5 |
| 195.55 | GyroSp-IQD | 358.7 | -68.5 |
| 204.56 | GyroSp-IQD | 358.6 | -68.4 |
| 213.60 | GyroSp-IQD | 359.1 | -68.4 |
| 222.61 | GyroSp-IQD | 358.2 | -68.4 |
| 231.54 | GyroSp-IQD | 359.6 | -68.4 |
| 240.55 | GyroSp-IQD | 358.7 | -68.5 |
| 249.62 | GyroSp-IQD | 358.8 | -68.5 |
| 258.55 | GyroSp-IQD | 358.9 | -68.3 |
| 267.54 | GyroSp-IQD | 358.4 | -68.4 |
| 276.63 | GyroSp-IQD | 358.8 | -68.4 |
| 285.61 | GyroSp-IQD | 359.2 | -68.2 |
| 294.52 | GyroSp-IQD | 359.8 | -68.3 |
| 303.61 | GyroSp-IQD | 358.4 | -68.4 |
| 312.57 | GyroSp-IQD | 359.4 | -68.3 |
| 324.60 | GyroSp-IQD | 358.6 | -68.3 |
| 330.62 | GyroSp-IQD | 358.8 | -68.3 |
| 339.59 | GyroSp-IQD | 359.3 | -68.3 |
| 348.55 | GyroSp-IQD | 359.3 | -68.2 |
| 357.61 | GyroSp-IQD | 358.7 | -68.2 |
| 366.59 | GyroSp-IQD | 359.0 | -68.2 |
| 375.59 | GyroSp-IQD | 358.9 | -68.2 |
| 384.63 | GyroSp-IQD | 359.1 | -68.2 |
| 393.59 | GyroSp-IQD | 358.6 | -68.2 |
| 402.62 | GyroSp-IQD | 359.0 | -68.2 |
| 411.57 | GyroSp-IQD | 358.8 | -68.2 |
| 420.62 | GyroSp-IQD | 358.8 | -68.2 |
| 429.60 | GyroSp-IQD | 358.5 | -68.2 |

| Depth | [1]Survey Type | Azimuth (°) | Dip (°) |
|---|---|---|---|
| 438.62 | GyroSp-IQD | 359.3 | -68.2 |
| 447.61 | GyroSp-IQD | 359.2 | -68.2 |
| 456.61 | GyroSp-IQD | 358.5 | -68.2 |
| 465.62 | GyroSp-IQD | 359.2 | -68.2 |
| 474.60 | GyroSp-IQD | 359.3 | -68.2 |
| 483.61 | GyroSp-IQD | 359.0 | -68.3 |
| 492.61 | GyroSp-IQD | 358.8 | -68.3 |
| 501.58 | GyroSp-IQD | 359.2 | -68.2 |
| 510.62 | GyroSp-IQD | 359.1 | -68.2 |
| 519.62 | GyroSp-IQD | 358.4 | -68.2 |
| 528.59 | GyroSp-IQD | 357.9 | -68.2 |
| 537.62 | GyroSp-IQD | 358.4 | -68.1 |
| 546.62 | GyroSp-IQD | 359.2 | -68.2 |
| 555.58 | GyroSp-IQD | 359.1 | -68.1 |
| 564.60 | GyroSp-IQD | 358.8 | -68.1 |
| 573.61 | GyroSp-IQD | 358.9 | -68.1 |
| 582.58 | GyroSp-IQD | 358.9 | -68.2 |
| 591.62 | GyroSp-IQD | 359.1 | -68.1 |
| 600.59 | GyroSp-IQD | 359.1 | -68.1 |
| 609.57 | GyroSp-IQD | 358.7 | -68.1 |
| 618.61 | GyroSp-IQD | 358.9 | -68.1 |
| 627.59 | GyroSp-IQD | 359.3 | -68.0 |
| 636.62 | GyroSp-IQD | 358.9 | -68.1 |
| 645.60 | GyroSp-IQD | 359.4 | -68.1 |
| 654.58 | GyroSp-IQD | 358.6 | -68.1 |
| 663.60 | GyroSp-IQD | 359.3 | -68.0 |
| 672.62 | GyroSp-IQD | 358.9 | -68.0 |
| 681.58 | GyroSp-IQD | 359.4 | -67.9 |
| 690.61 | GyroSp-IQD | 359.1 | -68.0 |
| 699.61 | GyroSp-IQD | 359.2 | -67.9 |
| 708.53 | GyroSp-IQD | 359.3 | -67.9 |
| 717.61 | GyroSp-IQD | 359.0 | -68.0 |
| 726.53 | GyroSp-IQD | 359.4 | -67.9 |
| 735.62 | GyroSp-IQD | 359.4 | -68.0 |
| 744.53 | GyroSp-IQD | 359.2 | -67.9 |
| 753.59 | GyroSp-IQD | 358.7 | -67.9 |
| 762.59 | GyroSp-IQD | 358.5 | -67.9 |
| 771.54 | GyroSp-IQD | 358.0 | -67.8 |
| 780.57 | GyroSp-IQD | 359.4 | -67.9 |
| 789.60 | GyroSp-IQD | 359.1 | -67.8 |
| 798.61 | GyroSp-IQD | 359.2 | -67.8 |
| 807.61 | GyroSp-IQD | 358.6 | -67.9 |
| 816.58 | GyroSp-IQD | 359.1 | -67.8 |
| 825.57 | GyroSp-IQD | 358.9 | -67.8 |
| 834.61 | GyroSp-IQD | 359.5 | -67.9 |
| 843.55 | GyroSp-IQD | 359.3 | -67.9 |
| 852.61 | GyroSp-IQD | 359.4 | -67.9 |
| 861.52 | GyroSp-IQD | 357.9 | -67.8 |
| 870.61 | GyroSp-IQD | 359.3 | -67.9 |

| Depth | [1]Survey Type | Azimuth (°) | Dip (°) |
|---|---|---|---|
| 879.61 | GyroSp-IQD | 359.0 | -67.9 |
| 888.56 | GyroSp-IQD | 358.7 | -67.9 |
| 897.62 | GyroSp-IQD | 359.4 | -67.9 |
| 906.62 | GyroSp-IQD | 359.6 | -68.0 |
| 915.53 | GyroSp-IQD | 359.1 | -68.0 |
| 924.63 | GyroSp-IQD | 359.0 | -68.0 |
| 933.53 | GyroSp-IQD | 359.1 | -68.0 |
| 942.52 | GyroSp-IQD | 359.0 | -68.1 |
| 951.62 | GyroSp-IQD | 359.2 | -68.1 |
| 960.54 | GyroSp-IQD | 359.6 | -68.0 |
| 969.53 | GyroSp-IQD | 359.0 | -68.1 |
| 978.61 | GyroSp-IQD | 358.9 | -68.1 |
| 987.51 | GyroSp-IQD | 359.4 | -68.1 |
| 996.50 | GyroSp-IQD | 359.4 | -68.2 |
| 0.00 | GyroSp-IQP | 357.88 | -69.22 |
| 5.02 | GyroSp-IQP | 357.91 | -69.10 |
| 10.05 | GyroSp-IQP | 358.03 | -68.99 |
| 15.02 | GyroSp-IQP | 357.89 | -68.86 |
| 20.03 | GyroSp-IQP | 357.83 | -68.72 |
| 25.06 | GyroSp-IQP | 357.83 | -68.67 |
| 30.01 | GyroSp-IQP | 357.79 | -68.69 |
| 35.05 | GyroSp-IQP | 357.81 | -68.71 |
| 40.01 | GyroSp-IQP | 357.82 | -68.67 |
| 45.05 | GyroSp-IQP | 357.82 | -68.68 |
| 50.03 | GyroSp-IQP | 357.79 | -68.66 |
| 55.01 | GyroSp-IQP | 357.84 | -68.69 |
| 60.04 | GyroSp-IQP | 357.96 | -68.68 |
| 65.01 | GyroSp-IQP | 357.82 | -68.64 |
| 70.04 | GyroSp-IQP | 357.73 | -68.67 |
| 75.01 | GyroSp-IQP | 357.78 | -68.67 |
| 80.02 | GyroSp-IQP | 357.78 | -68.63 |
| 85.00 | GyroSp-IQP | 357.88 | -68.66 |
| 90.01 | GyroSp-IQP | 357.94 | -68.69 |
| 95.01 | GyroSp-IQP | 357.80 | -68.66 |
| 100.04 | GyroSp-IQP | 357.98 | -68.66 |
| 105.00 | GyroSp-IQP | 357.94 | -68.68 |
| 110.01 | GyroSp-IQP | 358.08 | -68.61 |
| 115.04 | GyroSp-IQP | 358.02 | -68.63 |
| 120.02 | GyroSp-IQP | 358.07 | -68.60 |
| 125.04 | GyroSp-IQP | 357.94 | -68.62 |
| 130.01 | GyroSp-IQP | 358.06 | -68.56 |
| 135.01 | GyroSp-IQP | 358.15 | -68.53 |
| 140.01 | GyroSp-IQP | 358.11 | -68.52 |
| 145.02 | GyroSp-IQP | 358.06 | -68.51 |
| 150.00 | GyroSp-IQP | 358.06 | -68.51 |
| 155.03 | GyroSp-IQP | 358.16 | -68.50 |
| 160.00 | GyroSp-IQP | 358.07 | -68.48 |
| 165.02 | GyroSp-IQP | 357.96 | -68.48 |
| 170.04 | GyroSp-IQP | 358.10 | -68.44 |

| Depth | [1]Survey Type | Azimuth (°) | Dip (°) |
|---|---|---|---|
| 175.03 | GyroSp-IQP | 358.09 | -68.42 |
| 180.03 | GyroSp-IQP | 358.16 | -68.45 |
| 185.02 | GyroSp-IQP | 358.19 | -68.43 |
| 190.04 | GyroSp-IQP | 358.15 | -68.37 |
| 195.00 | GyroSp-IQP | 358.10 | -68.36 |
| 200.01 | GyroSp-IQP | 358.26 | -68.37 |
| 205.00 | GyroSp-IQP | 358.18 | -68.33 |
| 210.03 | GyroSp-IQP | 358.24 | -68.32 |
| 215.02 | GyroSp-IQP | 358.18 | -68.34 |
| 220.03 | GyroSp-IQP | 358.21 | -68.33 |
| 225.00 | GyroSp-IQP | 358.25 | -68.32 |
| 230.01 | GyroSp-IQP | 358.20 | -68.32 |
| 235.03 | GyroSp-IQP | 358.22 | -68.32 |
| 240.04 | GyroSp-IQP | 358.24 | -68.31 |
| 245.05 | GyroSp-IQP | 358.23 | -68.31 |
| 250.00 | GyroSp-IQP | 358.23 | -68.27 |
| 255.02 | GyroSp-IQP | 358.28 | -68.27 |
| 260.02 | GyroSp-IQP | 358.29 | -68.29 |
| 265.00 | GyroSp-IQP | 358.33 | -68.25 |
| 270.00 | GyroSp-IQP | 358.30 | -68.25 |
| 275.06 | GyroSp-IQP | 358.34 | -68.21 |
| 280.04 | GyroSp-IQP | 358.31 | -68.21 |
| 285.03 | GyroSp-IQP | 358.31 | -68.21 |
| 290.07 | GyroSp-IQP | 358.30 | -68.19 |
| 295.00 | GyroSp-IQP | 358.18 | -68.16 |
| 300.03 | GyroSp-IQP | 358.34 | -68.17 |
| 305.01 | GyroSp-IQP | 358.30 | -68.16 |
| 310.02 | GyroSp-IQP | 358.28 | -68.17 |
| 315.02 | GyroSp-IQP | 358.19 | -68.17 |
| 320.00 | GyroSp-IQP | 358.15 | -68.13 |
| 325.02 | GyroSp-IQP | 358.08 | -68.13 |
| 330.00 | GyroSp-IQP | 358.04 | -68.13 |
| 335.00 | GyroSp-IQP | 358.00 | -68.13 |
| 340.03 | GyroSp-IQP | 357.95 | -68.09 |
| 345.01 | GyroSp-IQP | 358.00 | -68.13 |
| 350.06 | GyroSp-IQP | 357.94 | -68.11 |
| 355.05 | GyroSp-IQP | 358.12 | -68.11 |
| 360.02 | GyroSp-IQP | 357.97 | -68.10 |
| 365.03 | GyroSp-IQP | 357.94 | -68.12 |
| 370.06 | GyroSp-IQP | 357.97 | -68.11 |
| 375.01 | GyroSp-IQP | 357.85 | -68.09 |
| 380.02 | GyroSp-IQP | 357.97 | -68.11 |
| 385.02 | GyroSp-IQP | 357.77 | -68.12 |
| 390.00 | GyroSp-IQP | 357.95 | -68.11 |
| 395.00 | GyroSp-IQP | 357.92 | -68.14 |
| 400.01 | GyroSp-IQP | 357.95 | -68.17 |
| 405.00 | GyroSp-IQP | 358.04 | -68.20 |
| 410.01 | GyroSp-IQP | 357.97 | -68.20 |
| 415.03 | GyroSp-IQP | 357.94 | -68.21 |

| Depth | [1]Survey Type | Azimuth (°) | Dip (°) |
|---|---|---|---|
| 420.02 | GyroSp-IQP | 357.95 | -68.16 |
| 425.03 | GyroSp-IQP | 357.87 | -68.22 |
| 430.02 | GyroSp-IQP | 357.97 | -68.24 |
| 435.04 | GyroSp-IQP | 357.98 | -68.23 |
| 440.03 | GyroSp-IQP | 358.05 | -68.21 |
| 445.03 | GyroSp-IQP | 357.85 | -68.23 |
| 450.02 | GyroSp-IQP | 357.95 | -68.26 |
| 455.02 | GyroSp-IQP | 357.99 | -68.27 |
| 460.03 | GyroSp-IQP | 357.84 | -68.27 |
| 465.00 | GyroSp-IQP | 357.91 | -68.30 |
| 470.00 | GyroSp-IQP | 358.09 | -68.31 |
| 475.03 | GyroSp-IQP | 357.99 | -68.29 |
| 480.02 | GyroSp-IQP | 358.09 | -68.30 |
| 485.00 | GyroSp-IQP | 358.09 | -68.30 |
| 490.00 | GyroSp-IQP | 358.08 | -68.26 |
| 495.00 | GyroSp-IQP | 358.04 | -68.26 |
| 500.02 | GyroSp-IQP | 358.15 | -68.26 |
| 505.05 | GyroSp-IQP | 358.31 | -68.27 |
| 510.02 | GyroSp-IQP | 358.18 | -68.27 |
| 515.01 | GyroSp-IQP | 358.16 | -68.25 |
| 520.00 | GyroSp-IQP | 358.15 | -68.28 |
| 525.02 | GyroSp-IQP | 358.29 | -68.27 |
| 530.02 | GyroSp-IQP | 358.26 | -68.21 |
| 535.02 | GyroSp-IQP | 358.31 | -68.23 |
| 540.03 | GyroSp-IQP | 358.23 | -68.21 |
| 545.01 | GyroSp-IQP | 358.25 | -68.21 |
| 550.00 | GyroSp-IQP | 358.28 | -68.21 |
| 555.06 | GyroSp-IQP | 358.38 | -68.22 |
| 560.03 | GyroSp-IQP | 358.46 | -68.23 |
| 565.01 | GyroSp-IQP | 358.36 | -68.24 |
| 570.01 | GyroSp-IQP | 358.31 | -68.22 |
| 575.03 | GyroSp-IQP | 358.40 | -68.24 |
| 580.04 | GyroSp-IQP | 358.37 | -68.26 |
| 585.05 | GyroSp-IQP | 358.39 | -68.24 |
| 590.03 | GyroSp-IQP | 358.49 | -68.22 |
| 595.02 | GyroSp-IQP | 358.35 | -68.22 |
| 600.07 | GyroSp-IQP | 358.47 | -68.22 |
| 605.00 | GyroSp-IQP | 358.54 | -68.21 |
| 610.00 | GyroSp-IQP | 358.51 | -68.20 |
| 615.03 | GyroSp-IQP | 358.47 | -68.19 |
| 620.00 | GyroSp-IQP | 358.59 | -68.18 |
| 625.00 | GyroSp-IQP | 358.62 | -68.18 |
| 630.00 | GyroSp-IQP | 358.51 | -68.19 |
| 635.04 | GyroSp-IQP | 358.47 | -68.18 |
| 640.00 | GyroSp-IQP | 358.47 | -68.16 |
| 645.02 | GyroSp-IQP | 358.58 | -68.16 |
| 650.01 | GyroSp-IQP | 358.46 | -68.15 |
| 655.01 | GyroSp-IQP | 358.52 | -68.15 |
| 660.01 | GyroSp-IQP | 358.54 | -68.14 |

| Depth | [1]Survey Type | Azimuth (°) | Dip (°) |
|---|---|---|---|
| 665.01 | GyroSp-IQP | 358.55 | -68.11 |
| 670.01 | GyroSp-IQP | 358.54 | -68.09 |
| 675.06 | GyroSp-IQP | 358.27 | -68.07 |
| 680.01 | GyroSp-IQP | 358.42 | -68.06 |
| 685.04 | GyroSp-IQP | 358.45 | -68.05 |
| 690.03 | GyroSp-IQP | 358.28 | -68.07 |
| 695.02 | GyroSp-IQP | 358.30 | -68.07 |
| 700.04 | GyroSp-IQP | 358.39 | -68.08 |
| 705.01 | GyroSp-IQP | 358.38 | -68.07 |
| 710.04 | GyroSp-IQP | 358.34 | -68.08 |
| 715.03 | GyroSp-IQP | 358.34 | -68.06 |
| 720.02 | GyroSp-IQP | 358.38 | -68.06 |
| 725.02 | GyroSp-IQP | 358.42 | -68.08 |
| 730.01 | GyroSp-IQP | 358.41 | -68.09 |
| 735.01 | GyroSp-IQP | 358.62 | -68.05 |
| 740.03 | GyroSp-IQP | 358.58 | -68.00 |
| 745.01 | GyroSp-IQP | 358.50 | -68.01 |
| 750.00 | GyroSp-IQP | 358.41 | -68.01 |
| 755.00 | GyroSp-IQP | 358.39 | -68.03 |
| 760.01 | GyroSp-IQP | 358.39 | -68.00 |
| 765.06 | GyroSp-IQP | 358.54 | -67.98 |
| 770.03 | GyroSp-IQP | 358.60 | -67.93 |
| 775.06 | GyroSp-IQP | 358.54 | -67.91 |
| 780.01 | GyroSp-IQP | 358.54 | -67.93 |
| 785.03 | GyroSp-IQP | 358.63 | -67.94 |
| 790.06 | GyroSp-IQP | 358.63 | -67.92 |
| 795.05 | GyroSp-IQP | 358.61 | -67.93 |
| 800.06 | GyroSp-IQP | 358.56 | -67.93 |
| 805.01 | GyroSp-IQP | 358.74 | -67.85 |
| 810.05 | GyroSp-IQP | 358.63 | -67.85 |
| 815.03 | GyroSp-IQP | 358.64 | -67.85 |
| 820.00 | GyroSp-IQP | 358.72 | -67.87 |
| 825.00 | GyroSp-IQP | 358.70 | -67.88 |
| 830.01 | GyroSp-IQP | 358.72 | -67.89 |
| 835.02 | GyroSp-IQP | 358.59 | -67.88 |
| 840.03 | GyroSp-IQP | 358.71 | -67.86 |
| 845.00 | GyroSp-IQP | 358.71 | -67.88 |
| 850.02 | GyroSp-IQP | 358.73 | -67.87 |
| 855.06 | GyroSp-IQP | 358.77 | -67.86 |
| 860.02 | GyroSp-IQP | 358.65 | -67.86 |
| 865.01 | GyroSp-IQP | 358.74 | -67.85 |
| 870.04 | GyroSp-IQP | 358.83 | -67.86 |
| 875.06 | GyroSp-IQP | 358.78 | -67.87 |
| 880.01 | GyroSp-IQP | 358.83 | -67.88 |
| 885.04 | GyroSp-IQP | 358.97 | -67.88 |
| 890.00 | GyroSp-IQP | 359.05 | -67.86 |
| 895.02 | GyroSp-IQP | 358.97 | -67.89 |
| 900.01 | GyroSp-IQP | 359.01 | -67.91 |
| 905.02 | GyroSp-IQP | 359.10 | -67.95 |

| Depth | [1]Survey Type | Azimuth (°) | Dip (°) |
|---|---|---|---|
| 910.01 | GyroSp-IQP | 359.16 | -67.94 |
| 915.05 | GyroSp-IQP | 359.21 | -67.96 |
| 920.00 | GyroSp-IQP | 359.33 | -67.97 |
| 925.00 | GyroSp-IQP | 359.30 | -68.00 |
| 930.03 | GyroSp-IQP | 359.21 | -68.00 |
| 935.02 | GyroSp-IQP | 359.27 | -68.01 |
| 940.04 | GyroSp-IQP | 359.31 | -68.00 |
| 945.03 | GyroSp-IQP | 359.24 | -68.02 |
| 950.03 | GyroSp-IQP | 359.23 | -68.02 |
| 955.00 | GyroSp-IQP | 359.26 | -68.02 |
| 960.01 | GyroSp-IQP | 359.28 | -67.98 |
| 965.03 | GyroSp-IQP | 359.26 | -67.97 |
| 970.06 | GyroSp-IQP | 359.31 | -67.98 |
| 975.05 | GyroSp-IQP | 359.36 | -67.96 |
| 980.01 | GyroSp-IQP | 359.51 | -67.97 |
| 985.02 | GyroSp-IQP | 359.30 | -67.97 |
| 990.00 | GyroSp-IQP | 359.43 | -67.97 |
| 995.00 | GyroSp-IQP | 359.34 | -67.94 |
| 1000.02 | GyroSp-IQP | 359.42 | -67.91 |

**Notes:**

[1]GyroSp-IQD measurements were collected during dril
collected post drilling of IG_BH06

