PHASE 2 INITIAL BOREHOLE DRILLING AND TESTING, SOUTH BRUCE

WP07 Data Report: Opportunistic Groundwater Sampling and Testing for SB_BH01

APM-REP-01332-0324 **November 2023**

Geofirma Engineering

nwmo
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Phase 2 Initial Borehole Drilling and Testing, South Bruce

WP07 Data Report: Opportunistic Groundwater Sampling and Testing for SB_BH01

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1 INTRODUCTION

Geofirma Engineering Ltd. (Geofirma) completed a drilling and testing program at borehole SB_BH01, northwest of Teeswater, Ontario (Figure 1). This report provides a detailed summary of one component of the Geofirma geoscientific investigation as part of the NWMO Phase 2 Initial Borehole Drilling and Testing Program at the South Bruce Site. Specifically, this report describes the activities associated with Geofirma's Work Package 7 (WP07) Opportunistic Groundwater (OGW) Sampling program during drilling activities at SB_BH01.

1.1 Background

Geofirma was retained by the Nuclear Waste Management Organization (NWMO) to complete a drilling and testing program for two deep bedrock boreholes (SB_BH01 and SB_BH02) as part of the NWMO's Phase 2 Geoscientific Preliminary Field Investigations. The full scope of the drilling and testing program for SB_BH01 is described in the Initial Borehole Characterization Plan. Borehole SB_BH01 was the first borehole drilled at the South Bruce Site as part of the Phase 2 Initial Borehole Drilling and Testing program. SB_BH01 is located approximately 3.5 km northwest of the community of Teeswater, Ontario, and was drilled to 880.84 m below ground surface (m BGS).

1.2 Geologic Setting

The sequence of rocks encountered in the SB_BH01 borehole consist of Paleozoic-aged strata that were deposited within the Michigan Basin northwest of the Algonquin Arch in Southwestern Ontario. The Michigan Basin is a circular-shaped cratonic basin that is composed primarily of shallow marine carbonates, evaporites, and shales that were deposited while eastern North America was in tropical latitudes during the Paleozoic Era (Armstrong and Carter 2010). West of the Algonquin Arch, strata from the Michigan Basin tend to gradually dip westward into the Michigan Basin. Borehole SB_BH01 was drilled through the entire Paleozoic sequence to approximately 20 m into the Precambrian basement, which is composed of high-grade metamorphic rocks of the Grenville Province.

MUNICIPALITY OF BROCKTON
Riversdale
Little Egypt
Greenock Swamp
F012077
Salem
Kinlough
T003553
Westford
BRUCE ROAD 4
TOWNSHIP OF HURON-KINLOSS
MUNICIPALITY OF SOUTH BRUCE
F012068
Holyrood
BRUCE ROAD 1
BRUCE ROAD 6
Kinloss Creek
CONCESSION 8
SB_BH01
Culross
Kinloss
Teeswater
Dickies Creek Wetland Complex
F012062
Lower Langside
T004881
Langside
Teeswater Wetland Complex
Anderson Creek Wetland Complex

LEGEND

- SB_BH01 Drill Site
- Municipality of South Bruce
- Municipality of Brockton
- Township of Huron-Kinloss
- Provincially Significant Wetland
- Wetland
- Waterbody
- Watercourse
- Major Road
- Local / Street
- OGSRL Well Locations

INSET MAP

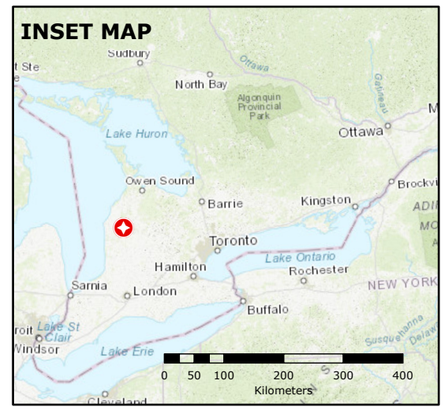

Figure 1
Location of SB_BH01 Drill Site

Scale 1:60,000

0 500 1,000 2,000 3,000 4,000
Meters

N

Projection: NAD 1983 UTM Zone 17N

Source: NWMO, Ontario GeoBase

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

PROJECT No. 20-211-1

NWMO South Bruce
Drilling and Testing

DESIGN: ADG
CAD/GIS: ADG
CHECK: SNS
REV: 0

DATE: 2023-10-30

GEOFIRMA ENGINEERING

E:\Data\Project\Bruce\Maps\20-211-1_SouthBruce\20-211-1_Figure1_SB_BH01_TestPlans.mxd

1.3 Technical Objectives

The technical objectives of the WP07 OGW sampling and testing activities were:

- The identification of permeable intervals for collecting opportunistic groundwater samples while drilling;
- Collection and preservation of sufficient groundwater sample volumes for geochemical analysis;
- Laboratory analysis of collected groundwater samples.