| Date (End of Run) | Time (End of Run) | Run # | Top of Run | Bottom of Run | Drill Fluid Volume Change (L) | Fluorescein Concentration | | | Temp | Density | | Elec. Cond. | | pH | | Dissolved Oxygen | | Turbidity | | ORP | ROP | Bit Rotation Speed | Torque | Holdback Pressure (Down- | WOB (estimate) | Fluid Injection (pump) Pressure | Downhole Fluid Flow Rate | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Inlet | Outlet | Change | | | | Reading | Change | Reading | Change | Reading | Change | Reading | Change | | | | | | | | | |
| dd-mmm-yy | hh:mm | - | (mbgs) | (mbgs) | >100 L | (ppb) | (ppb) | >20% change | (°C) | API Gravity | SG | (mS/cm) | >10% change | - | >0.5 Change | (mg/L) | >10% Change | (NTU) | >10% Change | (mV) | m/hr | RPM | psi | psi | lbs | psi | L/min | |
| 04-Sep-21 | 17:31 | 1 | 6.20 | 7.89 | | | | | | | | | | | | | | | | | 2.67 | 600.00 | 950 | 500 | 9620 | 20 | 40 | HQ3 coring within PWT casing. Core run was partially cement. Could not obtain representative volume or drill fluid parameter measurements. |
| 05-Sep-21 | 11:05 | 2 | 7.89 | 10.89 | 93 | 44.1 | 85.8 | 95% | 22.29 | 9.9 | 1.00 | 3.370 | | 12.00 | | 4.57 | | 263 | | -17 | 2.43 | 600 | 1300 | 200 | 3848 | 40 | 40 | |
| 05-Sep-21 | 12:35 | 3 | 10.89 | 11.42 | -27 | 86.9 | 84.4 | -3% | 23.49 | 10.0 | 1.00 | 3.460 | 3% | 11.88 | 0.12 | 5.34 | 17% | 250 | -5% | -13 | 2.89 | 600 | 1250 | 300 | 5772 | 40 | 40 | Short core run to the approximate depth of where the PQ casing will be drilled to. |
| 05-Sep-21 | 17:15 | 4 | 11.42 | 11.54 | | | | | | | | | | | | | | | | | 0.33 | | | | | | | PQ casing drilled 12 cm past HQ3 and broke along a structure. |
| 05-Sep-21 | 21:36 | 5 | 11.54 | 13.95 | -12 | 80.0 | 81.5 | 2% | 23.45 | 10.0 | 1.00 | 4.350 | | 11.98 | | 6.24 | | 1000 | #DIV/0! | -13 | 5.56 | 600 | 1100 | 250 | 4810 | 80 | 45 | |
| 05-Sep-21 | 23:43 | 6 | 13.95 | 16.94 | -15 | 92.4 | 113.7 | 23% | 22.50 | 10.0 | 1.00 | 4.460 | 3% | 11.96 | 0.02 | 4.94 | -21% | 1000 | 0% | -19 | 3.15 | 600 | 1100 | 200 | 3848 | 60 | 50 | |
| 06-Sep-21 | 02:05 | 7 | 16.94 | 19.93 | -12 | 109.2 | 102.7 | -6% | 22.53 | 10.0 | 1.00 | 4.220 | -5% | 11.90 | 0.06 | 5.24 | 6% | 1000 | 0% | -22 | 2.27 | 600 | 1100 | 250 | 4810 | 60 | 45 | |
| 06-Sep-21 | 05:42 | 8 | 19.93 | 22.95 | -23 | 93.6 | 92.3 | -1% | 21.11 | 10.0 | 1.00 | 3.840 | -9% | 11.99 | -0.09 | 5.36 | 2% | 1000 | 0% | -17 | 3.78 | 600 | 1150 | 100 | 1924 | 100 | 45 | |
| 06-Sep-21 | 09:33 | 9 | 22.95 | 25.88 | -27 | 104.9 | 103.0 | -2% | 21.88 | 10.0 | 1.00 | 3.590 | -7% | 11.89 | 0.10 | 5.84 | 9% | 1000 | 0% | -11 | 3.74 | 600 | 1100 | 200 | 3848 | 100 | 40 | |
| 06-Sep-21 | 10:42 | 10 | 25.88 | 28.84 | 5 | 104.6 | 102.4 | -2% | 22.27 | 10.0 | 1.00 | 3.520 | -2% | 11.94 | -0.05 | 5.29 | -9% | 1000 | 0% | -17 | 4.55 | 600 | 1150 | 150 | 2886 | 100 | 40 | |
| 06-Sep-21 | 12:03 | 11 | 28.84 | 31.86 | -21 | 103.4 | 100.8 | -3% | 22.77 | 10.0 | 1.00 | 3.300 | -6% | 11.88 | 0.06 | 4.75 | -10% | 1000 | 0% | -15 | 4.21 | 600 | 1150 | 200 | 3848 | 100 | 40 | |
| 06-Sep-21 | 13:15 | 12 | 31.86 | 34.86 | -111 | 102.5 | 100.2 | -2% | 23.14 | 10.0 | 1.00 | 3.060 | -7% | 11.83 | 0.05 | 6.47 | 36% | 1000 | 0% | -16 | 5.45 | 600 | 1150 | 200 | 3848 | 100 | 40 | |
| 06-Sep-21 | 14:31 | 13 | 34.86 | 37.87 | -45 | 100.7 | 98.7 | -2% | 23.24 | 10.0 | 1.00 | 3.020 | -1% | 11.82 | 0.01 | 5.23 | -19% | 1000 | 0% | -14 | 5.02 | 600 | 1200 | 200 | 3848 | 100 | 40 | |
| 06-Sep-21 | 15:43 | 14 | 37.87 | 40.86 | -28 | 99.5 | 98.1 | -1% | 23.30 | 10.0 | 1.00 | 2.810 | -7% | 11.79 | 0.03 | 5.06 | -3% | 1000 | 0% | -12 | 5.13 | 600 | 1200 | 200 | 3848 | 100 | 40 | |
| 06-Sep-21 | 16:43 | 15 | 40.86 | 43.87 | -31 | 100.0 | 100.3 | 0% | 23.77 | 10.0 | 1.00 | 2.620 | -7% | 11.74 | 0.05 | 5.55 | 10% | 1000 | 0% | -11 | 5.16 | 600 | 1200 | 200 | 3848 | 100 | 40 | |
| 06-Sep-21 | 17:39 | 16 | 43.87 | 46.87 | -17 | 101.3 | 100.5 | -1% | 23.68 | 10.0 | 1.00 | 2.560 | -2% | 11.74 | 0.00 | 5.13 | -8% | 1000 | 0% | -10 | 5.14 | 600 | 1200 | 200 | 3848 | 170 | 40 | |
| 06-Sep-21 | 21:23 | 17 | 46.87 | 49.92 | -35 | 100.9 | 103.6 | 3% | 21.25 | 10.0 | 1.00 | 1.960 | -23% | 11.67 | 0.07 | 8.73 | 70% | 1000 | 0% | 13 | 4.69 | 600 | 1250 | 200 | 3848 | 150 | 45 | |
| 06-Sep-21 | 23:12 | 18 | 49.92 | 52.75 | -38 | 103.3 | 94.8 | -8% | 21.11 | 10.0 | 1.00 | 1.780 | -9% | 11.80 | -0.13 | 6.45 | -26% | 1000 | 0% | 7 | 4.04 | 600 | 1200 | 150 | 2886 | 150 | 45 | |
| 07-Sep-21 | 00:28 | 19 | 52.75 | 52.95 | 2 | 101.0 | 92.8 | -8% | 19.11 | 10.0 | 1.00 | 1.880 | 6% | 11.84 | -0.04 | 6.38 | -1% | 1000 | 0% | 0 | 1.00 | 600 | 1150 | 250 | 4810 | 140 | 45 | |
| 07-Sep-21 | 02:24 | 20 | 52.95 | 55.94 | -43 | 101.2 | 102.9 | 2% | 19.54 | 10.0 | 1.00 | 1.660 | -12% | 11.76 | 0.08 | 6.01 | -6% | 1000 | 0% | 1 | 3.52 | 600 | 1150 | 200 | 3848 | 140 | 45 | Drill rig stopped for 22 minutes during run to fuel centrifuge |
| 07-Sep-21 | 04:35 | 21 | 55.94 | 58.92 | -24 | 103.8 | 102.2 | -2% | 20.19 | 10.0 | 1.00 | 1.510 | -9% | 11.69 | 0.07 | 10.45 | 74% | 1000 | 0% | 7 | 3.65 | 600 | 1200 | 150 | 2886 | 140 | 45 | |
| 07-Sep-21 | 05:46 | 22 | 58.92 | 61.94 | -7 | 102.4 | 102.9 | 0% | 20.40 | 10.0 | 1.00 | 1.490 | -1% | 11.67 | 0.02 | 10.46 | 0% | 1000 | 0% | 8 | 4.65 | 600 | 1300 | 150 | 2886 | 150 | 45 | |
| 07-Sep-21 | 10:03 | 23 | 61.94 | 64.85 | -36 | 100.5 | 98.4 | -2% | 20.87 | 10.0 | 1.00 | 1.280 | -14% | 11.31 | 0.36 | 5.44 | -48% | 1000 | 0% | 27 | 2.77 | 600 | 1300 | 200 | 3848 | 100 | 40 | |
| 07-Sep-21 | 11:28 | 24 | 64.85 | 67.89 | -23 | 99.4 | 97.6 | -2% | 21.33 | 10.0 | 1.00 | 1.190 | -7% | 11.34 | -0.03 | 9.55 | 76% | 1000 | 0% | 24 | 3.58 | 600 | 1300 | 200 | 3848 | 140 | 40 | |
| 07-Sep-21 | 12:35 | 25 | 67.89 | 70.89 | -19 | 98.0 | 98.0 | 0% | 21.71 | 9.8 | 1.00 | 1.100 | -8% | 11.31 | 0.03 | 6.23 | -35% | 1000 | 0% | 25 | 4.50 | 600 | 1300 | 200 | 3848 | 150 | 40 | |
| 07-Sep-21 | 13:40 | 26 | 70.89 | 73.86 | -27 | 98.5 | 97.1 | -1% | 21.58 | 9.8 | 1.00 | 1.030 | -6% | 11.27 | 0.04 | 5.82 | -7% | 1000 | 0% | 28 | 4.95 | 600 | 1350 | 200 | 3848 | 125 | 40 | Main generator maintenance, not able to use sensors. |
| 07-Sep-21 | 15:21 | 27 | 73.86 | 76.88 | -22 | 98.5 | 98.2 | 0% | 21.24 | 9.8 | 1.00 | 1.020 | -1% | 11.25 | 0.02 | 9.60 | 65% | 1000 | 0% | 34 | 4.77 | 600 | 1300 | 200 | 3848 | 130 | 40 | |
| 07-Sep-21 | 16:24 | 28 | 76.88 | 79.89 | -38 | 98.4 | 97.7 | -1% | 21.38 | 9.8 | 1.00 | 0.968 | -5% | 11.22 | 0.03 | 12.07 | 26% | 1000 | 0% | 42 | 4.30 | 600 | 1350 | 300 | 5772 | 130 | 40 | |
| 07-Sep-21 | 17:22 | 29 | 79.89 | 82.88 | -13 | 98.4 | 96.9 | -2% | 20.96 | 9.5 | 1.00 | 0.967 | 0% | 11.22 | 0.00 | 5.12 | -58% | 1000 | 0% | 36 | 5.28 | 600 | 1350 | 200 | 3848 | 130 | 40 | |
| 07-Sep-21 | 21:22 | 30 | 82.88 | 85.93 | -10 | 92.7 | 97.9 | 6% | 18.72 | 9.5 | 1.00 | 0.793 | -18% | 11.15 | 0.07 | 5.71 | 12% | 1000 | 0% | 52 | 3.81 | 600 | 1350 | 150 | 2886 | 175 | 45 | |
| 07-Sep-21 | 22:51 | 31 | 85.93 | 88.94 | -28 | 98.9 | 99.5 | 1% | 19.03 | 9.5 | 1.00 | 0.707 | -11% | 11.05 | 0.10 | 9.71 | 70% | 1000 | 0% | 55 | 3.69 | 600 | 1350 | 100 | 1924 | 150 | 45 | |
| 08-Sep-21 | 00:56 | 32 | 88.94 | 91.93 | 15 | 99.1 | 99.4 | 0% | 18.57 | 9.3 | 1.00 | 0.715 | 1% | 11.05 | 0.00 | 10.25 | 6% | 1000 | 0% | 55 | 3.90 | 600 | 1350 | 250 | 4810 | 175 | 45 | |
| 08-Sep-21 | 03:24 | 33 | 91.93 | 94.91 | -37 | 100.0 | 99.8 | 0% | 18.36 | 9.3 | 1.00 | 0.709 | -1% | 11.00 | 0.05 | 5.42 | -47% | 1000 | 0% | 54 | 3.65 | 600 | 1400 | 175 | 3367 | 150 | 45 | |
| 08-Sep-21 | 05:08 | 34 | 94.91 | 97.93 | -33 | 98.4 | 97.6 | -1% | 18.33 | 9.1 | 1.01 | 0.681 | -4% | 10.96 | 0.04 | 9.86 | 82% | 1000 | 0% | 63 | 3.86 | 600 | 1350 | 200 | 3848 | 150 | 45 | |
| 08-Sep-21 | 09:36 | 35 | 97.93 | 100.86 | -37 | 102.3 | 99.3 | -3% | 18.08 | 9.0 | 1.01 | 0.665 | -2% | 10.89 | 0.07 | 5.78 | -41% | 1000 | 0% | 68 | 3.59 | 600 | 1350 | 200 | 3848 | 200 | 40 | |
| 19-Sep-21 | 18:42 | 36 | 100.86 | 100.91 | | | | | | | | | | | | | | | | | 0.15 | 600 | 1000 | 600 | 11544 | 40 | 40 | Small section of core drilled to retrieve all components of the wiper and Van Ruth plugs |
| 20-Sep-21 | 12:55 | 37 | 100.91 | 103.88 | 93 | 89.8 | 84.8 | -6% | 17.90 | 9.4 | 1.00 | 0.738 | | 11.41 | | 10.84 | | 1000 | | 1 | 1.13 | 600 | 1500 | 350 | 6734 | 60 | 41 | Added 3L of Pure-Vis Added 17.3 mL of fluorescein to drill tank 2.34 m into run - system parameters coming into equilibrium |
| 20-Sep-21 | 17:19 | 38 | 103.88 | 106.89 | -42 | 95.4 | 104.6 | 10% | 17.78 | 9.5 | 1.00 | 0.669 | -9% | 11.45 | -0.04 | 13.53 | 25% | 1000 | 0% | 14 | 3.93 | 600 | 1400 | 250 | 4810 | 100 | 40 | Drill water in system reaching equilibrium (two core runs). Breaks: two natural (one stained and one chlorite) |
| 20-Sep-21 | 22:34 | 39 | 106.89 | 109.88 | -11 | 88.2 | 93.8 | 6% | 17.98 | 9.4 | 1.00 | 0.537 | -20% | 11.03 | 0.42 | 8.98 | -34% | 1000 | 0% | 2 | 1.34 | 600 | 1200 | 300 | 5772 | 100 | 40 | Added drill water: Took field chemistry before and near end of run, conductivity before was 0.639, DO before was 6.90. DO measurements are also constantly changing, and measurements were recorded after 15 minutes. Run took 2 hours and 14 minutes to complete. No issues during drilling, just slow going. Rodren (Garrett) thinks the bit is nearly worn out. |
| 21-Sep-21 | 01:02 | 40 | 109.88 | 112.93 | 10 | 93.8 | 91.4 | -3% | 17.51 | 9.2 | 1.01 | 0.552 | 3% | 11.23 | -0.20 | 8.15 | -9% | 1000 | 0% | -22 | 5.55 | 600 | 1600 | 250 | 4810 | 80 | 32 | Rodren (Garrett) sharpened the drill bit (pressure sharpen and dry-strip sharpen). The rate of penetration is much faster now. |
| 21-Sep-21 | 02:43 | 41 | 112.93 | 115.92 | -33 | 89.6 | 90.2 | 1% | 17.17 | 8.4 | 1.01 | 0.520 | -6% | 11.11 | 0.12 | 9.67 | 19% | 1000 | 0% | 2 | 5.12 | 600 | 1550 | 250 | 4810 | 100 | 35 | Drill run went smoothly, took 35 minutes. |
| 21-Sep-21 | 04:28 | 42 | 115.92 | 118.95 | 6 | 85.5 | 81.1 | -5% | 17.14 | 8.0 | 1.01 | 0.520 | 0% | 11.14 | -0.03 | 10.94 | 13% | 1000 | 0% | 3 | 4.91 | 600 | 1550 | 220 | 4233 | 100 | 32 | Drill run went smoothly, took 37 minutes. |
| 21-Sep-21 | 09:44 | 43 | 118.95 | 121.86 | -8 | 80.8 | 87.8 | 9% | 16.41 | 8.1 | 1.01 | 0.529 | 2% | 10.80 | 0.34 | 9.88 | -10% | 1000 | 0% | 62 | 3.43 | 600 | 1500 | 300 | 5772 | 100 | 40 | |
| 21-Sep-21 | 11:10 | 44 | 121.86 | 124.88 | 35 | 89.0 | 70.7 | -21% | 16.86 | 7.8 | 1.02 | 0.525 | -1% | 10.85 | -0.05 | 10.13 | 3% | 1000 | 0% | 72 | 3.29 | 600 | 1500 | 250 | 4810 | 100 | 38 | Drill parameters verified by Philippe Bureau. Low fluorescein due to turbidity - having difficulty filtering sample. |
| 21-Sep-21 | 12:45 | 45 | 124.88 | 127.88 | 13 | 86.7 | 84.6 | -2% | 17.10 | 7.3 | 1.02 | 0.557 | 6% | 10.76 | 0.09 | 10.55 | 4% | 1000 | 0% | 20 | 3.00 | 600 | 1500 | 200 | 3848 | 100 | 40 | Completed gyroscope check (borehole alignment). |
| 21-Sep-21 | 15:03 | 46 | 127.88 | 130.87 | 32 | 86.3 | 88.6 | 3% | 17.22 | 7.8 | 1.02 | 0.547 | -2% | 10.80 | -0.04 | 9.87 | -6% | 1000 | 0% | 4 | 3.04 | 600 | 1500 | 200 | 3848 | 100 | 38 | |
| 21-Sep-21 | 20:55 | 47 | 130.87 | 133.92 | -89 | 85.4 | 81.5 | -5% | 16.82 | 7.4 | 1.02 | 0.527 | -4% | 10.69 | 0.11 | 4.56 | -54% | 1000 | 0% | -18 | 4.07 | 600 | 1600 | 100 | 1924 | 100 | 32 | Drillers added approx. 180 L water to the system prior to the start of this core run. The drillers also commenced drilling prior to on-site hydrogeologist (Supervisor - Peter van Driel at the time) gave them the go-ahead; Initial stickup and water level in drill rods are estimated, and the initial field chemistry is based on a water sample from the SRU tank collected at 20:23 (13 minutes into the run). See detailed notes on CR047 Drill Record Form. |
| 21-Sep-21 | 23:58 | 48 | 133.92 | 136.94 | 15 | 85.0 | 79.2 | -7% | 16.40 | 6.9 | 1.02 | 0.525 | 0% | 10.63 | 0.06 | 5.00 | 10% | 1000 | 0% | -19 | 3.12 | 600 | 1550 | 150 | 2886 | 130 | 32 | Drillers added water to the system prior to the start of this run, approx. 80 L. |
| 22-Sep-21 | 02:33 | 49 | 136.94 | 139.92 | 7 | 80.8 | 78.8 | -3% | 15.51 | 7.0 | 1.02 | 0.516 | -2% | 10.73 | -0.10 | 3.46 | -31% | 1000 | 0% | -25 | 3.73 | 600 | 1550 | 200 | 3848 | 100 | 40 | No water added prior to start of this run. |
| 22-Sep-21 | 04:11 | 50 | 139.92 | 142.95 | -68 | 78.8 | 81.7 | 4% | 16.46 | 7.0 | 1.02 | 0.535 | 4% | 10.67 | 0.06 | 7.50 | 117% | 1000 | 0% | -16 | 4.43 | 650 | 1700 | 250 | 4810 | 180 | 40 | No water added prior to start of this run. |
| 22-Sep-21 | 05:48 | 51 | 142.95 | 145.92 | 64 | 76.5 | 79.5 | 4% | 16.20 | 7.1 | 1.02 | 0.551 | 3% | 10.58 | 0.09 | 10.55 | 41% | 1000 | 0% | -11 | 3.43 | 750 | 2000 | 200 | 3848 | 120 | 36 | Drillers needed to sharpen their bit mid-way through their run, and do maintenance on the bushing, because the drill string was wobbling. |
| 22-Sep-21 | 10:31 | 52 | 145.92 | 148.87 | 12 | 95.8 | 81.7 | -15% | 16.25 | 6.6 | 1.02 | 0.564 | 2% | 10.48 | 0.10 | 10.15 | -4% | 1000 | 0% | 14 | 2.39 | 600 | 1500 | 250 | 4810 | 120 | 38 | Slight turbidity in fluorescein SRU sample - very difficult to filter all turbidity for clear sample. Turbidity reduces Aquafluor fluorescein measurement. |
| 22-Sep-21 | 12:18 | 53 | 148.87 | 151.89 | -7 | 93.8 | 84.7 | -10% | 17.30 | 6.5 | 1.03 | 0.576 | 2% | 10.49 | -0.01 | 10.99 | 8% | 1000 | 0% | 11 | 2.63 | 600 | 1500 | 350 | 6734 | 120 | 38 | |
| 22-Sep-21 | 13:47 | 54 | 151.89 | 154.89 | -35 | 87.2 | 79.1 | -9% | 18.09 | 6.0 | 1.03 | 0.579 | 1% | 10.50 | -0.01 | 10.78 | -2% | 1000 | 0% | 9 | 2.90 | 600 | 1500 | 300 | 5772 | 120 | 40 | Completed gyroscope check (borehole alignment). |
| 22-Sep-21 | 15:51 | 55 | 154.89 | 157.89 | -11 | 80.8 | 81.0 | 0% | 19.07 | 5.8 | 1.03 | 0.594 | 3% | 10.34 | 0.16 | 6.40 | -41% | 1000 | 0% | 22 | 2.73 | 600 | 1500 | 300 | 5772 | 120 | 38 | |



GOLDER

| Date (End of Run) | Time (End of Run) | Run # | Top of Run | Bottom of Run | Drill Fluid Volume Change (L) | Fluorescein Concentration | | | Temp | Density | | Elec. Cond. | | pH | | Dissolved Oxygen | | Turbidity | | ORP | ROP | Bit Rotation Speed | Torque | Holdback Pressure (Down- | WOB (estimate) | Fluid Injection (pump) Pressure | Downhole Fluid Flow Rate | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Inlet | Outlet | Change | | | | Reading | Change | Reading | Change | Reading | Change | Reading | Change | | | | | | | | | |
| dd-mmm-yy | hh:mm | - | (mbgs) | (mbgs) | >100 L | (ppb) | (ppb) | >20% change | (°C) | API Gravity | SG | (mS/cm) | >10% change | - | >0.5 Change | (mg/L) | >10% Change | (NTU) | >10% Change | (mV) | m/hr | RPM | psi | psi | lbs | psi | L/min | |
| 22-Sep-21 | 17:15 | 56 | 157.89 | 160.88 | -42 | 79.4 | 80.8 | 2% | 19.38 | 5.5 | 1.03 | 0.595 | 0% | 10.29 | 0.05 | 10.68 | 67% | 1000 | 0% | 34 | 2.89 | 600 | 1550 | 250 | 4810 | 120 | 40 | |
| 22-Sep-21 | 20:53 | 57 | 160.88 | 163.93 | -15 | 79.2 | 77.7 | -2% | 18.24 | 7.0 | 1.02 | 0.575 | -3% | 10.22 | 0.07 | 11.05 | 3% | 1000 | 0% | -8 | 5.38 | 650 | 1750 | 350 | 6734 | 160 | 36 | Drillers added approximately 225L of water to the system prior to the start of the run. |
| 22-Sep-21 | 23:03 | 58 | 163.93 | 166.92 | -10 | 79.8 | 82.1 | 3% | 17.81 | 6.8 | 1.02 | 0.563 | -2% | 10.30 | -0.08 | 11.32 | 2% | 1000 | 0% | 35 | 4.98 | 650 | 1850 | 200 | 3848 | 120 | 40 | No water added prior to start of this run. |
| 23-Sep-21 | 00:52 | 59 | 166.92 | 169.95 | -12 | 80.0 | 81.3 | 2% | 18.11 | 5.8 | 1.03 | 0.570 | 1% | 10.26 | 0.04 | 3.97 | -65% | 1000 | 0% | -5 | 5.04 | 650 | 1800 | 300 | 5772 | 190 | 45 | No water added prior to start of this run. |
| 23-Sep-21 | 02:27 | 60 | 169.95 | 172.93 | -22 | 83.8 | 83.0 | -1% | 17.48 | 5.8 | 1.03 | 0.560 | -2% | 10.25 | 0.01 | 4.72 | 19% | 1000 | 0% | -4 | 6.17 | 650 | 1900 | 300 | 5772 | 190 | 45 | No water added prior to start of this run. |
| 23-Sep-21 | 03:52 | 61 | 172.93 | 175.93 | -14 | 82.8 | 82.9 | 0% | 17.93 | 5.7 | 1.03 | 0.574 | 2% | 10.18 | 0.07 | 9.77 | 107% | 1000 | 0% | -15 | 5.81 | 650 | 2000 | 200 | 3848 | 160 | 40 | No water added prior to start of this run. |
| 23-Sep-21 | 11:14 | 62 | 175.93 | 178.87 | -10 | 81.9 | 88.4 | 8% | 16.50 | 6.2 | 1.03 | 0.582 | 1% | 10.20 | -0.02 | 15.02 | 54% | 1000 | 0% | 32 | 2.45 | 600 | 1600 | 300 | 5772 | 140 | 42 | |
| 23-Sep-21 | 13:35 | 63 | 178.87 | 181.89 | -32 | 84.1 | 84.3 | 0% | 18.35 | 6.0 | 1.03 | 0.604 | 4% | 10.15 | 0.05 | 14.86 | -1% | 1000 | 0% | 34 | 2.52 | 600 | 1650 | 300 | 5772 | 140 | 40 | Completed gyroscope check (borehole alignment). |
| 23-Sep-21 | 15:39 | 64 | 181.89 | 184.87 | -17 | 77.0 | 79.7 | 4% | 19.20 | 5.3 | 1.03 | 0.623 | -2% | 10.08 | 0.07 | 7.89 | -47% | 1000 | 0% | 21 | 2.03 | 600 | 1600 | 300 | 5772 | 160 | 38 | Drill tank overflowed. Recovered 15 L and lost <5 L. |
| 23-Sep-21 | 17:28 | 65 | 184.87 | 187.87 | -28 | 81.7 | 78.4 | -4% | 19.23 | 5.5 | 1.03 | 0.651 | -3% | 10.02 | 0.06 | 7.67 | -3% | 1000 | 0% | 72 | 2.57 | 600 | 1650 | 300 | 5772 | 140 | 38 | Sampled core |
| 23-Sep-21 | 23:58 | 66 | 187.87 | 190.94 | -15 | 75.3 | 74.7 | -1% | 18.08 | 6.3 | 1.03 | 0.622 | 3% | 10.00 | 0.02 | 13.76 | 79% | 1000 | 0% | 27 | 3.61 | 650 | 1800 | 400 | 7696 | 200 | 40 | Added approximately 280 L of water to the SRU tank prior to the start of Core Run 66. Fluorescein Conc. in the water supply tank was 103.6 ppb. DO in the SRU tank was 12.51 mg/L after adding water but before Core Run 66, and it increased to 13.76 after Core Run 66 (no trigger). |
| 24-Sep-21 | 02:26 | 67 | 190.94 | 193.93 | -14 | 77.9 | 75.3 | -3% | 17.54 | 5.0 | 1.04 | 0.685 | -6% | 9.87 | 0.13 | 15.25 | 11% | 1000 | 0% | 23 | 2.46 | 650 | 2200 | 200 | 3848 | 180 | 40 | No water added prior to start of this run. While drilling, the drillers had to pause mid-run because the drill string was wobbling, and the water pressure temporarily rose up, resulting in some mist being sprayed from out of the piping above the drill tank. After letting the rig sit for four minutes, the water pressure went down, and drilling resumed. |
| 24-Sep-21 | 04:04 | 68 | 193.93 | 195.18 | -181 | 76.5 | 77.3 | 1% | 17.22 | 5.9 | 1.03 | 0.667 | 2% | 9.97 | -0.10 | 9.77 | -36% | 1000 | 0% | 60 | 2.42 | 650 | 1650 | 350 | 6734 | 200 | 40 | The drillers had to stop drilling mid-run because the core reportedly locked. After they stopped, and while explaining to Peter van Driel, the drill tank overflowed. Rodren (Garrett) estimates around 50L of fluid may have been lost, to the spill pad below the drill. PVD contacted AKV to discuss, and it was agreed not to proceed any further with any water yield testing, given most field chemistry parameters are steady, no natural fractures were observed in the core, and the loss can be explained by the overflow of the drill tank. Upon resuming drilling at 05:35 AM, Rodren promptly determined their drill bit was worn out, and then proceeded to pull up the drill string to change the bit. |
| 24-Sep-21 | 11:53 | 69 | 195.18 | 196.85 | 126 | 83.8 | 88.1 | 5% | 15.59 | 5.9 | 1.03 | 0.647 | 2% | 9.87 | 0.10 | 9.87 | 1% | 1000 | 0% | 78 | 3.71 | 600 | 1550 | 400 | 7696 | 170 | 38 | Run progressed smoothly. Rodren recovered 6 pails (120L) from centrifuge bag. |
| 24-Sep-21 | 13:04 | 70 | 196.85 | 199.88 | 15 | 80.0 | 80.3 | 0% | 15.74 | 5.7 | 1.03 | 0.604 | 4% | 9.86 | 0.01 | 9.19 | -7% | 1000 | 0% | 107 | 3.71 | 600 | 1500 | 350 | 6734 | 180 | 38 | Completed gyroscope check (borehole alignment). |
| 24-Sep-21 | 14:42 | 71 | 199.88 | 202.88 | -3 | 79.6 | 82.5 | 4% | 15.90 | 5.2 | 1.04 | 0.650 | -5% | 9.89 | -0.03 | 9.89 | 8% | 1000 | 0% | 119 | 4.19 | 600 | 1600 | 300 | 5772 | 200 | 40 | Collected 200 m drill water archive sample. |
| 24-Sep-21 | 15:58 | 72 | 202.88 | 205.88 | -15 | 81.3 | 85.2 | 5% | 16.20 | 4.5 | 1.04 | 0.674 | -2% | 9.85 | 0.04 | 10.71 | 8% | 1000 | 0% | 149 | 3.91 | 600 | 1500 | 250 | 4810 | 160 | 38 | |
| 24-Sep-21 | 17:23 | 73 | 205.88 | 208.89 | -10 | 80.9 | 79.9 | -1% | 16.29 | 3.9 | 1.05 | 0.679 | -1% | 9.88 | -0.03 | 9.88 | -8% | 1000 | 0% | 29 | 4.20 | 600 | 1500 | 300 | 5772 | 180 | 40 | Completed gyroscope check (borehole alignment). |
| 24-Sep-21 | 20:59 | 74 | 208.89 | 211.94 | 71 | 70.4 | 75.0 | 7% | 16.30 | 4.5 | 1.04 | 0.667 | 1% | 9.88 | 0.00 | 5.76 | -42% | 1000 | 0% | 43 | 5.90 | 650 | 1700 | 200 | 3848 | 200 | 40 | The drillers added approximately 350 L of fluorescein-water to the SRU tank prior to the start of Core Run 74, with no additional additives. |
| 24-Sep-21 | 22:35 | 75 | 211.94 | 214.94 | -13 | 72.4 | 69.9 | -4% | 16.63 | 5.0 | 1.04 | 0.622 | 5% | 9.86 | 0.02 | 10.94 | 90% | 1000 | 0% | 50 | 5.29 | 650 | 1600 | 200 | 3848 | 40 | 40 | Run progressed smoothly. |
| 25-Sep-21 | 00:07 | 76 | 214.94 | 217.93 | 0 | 74.8 | 76.6 | 2% | 16.10 | 4.0 | 1.04 | 0.654 | -3% | 9.85 | 0.01 | 1.79 | -84% | 1000 | 0% | 14 | 4.27 | 650 | 1750 | 150 | 2886 | 180 | 40 | Run progressed smoothly, completed gyroscope check (borehole alignment). |
| 25-Sep-21 | 02:52 | 77 | 217.93 | 220.95 | -7 | 83.0 | 82.5 | -1% | 16.23 | 5.0 | 1.04 | 0.645 | 1% | 9.84 | 0.01 | 8.55 | 378% | 1000 | 0% | 82 | 5.66 | 650 | 1750 | 150 | 2886 | 180 | 40 | Run progressed smoothly. |
| 25-Sep-21 | 04:31 | 78 | 220.95 | 223.94 | -3 | 82.5 | 88.1 | 7% | 15.67 | 4.0 | 1.04 | 0.653 | -1% | 9.79 | 0.05 | 1.59 | -81% | 1000 | 0% | 24 | 6.64 | 650 | 1750 | 200 | 3848 | 200 | 40 | Run progressed smoothly. |
| 25-Sep-21 | 05:43 | 79 | 223.94 | 226.94 | 5 | 85.7 | 86.7 | 1% | 15.72 | 3.6 | 1.05 | 0.659 | -1% | 9.75 | 0.04 | 6.06 | 281% | 1000 | 0% | 18 | 7.50 | 650 | 1750 | 200 | 3848 | 200 | 40 | Run progressed smoothly, completed gyroscope check (borehole alignment). |
| 25-Sep-21 | 10:43 | 80 | 226.94 | 229.87 | 5 | 82.5 | 86.4 | 5% | 14.49 | 3.8 | 1.05 | 0.683 | -2% | 9.60 | 0.15 | 4.12 | -32% | 1000 | 0% | 78 | 3.91 | 600 | 1550 | 300 | 5772 | 200 | 40 | |
| 25-Sep-21 | 12:20 | 81 | 229.87 | 232.87 | 51 | 83.3 | 79.2 | -5% | 15.15 | 3.9 | 1.05 | 0.686 | 0% | 9.59 | 0.01 | 4.35 | 6% | 1000 | 0% | 57 | 3.00 | 600 | 1500 | 250 | 4810 | 190 | 40 | |
| 25-Sep-21 | 13:30 | 82 | 232.87 | 235.87 | 25 | 78.5 | 78.6 | 0% | 15.53 | 3.9 | 1.05 | 0.667 | 2% | 9.49 | 0.10 | 10.46 | 140% | 1000 | 0% | 145 | 4.50 | 600 | 1500 | 400 | 7696 | 260 | 38 | Completed gyroscope check (borehole alignment). |
| 25-Sep-21 | 14:51 | 83 | 235.87 | 238.87 | -37 | 81.0 | 78.9 | -3% | 16.06 | 3.7 | 1.05 | 0.699 | -3% | 9.63 | -0.14 | 9.87 | -6% | 1000 | 0% | 80 | 4.39 | 600 | 1550 | 350 | 6734 | 190 | 38 | |
| 25-Sep-21 | 16:25 | 84 | 238.87 | 241.89 | -1 | 78.6 | 84.9 | 8% | 16.61 | 3.8 | 1.05 | 0.702 | 0% | 9.61 | 0.02 | 10.11 | 2% | 1000 | 0% | 94 | 3.62 | 600 | 1550 | 300 | 5772 | 200 | 40 | |
| 25-Sep-21 | 17:27 | 85 | 241.89 | 244.88 | 11 | 83.1 | 86.1 | 4% | 16.36 | 2.6 | 1.06 | 0.692 | 1% | 9.46 | 0.15 | 9.46 | -6% | 1000 | 0% | 87 | 5.61 | 600 | 1600 | 350 | 6734 | 180 | 40 | Completed gyroscope check (borehole alignment). |
| 25-Sep-21 | 21:23 | 86 | 244.88 | 247.94 | -22 | 81.0 | 84.3 | 4% | 16.55 | 3.9 | 1.05 | 0.587 | 11% | 9.43 | 0.03 | 1.38 | -85% | 1000 | 0% | 111 | 7.34 | 650 | 1900 | 300 | 5772 | 220 | 40 | Run progressed smoothly. The drillers added approximately 500 L of water to the SRU tank prior to the start of Core Run 086. Based on the initial field chemistry at the start of Core Run 086, dissolved oxygen concentrations (1.60 to 1.38 mg/L) and electrical conductivity measurements (0.550 to 0.587) were within 10%, and all other parameters changed less than trigger thresholds based on actual pre-run to post-run field chemistry measurements. |
| 25-Sep-21 | 23:55 | 87 | 247.94 | 250.94 | 5 | 84.0 | 79.3 | -6% | 16.17 | 3.3 | 1.05 | 0.636 | -5% | 9.46 | -0.03 | 1.98 | 43% | 1000 | 0% | 85 | 7.20 | 700 | 1800 | 300 | 5772 | 200 | 40 | Run progressed smoothly. Drill water archive sample will be sampled in the next run because the run was complete before we could collect it. |
| 26-Sep-21 | 02:09 | 88 | 250.94 | 253.95 | -4 | 78.0 | 72.5 | -7% | 14.99 | 3.5 | 1.05 | 0.625 | 1% | 9.38 | 0.08 | 10.69 | 440% | 1000 | 0% | 178 | 4.52 | 700 | 2000 | 200 | 3848 | 200 | 40 | Run progressed smoothly. Drill water archive sample was collected at 01:35. |
| 26-Sep-21 | 11:00 | 89 | 253.95 | 256.86 | -80 | 84.7 | 86.0 | 2% | 14.58 | 3.9 | 1.05 | 0.673 | -5% | 9.29 | 0.09 | 9.38 | -12% | 1000 | 0% | 132 | 3.12 | 600 | 1500 | 350 | 6734 | 190 | 38 | |
| 26-Sep-21 | 12:19 | 90 | 256.86 | 259.87 | 9 | 82.2 | 83.6 | 2% | 15.58 | 4.3 | 1.04 | 0.715 | -4% | 9.41 | -0.12 | 9.01 | -4% | 1000 | 0% | 126 | 3.69 | 600 | 1450 | 300 | 5772 | 200 | 38 | |
| 26-Sep-21 | 13:35 | 91 | 259.87 | 262.88 | 23 | 78.5 | 82.4 | 5% | 16.75 | 4.0 | 1.04 | 0.731 | -2% | 9.41 | 0.00 | 8.79 | -2% | 1000 | 0% | 93 | 3.69 | 600 | 1600 | 350 | 6734 | 190 | 38 | |
| 26-Sep-21 | 15:35 | 92 | 262.88 | 265.88 | -14 | 78.7 | 76.1 | -3% | 17.15 | 3.1 | 1.05 | 0.717 | 1% | 9.39 | 0.02 | 9.06 | 3% | 1000 | 0% | 109 | 3.60 | 600 | 1550 | 350 | 6734 | 200 | 40 | |
| 26-Sep-21 | 16:55 | 93 | 265.88 | 268.86 | -11 | 77.7 | 81.4 | 5% | 17.70 | 3.1 | 1.05 | 0.716 | 0% | 9.19 | 0.20 | 8.77 | -3% | 1000 | 0% | 139 | 3.37 | 600 | 1600 | 350 | 6734 | 200 | 38 | |
| 26-Sep-21 | 18:08 | 94 | 268.86 | 271.87 | -22 | 79.7 | 78.8 | -1% | 17.96 | 3.1 | 1.05 | 0.738 | -2% | 9.42 | -0.23 | 8.67 | -1% | 1000 | 0% | 122 | 3.61 | 600 | 1600 | 450 | 8658 | 200 | 38 | |
| 26-Sep-21 | 21:52 | 95 | 271.87 | 274.94 | 63 | 78.2 | 75.1 | -4% | 16.54 | 2.0 | 1.06 | 0.714 | 2% | 9.11 | 0.31 | 3.83 | -56% | 1000 | 0% | 109 | 5.42 | 700 | 1700 | 450 | 8658 | 250 | 40 | Run progressed smoothly. Drillers added approximately 200 L of water to the drill tank prior to the start of Core Run 095m, no additives. |
| 26-Sep-21 | 23:23 | 96 | 274.94 | 277.95 | -31 | 88.8 | 92.7 | 4% | 16.25 | 4.5 | 1.04 | 0.695 | 2% | 9.17 | -0.06 | 4.93 | 29% | 1000 | 0% | 45 | 6.45 | 700 | 1800 | 300 | 5772 | 250 | 40 | |
| 27-Sep-21 | 00:55 | 97 | 277.95 | 280.96 | -29 | 88.4 | 88.0 | 0% | 15.93 | 2.5 | 1.06 | 0.730 | -4% | 9.07 | 0.10 | 4.47 | -9% | 1000 | 0% | 0 | 4.63 | 700 | 2000 | 250 | 4810 | 200 | 40 | |
| 27-Sep-21 | 03:19 | 98 | 280.96 | 283.94 | -114 | 82.3 | 75.2 | -9% | 14.51 | 1.8 | 1.06 | 0.716 | 1% | 9.15 | -0.08 | 9.34 | 109% | 1000 | 0% | 135 | 5.59 | 700 | 2000 | 300 | 5772 | 200 | 40 | Fluid loss can be attributed to measurement error. Likely increased volume in sump box. |
| 27-Sep-21 | 04:52 | 99 | 283.94 | 286.94 | -19 | 74.1 | 82.1 | 11% | 14.68 | 4.8 | 1.04 | 0.713 | 0% | 9.14 | 0.01 | 6.64 | -29% | 1000 | 0% | 84 | 3.67 | 700 | 1850 | 450 | 8658 | 240 | 40 | |
| 27-Sep-21 | 06:30 | 100 | 286.94 | 289.94 | 13 | 89.7 | 85.3 | -5% | 13.06 | 2.6 | 1.06 | 0.696 | 2% | 9.28 | -0.14 | 2.10 | -68% | 1000 | 0% | 66 | 4.74 | 700 | 1950 | 300 | 5772 | 220 | 40 | |