The scientific objectives of this work package included:

- Determining chemical and isotopic character of groundwater at depth;
- Identifying the presence or absence of recent, older post-glacial and glacial recharge, interglacial recharge, and very old pre-glacial groundwater at all depths within the sedimentary sequence;
- Determining the transferability of groundwater chemical parameters in the context of regional understanding (i.e. based on regional data and data from OPG's DGR at the Bruce Nuclear Site).

This report has been prepared to describe the water sampling activities that were completed at SB_BH01 and present the results from the field and lab testing program. The results represent key findings including field and laboratory determination of physicochemical properties and isotopic signatures of the drill water, water source, and groundwater samples. Interpretation of the sample results with respect to water age, provenance, and regional context is to be completed as part of a separate report completed under a separate work package (WP10 data integration). Complete sample lists and results from the testing program are included in the report appendices.

2 DESCRIPTION OF ACTIVITIES

Field activities associated with the WP07 OGW sampling at SB_BH01 were completed between June 13 to September 24, 2021. All field activities, including preparation of the drill fluid tracer, purging, and sampling were completed by Geofirma.

Sampling of the drill water and the water source was completed as part of the drilling (WP02) scope of work. Field activities for sample collection that were completed as part of WP02 are described in the WP02 Data Report (Geofirma 2022a), however, laboratory results for the WP02 water samples are reported with results from WP07 (OGW sampling) in this data report.

The following section provides a summary of the field and laboratory activities that were completed as part of WP07 for SB_BH01. All field measurements and equipment calibrations that were completed as part of water sampling activities were recorded in a excel-format data quality confirmation (DQC) workbook, or entered directly into the NWMO acQuire “Opportunistic Groundwater and Drillwater Sampling” data entry object (DE-07).

2.1 Types of Samples Collected

Three primary water sample types were collected as part of drilling and testing activities at borehole SB_BH01: water source (WS), drill water (DW), and groundwater (GW) samples.

Water source (WS) samples were collected from the supply that was used to provide water for the drilling program. Collection of WS samples was completed as part of drilling (WP02) activities. WS samples were collected to obtain a record of water chemistry for the water source throughout drilling at SB_BH01.

Drill water (DW) samples were collected from the drill water return throughout the SB_BH01 drilling program as part of drilling (WP02) and OGW (WP07) activities. DW samples were collected to obtain a record of water chemistry during drilling and to evaluate the impact of drill water contamination on results for GW samples that were collected during drilling.

Groundwater (GW) samples were primarily collected from groundwater purged from the borehole as part of WP07 activities. In addition to the primary groundwater samples, purge water and QA/QC samples (duplicate, rinsate blanks, and tritium free blanks) were also assigned GW sample codes.

2.2 Field Methods

2.2.1 Tracing of Drill Water

The water used for drilling at SB_BH01 was sourced from Kincardine municipal supply, where the water was pumped from Lake Huron. This fresh water source provides a chemical signature that is distinct from groundwater at the site.

Fluorescein was used as an artificial tracer during drilling. Drill water was mixed in large half round (skid) tanks onsite using a concentrated fluorescein stock solution and the fresh water source. The concentration of the fluorescein tracer in the drill water was maintained at 100±10 ppb. Geofirma measured the fluorescein concentration in the drill water supply during each core run to ensure that the

tracer concentration remained within the targeted range throughout the drilling program. Fluorescein concentrations were measured using a portable handheld fluorometer (Turner Designs Aquafluor) and were recorded in the drilling (WP02) DQC workbook.