| Date (End of Run) | Time (End of Run) | Run # | Top of Run | Bottom of Run | Drill Fluid Volume Change (L) | Fluorescein Concentration | | | Temp | Density | | Elec. Cond. | | pH | | Dissolved Oxygen | | Turbidity | | ORP | ROP | Bit Rotation Speed | Torque | Holdback Pressure (Down- | WOB (estimate) | Fluid Injection (pump) Pressure | Downhole Fluid Flow Rate | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Inlet | Outlet | Change | | | | Reading | Change | Reading | Change | Reading | Change | Reading | Change | | | | | | | | | |
| dd-mmm-yy | hh:mm | - | (mbgs) | (mbgs) | >100 L | (ppb) | (ppb) | >20% change | (°C) | API Gravity | SG | (mS/cm) | >10% change | - | >0.5 Change | (mg/L) | >10% Change | (NTU) | >10% Change | (mV) | m/hr | RPM | psi | psi | lbs | psi | L/min | |
| 27-Sep-21 | 10:55 | 101 | 289.94 | 292.87 | 3 | 84.8 | 80.4 | -5% | 14.21 | 2.8 | 1.05 | 0.785 | -9% | 9.62 | -0.34 | 10.98 | 423% | 1000 | 0% | 105 | 3.74 | 600 | 1550 | 350 | 6734 | 220 | 40 | |
| 27-Sep-21 | 12:50 | 102 | 292.87 | 295.87 | -20 | 76.8 | 72.9 | -5% | 15.86 | 2.5 | 1.06 | 0.773 | 1% | 9.43 | 0.19 | 11.07 | 1% | 1000 | 0% | 170 | 2.57 | 600 | 1600 | 300 | 5772 | 200 | 40 | |
| 27-Sep-21 | 15:35 | 103 | 295.87 | 298.85 | 33 | 76.1 | 77.8 | 2% | 17.02 | 2.8 | 1.05 | 0.730 | 4% | 9.71 | -0.28 | 9.47 | -14% | 1000 | 0% | 102 | 2.45 | 600 | 1600 | 400 | 7696 | 200 | 38 | |
| 27-Sep-21 | 17:22 | 104 | 298.85 | 301.85 | -53 | 85.4 | 83.6 | -2% | 16.91 | 2.6 | 1.06 | 0.711 | 2% | 9.48 | 0.23 | 10.41 | 10% | 1000 | 0% | 98 | 3.46 | 600 | 1700 | 350 | 6734 | 220 | 40 | |
| 28-Sep-21 | 03:43 | 105 | 301.85 | 304.95 | -51 | 82.5 | 83.5 | 1% | 15.98 | 3.3 | 1.05 | 0.646 | 6% | 9.19 | 0.29 | 11.43 | 10% | 1000 | 0% | 91 | 5.64 | 700 | 1700 | 300 | 5772 | 220 | 40 | |
| 28-Sep-21 | 05:00 | 106 | 304.95 | 307.94 | -86 | 83.7 | 85.1 | 2% | 16.17 | 5.5 | 1.03 | 0.701 | -5% | 9.37 | -0.18 | 12.32 | 8% | 1000 | 0% | 73 | 3.74 | 600 | 2000 | 350 | 6734 | 220 | 40 | |
| 28-Sep-21 | 06:20 | 107 | 307.94 | 310.93 | -49 | 83.9 | 80.6 | -4% | 16.19 | 2.8 | 1.05 | 0.661 | 4% | 9.03 | 0.34 | 12.59 | 2% | 1000 | 0% | 90 | 5.13 | 600 | 2000 | 250 | 4810 | 210 | 40 | |
| 28-Sep-21 | 09:45 | 108 | 310.93 | 313.93 | 6 | 78.5 | 82.1 | 5% | 16.17 | 2.6 | 1.06 | 0.693 | -3% | 9.18 | -0.15 | 10.99 | -13% | 1000 | 0% | 102 | 3.27 | 600 | 1650 | 400 | 7696 | 240 | 40 | |
| 28-Sep-21 | 11:15 | 109 | 313.93 | 316.90 | 34 | 85.8 | 87.0 | 1% | 16.21 | 2.8 | 1.05 | 0.688 | 1% | 9.29 | -0.11 | 9.10 | -17% | 1000 | 0% | 94 | 3.96 | 600 | 1650 | 400 | 7696 | 220 | 40 | |
| 28-Sep-21 | 13:30 | 110 | 316.90 | 319.91 | -25 | 87.3 | 82.2 | -6% | 17.10 | 3.0 | 1.05 | 0.660 | 3% | 9.28 | 0.01 | 10.08 | 11% | 1000 | 0% | 114 | 4.51 | 600 | 1650 | 450 | 8658 | | 40 | CR110 through CR114 - pump gauge on drill broken. No injection fluid pressure readings for these four runs. replaced at CR115 |
| 28-Sep-21 | 15:02 | 111 | 319.91 | 322.91 | -16 | 79.6 | 80.1 | 1% | 17.90 | 3.0 | 1.05 | 0.662 | 0% | 9.29 | -0.01 | 9.92 | -2% | 1000 | 0% | 85 | 3.46 | 600 | 1650 | 450 | 8658 | | 40 | |
| 28-Sep-21 | 17:28 | 112 | 322.91 | 325.91 | -36 | 79.7 | 79.0 | -1% | 18.82 | 3.4 | 1.05 | 0.691 | -3% | 9.27 | 0.02 | 11.65 | 17% | 1000 | 0% | 88 | 4.29 | 600 | 1600 | 500 | 9620 | | 40 | |
| 28-Sep-21 | 20:35 | 113 | 325.91 | 328.93 | -19 | | | | | | | | | | | | | | - | | 5.18 | 700 | 2000 | 400 | 7696 | | 40 | WP02 staff not present at the end of run and missed the drill fluid sample for CR112. Sensor volume readings indicate 18L loss with stick core. |
| 28-Sep-21 | 22:05 | 114 | 328.93 | 331.95 | -37 | 83.4 | 79.0 | -5% | 19.26 | 3.5 | 1.05 | 0.702 | -1% | 9.02 | 0.25 | 11.14 | -4% | 1000 | #DIV/0! | 127 | 2.79 | 600 | 1800 | 450 | 8658 | | 40 | |
| 29-Sep-21 | 03:15 | 115 | 331.95 | 334.95 | -11 | 84.4 | 93.7 | 11% | 18.24 | 1.8 | 1.06 | 0.700 | 0% | 9.37 | -0.35 | 14.15 | 27% | 1000 | 0% | 112 | 4.50 | 700 | 2000 | 300 | 5772 | 220 | 40 | |
| 29-Sep-21 | 05:10 | 116 | 334.95 | 337.94 | 1 | 102.9 | 99.3 | -3% | 18.72 | 2.4 | 1.06 | 0.705 | -1% | 9.22 | 0.15 | 11.01 | -22% | 1000 | 0% | 108 | 5.98 | 700 | 950 | 450 | 8658 | 220 | 40 | |
| 29-Sep-21 | 09:50 | 117 | 337.94 | 340.88 | 36 | 86.6 | 79.4 | -8% | 17.47 | 2.8 | 1.05 | 0.771 | -7% | 9.27 | -0.05 | 8.19 | -26% | 1000 | 0% | 106 | 3.92 | 600 | 1650 | 450 | 8658 | 200 | 40 | |
| 29-Sep-21 | 11:20 | 118 | 340.88 | 343.92 | 6 | 78.5 | 79.0 | 1% | 17.47 | 3.0 | 1.05 | 0.729 | 4% | 9.32 | -0.05 | 7.95 | -3% | 1000 | 0% | 114 | 3.97 | 600 | 1700 | 350 | 6734 | 220 | 40 | |
| 29-Sep-21 | 14:05 | 119 | 343.92 | 346.94 | 45 | 76.6 | 76.8 | 0% | 19.06 | 3.0 | 1.05 | 0.766 | -4% | 9.17 | 0.15 | 10.94 | 38% | 1000 | 0% | 117 | 3.29 | 600 | 1700 | 400 | 7696 | 220 | 38 | |
| 29-Sep-21 | 15:32 | 120 | 346.94 | 349.92 | -4 | 77.5 | 80.0 | 3% | 19.27 | 3.0 | 1.05 | 0.758 | 1% | 8.92 | 0.25 | 9.86 | -10% | 1000 | 0% | 176 | 3.31 | 600 | 1700 | 550 | 10582 | 220 | 40 | |
| 29-Sep-21 | 17:30 | 121 | 349.92 | 352.88 | 12 | 73.6 | 76.7 | 4% | 18.49 | 3.2 | 1.05 | 0.754 | 0% | 9.10 | -0.18 | 9.58 | -3% | 1000 | 0% | 182 | 4.44 | 600 | 1700 | 450 | 8658 | 200 | 40 | |
| 29-Sep-21 | 21:30 | 122 | 352.88 | 355.95 | 82 | 91.8 | 85.7 | -7% | 20.03 | 3.0 | 1.05 | 0.788 | -3% | 9.01 | 0.09 | 8.55 | -11% | 1000 | 0% | 172 | 6.14 | 700 | 2050 | 400 | 7696 | 240 | 45 | |
| 29-Sep-21 | 22:55 | 123 | 355.95 | 358.95 | 90 | 86.9 | 78.9 | -9% | 20.78 | 5.8 | 1.03 | 0.757 | 3% | 8.90 | 0.11 | 9.54 | 12% | 1000 | 0% | 190 | 3.27 | 700 | 2020 | 300 | 5772 | 200 | 45 | |
| 30-Sep-21 | 00:35 | 124 | 358.95 | 361.94 | -39 | 97.0 | 101.0 | 4% | 19.68 | 3.4 | 1.05 | 0.689 | 7% | 9.30 | -0.40 | 10.70 | 12% | 1000 | 0% | 189 | 3.00 | 700 | 2200 | 300 | 5772 | 200 | 45 | |
| 30-Sep-21 | 02:35 | 125 | 361.94 | 364.94 | 9 | 83.7 | 85.7 | 2% | 19.75 | 2.5 | 1.06 | 0.758 | -7% | 8.89 | 0.41 | 7.98 | -25% | 1000 | 0% | 89 | 4.00 | 700 | 1600 | 400 | 7696 | 300 | 42 | |
| 30-Sep-21 | 03:55 | 126 | 364.94 | 367.94 | 28 | 90.3 | 88.8 | -2% | 18.65 | 2.8 | 1.05 | 0.763 | -1% | 9.25 | -0.36 | 7.10 | -11% | 1000 | 0% | 162 | 4.50 | 700 | 2000 | 400 | 7696 | 300 | 40 | |
| 30-Sep-21 | 13:58 | 127 | 367.94 | 370.92 | -5 | 197.3 | 168.7 | -14% | 18.89 | 3.0 | 1.05 | 0.759 | 0% | 9.31 | -0.06 | 10.66 | 50% | 1000 | 0% | 126 | 3.73 | 600 | 1700 | 350 | 6734 | 220 | 40 | |
| 30-Sep-21 | 17:03 | 128 | 370.92 | 373.91 | -32 | 108.5 | 98.8 | -9% | 20.54 | 2.5 | 1.06 | 0.747 | 1% | 8.93 | 0.38 | 8.93 | -16% | 1000 | 0% | 99 | 3.38 | 600 | 1700 | 350 | 6734 | 240 | 40 | |
| 30-Sep-21 | 22:20 | 129 | 373.91 | 376.95 | 93 | 102.2 | 98.4 | -4% | 19.48 | 3.4 | 1.05 | 0.705 | 4% | 9.14 | -0.21 | 10.50 | 18% | 1000 | 0% | 169 | 2.81 | 600 | 1700 | 400 | 7696 | 250 | 40 | |
| 01-Oct-21 | 00:35 | 130 | 376.95 | 379.58 | 34 | 95.9 | 91.0 | -5% | 18.74 | 2.6 | 1.06 | 0.759 | -5% | 9.09 | 0.05 | 11.17 | 6% | 1000 | 0% | 186 | 2.10 | 600 | 1800 | 400 | 7696 | 210 | 40 | Full core run drilled to retrieve 0.6 m of core that remained downhole. |
| 01-Oct-21 | 09:30 | 131 | 379.58 | 380.23 | 33 | | | | | | | | | | | | | | | | 0.52 | 600 | 1750 | 400 | 7696 | 220 | 40 | Additional stick-up was drilled. Short core. |
| 01-Oct-21 | 11:41 | 132 | 380.23 | 382.92 | -34 | 98.8 | 99.3 | 1% | 19.90 | 3.6 | 1.05 | 0.679 | 8% | 8.73 | 0.36 | 10.89 | -3% | 1000 | 0% | 69 | 2.27 | 600 | 1750 | 450 | 8658 | 240 | 40 | |
| 01-Oct-21 | 13:20 | 133 | 382.92 | 385.92 | -25 | 99.3 | 96.3 | -3% | 19.42 | 3.4 | 1.05 | 0.829 | -15% | 8.78 | -0.05 | 8.69 | -20% | 1000 | 0% | 89 | 2.81 | 600 | 1800 | 500 | 9620 | 300 | 40 | |
| 02-Oct-21 | 06:15 | 134 | 385.92 | 388.96 | 36 | 94.4 | 92.5 | -2% | 18.43 | 2.4 | 1.06 | 0.840 | -1% | 8.80 | -0.02 | 10.05 | 16% | 1000 | 0% | 35 | 6.08 | 600 | 1700 | 400 | 7696 | 200 | 40 | |
| 02-Oct-21 | 09:21 | 135 | 388.96 | 391.90 | 4 | 86.9 | 79.8 | -8% | 18.27 | 2.4 | 1.06 | 0.811 | 3% | 8.82 | -0.02 | 7.09 | -29% | 1000 | 0% | 79 | 5.35 | 600 | 1650 | 400 | 7696 | 200 | 40 | |
| 02-Oct-21 | 10:28 | 136 | 391.90 | 394.90 | 3 | 90.7 | 94.9 | 5% | 17.75 | 2.6 | 1.06 | 0.853 | -4% | 8.88 | -0.06 | 6.99 | -1% | 1000 | 0% | 78 | 5.45 | 600 | 1650 | 400 | 7696 | 200 | 40 | |
| 02-Oct-21 | 12:36 | 137 | 394.90 | 397.92 | -35 | 91.4 | 91.0 | -1% | 18.32 | 2.5 | 1.06 | 0.877 | -2% | 8.80 | 0.08 | 8.21 | 17% | 1000 | 0% | 68 | 5.33 | 600 | 1600 | 500 | 9620 | 200 | 40 | |
| 02-Oct-21 | 14:00 | 138 | 397.92 | 400.92 | -13 | 98.7 | 95.2 | -4% | 17.92 | 2.4 | 1.06 | 0.854 | 2% | 8.95 | -0.15 | 5.88 | -28% | 1000 | 0% | 102 | 5.14 | 600 | 1650 | 400 | 7696 | 220 | 40 | |
| 02-Oct-21 | 20:55 | 139 | 400.92 | 403.95 | 48 | 92.9 | 83.9 | -10% | 17.97 | 1.0 | 1.07 | 0.849 | 1% | 8.89 | 0.06 | 10.40 | 77% | 1000 | 0% | 171 | 5.19 | 600 | 1700 | 400 | 7696 | 200 | 40 | Approximately 8" of rock core inside hole. Retrieved at 23:35 |
| 03-Oct-21 | 00:45 | 140 | 403.95 | 406.95 | 29 | 79.7 | 89.1 | 12% | 18.05 | 3.3 | 1.05 | 0.743 | 11% | 8.92 | -0.03 | 8.94 | -14% | 1000 | 0% | 203 | 6.00 | 600 | 1700 | 400 | 7696 | 200 | 40 | |
| 03-Oct-21 | 05:20 | 141 | 406.95 | 409.95 | -3 | 86.9 | 91.7 | 6% | 17.40 | 2.0 | 1.06 | 0.797 | -5% | 8.84 | 0.08 | 10.59 | 18% | 1000 | 0% | 141 | 5.14 | 600 | 1700 | 400 | 7696 | 200 | 40 | |
| 03-Oct-21 | 11:14 | 142 | 409.95 | 412.90 | 36 | 83.5 | 94.4 | 13% | 16.71 | 2.7 | 1.05 | 0.792 | 1% | 8.75 | 0.09 | 8.49 | -20% | 1000 | 0% | 201 | 3.85 | 600 | 1700 | 350 | 6734 | 220 | 40 | |
| 03-Oct-21 | 13:40 | 143 | 412.90 | 415.90 | 7 | 88.5 | 92.9 | 5% | 16.89 | 2.6 | 1.06 | 0.811 | -2% | 8.67 | 0.08 | 11.58 | 36% | 1000 | 0% | 223 | 5.14 | 600 | 1700 | 450 | 8658 | 220 | 40 | |
| 03-Oct-21 | 15:03 | 144 | 415.90 | 418.90 | -33 | 92.5 | 90.0 | -3% | 16.80 | 3.0 | 1.05 | 0.836 | -2% | 8.91 | -0.24 | 10.79 | -7% | 1000 | 0% | 220 | 4.74 | 600 | 1700 | 350 | 6734 | 200 | 40 | |
| 03-Oct-21 | 16:09 | 145 | 418.90 | 421.89 | 12 | 98.1 | 90.4 | -8% | 17.11 | 2.6 | 1.06 | 0.872 | -4% | 8.96 | -0.05 | 10.92 | 1% | 1000 | 0% | 186 | 5.28 | 600 | 1650 | 500 | 9620 | 200 | 40 | |
| 03-Oct-21 | 21:00 | 146 | 421.89 | 424.95 | -9 | 86.1 | 90.8 | 5% | 16.58 | 2.0 | 1.06 | 0.857 | 2% | 8.88 | 0.08 | 11.69 | 7% | 1000 | 0% | 181 | 4.59 | 600 | 1800 | 450 | 8658 | 200 | 40 | |
| 04-Oct-21 | 10:20 | 147 | 424.95 | 427.91 | 19 | 81.0 | 88.3 | 9% | 11.78 | 2.8 | 1.05 | 0.898 | -4% | 9.18 | -0.30 | 8.38 | -28% | 1000 | 0% | 112 | 4.67 | 600 | 1750 | 500 | 9620 | 200 | 40 | |
| 04-Oct-21 | 11:42 | 148 | 427.91 | 430.91 | -31 | 99.0 | 110.8 | 12% | 16.31 | 2.8 | 1.05 | 0.818 | 8% | 9.01 | 0.17 | 8.48 | 1% | 1000 | 0% | 180 | 4.29 | 600 | 1750 | 450 | 8658 | 220 | 40 | |
| 04-Oct-21 | 13:04 | 149 | 430.91 | 433.93 | 38 | 89.4 | 99.9 | 12% | 17.66 | 2.8 | 1.05 | 0.789 | 3% | 9.09 | -0.08 | 10.69 | 26% | 1000 | 0% | 103 | 6.25 | 600 | 1750 | 450 | 8658 | 220 | 40 | |
| 04-Oct-21 | 20:50 | 150 | 433.93 | 436.95 | -31 | 93.7 | 92.8 | -1% | 18.26 | 2.9 | 1.05 | 0.809 | -2% | 9.11 | -0.02 | 10.18 | -5% | 1000 | 0% | 179 | 5.18 | 600 | 1800 | 450 | 8658 | 200 | 40 | |
| 04-Oct-21 | 22:05 | 151 | 436.95 | 440.12 | -5 | 92.8 | 88.8 | -4% | 17.65 | 2.6 | 1.06 | 0.829 | -2% | 9.06 | 0.05 | 8.45 | -17% | 1000 | 0% | 169 | 7.61 | 600 | 1800 | 450 | 8658 | 200 | 40 | |
| 05-Oct-21 | 00:56 | 152 | 440.12 | 440.40 | 13 | 77.6 | | | | | | | | | | | | | | | 1.05 | 600 | 1800 | 450 | 8658 | 200 | 40 | |
| 05-Oct-21 | 23:35 | 153 | 440.40 | 442.95 | 494 | 83.8 | 81.6 | -3% | 17.89 | 2.8 | 1.05 | 0.877 | -5% | 9.04 | 0.02 | 10.25 | 21% | 1000 | #DIV/0! | 156 | 3.82 | 650 | 1500 | 600 | 11544 | 200 | 45 | Bit changed before start of run. |
| 06-Oct-21 | 02:08 | 154 | 442.95 | 445.91 | 89 | 85.4 | 89.5 | 5% | 17.68 | 2.0 | 1.06 | 0.856 | 2% | 8.56 | 0.48 | 10.35 | 1% | 1000 | 0% | 119 | 3.48 | 650 | 1700 | 600 | 11544 | 200 | 45 | |
| 06-Oct-21 | 03:35 | 155 | 445.91 | 448.93 | -231 | 81.7 | 82.4 | 1% | 17.59 | 3.8 | 1.05 | 0.737 | 12% | 9.00 | -0.44 | 10.20 | -1% | 1000 | 0% | 105 | 4.03 | 600 | 1700 | 600 | 11544 | 200 | 40 | No natural fractures to validate fluid loss. |
| 06-Oct-21 | 05:00 | 156 | 448.93 | 451.94 | 84 | 79.2 | 77.4 | -2% | 17.31 | 3.5 | 1.05 | 0.754 | -2% | 8.76 | 0.24 | 9.93 | -3% | 1000 | 0% | 70 | 3.28 | 600 | 1700 | 600 | 11544 | 200 | 40 | |
| 06-Oct-21 | 09:30 | 157 | 451.94 | 454.93 | 53 | 83.0 | 90.8 | 9% | 17.10 | 3.4 | 1.05 | 0.798 | -4% | 9.10 | -0.34 | 7.88 | -21% | 1000 | 0% | 106 | 4.08 | 600 | 1750 | 450 | 8658 | 240 | 40 | |
| 06-Oct-21 | 13:53 | 158 | 454.93 | 457.91 | -32 | 80.3 | 85.0 | 6% | 18.38 | 4.0 | 1.04 | 0.810 | -1% | 8.93 | 0.17 | 7.73 | -2% | 1000 | 0% | 204 | 4.06 | 600 | 1750 | 350 | 6734 | 240 | 40 | 1 L purevis added during run. |
| 06-Oct-21 | 15:16 | 159 | 457.91 | 460.94 | -32 | 84.7 | 78.8 | -7% | 18.90 | 4.0 | 1.04 | 0.809 | 0% | 8.82 | 0.11 | 8.07 | 4% | 1000 | 0% | 219 | 3.95 | 600 | 1700 | 450 | 8658 | 220 | 40 | |
| 06-Oct-21 | 16:43 | 160 | 460.94 | 463.93 | -15 | 82.6 | 81.7 | -1% | 18.46 | 2.8 | 1.05 | 0.882 | -7% | 8.98 | -0.16 | 8.99 | 11% | 1000 | 0% | 169 | 5.13 | 600 | 1750 | 450 | 8658 | 240 | 40 | |
| 06-Oct-21 | 21:40 | 161 | 463.93 | 466.94 | -60 | 90.5 | 86.6 | -4% | 18.52 | 2.9 | 1.05 | 0.852 | 3% | 9.12 | -0.14 | 12.28 | 37% | 1000 | 0% | 196 | 3.01 | 600 | 1550 | 600 | 11544 | 210 | 40 | |
| 06-Oct-21 | 23:21 | 162 | 466.94 | 469.95 | 87 | 82.9 | 85.1 | 3% | 18.77 | 2.4 | 1.06 | 0.894 | -4% | 8.73 | 0.39 | 9.28 | -24% | 1000 | 0% | 21 | 3.76 | 600 | 1750 | 450 | 8658 | 210 | 40 | |
| 07-Oct-21 | 01:40 | 163 | 469.95 | 472.95 | -2 | 92.2 | 90.7 | -2% | 18.93 | 5.5 | 1.03 | 0.925 | -3% | 8.98 | -0.25 | 9.98 | 8% | 1000 | 0% | 165 | 3.47 | 650 | 1800 | 400 | 7696 | 200 | 40 | |
| 07-Oct-21 | 03:08 | 164 | 472.95 | 475.94 | -96 | 76.4 | 84.3 | 10% | 18.06 | 3.2 | 1.05 | 0.904 | 2% | 8.90 | 0.08 | 9.27 | -7% | 1000 | 0% | 60 | 3.26 | 650 | 1850 | 450 | 8658 | 200 | 40 | |
| 07-Oct-21 | 13:15 | 165 | 475.94 | 478.93 | -1 | 80.4 | 85.1 | 6% | 18.84 | 2.8 | 1.05 | 0.918 | -1% | 8.82 | 0.08 | 10.63 | 15% | 1000 | 0% | 144 | 4.85 | 600 | 1600 | 450 | 8658 | 300 | 40 | 1 L purevis added to new drill water before run. |
| 07-Oct-21 | 15:18 | 166 | 478.93 | 481.94 | -3 | 92.8 | 88.1 | -5% | 18.99 | 3.2 | 1.05 | 0.683 | 24% | 9.13 | -0.31 | 10.23 | -4% | 1000 | 0% | 120 | 5.31 | 600 | 1650 | 450 | 8658 | 220 | 40 | |
| 07-Oct-21 | 21:15 | 167 | 481.94 | 484.95 | -19 | 83.8 | 86.4 | 3% | 18.00 | 3.0 | 1.05 | 0.835 | -15% | 8.99 | 0.14 | 12.62 | 23% | 1000 | 0% | 16 | 4.75 | 650 | 1850 | 450 | 8658 | 230 | 40 | |
| 07-Oct-21 | 22:42 | 168 | 484.95 | 487.94 | -90 | 94.3 | 77.4 | -18% | 18.56 | 4.0 | 1.04 | 0.774 | 6% | 8.97 | 0.02 | 12.68 | 0% | 1000 | 0% | 59 | 3.74 | 650 | 1850 | 450 | 8658 | 200 | 40 | |
| 08-Oct-21 | 01:38 | 169 | 487.94 | 490.94 | 95 | 77.8 | 76.6 | -1% | 19.03 | 3.8 | 1.05 | 0.785 | -1% | 8.92 | 0.05 | 12.40 | -2% | 1000 | 0% | -25 | 2.81 | 650 | 1800 | 450 | 8658 | 200 | 40 | |
| 08-Oct-21 | 03:21 | 170 | 490.94 | 493.95 | -92 | 90.3 | 83.0 | -8% | 19.18 | 5.0 | 1.04 | 0.825 | -4% | 8.92 | 0.00 | 12.24 | -1% | 1000 | 0% | 22 | 2.87 | 650 | 1900 | 400 | 7696 | 200 | 40 | |
| 08-Oct-21 | 05:03 | 171 | 493.95 | 496.94 | -90 | 90.8 | 79.7 | -12% | 19.05 | 3.8 | 1.05 | 0.787 | 4% | 8.89 | 0.03 | 11.83 | -3% | 1000 | 0% | -18 | 2.99 | 650 | 1850 | 400 | 7696 | 200 | 40 | |
| 08-Oct-21 | 09:18 | 172 | 496.94 | 499.93 | 24 | 87.6 | 95.1 | 9% | 18.17 | 3.8 | 1.05 | 0.860 | -7% | 8.78 | 0.11 | 14.01 | 18% | 1000 | 0% | 99 | 4.27 | 600 | 1750 | 500 | 9620 | 280 | 40 | |
| 08-Oct-21 | 10:44 | 173 | 499.93 | 502.96 | 166 | 91.5 | 80.0 | -13% | 17.97 | 3.6 | 1.05 | 0.875 | -2% | 8.85 | -0.07 | 9.89 | -29% | 1000 | 0% | 59 | 4.55 | 600 | 1750 | 450 | 8658 | 240 | 40 | |
| 08-Oct-21 | 11:58 | 174 | 502.96 | 505.91 | -54 | 93.0 | 95.5 | 3% | 18.47 | 3.8 | 1.05 | 0.650 | 23% | 8.71 | 0.14 | 10.14 | 3% | 1000 | 0% | 49 | 4.66 | 600 | 1750 | 450 | 8658 | 220 | 40 | |
| 08-Oct-21 | 16:27 | 175 | 505.91 | 508.89 | -51 | 91.5 | 93.4 | 2% | 18.85 | 3.5 | 1.05 | 0.824 | -17% | 8.65 | 0.06 | 11.36 | 12% | 1000 | 0% | 59 | 4.26 | 600 | 1750 | 400 | 7696 | 240 | 40 | |
| 08-Oct-21 | 21:38 | 176 | 508.89 | 511.94 | -60 | 81.5 | 82.6 | 1% | 18.10 | 2.8 | 1.05 | 0.822 | 0% | 8.86 | -0.21 | 13.01 | 15% | 1000 | 0% | 13 | 4.57 | 650 | 1900 | 550 | 10582 | 230 | 40 | |
| 08-Oct-21 | 23:47 | 177 | 511.94 | 514.95 | -13 | 72.5 | 78.8 | 9% | 18.63 | 3.0 | 1.05 | 0.827 | -1% | 8.73 | 0.13 | 12.94 | -1% | 1000 | 0% | -6 | 3.76 | 650 | 1900 | 450 | 8658 | 230 | 40 | |



GOLDER

| Date (End of Run) | Time (End of Run) | Run # | Top of Run | Bottom of Run | Drill Fluid Volume Change (L) | Fluorescein Concentration | | | Temp | Density | | Elec. Cond. | | pH | | Dissolved Oxygen | | Turbidity | | ORP | ROP | Bit Rotation Speed | Torque | Holdback Pressure (Down- | WOB (estimate) | Fluid Injection (pump) Pressure | Downhole Fluid Flow Rate | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Inlet | Outlet | Change | | | | Reading | Change | Reading | Change | Reading | Change | Reading | Change | | | | | | | | | |
| dd-mmm-yy | hh:mm | - | (mbgs) | (mbgs) | >100 L | (ppb) | (ppb) | >20% change | (°C) | API Gravity | SG | (mS/cm) | >10% change | - | >0.5 Change | (mg/L) | >10% Change | (NTU) | >10% Change | (mV) | m/hr | RPM | psi | psi | lbs | psi | L/min | |
| 09-Oct-21 | 02:08 | 178 | 514.95 | 517.94 | 20 | 78.0 | 74.9 | -4% | 18.70 | 4.1 | 1.04 | 0.714 | 11% | 8.89 | -0.16 | 13.79 | 7% | 1000 | 0% | 3 | 3.15 | 650 | 1850 | 450 | 8658 | 200 | 40 | |
| 09-Oct-21 | 03:40 | 179 | 517.94 | 520.94 | 67 | 83.0 | 79.6 | -4% | 19.19 | 3.8 | 1.05 | 0.832 | -12% | 8.72 | 0.17 | 11.91 | -14% | 1000 | 0% | 20 | 3.27 | 650 | 1850 | 450 | 8658 | 200 | 40 | |
| 09-Oct-21 | 05:23 | 180 | 520.94 | 523.95 | 159 | 71.4 | 82.9 | 16% | 19.29 | 3.6 | 1.05 | 0.816 | 2% | 8.68 | 0.04 | 11.12 | -7% | 1000 | 0% | -1 | 3.11 | 600 | 1850 | 450 | 8658 | 210 | 40 | |
| 09-Oct-21 | 09:28 | 181 | 523.95 | 526.95 | 85 | 72.3 | 74.3 | 3% | 18.53 | 4.0 | 1.04 | 0.675 | 14% | 8.70 | -0.02 | 10.68 | -4% | 1000 | 0% | 105 | 3.76 | 600 | 1750 | 550 | 10582 | 240 | 40 | |
| 09-Oct-21 | 10:53 | 182 | 526.95 | 529.92 | 46 | 73.4 | 74.9 | 2% | 18.87 | 4.0 | 1.04 | 0.695 | -2% | 8.69 | 0.01 | 11.30 | 6% | 1000 | 0% | 185 | 4.05 | 600 | 1750 | 500 | 9620 | 220 | 40 | |
| 09-Oct-21 | 12:14 | 183 | 529.92 | 532.92 | -63 | 73.8 | 80.6 | 9% | 18.53 | 3.8 | 1.05 | 0.698 | 0% | 8.66 | 0.03 | 12.05 | 7% | 1000 | 0% | 96 | 4.19 | 600 | 1750 | 450 | 8658 | 240 | 40 | |
| 09-Oct-21 | 15:04 | 184 | 532.92 | 535.92 | 11 | 80.5 | 81.7 | 2% | 19.11 | 3.6 | 1.05 | 0.693 | 1% | 8.66 | 0.00 | 9.23 | -23% | 1000 | 0% | 87 | 4.19 | 600 | 1700 | 550 | 10582 | 240 | 40 | |
| 09-Oct-21 | 16:27 | 185 | 535.92 | 538.91 | 13 | 86.2 | 81.4 | -6% | 19.41 | 3.2 | 1.05 | 0.688 | 1% | 8.68 | -0.02 | 10.89 | 18% | 1000 | 0% | 124 | 3.82 | 600 | 1750 | 450 | 8658 | 220 | 40 | |
| 09-Oct-21 | 21:03 | 186 | 538.91 | 541.95 | -69 | 80.1 | 79.3 | -1% | 18.27 | 2.4 | 1.06 | 0.738 | -5% | 8.69 | -0.01 | 11.03 | 1% | 1000 | 0% | 115 | 4.68 | 600 | 1750 | 550 | 10582 | 190 | 40 | |
| 09-Oct-21 | 22:49 | 187 | 541.95 | 544.95 | -62 | 74.6 | 72.6 | -3% | 18.67 | 3.7 | 1.05 | 0.745 | -1% | 8.65 | 0.04 | 11.33 | 3% | 1000 | 0% | 115 | 4.62 | 600 | 1600 | 650 | 12506 | 230 | 40 | |
| 10-Oct-21 | 00:15 | 188 | 544.95 | 547.95 | -90 | 69.7 | 74.7 | 7% | 18.70 | 3.2 | 1.05 | 0.685 | 6% | 8.59 | 0.06 | 12.26 | 8% | 1000 | 0% | 105 | 4.09 | 600 | 1650 | 600 | 11544 | 230 | 40 | |
| 10-Oct-21 | 02:00 | 189 | 547.95 | 550.95 | -94 | 75.2 | 82.9 | 10% | 17.86 | 3.7 | 1.05 | 0.670 | 2% | 8.82 | -0.23 | 11.70 | -5% | 1000 | 0% | 95 | 5.14 | 600 | 1700 | 600 | 11544 | 220 | 40 | |
| 10-Oct-21 | 04:17 | 190 | 550.95 | 553.95 | 38 | 84.3 | 86.0 | 2% | 18.56 | 4.5 | 1.04 | 0.704 | -3% | 8.72 | 0.10 | 13.00 | 11% | 1000 | 0% | 112 | 3.83 | 600 | 1650 | 600 | 11544 | 200 | 40 | |
| 10-Oct-21 | 10:32 | 191 | 553.95 | 556.94 | 69 | 76.5 | 76.2 | 0% | 19.65 | 4.0 | 1.04 | 0.680 | 2% | 8.39 | 0.33 | 10.47 | -19% | 1000 | 0% | 101 | 1.78 | 600 | 1750 | 550 | 10582 | 260 | 40 | Drilling stopped at 9:30am due to thunder/lightning. Resumed at 10:15am |
| 10-Oct-21 | 11:50 | 192 | 556.94 | 559.91 | -14 | 78.4 | 86.6 | 10% | 17.90 | 3.8 | 1.05 | 0.763 | -8% | 8.52 | -0.13 | 12.62 | 21% | 1000 | 0% | 198 | 5.09 | 550 | 1650 | 600 | 11544 | 240 | 40 | |
| 10-Oct-21 | 13:21 | 193 | 559.91 | 562.91 | -45 | 89.0 | 87.2 | -2% | 18.19 | 3.9 | 1.05 | 0.737 | 3% | 8.44 | 0.08 | 13.01 | 3% | 1000 | 0% | 202 | 4.86 | 550 | 1750 | 550 | 10582 | 240 | 40 | |
| 10-Oct-21 | 16:03 | 194 | 562.91 | 565.91 | -13 | 78.4 | 84.2 | 7% | 18.14 | 3.2 | 1.05 | 0.747 | -1% | 8.64 | -0.20 | 14.66 | 13% | 1000 | 0% | 232 | 4.62 | 550 | 1800 | 500 | 9620 | 240 | 40 | |
| 10-Oct-21 | 17:46 | 195 | 565.91 | 568.93 | -2 | 81.8 | 81.8 | 0% | 19.02 | 2.9 | 1.05 | 0.719 | 3% | 8.69 | -0.05 | 12.96 | -12% | 1000 | 0% | 210 | 4.42 | 550 | 1750 | 600 | 11544 | 260 | 40 | |
| 10-Oct-21 | 22:25 | 196 | 568.93 | 571.94 | -72 | 81.5 | 78.7 | -3% | 17.13 | 3.5 | 1.05 | 0.762 | -4% | 8.78 | -0.09 | 13.06 | 1% | 1000 | 0% | 190 | 3.41 | 600 | 1650 | 700 | 13468 | 220 | 40 | |
| 10-Oct-21 | 23:37 | 197 | 571.94 | 574.94 | -42 | 82.2 | 80.5 | -2% | 16.91 | 3.4 | 1.05 | 0.783 | -2% | 9.11 | -0.33 | 11.63 | -11% | 1000 | 0% | 207 | 4.74 | 600 | 1700 | 700 | 13468 | 220 | 40 | |
| 11-Oct-21 | 02:18 | 198 | 574.94 | 577.94 | 95 | 79.6 | 79.3 | 0% | 17.23 | 3.4 | 1.05 | 0.786 | 0% | 8.67 | 0.44 | 11.82 | 2% | 1000 | 0% | 209 | 2.81 | 600 | 1600 | 650 | 12506 | 230 | 40 | |
| 11-Oct-21 | 04:16 | 199 | 577.94 | 580.95 | -77 | 75.6 | 83.8 | 11% | 16.67 | 3.2 | 1.05 | 0.805 | -2% | 8.67 | 0.00 | 12.38 | 5% | 1000 | 0% | 124 | 3.28 | 600 | 1550 | 650 | 12506 | 220 | 40 | |
| 11-Oct-21 | 15:22 | 200 | 580.95 | 583.92 | 26 | 61.2 | 71.7 | 17% | 16.20 | 3.2 | 1.05 | 0.862 | -6% | 8.83 | -0.16 | 8.83 | -29% | 1000 | 0% | 135 | 5.09 | 575 | 1800 | 550 | 10582 | 325 | 40 | Generator issues. Borehole column sitting for extended period of time. |
| 11-Oct-21 | 16:50 | 201 | 583.92 | 586.91 | -82 | 85.5 | 105.1 | 23% | 16.18 | 4.1 | 1.04 | 0.871 | -1% | 8.73 | 0.10 | 7.32 | -17% | 1000 | 0% | 118 | 4.60 | 600 | 1800 | 500 | 9620 | 325 | 40 | 18 mL of fluorescein solution added to SRU before drill run |
| 11-Oct-21 | 21:40 | 202 | 586.91 | 589.95 | -87 | 84.4 | 81.1 | -4% | 16.80 | 3.0 | 1.05 | 0.840 | 3% | 8.80 | -0.07 | 11.57 | 58% | 1000 | 0% | 70 | 2.90 | 550 | 1450 | 600 | 11544 | 300 | 40 | Drillers added approximately 950L of water to the SRU tank prior to the start of Core Run 202. |
| 11-Oct-21 | 23:10 | 203 | 589.95 | 592.94 | -96 | 84.6 | 86.0 | 2% | 17.39 | 5.5 | 1.03 | 0.895 | -6% | 8.71 | 0.09 | 12.94 | 12% | 1000 | 0% | 82 | 4.08 | 500 | 1600 | 600 | 11544 | 300 | 40 | |
| 12-Oct-21 | 00:58 | 204 | 592.94 | 595.95 | -80 | 81.7 | 77.6 | -5% | 16.62 | 3.8 | 1.05 | 0.804 | 9% | 8.77 | -0.06 | 13.04 | 1% | 1000 | 0% | 94 | 3.40 | 550 | 1600 | 700 | 13468 | 280 | 40 | |
| 12-Oct-21 | 04:38 | 205 | 595.95 | 598.93 | 2 | 76.1 | 70.9 | -7% | 16.49 | 4.3 | 1.04 | 0.769 | 4% | 8.79 | -0.02 | 10.50 | -19% | 1000 | 0% | 47 | 2.45 | 550 | 1500 | 750 | 14430 | 360 | 40 | |
| 12-Oct-21 | 09:37 | 206 | 598.93 | 601.93 | 41 | 72.1 | 83.0 | 15% | 15.11 | 4.3 | 1.04 | 0.737 | 3% | 8.68 | 0.11 | 14.92 | 42% | 1000 | 0% | 57 | 4.39 | 550 | 1750 | 600 | 11544 | 350 | 40 | |
| 12-Oct-21 | 11:05 | 207 | 601.93 | 604.92 | -16 | 82.8 | 82.9 | 0% | 15.08 | 4.1 | 1.04 | 0.755 | -2% | 8.67 | 0.01 | 10.45 | -30% | 1000 | 0% | 68 | 4.98 | 500 | 1750 | 500 | 9620 | 350 | 40 | |
| 12-Oct-21 | 12:47 | 208 | 604.92 | 607.92 | -30 | 93.0 | 92.8 | 0% | 15.44 | 4.3 | 1.04 | 0.738 | 2% | 8.99 | -0.32 | 13.05 | 25% | 1000 | 0% | 111 | 4.50 | 500 | 1800 | 600 | 11544 | 325 | 40 | 15 mL of fluorescein solution added to SRU prior to core run |
| 12-Oct-21 | 15:38 | 209 | 607.92 | 610.91 | 4 | 82.7 | 90.9 | 10% | 16.12 | 4.3 | 1.04 | 0.749 | -1% | 8.80 | 0.19 | 11.37 | -13% | 1000 | 0% | 96 | 3.90 | 550 | 1900 | 500 | 9620 | 375 | 40 | |
| 12-Oct-21 | 17:18 | 210 | 610.91 | 613.90 | -20 | 96.4 | 105.7 | 10% | 16.00 | 4.5 | 1.04 | 0.761 | -1% | 8.70 | 0.10 | 14.58 | 28% | 1000 | 0% | 112 | 3.99 | 550 | 1850 | 550 | 10582 | 375 | 40 | |
| 12-Oct-21 | 23:08 | 211 | 613.90 | 616.71 | 26 | 102.7 | 109.9 | 7% | 14.72 | 4.8 | 1.04 | 0.745 | 2% | 8.92 | -0.22 | 18.44 | 26% | 1000 | 0% | 121 | 1.72 | 550 | 1500 | 650 | 12506 | 350 | 45 | Core run stopped short, difficulty drilling. |
| 13-Oct-21 | 00:45 | 212 | 616.71 | 616.79 | 18 | 109.9 | | -100% | 12.78 | 3.8 | 1.05 | 0.752 | -1% | 8.48 | 0.44 | 10.48 | -43% | 1000 | 0% | 182 | 0.27 | 600 | 1500 | 600 | 11544 | 400 | 50 | The drill bit wore out before the full core run was complete, requiring a stop to drilling and a drill bit change. Sample spilled prior to fluorescein measurement. Volume change based on sensor readings. |
| 14-Oct-21 | 04:18 | 213 | 616.79 | 619.94 | -49 | 90.7 | 88.0 | -3% | 16.77 | 6.0 | 1.03 | 0.759 | -1% | 8.81 | -0.33 | 13.50 | 29% | 1000 | 0% | 26 | 3.00 | 650 | 1500 | 750 | 14430 | 300 | 40 | The inner tube snapped when trying to retrieve the core run. The drillers pulled out the rods to retrieve the core, and also changed the drill bit again. |
| 19-Oct-21 | 03:16 | 214 | 619.94 | 622.94 | -47 | 46.8 | 88.4 | 89% | 14.40 | 10.6 | 1.00 | 0.181 | 58% | 8.27 | 0.54 | 3.91 | -71% | 1000 | 0% | 109 | 7.83 | 600 | 2100 | 450 | 8658 | 250 | 40 | Drilling resumed after a delay of five days, with many alterations to the drilling fluid, including adding 2,250 L of water and 2 L pure vis prior to the start of CR214. |
| 19-Oct-21 | 08:58 | 215 | 622.94 | 625.93 | 24 | 49.5 | 89.3 | 81% | 14.32 | 7.7 | 1.02 | 0.436 | -26% | 8.12 | 0.15 | 8.70 | 123% | 1000 | 0% | 49 | 4.98 | 550 | 1750 | 500 | 9620 | 200 | 40 | |
| 19-Oct-21 | 12:15 | 216 | 625.93 | 628.92 | 0 | 90.3 | 87.1 | -4% | 14.32 | 8.2 | 1.01 | 0.302 | 13% | 8.59 | -0.47 | 8.27 | -5% | 1000 | 0% | 47 | 4.49 | 550 | 1800 | 450 | 8658 | 175 | 40 | Centrifuge generator having issues. Stopped drilling from 11:30 to 11:53 to perform maintenance. |
| 19-Oct-21 | 13:45 | 217 | 628.92 | 631.92 | 2 | 101.3 | 78.1 | -23% | 14.26 | 8.2 | 1.01 | 0.374 | -7% | 8.38 | 0.21 | 7.69 | -7% | 1000 | 0% | 87 | 4.50 | 550 | 1700 | 450 | 8658 | 175 | 40 | |
| 19-Oct-21 | 15:28 | 218 | 631.92 | 634.94 | -36 | 85.4 | 79.2 | -7% | 14.17 | 7.7 | 1.02 | 0.364 | 1% | 8.48 | -0.10 | 6.27 | -18% | 1000 | 0% | 35 | 4.21 | 550 | 1750 | 500 | 9620 | 150 | 40 | |
| 19-Oct-21 | 17:17 | 219 | 634.94 | 637.91 | 3 | 80.9 | 76.8 | -5% | 14.25 | 7.6 | 1.02 | 0.354 | 1% | 8.64 | -0.16 | 9.83 | 57% | 1000 | 0% | 20 | 4.35 | 550 | 1750 | 500 | 9620 | 150 | 40 | |
| 19-Oct-21 | 21:43 | 220 | 637.91 | 640.95 | 6 | 92.9 | 82.3 | -11% | 13.09 | 8.4 | 1.01 | 0.380 | -3% | 8.37 | 0.27 | 7.10 | -28% | 1000 | 0% | 7 | 4.05 | 700 | 2400 | 500 | 9620 | 175 | 40 | Drillers added 2 L of pure vis to the drill fluid during CR220. |
| 19-Oct-21 | 23:42 | 221 | 640.95 | 643.94 | -4 | 79.2 | 70.9 | -10% | 13.35 | 7.9 | 1.02 | 0.385 | -1% | 8.49 | -0.12 | 2.87 | -60% | 1000 | 0% | 34 | 4.60 | 700 | 2500 | 500 | 9620 | 200 | 45 | |
| 20-Oct-21 | 01:39 | 222 | 643.94 | 646.94 | -10 | 69.9 | 71.9 | 3% | 14.10 | 8.1 | 1.01 | 0.440 | -6% | 8.36 | 0.13 | 7.33 | 155% | 1000 | 0% | -9 | 6.67 | 700 | 2400 | 350 | 6734 | 200 | 40 | |
| 20-Oct-21 | 03:25 | 223 | 646.94 | 649.93 | -13 | 77.1 | 74.0 | -4% | 13.40 | 7.6 | 1.02 | 0.411 | 3% | 8.30 | 0.06 | 10.57 | 44% | 1000 | 0% | 207 | 7.80 | 650 | 2500 | 500 | 9620 | 200 | 40 | Drillers added 4 L of pure vis to the drill fluid during CR223. |
| 20-Oct-21 | 04:58 | 224 | 649.93 | 652.94 | -37 | 72.3 | 76.8 | 6% | 13.51 | 7.7 | 1.02 | 0.405 | 1% | 8.46 | -0.16 | 9.81 | -7% | 1000 | 0% | 50 | 6.95 | 700 | 2700 | 400 | 7696 | 200 | 45 | Collected the 650 m drill water archive sample. |
| 20-Oct-21 | 09:10 | 225 | 652.94 | 655.91 | 5 | 95.3 | 91.9 | -4% | 13.82 | 8.1 | 1.01 | 0.544 | -14% | 8.51 | -0.05 | 7.12 | -27% | 1000 | 0% | 305 | 5.24 | 550 | 1750 | 500 | 9620 | 200 | 40 | |
| 20-Oct-21 | 10:31 | 226 | 655.91 | 658.91 | 18 | 92.2 | 77.9 | -15% | 13.70 | 6.5 | 1.03 | 0.487 | 6% | 8.83 | -0.32 | 10.05 | 41% | 1000 | 0% | 299 | 5.62 | 550 | 1750 | 600 | 11544 | 200 | 40 | |
| 20-Oct-21 | 12:05 | 227 | 658.91 | 661.92 | -7 | 80.8 | 82.5 | 2% | 13.82 | 7.4 | 1.02 | 0.461 | 3% | 8.47 | 0.36 | 8.70 | -13% | 1000 | 0% | 275 | 5.47 | 550 | 1700 | 650 | 12506 | 200 | 40 | |
| 20-Oct-21 | 13:54 | 228 | 661.92 | 664.93 | 0 | 77.2 | 72.0 | -7% | 13.99 | 7.4 | 1.02 | 0.462 | 0% | 8.51 | -0.04 | 10.17 | 17% | 1000 | 0% | 229 | 6.02 | 500 | 1700 | 600 | 11544 | 225 | 40 | Added approximately 500 L to the SRU prior to the run |
| 20-Oct-21 | 15:14 | 229 | 664.93 | 667.93 | -14 | 72.2 | 66.8 | -7% | 14.21 | 7.0 | 1.02 | 0.510 | -5% | 8.57 | -0.06 | 6.43 | -37% | 1000 | 0% | 191 | 6.21 | 550 | 1750 | 600 | 11544 | 225 | 40 | |
| 20-Oct-21 | 16:57 | 230 | 667.93 | 670.94 | -17 | 83.2 | 78.1 | -6% | 14.13 | 7.1 | 1.02 | 0.501 | 1% | 8.58 | -0.01 | 5.46 | -15% | 1000 | 0% | 174 | 5.47 | 550 | 1750 | 650 | 12506 | 200 | 40 | 2L Pure-vis and 25 mL fluorescein solution added to drill fluid system |
| 20-Oct-21 | 20:42 | 231 | 670.94 | 673.94 | 13 | 77.8 | 85.4 | 10% | 13.71 | 7.3 | 1.02 | 0.447 | 5% | 8.27 | 0.31 | 4.02 | -26% | 1000 | 0% | 502 | 8.18 | 700 | 2500 | 500 | 9620 | 250 | 40 | Very short drilling time - 22 minutes. |
| 20-Oct-21 | 22:02 | 232 | 673.94 | 676.95 | -6 | 81.1 | 96.9 | 20% | 15.34 | 7.3 | 1.02 | 0.443 | 0% | 8.50 | -0.23 | 8.80 | 119% | 1000 | 0% | 319 | 9.03 | 700 | 2500 | 500 | 9620 | 200 | 40 | Very short drilling time - 20 minutes. |
| 21-Oct-21 | 00:44 | 233 | 676.95 | 679.95 | 17 | 100.6 | 92.7 | -8% | 13.53 | 7.6 | 1.02 | 0.493 | -5% | 8.48 | 0.02 | 5.50 | -38% | 1000 | 0% | 359 | 10.00 | 650 | 2600 | 500 | 9620 | 300 | 40 | Very short drilling time - 18 minutes. |
| 21-Oct-21 | 03:35 | 234 | 679.95 | 682.95 | 6 | 85.1 | 89.3 | 5% | 13.20 | 8.0 | 1.01 | 0.521 | -3% | 8.48 | 0.00 | 8.67 | 58% | 1000 | 0% | 262 | 9.47 | 650 | 2400 | 500 | 9620 | 250 | 40 | Very short drilling time - 19 minutes. |
| 21-Oct-21 | 12:16 | 235 | 682.95 | 685.91 | -4 | 109.7 | 107.0 | -2% | 12.92 | 6.9 | 1.02 | 0.541 | -2% | 8.38 | 0.10 | 8.60 | -1% | 1000 | 0% | 255 | 5.73 | 550 | 1750 | 600 | 11544 | 275 | 41 | |
| 21-Oct-21 | 14:38 | 236 | 685.91 | 688.91 | 5 | 100.0 | 94.6 | -5% | 13.03 | 7.0 | 1.02 | 0.536 | 1% | 8.26 | 0.12 | 8.65 | 1% | 1000 | 0% | 233 | 5.81 | 550 | 1800 | 600 | 11544 | 250 | 41 | |
| 21-Oct-21 | 16:00 | 237 | 688.91 | 691.92 | -3 | 91.9 | 88.5 | -4% | 13.28 | 6.8 | 1.02 | 0.555 | -2% | 8.29 | -0.03 | 7.21 | -17% | 1000 | 0% | 218 | 5.64 | 550 | 1700 | 650 | 12506 | 225 | 41 | |
| 21-Oct-21 | 21:35 | 238 | 691.92 | 694.94 | -8 | 86.6 | 86.9 | 0% | 14.00 | 5.0 | 1.04 | 0.551 | 0% | 8.58 | -0.29 | 3.79 | -47% | 1000 | 0% | 200 | 5.85 | 600 | 2000 | 750 | 14430 | 300 | 40 | Added approximately 500 L to the SRU prior to the run |
| 22-Oct-21 | 00:15 | 239 | 694.94 | 697.95 | 15 | 89.3 | 78.9 | -12% | 13.41 | 6.0 | 1.03 | 0.553 | 0% | 8.59 | -0.01 | 8.37 | 121% | 1000 | 0% | 177 | 4.51 | 600 | 1750 | 800 | 15392 | 225 | 42 | |
| 22-Oct-21 | 02:50 | 240 | 697.95 | 700.95 | 57 | 84.0 | 85.5 | 2% | 14.33 | 8.2 | 1.01 | 0.524 | 3% | 8.58 | 0.01 | 9.48 | 13% | 1000 | 0% | 183 | 5.81 | 600 | 2500 | 600 | 11544 | 220 | 40 | Collected the 700 m drill water archive sample. |
| 22-Oct-21 | 04:38 | 241 | 700.95 | 703.94 | 8 | 84.7 | 79.2 | -6% | 15.48 | 6.9 | 1.02 | 0.567 | -4% | 8.52 | 0.06 | 8.50 | -10% | 1000 | 0% | 156 | 3.90 | 600 | 2000 | 800 | 15392 | 300 | 45 | |
| 22-Oct-21 | 10:06 | 242 | 703.94 | 706.81 | 40 | 76.7 | 80.1 | 4% | 15.15 | 6.8 | 1.02 | 0.593 | -3% | 8.83 | -0.31 | 9.52 | 12% | 1000 | 0% | 184 | 3.91 | 600 | 1850 | 600 | 11544 | 325 | 48 | |
| 22-Oct-21 | 12:44 | 243 | 706.81 | 709.81 | -31 | 82.6 | 78.7 | -5% | 13.98 | 6.1 | 1.03 | 0.640 | -5% | 8.70 | 0.13 | 8.31 | -13% | 1000 | 0% | 185 | 3.91 | 600 | 1850 | 600 | 11544 | 325 | 48 | |
| 22-Oct-21 | 14:40 | 244 | 709.81 | 712.86 | 15 | 88.4 | 97.1 | 10% | 13.63 | 6.1 | 1.03 | 0.631 | 1% | 8.67 | 0.03 | 9.73 | 17% | 1000 | 0% | 192 | 4.16 | 575 | 1850 | 700 | 13468 | 250 | 48 | Added 20 mL fluorescein solution to SRU prior to core run |
| 22-Oct-21 | 17:22 | 245 | 712.86 | 715.88 | -8 | 84.2 | 88.0 | 5% | 14.36 | 5.8 | 1.03 | 0.626 | 1% | 8.70 | -0.03 | 9.27 | -5% | 1000 | 0% | 254 | 3.18 | 575 | 1800 | 650 | 12506 | 275 | 48 | |
| 22-Oct-21 | 21:59 | 246 | 715.88 | 718.95 | 6 | 78.6 | 96.5 | 23% | 13.39 | 7.1 | 1.02 | 0.629 | 0% | 8.81 | -0.11 | 10.49 | 13% | 1000 | 0% | 322 | 4.39 | 600 | 1800 | 450 | 8658 | 300 | 40 | Drillers added approximately 800 L of water to the SRU prior to core run, no other additives. |