2.2.2 OGW Interval Selection

Intervals for OGW sampling were identified based on a combination of core and drilling indicators, including:

- Evidence of potential permeability from core logging (open fractures, porosity features, alteration along fractures, etc.)
- Drilling fluid circulation measurements, including
    - Drill fluid loss to the formation
    - Influx of formation water to the borehole
- Drill pump pressure changes
- Drilling performance indicators (e.g., increased or inconsistent rate of penetration)

Details of the methodology and field procedures to monitor drill fluid conditions and drilling parameters are described in the WP02 Data Report (Geofirma 2022a). Core logging procedures are described in the WP03 Data Report (Geofirma 2022b) and associated Geological and Geotechnical Core Logging Procedures Manual.

When a potential OGW sample was identified, drilling was stopped and the NWMO WP07 Technical Lead was contacted by the Geofirma WP07 Technical Lead to confirm that OGW sampling activities were to be completed for that interval.

2.2.2.1 *Collection of Pre-Purge Drill Water Samples*

Upon approval from the NWMO WP07 Technical Lead, Geofirma collected a sample of the drill water prior to purging. The pre-purge drill water samples were collected directly from the drill fluid return or drill pipe following sampling requirements outlined in Section 2.2.7. A microbiology sample was also collected with pre-purging drill water sample. Field parameter measurements and in-field analytical testing were completed at the time of sampling and were recorded directly in acQuire using the “Opportunistic Groundwater and Drillwater Sampling” data entry object (DE-07) and the associated data sheets in the WP07 DQC workbook. Field parameter measurements and field analytical measurements of drill fluid followed procedures described in Section 2.2.6.

2.2.3 Interval Isolation

Interval isolation using an inflatable wireline packer system was completed after collection of the pre-purge drill water sample. By isolating the test interval, formation permeability for the test interval could be assessed and the required purge volume was reduced.

The test intervals were isolated from the rest of the borehole using the STX-60 packer system, manufactured by Inflatable Packers International LLC. The STX system was lowered by wireline within the drill pipe and latched inside the PQ core barrel. With the packer system latched in the core barrel, the

drill pipe was raised or lowered to adjust the position of the packer to provide a seal at the top of the targeted test interval. With the packer inflated, the test interval was sealed from the borehole annulus and could be purged through the drill pipe.

2.2.4 Evaluation of Sample Feasibility

After the interval was isolated using the STX-60 packer equipment, the potential OGW interval was evaluated to determine whether sufficient drilling fluid could be purged from the interval within the project time constraints (72 hours) to provide a groundwater sample that was representative of in-situ formation conditions.

The feasibility of the OGW intervals were assessed using a short duration pumping test. The short duration pumping tests were completed with a submersible pump (e.g., Grundfos Rediflo 2) for a sufficient period to overcome wellbore storage effects and obtain steady state drawdown conditions. If the interval could not maintain a steady pumping rate, then the pump was shut off and recovery to pre-purging static water level was monitored. Water levels and purge volumes/flow rates measured during the pumping test were recorded in the WP07 DQC workbook.

Using the test data, interval transmissivity/hydraulic conductivity and available purge rates were estimated. The available purge rates were used to determine if the minimum required purge rate could be met. The minimum required purge rate was calculated by dividing the system volume (3 interval volumes + 3 drill rod volumes + fluid losses to formation) by 72 hours. The NWMO WP07 Technical Lead was informed by Geofirma if the test interval was expected to be capable of maintaining the minimum required purge rate. The NWMO WP07 Technical Lead provided final confirmation to proceed with purging of each test interval.

2.2.5 Purging

Once sample collection from the isolated interval was assessed to be feasible, purging of OGW sample intervals was completed using a submersible pump or swabbing equipment. Six intervals (OGW1 through OGW6) were purged by submersible pump. Due to a relatively low permeability, OGW7 was purged by swabbing to enable higher drawdown and increased production. Field parameter measurements (Section 2.2.7) were collected regularly throughout purging to evaluate whether sufficient drill water had been produced to obtain a representative groundwater sample. Records of field parameter measurements were maintained in the WP07 DQC workbook.

Purge water archive samples were collected at a frequency of approximately one sample every system volume purged. Purge water samples were filtered, transferred into two 500 mL HDPE (no preservative) bottles and one 120 mL HDPE (with HNO_3 preservative) bottle, and refrigerated. Field parameter measurements for purge water samples were completed at the time of sampling and were recorded directly into acQuire using the “Opportunistic Groundwater and Drillwater Sampling” data entry object (DE-07). Field measurements of dissolved oxygen, ferrous iron, alkalinity, and sulphide were also recorded in the DQC workbook for each purge water archive sample.