| Date (End of Run) | Time (End of Run) | Run # | Top of Run | Bottom of Run | Drill Fluid Volume Change (L) | Fluorescein Concentration | | | Temp | Density | | Elec. Cond. | | pH | | Dissolved Oxygen | | Turbidity | | ORP | ROP | Bit Rotation Speed | Torque | Holdback Pressure (Down- | WOB (estimate) | Fluid Injection (pump) Pressure | Downhole Fluid Flow Rate | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Inlet | Outlet | Change | | | | Reading | Change | Reading | Change | Reading | Change | Reading | Change | | | | | | | | | |
| dd-mmm-yy | hh:mm | - | (mbgs) | (mbgs) | >100 L | (ppb) | (ppb) | >20% change | (°C) | API Gravity | SG | (mS/cm) | >10% change | - | >0.5 Change | (mg/L) | >10% Change | (NTU) | >10% Change | (mV) | m/hr | RPM | psi | psi | lbs | psi | L/min | |
| 22-Oct-21 | 23:53 | 247 | 718.95 | 721.94 | 109 | 101.2 | 107.9 | 7% | 14.25 | 7.5 | 1.02 | 0.580 | 5% | 8.86 | -0.05 | 11.25 | 7% | 1000 | 0% | 331 | 5.44 | 650 | 1800 | 750 | 14430 | 360 | 46 | Fluid gain above 100 L, however no other triggers. Decided not to initiate WP-07 after consulting with Andrew Verok. More likely an increased volume in the sump box during initial measurements. |
| 23-Oct-21 | 03:13 | 248 | 721.94 | 724.93 | 70 | 108.6 | 104.8 | -3% | 13.32 | 6.7 | 1.02 | 0.601 | -2% | 9.19 | -0.33 | 10.80 | -4% | 1000 | 0% | 233 | 5.44 | 600 | 2200 | 750 | 14430 | 325 | 45 | |
| 23-Oct-21 | 05:01 | 249 | 724.93 | 727.94 | 6 | 104.8 | 102.5 | -2% | 13.49 | 6.9 | 1.02 | 0.614 | -1% | 8.89 | 0.30 | 10.97 | 2% | 1000 | 0% | 249 | 4.88 | 600 | 1750 | 750 | 14430 | 300 | 45 | |
| 23-Oct-21 | 11:21 | 250 | 727.94 | 730.86 | 6 | 94.0 | 102.2 | 9% | 13.05 | 5.5 | 1.03 | 0.654 | -4% | 9.13 | -0.24 | 10.43 | -5% | 1000 | 0% | 188 | 4.61 | 575 | 1750 | 700 | 13468 | 300 | 48 | |
| 23-Oct-21 | 13:38 | 251 | 730.86 | 733.88 | 48 | 108.8 | 104.0 | -4% | 13.26 | 5.8 | 1.03 | 0.662 | -1% | 8.96 | 0.17 | 10.16 | -3% | 1000 | 0% | 186 | 3.94 | 575 | 1800 | 700 | 13468 | 300 | 48 | |
| 23-Oct-21 | 15:25 | 252 | 733.88 | 736.85 | 16 | 104.0 | 101.8 | -2% | 13.48 | 5.5 | 1.03 | 0.646 | 2% | 8.84 | 0.12 | 10.08 | -1% | 1000 | 0% | 168 | 3.96 | 575 | 1850 | 700 | 13468 | 300 | 48 | |
| 23-Oct-21 | 21:40 | 253 | 736.85 | 739.95 | -132 | 102.7 | 100.5 | -2% | 13.59 | 6.3 | 1.03 | 0.665 | -2% | 9.03 | -0.19 | 10.74 | 7% | 1000 | 0% | 176 | 3.96 | 600 | 2050 | 600 | 11544 | 220 | 40 | Fluid loss of 131 L, however no other triggers. Rock core does not have any fractures and consistent tonalite lithology. Did not initiate WP-07. |
| 24-Oct-21 | 01:44 | 254 | 739.95 | 742.93 | 29 | 99.9 | 91.3 | -9% | 14.06 | 6.6 | 1.02 | 0.658 | 1% | 8.89 | 0.14 | 11.49 | 7% | 1000 | 0% | 172 | 4.26 | 600 | 2050 | 750 | 14430 | 250 | 40 | Vacuum pump not working for noble gas sampling of rock core samples. Stopped further drilling until day shift to troubleshoot the problem, because time-sensitive core samples are required at this depth interval. |
| 24-Oct-21 | 09:35 | 255 | 742.93 | 745.85 | -28 | 99.1 | 94.4 | -5% | 13.31 | 5.8 | 1.03 | 0.693 | -3% | 8.92 | -0.03 | 9.93 | -14% | 1000 | 0% | 158 | 3.58 | 575 | 1850 | 600 | 11544 | 300 | 48 | |
| 24-Oct-21 | 11:30 | 256 | 745.85 | 748.86 | 20 | 94.9 | 91.9 | -3% | 14.48 | 5.7 | 1.03 | 0.686 | 1% | 8.85 | 0.07 | 9.52 | -4% | 1000 | 0% | 170 | 4.01 | 575 | 1850 | 700 | 13468 | 300 | 48 | |
| 24-Oct-21 | 13:40 | 257 | 748.86 | 751.90 | -27 | 93.8 | 92.8 | -1% | 14.71 | 5.3 | 1.03 | 0.673 | 1% | 8.81 | 0.04 | 11.26 | 18% | 1000 | 0% | 160 | 4.05 | 575 | 1950 | 650 | 12506 | 325 | 48 | |
| 24-Oct-21 | 15:37 | 258 | 751.90 | 754.89 | 9 | 91.5 | 90.7 | -1% | 14.77 | 5.8 | 1.03 | 0.680 | -1% | 8.94 | -0.13 | 8.56 | -24% | 1000 | 0% | 170 | 2.89 | 575 | 1850 | 600 | 11544 | 300 | 48 | |
| 24-Oct-21 | 21:37 | 259 | 754.89 | 757.92 | 11 | 91.3 | 91.5 | 0% | 14.71 | 6.5 | 1.03 | 0.670 | 1% | 8.93 | 0.01 | 10.82 | 26% | 1000 | 0% | 140 | 3.71 | 600 | 1850 | 750 | 14430 | 300 | 40 | |
| 25-Oct-21 | 00:11 | 260 | 757.92 | 760.94 | -29 | 90.7 | 91.3 | 1% | 14.68 | 6.8 | 1.02 | 0.654 | 2% | 8.96 | -0.03 | 11.84 | 9% | 1000 | 0% | 208 | 3.86 | 600 | 2200 | 600 | 11544 | 250 | 40 | |
| 25-Oct-21 | 01:47 | 261 | 760.94 | 763.95 | -11 | 83.7 | 86.7 | 4% | 15.39 | 6.0 | 1.03 | 0.656 | 0% | 8.86 | 0.10 | 8.22 | -31% | 1000 | 0% | 185 | 4.63 | 600 | 2200 | 750 | 14430 | 250 | 40 | |
| 25-Oct-21 | 03:39 | 262 | 763.95 | 766.92 | -41 | 98.5 | 83.8 | -15% | 15.78 | 6.0 | 1.03 | 0.648 | 1% | 8.84 | 0.02 | 9.96 | 21% | 1000 | 0% | 167 | 3.49 | 600 | 2000 | 850 | 16354 | 300 | 40 | |
| 25-Oct-21 | 09:08 | 263 | 766.92 | 769.89 | 7 | 76.0 | 97.2 | 28% | 14.05 | 5.6 | 1.03 | 0.754 | -11% | 8.83 | 0.01 | 6.50 | -35% | 1000 | 0% | 284 | 3.87 | 600 | 2000 | 700 | 13468 | 300 | 48 | |
| 25-Oct-21 | 11:10 | 264 | 769.89 | 772.88 | 14 | 101.8 | 104.3 | 2% | 13.97 | 5.4 | 1.03 | 0.760 | -1% | 8.86 | -0.03 | 7.98 | 23% | 1000 | 0% | 295 | 3.66 | 600 | 2000 | 700 | 13468 | 350 | 48 | |
| 25-Oct-21 | 12:54 | 265 | 772.88 | 775.87 | -7 | 100.9 | 101.3 | 0% | 14.06 | 5.1 | 1.04 | 0.815 | -5% | 8.67 | 0.19 | 5.46 | -32% | 1000 | 0% | 191 | 4.17 | 600 | 2000 | 650 | 12506 | 350 | 48 | |
| 25-Oct-21 | 15:11 | 266 | 775.87 | 778.88 | 9 | 102.0 | 101.4 | -1% | 13.83 | 5.4 | 1.03 | 0.800 | 1% | 8.71 | -0.04 | 8.34 | 53% | 1000 | 0% | 321 | 3.84 | 600 | 1950 | 750 | 14430 | 350 | 48 | |
| 25-Oct-21 | 16:57 | 267 | 778.88 | 781.87 | 8 | 100.8 | 120.5 | 20% | 13.77 | 5.6 | 1.03 | 0.827 | -3% | 8.76 | -0.05 | 5.34 | -36% | 1000 | 0% | 218 | 3.52 | 600 | 2000 | 700 | 13468 | 350 | 48 | |
| 25-Oct-21 | 23:44 | 268 | 781.87 | 784.90 | 15 | 102.5 | 107.2 | 5% | 12.50 | 6.9 | 1.02 | 0.814 | 1% | 8.56 | 0.20 | 11.77 | 120% | 1000 | 0% | 214 | 3.37 | 600 | 2000 | 700 | 13468 | 250 | 40 | Drillers added water to the system prior to the start of this run, approx. 500 L. 4 L Purevis added to drill tank |
| 26-Oct-21 | 01:48 | 269 | 784.90 | 787.93 | 22 | 107.7 | 100.9 | -6% | 12.81 | 6.2 | 1.03 | 0.823 | -1% | 8.82 | -0.26 | 8.28 | -30% | 1000 | 0% | 162 | 3.95 | 600 | 2000 | 800 | 15392 | 300 | 40 | |
| 26-Oct-21 | 03:22 | 270 | 787.93 | 790.93 | -41 | 103.2 | 97.2 | -6% | 12.62 | 6.0 | 1.03 | 0.787 | 4% | 8.73 | 0.09 | 10.66 | 29% | 1000 | 0% | 230 | 4.62 | 600 | 2050 | 800 | 15392 | 300 | 40 | |
| 26-Oct-21 | 05:04 | 271 | 790.93 | 793.93 | 11 | 99.0 | 108.4 | 9% | 12.32 | 5.2 | 1.04 | 0.772 | 2% | 8.62 | 0.11 | 9.01 | -15% | 1000 | 0% | 232 | 4.09 | 600 | 2100 | 750 | 14430 | 250 | 40 | |
| 26-Oct-21 | 09:28 | 272 | 793.93 | 796.86 | -7 | 88.5 | 88.0 | -1% | 12.66 | 4.8 | 1.04 | 0.772 | 0% | 8.84 | -0.22 | 8.92 | -1% | 1000 | 0% | 238 | 3.82 | 600 | 1800 | 750 | 14430 | 450 | 48 | |
| 26-Oct-21 | 11:21 | 273 | 796.86 | 799.88 | -16 | 90.2 | 88.3 | -2% | 13.77 | 5.5 | 1.03 | 0.709 | 6% | 8.99 | -0.15 | 11.10 | 24% | 1000 | 0% | 299 | 3.42 | 600 | 1950 | 750 | 14430 | 400 | 48 | |
| 26-Oct-21 | 21:23 | 274 | 799.88 | 802.94 | 49 | 86.7 | 95.8 | 11% | 12.94 | 5.4 | 1.03 | 0.737 | -3% | 8.98 | 0.01 | 11.20 | 1% | 1000 | 0% | 222 | 3.46 | 600 | 1850 | 750 | 14430 | 300 | 40 | |
| 26-Oct-21 | 23:34 | 275 | 802.94 | 805.94 | -28 | 93.8 | 89.4 | -5% | 13.30 | 5.2 | 1.04 | 0.750 | -1% | 8.98 | 0.00 | 9.98 | -11% | 1000 | 0% | 227 | 3.67 | 600 | 2000 | 700 | 13468 | 300 | 40 | |
| 27-Oct-21 | 01:22 | 276 | 805.94 | 808.95 | -11 | 102.9 | 94.8 | -8% | 13.28 | 5.5 | 1.03 | 0.695 | 6% | 9.03 | -0.05 | 11.40 | 14% | 1000 | 0% | 231 | 4.10 | 600 | 2100 | 800 | 15392 | 250 | 40 | |
| 27-Oct-21 | 04:21 | 277 | 808.95 | 811.94 | -49 | 91.6 | 86.3 | -6% | 13.90 | 5.2 | 1.04 | 0.772 | -8% | 8.99 | 0.04 | 9.80 | -14% | 1000 | 0% | 215 | 3.90 | 600 | 2050 | 800 | 15392 | 300 | 40 | |
| 27-Oct-21 | 10:24 | 278 | 811.94 | 814.86 | 0 | 92.9 | 96.3 | 4% | 13.31 | 5.1 | 1.04 | 0.746 | 3% | 8.88 | 0.11 | 11.18 | 14% | 1000 | 0% | 242 | 4.87 | 600 | 2000 | 850 | 16354 | 400 | 48 | |
| 27-Oct-21 | 12:18 | 279 | 814.86 | 817.88 | -15 | 93.8 | 94.0 | 0% | 13.90 | 5.5 | 1.03 | 0.755 | -1% | 9.05 | -0.17 | 11.49 | 3% | 1000 | 0% | 183 | 3.18 | 600 | 2000 | 800 | 15392 | 400 | 48 | |
| 27-Oct-21 | 14:31 | 280 | 817.88 | 820.91 | -45 | 101.6 | 100.6 | -1% | 14.60 | 4.7 | 1.04 | 0.782 | -3% | 9.08 | -0.03 | 12.24 | 7% | 1000 | 0% | 177 | 2.75 | 600 | 2000 | 750 | 14430 | 400 | 48 | |
| 27-Oct-21 | 17:28 | 281 | 820.91 | 823.87 | 43 | 99.6 | 94.5 | -5% | 15.25 | 5.5 | 1.03 | 0.783 | 0% | 9.08 | 0.00 | 11.45 | -6% | 1000 | 0% | 213 | 2.07 | 600 | 1900 | 700 | 13468 | 400 | 48 | |
| 27-Oct-21 | 21:10 | 282 | 823.87 | 825.28 | 78 | 103.0 | 95.3 | -7% | 15.52 | 5.3 | 1.03 | 0.768 | 2% | 8.92 | 0.16 | 13.10 | 14% | 1000 | 0% | 251 | 1.92 | 600 | 2000 | 750 | 14430 | 400 | 40 | 100 L added to SRU prior to the core run. Drill bit change required following CR282. |
| 28-Oct-21 | 15:37 | 283 | 825.28 | 826.86 | 21 | 92.9 | 82.8 | -11% | 13.16 | 5.8 | 1.03 | 0.796 | -3% | 8.96 | -0.04 | 12.08 | -8% | 1000 | 0% | 240 | 5.27 | 600 | 1900 | 900 | 17316 | 350 | 48 | |
| 28-Oct-21 | 17:08 | 284 | 826.86 | 829.90 | 3 | 90.5 | 88.0 | -3% | 13.65 | 5.8 | 1.03 | 0.830 | -3% | 8.91 | 0.05 | 11.40 | -6% | 1000 | 0% | 225 | 5.70 | 600 | 2000 | 700 | 13468 | 400 | 48 | |
| 28-Oct-21 | 21:26 | 285 | 829.90 | 832.94 | -97 | 96.9 | 95.1 | -2% | 15.61 | 6.4 | 1.03 | 0.807 | 2% | 8.93 | -0.02 | 12.09 | 6% | 1000 | 0% | 252 | 5.36 | 600 | 2000 | 700 | 13468 | 300 | 40 | Approximately 400L water added to SRU tank before core run. |
| 29-Oct-21 | 00:05 | 286 | 832.94 | 835.92 | -20 | 97.8 | 94.0 | -4% | 15.98 | 5.6 | 1.03 | 0.816 | -1% | 8.97 | -0.04 | 9.05 | -25% | 1000 | 0% | 223 | 4.36 | 600 | 2000 | 800 | 15392 | 250 | 40 | |
| 29-Oct-21 | 02:08 | 287 | 835.92 | 838.94 | -5 | 91.4 | 91.2 | 0% | 15.53 | 5.4 | 1.03 | 0.816 | 0% | 8.97 | 0.00 | 12.90 | 43% | 1000 | 0% | 232 | 4.53 | 600 | 2200 | 650 | 12506 | 250 | 40 | |
| 29-Oct-21 | 05:21 | 288 | 838.94 | 841.94 | 2 | 85.4 | 82.4 | -4% | 15.79 | 6.0 | 1.03 | 0.780 | 4% | 8.83 | 0.14 | 13.23 | 3% | 1000 | 0% | 253 | 4.29 | 600 | 2050 | 750 | 14430 | 300 | 40 | |
| 29-Oct-21 | 10:29 | 289 | 841.94 | 844.87 | 86 | 87.1 | 86.4 | -1% | 14.71 | 4.8 | 1.04 | 0.848 | -7% | 8.86 | -0.03 | 11.02 | -17% | 1000 | 0% | 250 | 3.59 | 600 | 1800 | 700 | 13468 | 450 | 48 | |
| 29-Oct-21 | 12:40 | 290 | 844.87 | 847.88 | -69 | 89.2 | 90.2 | 1% | 15.51 | 5.4 | 1.03 | 0.795 | 5% | 8.87 | -0.01 | 10.24 | -7% | 1000 | 0% | 247 | 2.82 | 600 | 1900 | 750 | 14430 | 400 | 48 | |
| 29-Oct-21 | 16:10 | 291 | 847.88 | 850.90 | -11 | 85.8 | 84.9 | -1% | 15.45 | 6.4 | 1.03 | 0.892 | -10% | 8.86 | 0.01 | 11.17 | 9% | 1000 | 0% | 265 | 2.70 | 600 | 1800 | 600 | 11544 | 450 | 48 | Collected drill water in six amber glass bottles for archive sample at 850 mbgs |
| 29-Oct-21 | 21:15 | 292 | 850.90 | 853.91 | -15 | 98.0 | 97.5 | 0% | 14.86 | 5.6 | 1.03 | 0.821 | 7% | 8.92 | -0.06 | 8.58 | -23% | 1000 | 0% | 238 | 3.84 | 600 | 1950 | 750 | 14430 | 300 | 40 | |
| 29-Oct-21 | 22:56 | 293 | 853.91 | 856.94 | -16 | 95.9 | 90.9 | -5% | 15.02 | 5.0 | 1.04 | 0.801 | 2% | 8.91 | 0.01 | 9.69 | 13% | 1000 | 0% | 225 | 5.86 | 600 | 2200 | 550 | 10582 | 300 | 40 | |
| 30-Oct-21 | 03:02 | 294 | 856.94 | 859.94 | -10 | 89.9 | 95.3 | 6% | 14.75 | 4.6 | 1.04 | 0.875 | -7% | 9.01 | -0.10 | 7.69 | -21% | 1000 | 0% | 178 | 5.63 | 600 | 2200 | 750 | 14430 | 300 | 40 | |
| 30-Oct-21 | 10:38 | 295 | 859.94 | 862.87 | 18 | 103.3 | 109.9 | 6% | 14.13 | 6.5 | 1.03 | 0.928 | -5% | 8.67 | 0.34 | 11.46 | 49% | 1000 | 0% | 265 | 2.84 | 600 | 1950 | 700 | 13468 | 400 | 48 | |
| 30-Oct-21 | 12:35 | 296 | 862.87 | 865.85 | -32 | 106.7 | 96.7 | -9% | 14.65 | 5.8 | 1.03 | 0.922 | 1% | 8.68 | -0.01 | 10.52 | -8% | 1000 | 0% | 251 | 3.14 | 600 | 2000 | 750 | 14430 | 350 | 48 | |
| 30-Oct-21 | 15:24 | 297 | 865.85 | 868.87 | -33 | 99.5 | 91.3 | -8% | 14.95 | 5.2 | 1.04 | 0.927 | -1% | 8.67 | 0.01 | 11.40 | 8% | 1000 | 0% | 260 | 2.21 | 600 | 2000 | 700 | 13468 | 400 | 48 | |
| 30-Oct-21 | 22:05 | 298 | 868.87 | 871.95 | 4 | 92.5 | 88.7 | -4% | 15.51 | 5.4 | 1.03 | 0.892 | 4% | 8.80 | -0.13 | 10.41 | -9% | 1000 | 0% | 220 | 2.31 | 600 | 2100 | 600 | 11544 | 300 | 40 | |
| 30-Oct-21 | 23:55 | 299 | 871.95 | 874.94 | 44 | 93.2 | 86.0 | -8% | 14.66 | 4.8 | 1.04 | 0.958 | -7% | 8.59 | 0.21 | 11.61 | 12% | 1000 | 0% | 290 | 4.27 | 600 | 2100 | 900 | 17316 | 300 | 40 | 500L of water added to SRU. 1L of pure-vis added to drill tank prior to core run. |
| 31-Oct-21 | 01:52 | 300 | 874.94 | 877.95 | 14 | 84.1 | 99.0 | 18% | 14.40 | 5.6 | 1.03 | 0.827 | 13% | 8.61 | -0.02 | 10.21 | -12% | 1000 | 0% | 188 | 4.51 | 600 | 2100 | 700 | 13468 | 250 | 40 | |
| 31-Oct-21 | 03:43 | 301 | 877.95 | 880.94 | 3 | 98.4 | 97.8 | -1% | 14.21 | 5.7 | 1.03 | 0.866 | -4% | 8.59 | 0.02 | 10.18 | 0% | 1000 | 0% | 263 | 3.38 | 600 | 2200 | 650 | 12506 | 250 | 40 | |
| 31-Oct-21 | 05:14 | 302 | 880.94 | 883.94 | -69 | 99.7 | 92.6 | -7% | 14.20 | 5.8 | 1.03 | 0.940 | -7% | 8.59 | 0.00 | 10.07 | -1% | 1000 | 0% | 277 | 4.62 | 600 | 2200 | 800 | 15392 | 250 | 40 | |
| 31-Oct-21 | 09:50 | 303 | 883.94 | 886.89 | -14 | 95.9 | 89.5 | -7% | 13.42 | 6.1 | 1.03 | 0.884 | 6% | 8.66 | -0.07 | 11.41 | 13% | 1000 | 0% | 263 | 2.53 | 600 | 2100 | 800 | 15392 | 400 | 48 | |
| 31-Oct-21 | 11:46 | 304 | 886.89 | 889.88 | 70 | 90.2 | 86.6 | -4% | 14.32 | 4.9 | 1.04 | 0.899 | -2% | 8.73 | -0.07 | 11.00 | -4% | 1000 | 0% | 229 | 2.99 | 600 | 2100 | 700 | 13468 | 400 | 48 | |
| 31-Oct-21 | 13:51 | 305 | 889.88 | 892.89 | -37 | 85.3 | 87.7 | 3% | 14.88 | 6.4 | 1.03 | 0.897 | 0% | 8.57 | 0.16 | 11.52 | 5% | 1000 | 0% | 282 | 3.17 | 600 | 2100 | 800 | 15392 | 400 | 48 | |
| 31-Oct-21 | 16:21 | 306 | 892.89 | 895.83 | -33 | 87.0 | 85.3 | -2% | 14.56 | 6.3 | 1.03 | 0.924 | -3% | 8.80 | -0.23 | 12.13 | 5% | 1000 | 0% | 237 | 2.71 | 600 | 2100 | 700 | 13468 | 400 | 48 | |
| 31-Oct-21 | 21:00 | 307 | 895.83 | 898.94 | 10 | 88.6 | 82.5 | -7% | 13.52 | 5.6 | 1.03 | 0.970 | -5% | 8.42 | 0.38 | 12.44 | 3% | 1000 | 0% | 230 | 3.59 | 600 | 2100 | 850 | 16354 | 300 | 40 | |
| 31-Oct-21 | 22:38 | 308 | 898.94 | 901.95 | -51 | 84.7 | 83.9 | -1% | 13.34 | 5.4 | 1.03 | 1.050 | -8% | 8.55 | -0.13 | 10.91 | -12% | 1000 | 0% | 236 | 4.30 | 600 | 2200 | 800 | 15392 | 300 | 40 | |
| 01-Nov-21 | 00:54 | 309 | 901.95 | 904.95 | -19 | 82.0 | 91.5 | 12% | 13.84 | 5.8 | 1.03 | 0.987 | 6% | 8.54 | 0.01 | 12.22 | 12% | 1000 | 0% | 229 | 3.91 | 600 | 2200 | 800 | 15392 | 300 | 40 | |
| 01-Nov-21 | 02:40 | 310 | 904.95 | 907.95 | -24 | 99.0 | 95.5 | -4% | 13.95 | 5.8 | 1.03 | 1.060 | -7% | 8.54 | 0.00 | 10.62 | -13% | 1000 | 0% | 179 | 4.29 | 600 | 2100 | 950 | 18278 | 300 | 40 | |
| 01-Nov-21 | 04:56 | 311 | 907.95 | 910.95 | -21 | 92.1 | 92.3 | 0% | 13.61 | 5.6 | 1.03 | 0.991 | 7% | 8.50 | 0.04 | 11.27 | 6% | 1000 | 0% | 220 | 3.83 | 600 | 2200 | 900 | 17316 | 300 | 40 | |
| 01-Nov-21 | 09:59 | 312 | 910.95 | 913.85 | 44 | 99.0 | 93.9 | -5% | 13.26 | 4.7 | 1.04 | 0.980 | 1% | 8.33 | 0.17 | 12.20 | 8% | 1000 | 0% | 293 | 4.05 | 600 | 2200 | 900 | 17316 | 400 | 48 | API Gravity calculated from S.G. calculated using the analytical scale. |
| 01-Nov-21 | 11:45 | 313 | 913.85 | 916.87 | -91 | 92.4 | 92.6 | 0% | 13.46 | 4.9 | 1.04 | 1.060 | -8% | 8.53 | -0.20 | 11.64 | -5% | 1000 | 0% | 288 | 4.12 | 600 | 2000 | 900 | 17316 | 400 | 48 | API Gravity calculated from S.G. calculated using the analytical scale. |
| 01-Nov-21 | 13:46 | 314 | 916.87 | 919.86 | 19 | 90.4 | 92.0 | 2% | 13.65 | 4.2 | 1.04 | 1.020 | 4% | 8.38 | 0.15 | 11.62 | 0% | 1000 | 0% | 259 | 3.15 | 600 | 2000 | 900 | 17316 | 400 | 48 | API Gravity calculated from S.G. calculated using the analytical scale. |

| Date (End of Run) | Time (End of Run) | Run # | Top of Run | Bottom of Run | Drill Fluid Volume Change (L) | Fluorescein Concentration | | | Temp | Density | | Elec. Cond. | | pH | | Dissolved Oxygen | | Turbidity | | ORP | ROP | Bit Rotation Speed | Torque | Holdback Pressure (Down- | WOB (estimate) | Fluid Injection (pump) Pressure | Downhole Fluid Flow Rate | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Inlet | Outlet | Change | | | | Reading | Change | Reading | Change | Reading | Change | Reading | Change | | | | | | | | | |
| dd-mmm-yy | hh:mm | - | (mbgs) | (mbgs) | >100 L | (ppb) | (ppb) | >20% change | (°C) | API Gravity | SG | (mS/cm) | >10% change | - | >0.5 Change | (mg/L) | >10% Change | (NTU) | >10% Change | (mV) | m/hr | RPM | psi | psi | lbs | psi | L/min | |
| 01-Nov-21 | 16:21 | 315 | 919.86 | 922.88 | -24 | 95.8 | 92.1 | -4% | 13.47 | 4.2 | 1.04 | 1.020 | 0% | 8.50 | -0.12 | 12.57 | 8% | 1000 | 0% | 290 | 3.18 | 600 | 2100 | 700 | 13468 | 400 | 48 | API Gravity calculated from S.G. calculated using the analytical scale. |
| 01-Nov-21 | 22:14 | 316 | 922.88 | 925.94 | 10 | 95.3 | 95.0 | 0% | 13.63 | 6.0 | 1.03 | 0.939 | 8% | 8.82 | -0.32 | 10.51 | -16% | 1000 | 0% | 260 | 4.17 | 600 | 2200 | 900 | 17316 | 300 | 40 | 800 L of water added to SRU before start of run |
| 02-Nov-21 | 00:10 | 317 | 925.94 | 928.95 | -83 | 90.1 | 90.0 | 0% | 13.82 | 5.8 | 1.03 | 0.909 | 3% | 8.66 | 0.16 | 10.92 | 4% | 1000 | 0% | 250 | 3.41 | 600 | 2250 | 850 | 16354 | 250 | 40 | Issue with the latch on drill; fixed at 21:00 |
| 02-Nov-21 | 02:23 | 318 | 928.95 | 931.95 | -32 | 85.2 | 85.7 | 1% | 14.23 | 5.6 | 1.03 | 0.767 | 14% | 8.76 | -0.10 | 8.86 | -19% | 1000 | 0% | 226 | 3.60 | 600 | 2400 | 800 | 15392 | 250 | 40 | |
| 02-Nov-21 | 04:22 | 319 | 931.95 | 934.95 | -70 | 94.5 | 88.9 | -6% | 14.40 | 5.6 | 1.03 | 0.978 | -21% | 8.77 | -0.01 | 7.79 | -12% | 1000 | 0% | 158 | 3.40 | 600 | 2200 | 800 | 15392 | 399 | 40 | |
| 02-Nov-21 | 10:51 | 320 | 934.95 | 937.86 | -24 | 90.6 | 87.5 | -3% | 13.34 | 5.8 | 1.03 | 0.834 | 14% | 8.69 | 0.08 | 11.72 | 50% | 1000 | 0% | 275 | 2.16 | 600 | 2100 | 800 | 15392 | 450 | 48 | 1L of pure-vis added to drill tank prior to core run. |
| 02-Nov-21 | 13:13 | 321 | 937.86 | 940.86 | 29 | 85.8 | 85.3 | -1% | 13.91 | 5.7 | 1.03 | 0.860 | -3% | 8.60 | 0.09 | 12.16 | 4% | 1000 | 0% | 290 | 3.53 | 600 | 2000 | 900 | 17316 | 450 | 48 | |
| 02-Nov-21 | 15:21 | 322 | 940.86 | 943.86 | 26 | 84.4 | 79.9 | -5% | 14.08 | 5.5 | 1.03 | 0.852 | 1% | 8.71 | -0.11 | 10.91 | -10% | 1000 | 0% | 240 | 2.86 | 600 | 1900 | 850 | 16354 | 450 | 48 | |
| 02-Nov-21 | 17:27 | 323 | 943.86 | 946.85 | -8 | 79.3 | 81.9 | 3% | 14.81 | 5.8 | 1.03 | 0.870 | -2% | 8.73 | -0.02 | 10.63 | -3% | 1000 | 0% | 245 | 2.76 | 600 | 2000 | 750 | 14430 | 400 | 48 | |
| 02-Nov-21 | 21:49 | 324 | 946.85 | 949.95 | -59 | 90.1 | 86.9 | -4% | 13.94 | 5.4 | 1.03 | 0.941 | -7% | 8.49 | 0.24 | 12.97 | 22% | 1000 | 0% | 274 | 3.44 | 600 | 2100 | 900 | 17316 | 300 | 40 | |
| 02-Nov-21 | 23:44 | 325 | 949.95 | 952.94 | -11 | 87.2 | 87.7 | 1% | 13.56 | 5.6 | 1.03 | 0.913 | 3% | 8.59 | -0.10 | 11.29 | -13% | 1000 | 0% | 242 | 3.74 | 600 | 2100 | 900 | 17316 | 300 | 40 | |
| 03-Nov-21 | 01:27 | 326 | 952.94 | 955.95 | 28 | 92.1 | 87.1 | -5% | 13.81 | 5.6 | 1.03 | 0.841 | 7% | 8.63 | -0.04 | 11.98 | 6% | 1000 | 0% | 209 | 5.16 | 600 | 2150 | 900 | 17316 | 300 | 40 | |
| 03-Nov-21 | 03:26 | 327 | 955.95 | 958.96 | -27 | 92.5 | 95.7 | 3% | 13.36 | 5.1 | 1.04 | 0.973 | -13% | 8.45 | 0.18 | 10.05 | -16% | 1000 | 0% | 211 | 5.47 | 600 | 2100 | 1000 | 19240 | 300 | 40 | |
| 03-Nov-21 | 04:58 | 328 | 958.96 | 961.94 | -28 | 92.9 | 90.8 | -2% | 13.69 | 5.0 | 1.04 | 0.906 | 7% | 8.45 | 0.00 | 12.54 | 25% | 1000 | 0% | 270 | 5.42 | 600 | 2150 | 950 | 18278 | 250 | 40 | |
| 03-Nov-21 | 09:23 | 329 | 961.94 | 964.87 | -45 | 87.1 | 86.9 | 0% | 13.01 | 5.7 | 1.03 | 0.980 | -7% | 8.39 | 0.06 | 10.58 | -16% | 1000 | 0% | 247 | 3.03 | 600 | 2100 | 900 | 17316 | 400 | 48 | |
| 03-Nov-21 | 12:00 | 330 | 964.87 | 967.86 | -25 | 90.2 | 88.2 | -2% | 13.42 | 5.5 | 1.03 | 1.010 | -3% | 8.52 | -0.13 | 10.93 | 3% | 1000 | 0% | 258 | 2.68 | 600 | 2000 | 850 | 16354 | 400 | 50 | |
| 03-Nov-21 | 13:50 | 331 | 967.86 | 970.85 | -16 | 87.9 | 84.6 | -4% | 14.01 | 5.8 | 1.03 | 0.820 | 19% | 8.56 | -0.04 | 11.30 | 3% | 1000 | 0% | 271 | 3.74 | 600 | 2000 | 900 | 17316 | 400 | 50 | |
| 03-Nov-21 | 16:46 | 332 | 970.85 | 973.86 | -36 | 88.5 | 91.1 | 3% | 12.57 | 5.4 | 1.03 | 0.985 | -17% | 8.46 | 0.10 | 10.39 | -8% | 1000 | 0% | 233 | 2.54 | 600 | 2000 | 850 | 16354 | 400 | 50 | 4 L purevis added to drill tank before run. |
| 03-Nov-21 | 22:15 | 333 | 973.86 | 976.95 | -75 | 92.8 | 85.0 | -8% | 12.90 | 6.0 | 1.03 | 0.920 | 6% | 8.40 | 0.06 | 10.75 | 3% | 1000 | 0% | 260 | 4.88 | 600 | 2150 | 1050 | 20202 | 250 | 40 | |
| 03-Nov-21 | 23:50 | 334 | 976.95 | 979.95 | -24 | 88.3 | 86.2 | -2% | 13.22 | 6.5 | 1.03 | 0.959 | -4% | 8.42 | -0.02 | 7.49 | -30% | 1000 | 0% | 268 | 5.29 | 600 | 2150 | 1000 | 19240 | 300 | 40 | |
| 04-Nov-21 | 01:30 | 335 | 979.95 | 982.94 | -54 | 89.3 | 88.7 | -1% | 13.68 | 6.3 | 1.03 | 0.903 | 6% | 8.35 | 0.07 | 8.19 | 9% | 1000 | 0% | 278 | 4.98 | 600 | 2250 | 950 | 18278 | 300 | 40 | |
| 04-Nov-21 | 03:50 | 336 | 982.94 | 985.94 | -36 | 85.4 | 93.6 | 10% | 13.35 | 6.0 | 1.03 | 0.961 | -6% | 8.29 | 0.06 | 7.89 | -4% | 1000 | 0% | 265 | 4.00 | 600 | 2100 | 1000 | 19240 | 250 | 40 | |
| 04-Nov-21 | 11:37 | 337 | 985.94 | 988.84 | 20 | 88.7 | 86.8 | -2% | 13.76 | 6.5 | 1.03 | 0.948 | 1% | 8.41 | -0.12 | 10.46 | 33% | 1000 | 0% | 240 | 2.07 | 600 | 2000 | 800 | 15392 | 400 | 50 | |
| 04-Nov-21 | 15:36 | 338 | 988.84 | 991.84 | 19 | 85.7 | 87.9 | 2% | 12.79 | 5.9 | 1.03 | 0.958 | -1% | 8.36 | 0.05 | 10.62 | 2% | 1000 | 0% | 298 | 1.76 | 600 | 2000 | 750 | 14430 | 400 | 48 | 1L of pure-vis added to drill tank prior to core run. |
| 05-Nov-21 | 10:29 | 339 | 991.84 | 994.82 | -4 | 94.1 | 90.3 | -4% | 12.36 | 7.5 | 1.02 | 1.000 | -4% | 8.50 | -0.14 | 12.23 | 15% | 1000 | 0% | 246 | 3.03 | 600 | 2000 | 750 | 14430 | 450 | 48 | |
| 05-Nov-21 | 12:22 | 340 | 994.82 | 997.82 | 16 | 90.6 | 87.8 | -3% | 13.76 | 6.5 | 1.03 | 1.060 | -6% | 8.39 | 0.11 | 11.48 | -6% | 1000 | 0% | 239 | 3.53 | 600 | 2000 | 750 | 14430 | 500 | 58 | |
| 05-Nov-21 | 14:12 | 341 | 997.82 | 1000.83 | -30 | 83.9 | 84.6 | 1% | 15.05 | 4.2 | 1.04 | 0.970 | 9% | 8.36 | 0.03 | 10.89 | -5% | 1000 | 0% | 244 | 4.40 | 600 | 1900 | 900 | 17316 | 550 | 58 | |

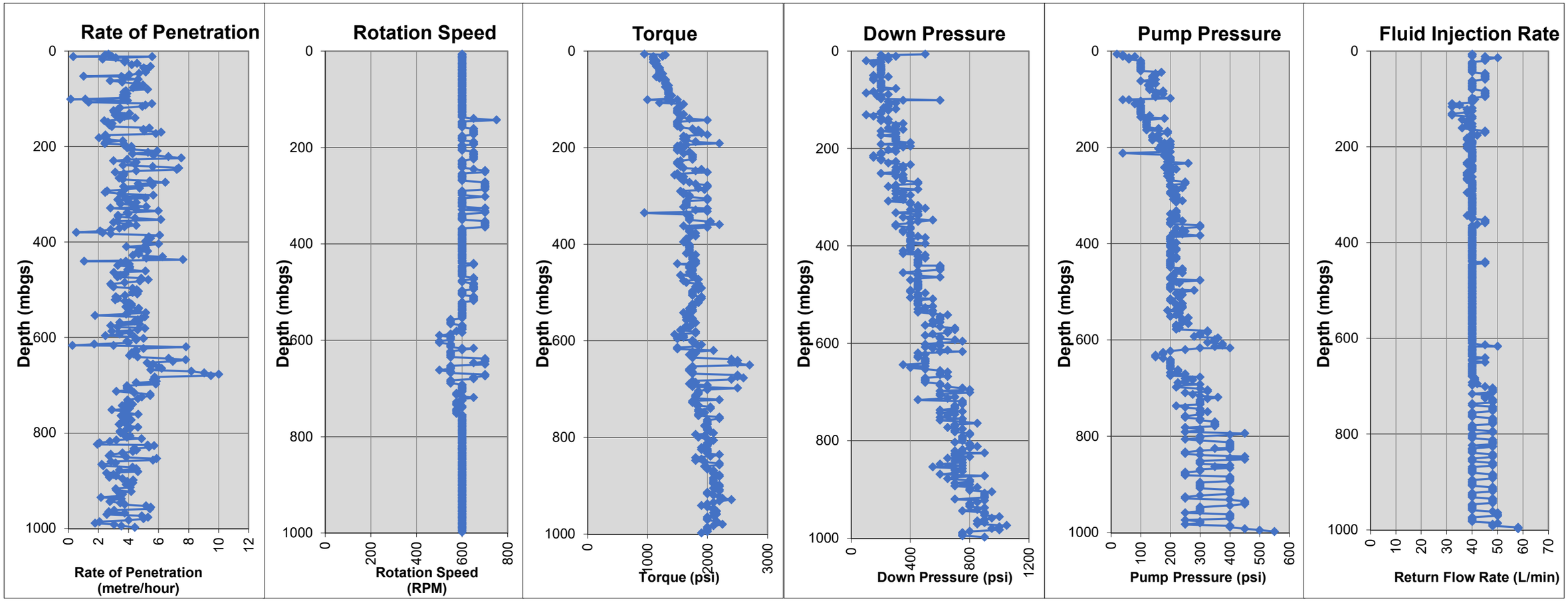
| Sample ID | Run Number | Depth From | Depth To | Date | Time | Fluorescein Concentration | Density | Temperature | EC | pH | DO | ORP | Turbidity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (mbgs) | (mbgs) | dd-mmm-yy | hh:mm | (ppb) | g/cc | (˚C) | (mS/cm) | - | mg/L | mV | NTU |
| IG_BH06_DW001 | CR017 | 46.87 | 49.92 | 06-Sep-21 | 21:00 | 103.60 | 1.000 | 21.25 | 1.96 | 11.67 | 8.73 | 13 | >1000 |
| IG_BH06_DW002 | CR035 | 97.93 | 100.86 | 08-Sep-21 | 09:25 | 99.34 | 1.010 | 18.08 | 0.67 | 10.89 | 5.78 | 68 | >1000 |
| IG_BH06_DW003 | - | 100.86 | | 11-Sep-21 | 11:22 | 84.05 | 1.000 | 18.78 | 0.41 | 10.14 | 0 | 62 | >1000 |
| IG_BH06_DW004 | CR053 | 148.87 | 151.89 | 22-Sep-21 | 12:05 | 93.82 | 1.030 | 17.3 | 0.58 | 10.49 | 10.99 | 11 | >1000 |
| IG_BH06_DW005 | CR071 | 199.88 | 202.88 | 24-Sep-21 | 14:38 | 82.50 | 1.040 | 15.9 | 0.65 | 9.89 | 9.76 | 119 | >1000 |
| IG_BH06_DW006 | CR088 | 250.94 | 253.95 | 26-Sep-21 | 01:35 | 72.52 | 1.050 | 14.99 | 0.63 | 9.38 | 10.69 | 178 | >1000 |
| IG_BH06_DW007 | CR104 | 298.85 | 301.85 | 27-Sep-21 | 17:05 | 83.61 | 1.060 | 16.91 | 0.71 | 9.48 | 10.41 | 98 | >1000 |
| IG_BH06_DW008 | CR121 | 349.92 | 352.88 | 29-Sep-21 | 16:50 | 76.67 | 1.050 | 18.49 | 0.75 | 9.1 | 9.58 | 182 | >1000 |
| IG_BH06_DW009 | CR138 | 397.92 | 400.92 | 02-Oct-21 | 13:50 | 95.22 | 1.060 | 17.92 | 0.85 | 8.95 | 5.88 | 102 | >1000 |
| IG_BH06_DW010 | CR156 | 448.93 | 451.94 | 06-Oct-21 | 04:20 | 77.41 | 1.050 | 17.31 | 0.84 | 9.07 | 9.54 | 77 | >1000 |
| IG_BH06_DW011 | CR173 | 499.93 | 502.96 | 08-Oct-21 | 10:15 | 80.04 | 1.050 | 17.97 | 0.88 | 8.85 | 9.89 | 59 | >1000 |
| IG_BH06_DW012 | CR189 | 547.95 | 550.95 | 10-Oct-21 | 01:50 | 82.90 | 1.050 | 17.86 | 0.67 | 8.82 | 11.7 | 95 | >1000 |
| IG_BH06_DW013 | CR206 | 598.93 | 601.93 | 12-Oct-21 | 09:30 | 82.96 | 1.040 | 15.11 | 0.74 | 8.68 | 14.92 | 57 | >1000 |
| IG_BH06_DW014 | CR224 | 649.93 | 652.94 | 20-Oct-21 | 04:36 | 76.83 | 1.020 | 13.51 | 0.41 | 8.46 | 9.81 | 50 | >1000 |
| IG_BH06_DW015 | CR240 | 697.95 | 700.95 | 22-Oct-21 | 02:31 | 85.50 | 1.010 | 14.33 | 0.52 | 8.58 | 9.48 | 183 | >1000 |
| IG_BH06_DW016 | CR257 | 748.86 | 751.9 | 24-Oct-21 | 13:30 | 92.75 | 1.030 | 14.71 | 0.67 | 8.81 | 11.26 | 160 | >1000 |
| IG_BH06_DW017 | CR274 | 799.88 | 802.94 | 26-Oct-21 | 20:33 | 95.84 | 1.030 | 12.94 | 0.74 | 8.98 | 11.2 | 222 | >1000 |
| IG_BH06_DW018 | CR291 | 847.88 | 850.9 | 29-Oct-21 | 15:55 | 84.90 | 1.03 | 15.45 | 0.89 | 8.86 | 11.17 | 265 | >1000 |
| IG_BH06_DW019 | CR308 | 898.94 | 901.95 | 31-Oct-21 | 22:15 | 83.91 | 1.03 | 13.34 | 1.05 | 8.55 | 10.91 | 236 | >1000 |
| IG_BH06_DW020 | CR325 | 949.95 | 952.94 | 02-Nov-21 | 23:05 | 87.66 | 1.03 | 13.56 | 0.91 | 8.59 | 11.29 | 242 | >1000 |
| IG_BH06_DW021 | CR341 | 997.82 | 1000.83 | 05-Nov-21 | 14:05 | 84.62 | 1.04 | 15.05 | 0.97 | 8.36 | 10.89 | 244 | >1000 |

**APPENDIX B**

# Figure B-1: Drilling Parameters

# Figure B-2: Drill Fluid Parameters

# Figure B-3: Drill Fluid Parameters




NOTES

1. Gaps in data appear where readings were not available.

CONSULTANT

WSP GOLDER

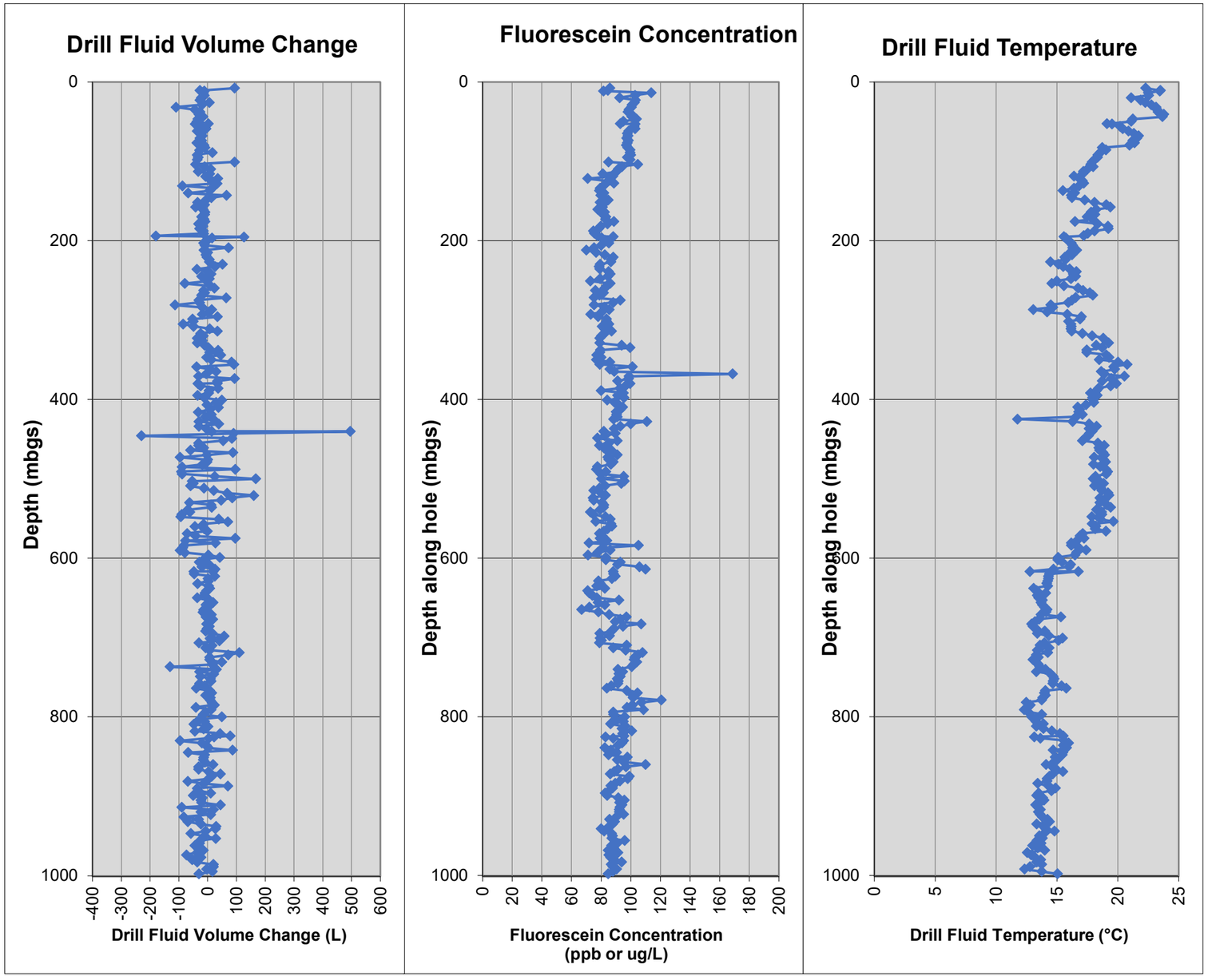
CLIENT
NWMO Ignace Drilling IG_BH06

TITLE
Figure B-1: Drilling Parameters

DATE
November 2022

DRAWN/REV
AKV / JLC

PROJECT NO.
20253946 (6020)




NOTES

1. Gaps in data appear where readings were not available.

CONSULTANT

WSP GOLDER

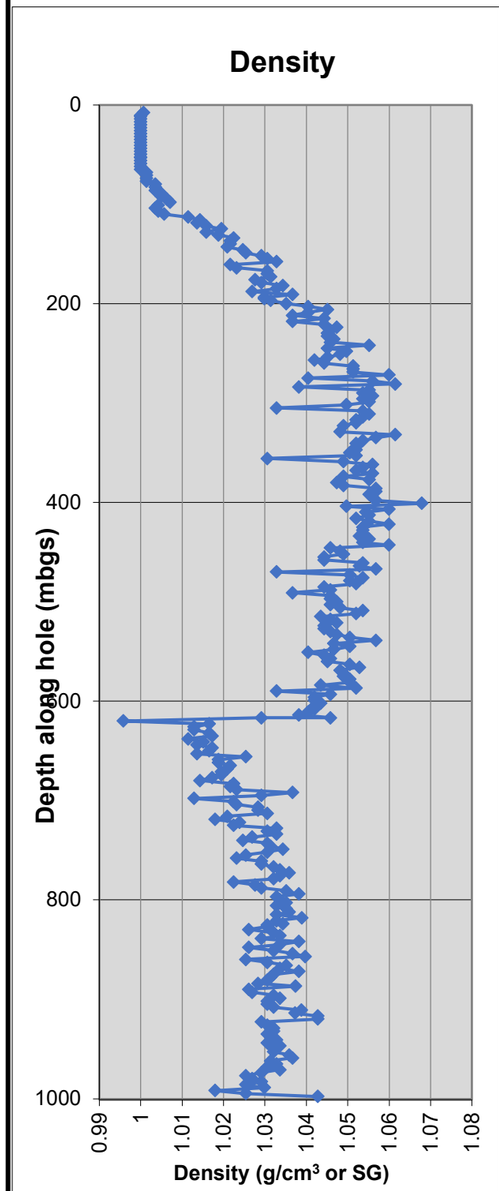
CLIENT
NWMO Ignace Drilling IG_BH06

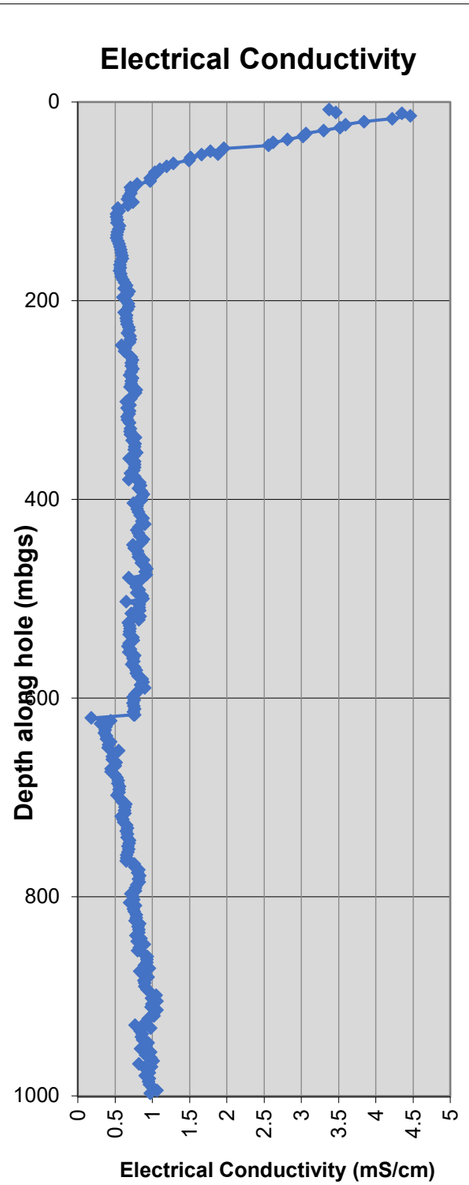
TITLE
Figure B-2: Drill Fluid Parameters

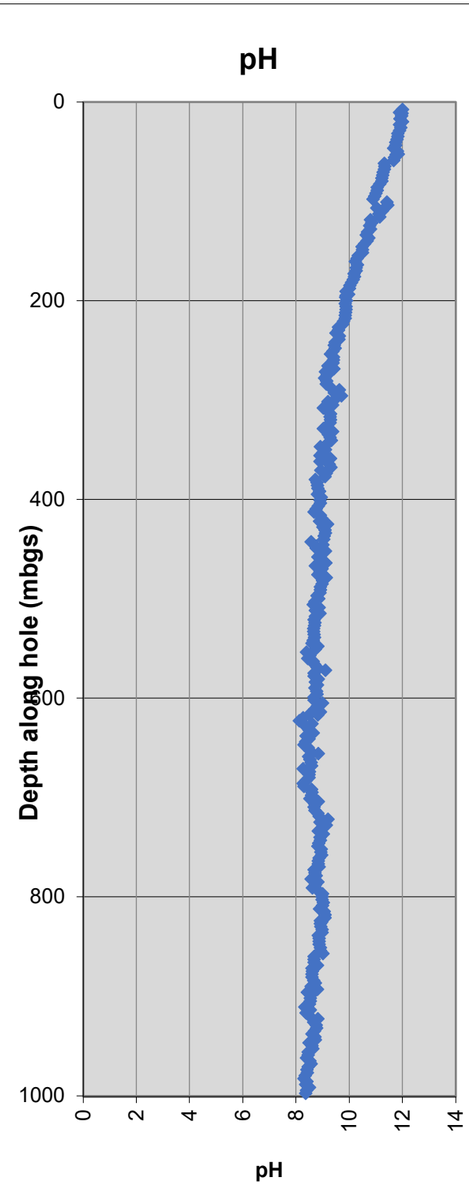
DATE
November 2022

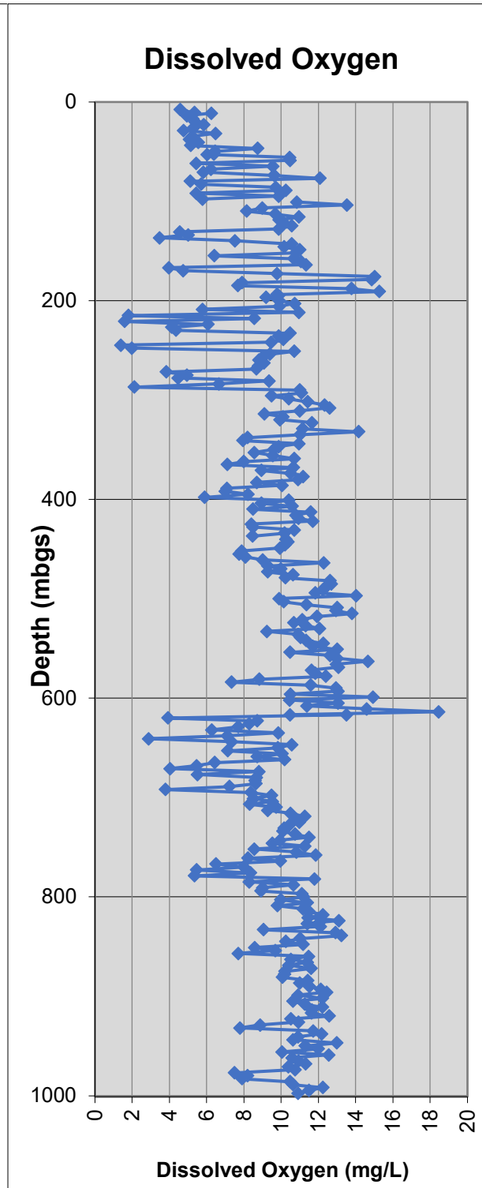
DRAWN/REV
AKV / JLC

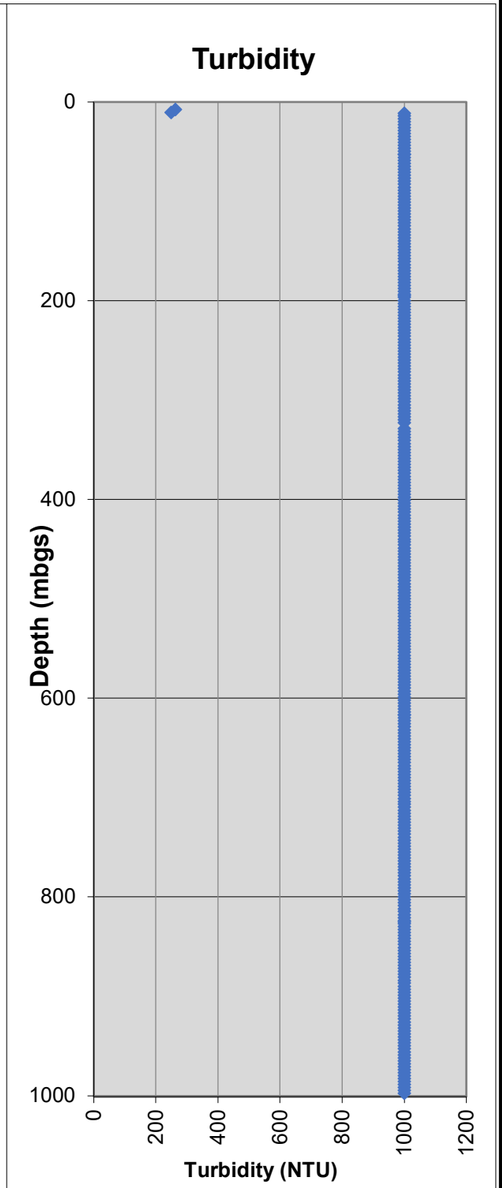
PROJECT NO.
20253946 (6020)




NOTES

1. Gaps in data appear where readings were not available.

CONSULTANT

WSP GOLDER

CLIENT

NWMO Ignace Drilling IG_BH06

TITLE

Figure B-3: Drill Fluid Parameters

DATE

November 2022

DRAWN/REV

AKV / JLC

PROJECT NO.