Each purge water sample was assigned an identification number in acQuire following naming conventions described in Section 2.2.7.1.

2.2.6 Field Parameter Measurements and In-Field Analytical Testing

Several atmospheric sensitive parameters required field measurements to be completed in the field. The testing methodologies that were used for these field measurements and analyses are summarized in Table 1.

Table 1 Methods for Field Parameter Measurements and In-Field Analytical Testing

Parameter	Field-Measurement Method
Fluorescein	Handheld Fluorimeter (Turner Designs AquaFluor)
Turbidity	In sealed flow-through cell (i.e., Horiba Flow Chamber) with inserted water quality multi-probe (Horiba-U52/U50)
Dissolved Oxygen (DO) (for concentrations > 1 mg/L)	
Electrical Conductivity	
Temperature	
Oxidation-Reduction Potential (ORP)	
pH	
Fluid Density	Hydrometer measurement in graduated cylinder. One of two hydrometers will be used, depending on the density of the drill fluid and sample water (SG > 1.0 or SG < 1.0)
Total Sulphide [S^{2-}_{Total}]	HACH Method 8131: Dissolved total sulphide by methylene blue method and colorimeter (Hach DR900 Multiparameter Colorimeter).
Ferrous Iron [Fe^{2+}]	HACH Method 8146: 1-10 Phenanthroline Method using portable colorimeter (Hach DR900 Multiparameter Colorimeter).
Dissolved Oxygen (DO) (for concentrations < 1 mg/L)	HACH Method 8316: Indigo Carmine method using portable colorimeter (Hach DR900) for concentrations < 1mg/L and Horiba-U52/50 for concentrations > 1 mg/L
Alkalinity	HACH Method 8203: Alkalinity Test Kit, digital titration method using sulphuric acid (H_2SO_4), phenolphthalein indicator, and bromcresol green-methyl red indicator; hydroxide, carbonate and bicarbonate alkalinities can be determined

Results from the field parameter measurements and in-field analytical testing were recorded in the WP07 DQC workbook and in acQuire, where applicable. All calibrations and calibration checks of equipment used for in-field analytical testing were recorded in the Equipment Calibration form in the WP07 DQC.

Care was taken to minimize atmospheric exposure of samples for field parameter measurements and in-field testing during the sampling process. Field measurements were either completed immediately after sample collection, or the water was held in airtight sample containers for a short duration until the water was released for testing.

2.2.7 Sample Collection

Fluorescein concentrations were the primary indicator used to assess purging progress. Purging of the OGW intervals continued until the produced water reached of target of less than 5% of the pre-purging drill water fluorescein concentration, or as otherwise directed by the NWMO WP07 Technical Lead. Stabilization of other field parameters (e.g., dissolved oxygen, temperature, pH) was also documented to support the decision to initiate sample collection.

Prior to collection of OGW samples, all sampling equipment was decontaminated with the decontamination procedure documented in the Equipment Decontamination form in the DQC workbook. A rinsate sample for QA/QC purposes was collected after decontamination activities during each OGW sampling event, except for OGW1 where no QA/QC samples were collected. Additional information about QA/QC sampling during OGW activities is provided in Section 2.2.8.

Water for the OGW samples was collected directly from the pump/swabbing discharge line using laboratory-supplied bottles. A summary of the sample bottle type, preservation methods, and holding times is provided in Table 2. Specialized sampling procedures were used for collection of noble gas samples (using a Westbay MOSDAX sampler probe) and microbiology samples. The Westbay sampling procedure was also used to obtain the water that was required for the primary and duplicate samples collected from the deepest sampling interval (OGW7).

Complete sample suites were collected for each primary groundwater sample and the associated pre-purge drill water (DW) sample. Collection of the samples was recorded on the “Sample Bottle Collection” sheet in the DQC Workbook.