20253946 (6020)

**APPENDIX C**

# Table C-1: Water Quality Parameters Collected During Final IG_BH06 Flushing

| Date / Time | Elapsed Time (Hours) | Approx. Volume (L) | Fluorescein (ppb) | Temperature (°C) | pH | ORP (mV) | Conductivity (mS/cm) | Turbidity (NTU) | DO (mg/L) |
|---|---|---|---|---|---|---|---|---|---|
| 06-Nov-21 / 12:20 | - | 0 | 95.5 | 10.56 | 6.60 | 392 | 0.074 | 81.6 | 14.21 |
| 06-Nov-21 / 12:58 | 1 | 2736 | 94.78 | 11.97 | 8.34 | 25 | 0.890 | 1000 | 9.78 |
| 06-Nov-21 / 13:30 | 1.2 | 3456 | 96.00 | 11.26 | 8.38 | 22 | 0.948 | 1000 | 12.32 |
| 06-Nov-21 / 14:00 | 1.7 | 4176 | 99.57 | 10.57 | 8.42 | -143 | 0.768 | 1000 | 9.43 |
| 06-Nov-21 / 14:30 | 2.2 | 4896 | 98.84 | 9.88 | 7.60 | 277 | 0.101 | 1000 | 8.60 |
| 06-Nov-21 / 15:00 | 2.7 | 5616 | 98.68 | 10.09 | 7.15 | 325 | 0.076 | 419 | 8.12 |
| 06-Nov-21 / 15:10 | - | - | 93.07 | 9.59 | 6.82 | 392 | 0.055 | 116 | 14.87 |
| 06-Nov-21 / 15:40 | 3.3 | 14000 | 92.14 | 9.77 | 6.78 | 357 | 0.068 | 339 | 8.33 |
| 06-Nov-21 / 16:10 | 3.8 | 16560 | 92.07 | 10.23 | 6.96 | 315 | 0.064 | 238 | 9.32 |
| 06-Nov-21 / 16:40 | 4.3 | 18720 | 93.62 | 10.19 | 6.89 | 326 | 0.066 | 217 | 9.02 |
| 06-Nov-21 / 16:55 | - | - | 91.17 | 10.13 | 6.87 | 391 | 0.054 | 97.9 | 11.65 |
| 06-Nov-21 / 17:30 | 5.2 | 21700 | 85.61 | 9.41 | 6.69 | 362 | 0.058 | 130 | 12.67 |
| 06-Nov-21 / 18:00 | 5.7 | 22100 | 83.42 | 8.89 | 6.75 | 369 | 0.058 | 57.50 | 10.71 |
| 06-Nov-21 / 18:30 | 6.2 | 25160 | 83.30 | 9.40 | 6.65 | 372 | 0.060 | 34.10 | 12.61 |
| 06-Nov-21 / 19:00 | 6.7 | 28800 | 69.61 | 10.56 | 6.09 | 435 | 0.026 | 43.30 | 12.80 |
| 06-Nov-21 / 19:30 | 7.2 | 29240 | 69.81 | 9.81 | 6.75 | 373 | 0.059 | 44.50 | 14.67 |
| 06-Nov-21 / 20:00 | 7.7 | 31280 | 64.55 | 9.91 | 6.81 | 341 | 0.058 | 31.50 | 14.07 |
| 06-Nov-21 / 20:30 | 8.2 | 33320 | 65.11 | 9.98 | 6.79 | 356 | 0.061 | 34.50 | 13.77 |
| 06-Nov-21 / 20:54 | - | 0 | 67.71 | 10.88 | 7.18 | 290 | 0.058 | 29.80 | 14.19 |
| 06-Nov-21 / 21:30 | 9.2 | 37400 | 62.83 | 9.82 | 7.23 | 324 | 0.057 | 19.60 | 15.00 |
| 06-Nov-21 / 22:00 | 9.7 | 39440 | 64.5 | 13.89 | 6.32 | 353 | 0.050 | 19 | 11.75 |
| 06-Nov-21 / 22:30 | 10.2 | 41480 | 65.31 | 14.20 | 7.15 | 232 | 0.056 | 23.20 | 11.48 |
| 06-Nov-21 / 23:00 | 10.7 | 42240 | 89.70 | 11.75 | 6.99 | 319 | 0.059 | 18.70 | 13.48 |
| 06-Nov-21 / 23:30 | 11.2 | 44220 | 96.28 | 10.80 | 7.02 | 263 | 0.059 | 10.30 | 11.30 |
| 07-Nov-21 / 00:00 | 10.9 | 43164 | 96.46 | 10.41 | 7.14 | 289 | 0.058 | 6.80 | 14.98 |
| 07-Nov-21 / 00:30 | 11.4 | 45144 | 95.31 | 11.01 | 7.19 | 285 | 0.058 | 9.10 | 16.84 |
| 07-Nov-21 / 01:07 | - | - | 94.31 | 11.38 | 7.15 | 292 | 0.058 | 3.40 | 14.95 |
| 07-Nov-21 / 01:30 | 12.4 | 49104 | 95.04 | 11.31 | 7.15 | 271 | 0.056 | 1.30 | 13.67 |
| 07-Nov-21 / 01:00 | 12.9 | 51084 | 95.05 | 11.02 | 7.16 | 297 | 0.056 | 1.00 | 14.22 |
| 07-Nov-21 / 01:30 | 13.4 | 53064 | 93.75 | 10.68 | 7.09 | 280 | 0.059 | 0.10 | 14.12 |
| 07-Nov-21 / 02:00 | 13.9 | 55044 | 83.45 | 11.68 | 7.20 | 258 | 0.057 | 0.00 | 14.20 |
| 07-Nov-21 / 02:30 | 14.4 | 57024 | 80.65 | 11.62 | 7.27 | 211 | 0.059 | 0.00 | 12.09 |
| 07-Nov-21 / 03:00 | 14.9 | 59004 | 73.84 | 10.45 | 7.22 | 231 | 0.059 | 3.90 | 14.83 |
| 07-Nov-21 / 03:30 | 15.4 | 60984 | 73.24 | 11.33 | 7.19 | 236 | 0.058 | 0.00 | 13.18 |
| 07-Nov-21 / 04:00 | 15.9 | 62964 | 73.47 | 10.78 | 7.28 | 209 | 0.058 | 0.20 | 13.31 |
| 07-Nov-21 / 04:30 | 16.4 | 64944 | 75.22 | 9.56 | 6.99 | 261 | 0.060 | 1.30 | 12.61 |
| 07-Nov-21 / 05:00 | 16.9 | 66924 | 75.71 | 9.87 | 6.90 | 298 | 0.057 | 0.00 | 13.72 |
| 07-Nov-21 / 05:25 | 17.32 | 68574 | - | - | - | - | - | - | - |

Note:

Indicates baseline readings for water source

**APPENDIX D**

# Technical Memo – Correction to Reference Ground Surface Elevation Datum – IG_BH06 – Phase 2 Initial Borehole Drilling and Testing at IG_BH04/05/06, Ignace Area

# TECHNICAL MEMORANDUM

**DATE** September 27, 2022 **Project No.** 20253946

**TO** Warwick Watt
Nuclear Waste Management Organization

**CC** Andrew Verok, Matt Bowman, Kyle Matter, Jennifer Hlookoff, Natacha Lugo Bizarro

**FROM** George Schneider, Joe Carvalho, Natalie Solis **EMAIL george.schneider@wsp.com**

**CORRECTION TO REFERENCE GROUND SURFACE ELEVATION DATUM – IG_BH06 – PHASE 2 INITIAL BOREHOLE DRILLING AND TESTING AT IG_BH04/05/06, IGNACE AREA**

Mr. Watt

While the WP09 team was preparing the data report for IG_BH06, we came across a discrepancy in the position of the **ground surface elevation reference datum** stated in the WP02 data report issued in June 2022 relative to the survey results provided by Rugged Geomatics in their letter dated March 17, 2022.

In an effort to resolve this discrepancy, we re-examined our correlation of the Rugged Geomatics survey data to the as-built wellhead at the time of the survey, reviewed the well head construction schematic from the WP02 data report for IG_BH06, and prepared a as shown in the following attachments to this memorandum.

- Attachment 1 - Correlation of Wellhead Survey Data from Rugged Geomatics (letter dated March 17, 2022) to As-Built Wellhead at IG_BH06
- Attachment 2 - Original Casing Stickup and Ground Level Reference Point from WP02 Data Report for IG_BH06
- Attachment 3 - Schematic Showing IG_BH06 Well Head A – Initial Well Head during Drilling / Testing and B - Final Well Head with Locking Extension Added

Based on our review, we have concluded that in the same manner to what happened at IG_BH05, the surveyed position of the HWT (PQ) surface casing at IG_BH06 reported in the letter from Rugged Geomatics was inadvertently mistaken to be the position of the HWT (PQ) surface casing as it was during drilling, testing and Westbay installation. However, prior to being surveyed by Rugged Geomatics in March 2022, this original casing at IG_BH06 was extended after the installation of the Westbay system in order to complete the well head with a monopod bracket and protective casing.

The original position of the HWT (PQ) surface casing prior to it being extended was also surveyed, and was identified by Rugged Geomatics as survey point 506 “welded joint on pqt”.

Using that information, we have calculated the correct **ground surface elevation reference datum for IG_BH06** relative to the original position of the HWT (PQ) casing.

The calculation is presented in Table 1 (attached) and the corrected coordinates, along with the erroneous coordinates and the magnitude of the correction, are as follows.

| Easting (m) | Northing (m) | Elevation (masl) | Note |
|---|---|---|---|
| 555440.44 | 5485327.98 | 418.19 | Erroneous Ground Surface Reference Datum |
| 555440.35 | 5485328.11 | 417.74 | Corrected Ground Surface Reference Datum |
| -0.09 | 0.13 | -0.45 | Magnitude of correction |

CGVD 2013 datum

We will be correcting this datum in the IG_BH06 WP09 data deliverable (revision R2a) and will be re-issuing it to the NWMO, and we will be using the corrected datum in the draft IG_BH06 WP09 data report.

We will be informing our Work Package Leads of this correction to the datum, and ask them to identify which data packages and reports are affected and propose corrective actions. We will also be checking the ground surface reference elevation datum used at IG_BH04, and will report back immediately if a similar error occurred at this borehole.

This incident at IG_BH06 will be investigated as part of the existing non-conformance investigation we recently opened in our Quality Management System regarding Ground Surface Reference Datum discrepancy at IG_BH05, as both incidents appear to be the result of the same error.

If you have any questions, please contact the undersigned.

**Golder Associates Ltd.**

George Schneider, M.Sc., P.Geo.
*Senior Geoscientist - Principal*

Joe Carvalho, Ph.D., P.Eng.
*Mining & Rock Engineering - Principal*

Natalie Solis, P.Eng.
*Project Manager*

GWS/JLC/NAS

Distribution: WSP Golder, Westbay Instruments, NWMO

Attachments: Table 1 – Calculation of Original Ground Surface Reference Datum Position from Rugged Geomatics Survey Data IG_BH06

Attachments 1 to 3

https://golderassociates.sharepoint.com/sites/142487/project files/5 qaqc/07 qaqc ncrs/10 ncr gnd surface reference datum/bh06 gen memo/20253946 ig_bh06 elev ref datum correction 27sep2022 r2a.docx

**Table 1**
**Calculation of Original Ground Surface Reference Datum Position from Rugged Geomatics Survey Data**
**IG_BH06**

| Surveyed Point | Easting (m) | Northing (m) | Elevation (masl) | Note |
|---|---|---|---|---|
| 506 | 555440.36 | 5485327.95 | 418.17 | Original HWT (PQ) casing as surveyed by Rugged Geomatics (high side) |

CGVD 2013 datum

| Field Measured Parameter | Value |
|---|---|
| Borehole azimuth ($^0$) final gyro survey | 357.88 |
| Borehole dip ($^0$) final gyro survey | -69.22 |
| Ground Surface Reference Datum (m along hole) | 0.000 |
| PWT Conductor Casing Stick-up (m along hole) | 0.380 |
| HWT (PQ) Surface Casing Stick-up (m along hole) | 0.460 |
| HWT (PQ) Surface Casing Extension (m) | 0.403 |
| Westbay Riser Pipe Stick-up (m along hole) | |
| Westbay Riser Pipe Extension (m) | |

A - Vertical distance between Ground Surface Reference Datum and top of original HWT (PQ) casing
= HWT Surface Casing Stick-up * SIN(BH dip)
= 0.430 m

B - Elevation of Reference Datum (masl)
= Elevation of top of original HWT (PQ) casing - A
= 417.740 masl

C - Horizontal shift of reference datum relatvie to surveyed top of original HWT (PQ) casing (m)
= A* TAN(90 - BH dip)
= 0.163 m

D - Shift in Easting relative to original HWT (PQ) casing (m)
= C * SIN(BH azimuth)
= -0.006 m

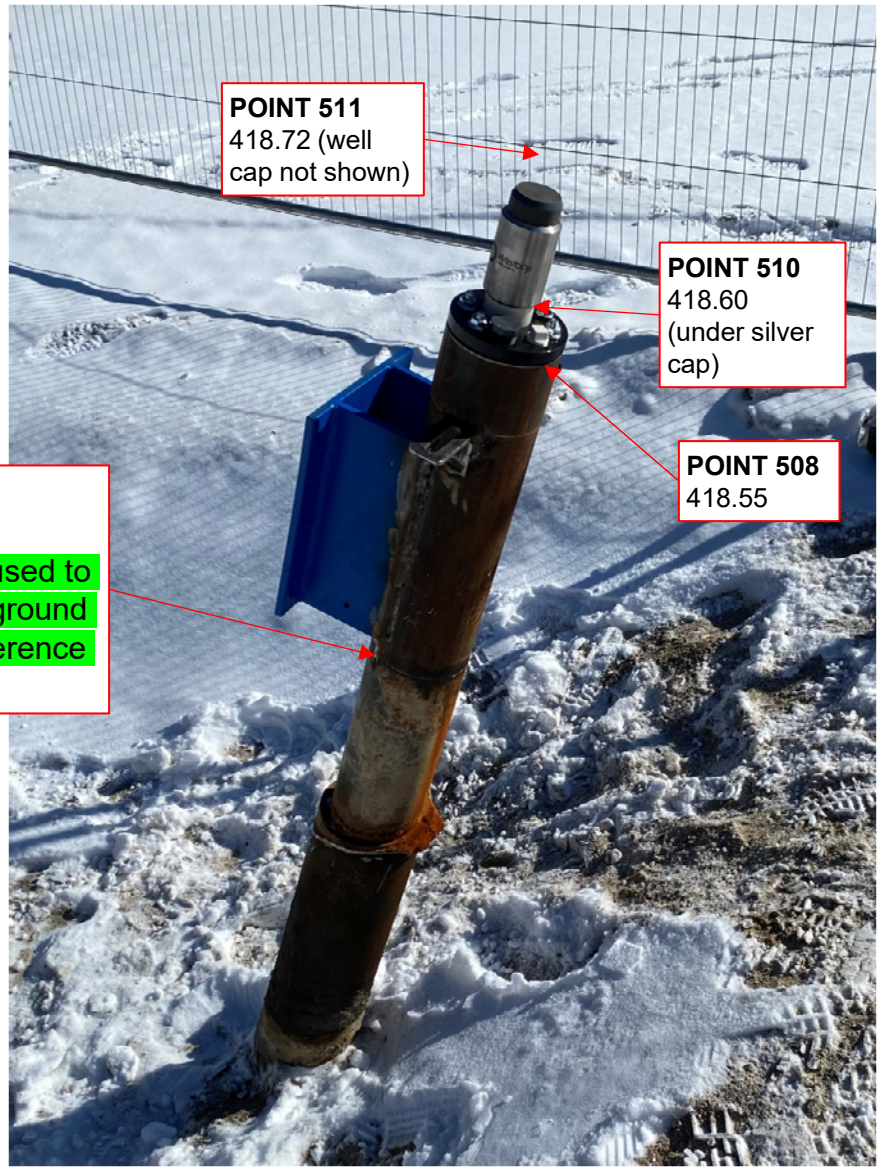
D - Shift in Northing relative to original HWT (PQ) casing (m)
= C * COS(BH azimuth)
= 0.163 m

| Calculated Point | Easting (m) | Northing (m) | Elevation (masl) | Note |
|---|---|---|---|---|
| N/A | 555440.35 | 5485328.11 | 417.74 | Original Ground Surface Reference Datum |

CGVD 2013 datum

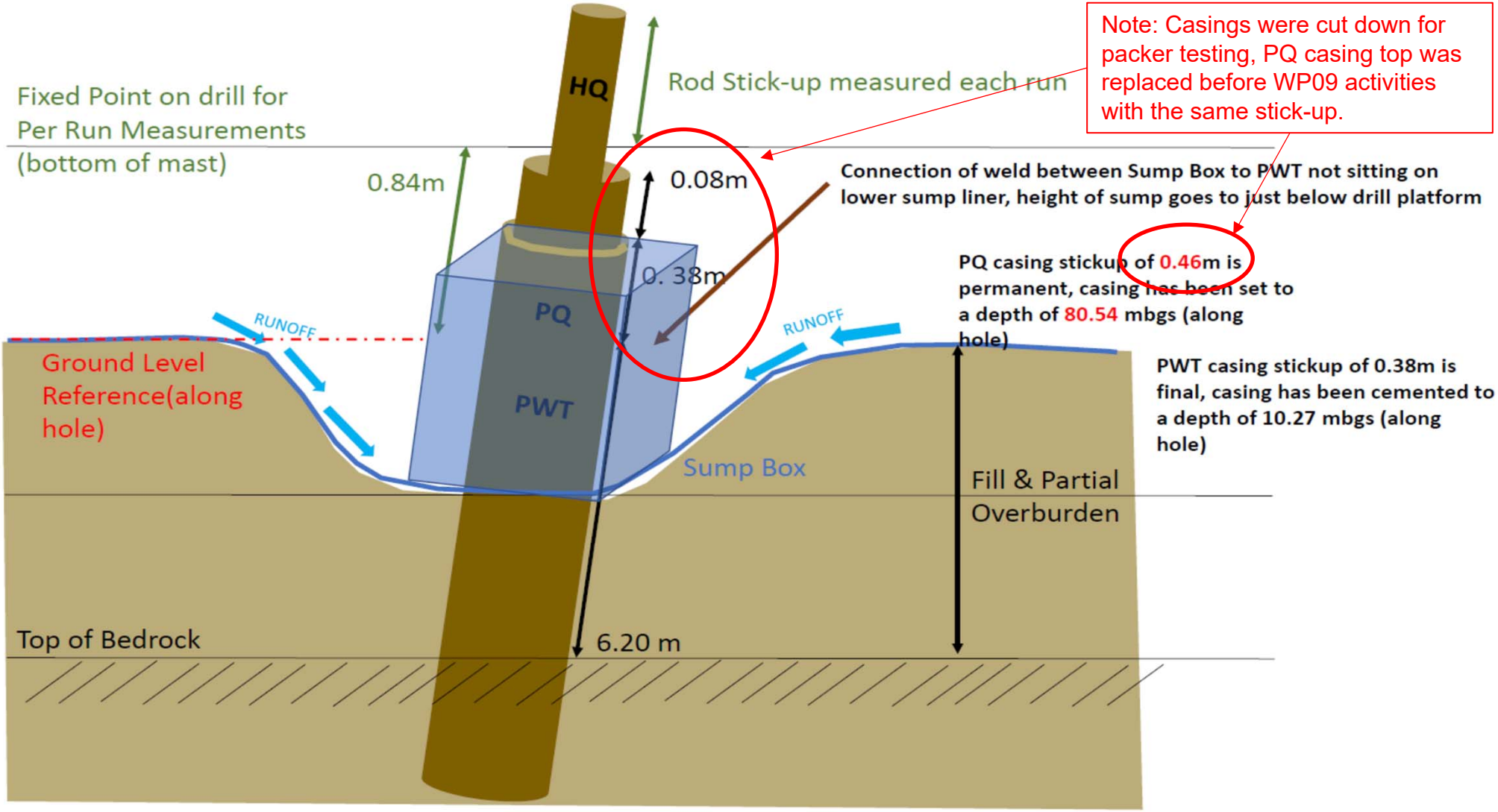
# Attachment 1 - Correlation of Wellhead Survey Data from Rugged Geomatics (letter dated March 17, 2022) to As-Built Wellhead at IG_BH06

| Point | Easting | Northing | Elevation | code |
|---|---|---|---|---|
| 504 | 555440.45 | 5485328.35 | 417.38 | referencepoint beforebackfilling |
| 505 | 555440.75 | 5485331.28 | 417.72 | ground level |
| 506 | 555440.36 | 5485327.95 | 418.17 | welded joint on pqt |
| 507 | 555440.47 | 5485328.12 | 417.87 | sump box weld |
| 508 | 555440.44 | 5485327.84 | 418.55 | top of pqt |
| 509 | 555440.44 | 5485327.77 | 418.65 | topofwestbaycasingsilvercap |
| 510 | 555440.46 | 5485327.79 | 418.60 | topofwestbaycasingwhitetop |
| 511 | 555440.44 | 5485327.78 | 418.72 | top of well cap |

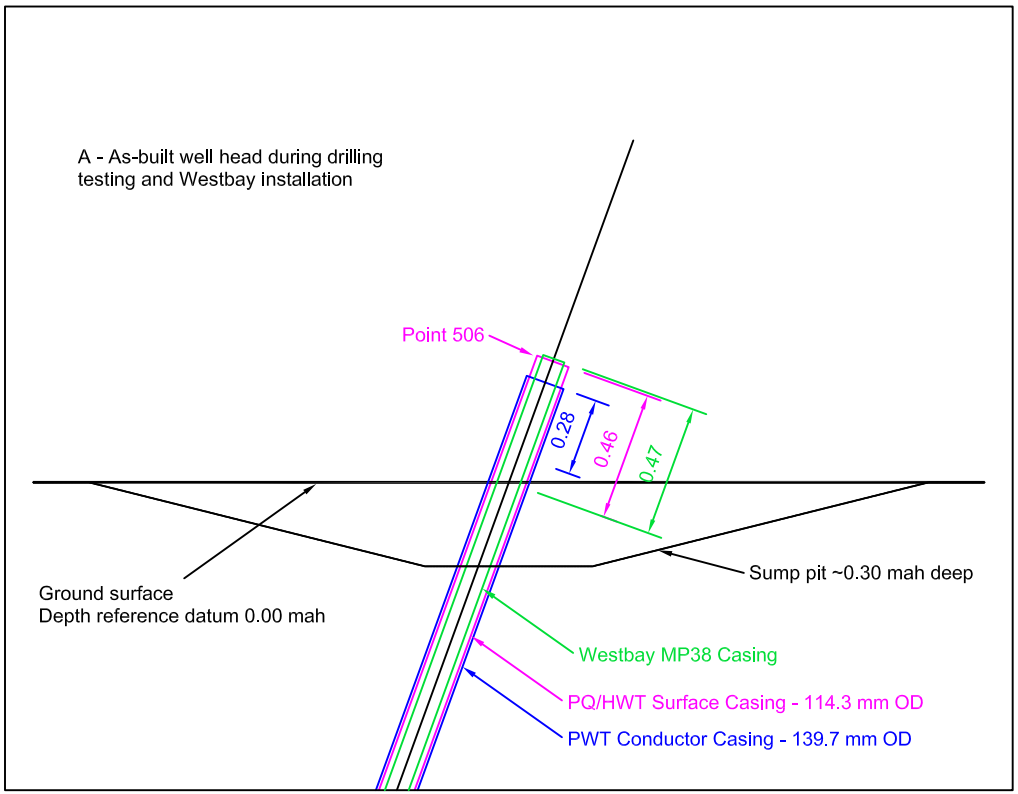


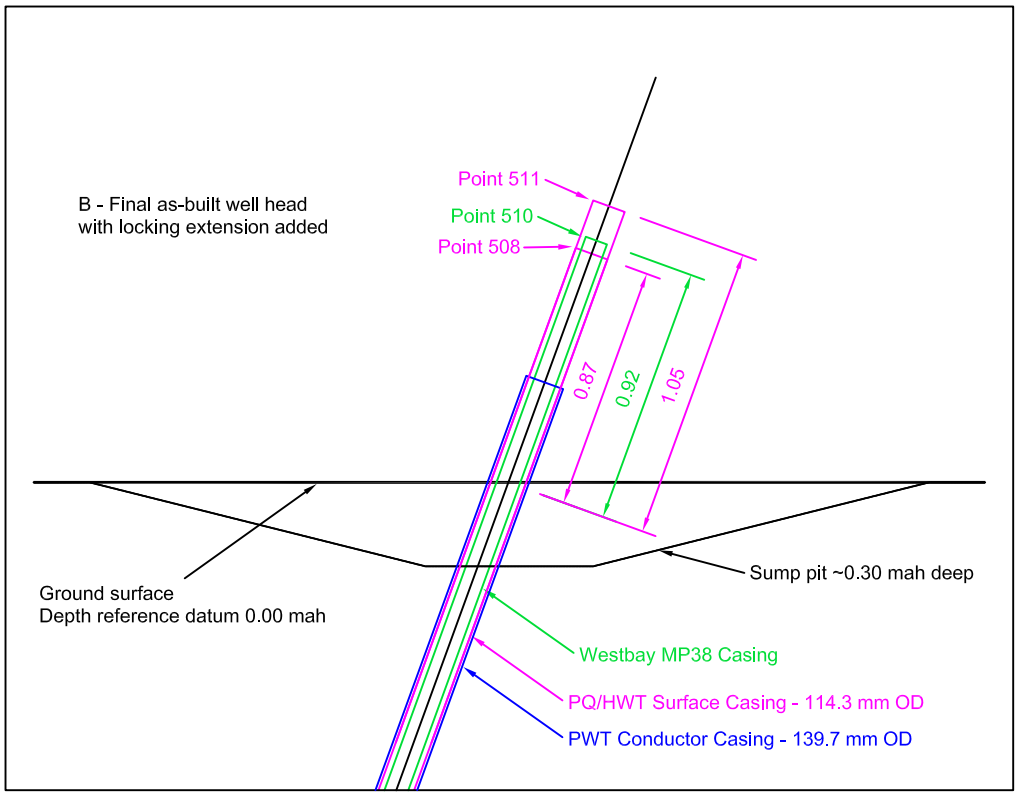

Ground Level Reference Elevation
= Top of PQ – 0.46 mah
(0.43 m vertical @ BH angle of 69.22 deg)
= welded joint on pqt (from survey) – 0.43 m
= 418.17 m – 0.43 m
**= 417.74 m**

**Attachment 2 – Original Casing Stickup and Ground Level Reference Point from WP02 Data Report for IG_BH06**



# Attachment 3 - Schematic Showing IG_BH06 Well Head
# A - Initial Well Head during Drilling / Testing and B - Final Well Head with Locking Extension Added






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