Table 2 Sample Container Specifications, Holding times, and Analytical Lab, by Analyte Group

Analytes	Bottle Type	Volume	Sampling and Preservation	Lab Holding Time (Maximum)	Geofirma Holding Time (Optimal)	Analytical Lab or Storage
Major Elements and Metals (Na, K, Ca, Mg, Sr, Li, Si, Al, B)	Red-capped bottle (O. Reg.)	120 mL	Field filtered, 2mL 18% NHO_3	30 days	15 days	Bureau Veritas Labs
Dissolved Sulphur, Dissolved Iron (all species)						
Ruthenium (Ru)	Red-capped bottle (O. Reg.)	120 mL	2mL 18% NHO_3	30 days	15 days	
Rare Earth Elements (Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Tm, Yb, Y)	Red-capped bottle (O. Reg.)	120 mL	Field Filtered, 2mL 18% NHO_3	30 days	15 days	
Reactive Silica (SiO_2)	General (HDPE)	250 mL	Field Filtered	28 days	14 days	

Analytes	Bottle Type	Volume	Sampling and Preservation	Lab Holding Time (Maximum)	Geofirma Holding Time (Optimal)	Analytical Lab or Storage
Sulphide (S^{2-}) (by zinc acetate ppt)	Pink-capped bottle	120 mL	Field Filtered No Headspace 0.5 mL 5N NaOH 0.5 mL 2N ZnAc	7 days	3 days	
Anions (Br, Cl, SO_4, PO_4, I, NO_2, NO_3)	General (HDPE)	500 mL	None	14 days	7 days	
Fluoride (F)						
HCO_3						
Total Nitrogen	Nutrient	120 mL	0.5 mL 50% sulfuric acid	10 days	5 days	
Total Phosphorus						
Total Organic Carbon (TOC)						
Dissolved Organic Carbon (DOC)	General (HDPE)	120 mL	None	5 days	3 days	
Total Ammonia (NH_4+NH_3)	Vial	40 mL	0.17mL 50% sulfuric acid	28 days	14 days	
Gross Alpha and Gross Beta	Radiological	1000 mL	None (preserved upon arrival by laboratory)	5 days (prior to laboratory preservation)	3 days	
^{238}U, ^{234}U, ^{235}U	Radiological	1000 mL	None (preserved upon arrival by laboratory)	5 days (prior to laboratory preservation)	3 days	
^{222}Rn	Radiological	250 mL	Refer to BV Guidance	3 days	1 day	
Colloid Concentration	HDPE	500 mL x 3	None	7 days	3 days	SGS
$\delta^{18}O$, $\delta^{2}H$	HDPE	100 mL	Minimize Headspace	No Limit	No Limit	University of Ottawa
^{3}H (Enriched)	HDPE	500 mL	Minimize Headspace	No Limit	No Limit	
$^{87}Sr/^{86}Sr$	HDPE	500 mL	Minimize Headspace	No Limit	No Limit	
$\delta^{13}C$-DIC	Glass Vial with Septa	40 mL x 3	Field Filtered, Minimize Headspace	4 weeks	4 weeks	
^{14}C-DIC	Prebaked Glass	500 mL	Field Filtered, Minimize Headspace 1 drop $HgCl_2$	4 weeks	4 weeks	
^{129}I, ^{36}Cl	HDPE	1000 mL	None	No Limit	No Limit	
$\delta^{37}Cl$	HDPE	500 mL	None	No Limit	No Limit	

Analytes	Bottle Type	Volume	Sampling and Preservation	Lab Holding Time (Maximum)	Geofirma Holding Time (Optimal)	Analytical Lab or Storage
Noble Gases	Crimped Copper Tubing	Annealed 3/8 inch, 1 m long	Fill in-line with Westbay sampling container, evacuate prior to sampling	No Limit	No Limit	
^{40}K	Calculate from Total K Concentrations					
Microbiology (DNA, PFLA, Cell Count)	Sampling Requirements in WP07 Test Plan			30 days	20 days	University of Waterloo
Archive	Red-capped bottle (O. Reg.)	120 mL	Field filtered, 2mL 18% NHO_3	30 days	15 days	NWMO South Bruce Core Storage Facility
NaFl and Archive	HDPE	2x 500 mL	Field Filtered, Minimize Headspace	No Limit	No Limit	

2.2.7.1 *Sample Naming Convention*

AcQuire was used to log groundwater (GW), drill water (DW) and water source (WS) samples collected as part of WP02 and WP07 activities. Samples were logged in acQuire using the Opportunistic Groundwater and Drillwater Sampling data entry object (DE-07). AcQuire automatically generated sample numbers in the form of SB_BH0x_AA00x, where:

- SB_BH01 is the borehole ID
- AA is the type of sample (e.g. DW, WS, GW)
- And 00x is a sequential number automatically generated.

For purge water archive samples, the type of sample assigned was GW and the QA/QC type was marked “PR (purge)”, with the “Archive” box checked.

2.2.8 QA/QC Sampling

QA/QC samples were collected as part of the OGW sampling program. QA/QC samples (duplicates, rinsate and blanks) were collected for each OGW interval, except OGW1 where no QA/QC samples were collected. Three types of QA/QC samples were collected:

- Duplicates samples for all laboratory analyses;
- Rinsate blanks to assess the equipment decontamination procedure; and
- Tritium-free blanks to assess atmospheric contamination during sample collection and transport.

2.2.8.1 Duplicate Sample Sets and Relative Percent Difference

Duplicate samples were collected using the same sampling methods as the associated primary OGW groundwater sample. Duplicate samples bottles were filled at the same time as the OGW sample by alternating between the duplicate and the OGW sample bottles (e.g., fill OGW and duplicate sulphide bottles, then start filling the next bottle type).

Duplicate sets were compared to assess the consistency of analytical results by relative percent difference (RPD) for each analyte where the primary and duplicate sample had reported values above method detection limits. RPD was calculated by the equation below:

$$\text{Equation 1: } RPD = \frac{|x_1 - x_2|}{\bar{x}} \times 100\%$$

Where: x_1 = concentration of original sample
x_2 = concentration of duplicate sample
$\bar{x}$ = average concentration of original and duplicate sample

RPD values for homogeneous water samples are generally considered acceptable for laboratory QA if the RPD is less than 30% (MECP 2004). However, since the uncertainty associated with a value increases dramatically as the result approaches the method detection limit (MDL), the MECP recommends using a duplicate result in RPD calculations only if the average of the two duplicates is greater than five times the MDL (5x MDL) (MECP, 2004).

2.2.8.2 Rinsate Blanks

Rinsate blanks were collected by running deionized water through the sampling equipment after completion of decontamination activities. Each rinsate sample was analysed for major elements, metals, and trace elements at Bureau Veritas at the same time as the corresponding OGW sample. No field parameter measurements or in-field analytical testing were conducted on the rinsate blanks.

2.2.8.3 Tritium Free Blanks

Certain analytical parameters (e.g., tritium) have the potential to be compromised through atmospheric exposure or from bottles and equipment during transport and sampling. Tritium-free blanks were used to assess atmospheric contamination of groundwater samples. Tritium-free water was provided in bottles by the University of Ottawa. These bottles would be stored on-site and left exposed to the atmosphere for the same duration as the tritium and ^{14}C-DIC samples. During sampling, the tritium-free water was decanted into sample bottles identical to the ones used for Tritium and ^{14}C-DIC analyses. Each tritium-free blank was analyzed for tritium and ^{14}C-DIC at the same time as a corresponding OGW sample. No field parameter measurements or in-field analytical testing was conducted on tritium-free blanks.

2.2.9 Sample Shipping

All samples collected for analyses were delivered to the appropriate analytical laboratories and tested within the lab holding times shown in Table 2. All samples were shipped using chain of custody (COC) forms to ensure traceability from the field sample collection through to the analysis result. A COC tracking sheet in the DQC Workbook was used to track the progress of COCs during shipping and receiving. All COCs were verified and signed by both the shipper and the receiver.

Groundwater samples shipped to labs for analysis were carefully packaged in bubble wrap and placed on ice packs in coolers. Except for microbiology samples (DNA PLFA), dry ice was not used for refrigerating samples during collection, storage, and transport. Archive samples were delivered to NWMO under Chain of Custody and are stored in a refrigerator at NWMO's South Bruce core storage facility.

2.3 Laboratory Analyses and Methods

2.3.1 Analyses at Bureau Veritas Laboratories (BVL)

Bureau Veritas (formerly Maxxam Analytics Inc) completed laboratory analyses of the non-isotopic parameters, which included major elements and metals, trace elements, anions, and nutrients. BVL also completed analyses for select radiological parameters. Bureau Veritas is accredited through CAEAL, Standards Council of Canada and MECP licenses for the listed analytes.

2.3.2 Analyses at University of Ottawa

The University of Ottawa's Hydrogeochemistry laboratory completed most of the stable and radioactive isotope analyses. While uOttawa was the primary analytical laboratory, some isotope analyses were subcontracted to complete specific analyses. The analyses of ^{37}Cl and $^{87}Sr/^{86}Sr$ were completed by IT^2 laboratory, ^{36}Cl analysis was completed by Eidgenössische Technische Hochschule (ETH) Zurich and Lawrence Livermore National Laboratory, and noble gas analyses by the University of Utah.

2.3.3 Analyses at SGS Laboratories

SGS laboratories completed the colloid analyses at the SGS laboratory in Lakefield Ontario. The colloid analyses included total colloids by filtration, and colloid particle size distribution by Malvern analysis. Results from the colloid analyses have been provided to NWMO with the associated data delivery but are not discussed in this report.

2.3.4 Microbiology Analyses at the University of Waterloo

All microbiological analyses that were undertaken by the University of Waterloo were completed under a separate contract with the NWMO. Laboratory analysis and reporting associated with the microbiology samples are not included in this report.

2.4 Data Quality Assurance and Quality Control (QA/QC)

Opportunistic groundwater sampling (WP07) activities were completed following the WP07 Test Plan and Project Quality Plan. All field data associated with WP07 activities were recorded directly into NWMO's acQuire database or into a purpose-built Data Quality Confirmation (DQC) workbook.

Equipment calibration checks and calibrations were also completed at the start of each shift, for any equipment associated with quality control. All fridges and freezers holding samples were checked to ensure that the internal temperature was within an acceptable range, as outline in the Project Quality Plan. Records of equipment calibration checks and calibrations were recorded in the WP07 DQC workbook. Records of fridge and freezer temperatures were recorded in the WP03 (Core Logging, Photography, and Sampling) DQC workbook.

QA/QC samples were collected as part of the OGW sampling program. The QA/QC sampling methods are described in Section 2.2.8 with results from the QA/QC sampling program presented in Section 3.4.4.

3 RESULTS

3.1 Sample Collection Summary

Table 3 provides a summary of the water samples that were collected during the drilling and testing program at SB_BH01. Of the 111 samples, 31 WS samples and 24 of the DW samples were collected as part of drilling (WP02) activities. All other samples were collected as part of OGW sampling activities (WP07).

Table 3 Water Sampling Summary, SB_BH01

Sample Type	Sample Sub-Type	Number of Samples
Water Source (WS)	WS – Full Suite	10
	WS – Reduced Suite[1]	21
	Water Source (WS) Subtotal	31
Drill Water (DW)	DW – While Drilling	24
	DW – Pre-Purge for OGW	8
	Drill Water (GW) Subtotal	32
Groundwater (GW)	GW – Field Blank	6
	GW – Rinsate Blank	6
	GW – Purge Water Archive	23
	GW – Groundwater Sample	7
	GW – Duplicate Groundwater Sample	6
	Groundwater (GW) Subtotal	48
	All Water Samples	111

1. WS samples with reduced suite were analyzed for a subset of conventional and isotopic analyses.

3.2 OGW Interval Selection and Purging

Table 4 provides a summary of interval selection and purging results for OGW sampling events at SB_BH01. A total of seven test intervals were selected and sampled, including three intervals in the shallow bedrock above the Salina Group (OGW1, OGW2, and OGW3), two intervals in the Salina Group (OGW4 and OGW5), one interval in the Guelph Formation (OGW6), and one interval that spanned the bottom of the Shadow Lake Formation and the Precambrian crystalline basement rock (OGW7).

Six of the OGW intervals (OGW1-6) were purged using a submersible Grundfos pump, and one interval (OGW7) was purged by swabbing. The OGW7 (Precambrian) interval had relatively lower permeability than the other intervals and was purged by swabbing to enable higher drawdown and increased purge rates.

All seven intervals that were selected for OGW sampling were purged until the final fluorescein concentration was below 5% of the pre-purging drill water concentration and field parameters had stabilized. Total purge volumes required to meet sampling targets were between 3,400 and 47,000 L. Average purge rates for the OGW events were between 2 to 23 liters/min, depending on the purging method and yield of the formation (e.g. continuous pumping or recovery time between

pumping/swabbing). Purging for OGW7 was only completed by swabbing during day shifts, so the average purge rate for that OGW event is low (2 liters/min).

At the time of purging and sampling, field observations indicated that the OGW sampling activities for OGW7 (Precambrian interval) were successful. Subsequent review of the groundwater isotope results, field observations, and straddle packer results (WP06) suggest that there was a poor packer seal or packer failure during purging of the interval. As a result, the water sample and chemistry results obtained from OGW7 are interpreted to be sourced from a blend of water from permeable intervals in the Salina A2 Carbonate, Salina A1 Carbonate, and Guelph Formations, and are therefore not representative of the targeted Precambrian interval. Further discussion of the OGW7 sample results is provided in Section 3.4.3.3.

Table 4 OGW Interval Selection and Purging Summary

OGW #	WP10 Formation/Unit Sampled[1]	Interval Depth (m)	Purging and Sampling Date	Total Volume Purged (L)[2]	Fluorescein Concentration (ppb)		P_{GW}[3]	Purging Method
					Pre-Purge DW Sample	GW Sample		
OGW1	Amherstburg/ Bois Blanc	70.17-75.59	Jun 13-15, 2021	32,000	105.6	2.1	0.98	Submersible Pump
OGW2	Bois Blanc	91.57-99.59	Jun 16-28, 2021	47,000	95.3	2.8	0.97	Submersible Pump
OGW3	Bass Island	113.67-120.59	Jun 20-21, 2021	3,400	48.2	<0.4[4]	0.99	Submersible Pump
OGW4	Salina A2 Carbonate	267.17-273.59	Jul 21-26, 2021	29,300	91.8	0.4	0.99	Submersible Pump
OGW5	Salina A1 Carbonate	280.57-285.59	Jul 27-29, 2021	10,900	112.7	2.4	0.98	Submersible Pump
OGW6	Guelph	316.57-321.59	Jul 31-Aug 2, 2021	16,000	94.6	2.4	0.98	Submersible Pump
OGW7	Shadow Lake/Precambrian	859.88-880.84	Sep 20-24, 2021	12,900	100.1	2.6	0.97	Swabbing

1. Formations shown are based on finalized tops from borehole data integration (WP10)
2. Total Volume Purged is rounded to the nearest 100 L
3. P_{GW} is the proportion of groundwater in the OGW sample, calculation of P_{GW} is described in section 3.3.
4. Below method detection limit of 0.4 ppb

3.3 Estimation of Drill Water Contamination on Final Groundwater Samples

Impacts of drill water contamination on the groundwater sample results were evaluated based on the relative concentration of fluorescein in the drill water and final/primary groundwater samples. Equation 2 was used to calculate the proportion of groundwater (P_{GW}) in the final/primary sample from each OGW event, assuming that the initial (pre-drilling) fluorescein concentration in groundwater was zero. With the P_{GW} in the final sample known, results for the final/primary groundwater samples were corrected with Equation 3.

P_{GW}'s calculated for each OGW event are shown in Table 4 . The calculated P_{GW} for groundwater samples collected at SB_BH01 were between 0.97-0.99. These high P_{GW} confirm that the purging program was

successful and the final groundwater sample results provide representative estimates of in-situ groundwater chemistry if there are no other sampling-related impacts on sample quality.

The P_{GW} values can be used to correct for drill water contamination for each analyte where the final groundwater sample and associated pre-purging drill water sample have reported values above the method detection limits.

Equation 2: $P_{GW} = (1 - \frac{Sample\ Flourescein\ Concentration}{Drill\ Water\ Flourescein\ Concentration})$ Equation 3: $C_{GW} = \frac{C_S - C_{DW}(1-P_{GW})}{P_{GW}}$

Where:
C_{GW} = groundwater concentration
C_S = sample concentration
C_{DW} = drill water concentration
P_{GW} = proportion of groundwater (in sample)

Results presented in the text of this report have not been corrected for drill water contamination, unless stated. The drill water corrected results are provided separately in Appendix C.

3.4 Water Chemistry Results

Section 3.4.1 to Section 3.4.4 provide a summary of major findings from the water sampling program at SB_BH01. A sample summary table is provided in Appendix A that lists all samples that were collected as part of WP02 and WP07 activities, with sample depths (where applicable) and sample descriptions. Complete result tables, including field parameter measurements, in-field analyses, and laboratory results are included in Appendix B.

Copies of chain of custody forms and final laboratory reports, including descriptions of laboratory methodologies, have been provided to the NWMO as part of a formal data delivery that accompanied this report.

3.4.1 Water Source (WS) Results

Table 5 provides a summary of key parameters for water source samples that were collected at SB_BH01. Except for SB_BH01_WS029, all water source samples had consistent major anion, cation, and field parameter measurements (pH, conductivity, etc.). The high consistency between WS samples was expected since the water used throughout the drilling program was from a single source: the Kincardine municipal supply, which extracts water from an intake in Lake Huron. Complete results tables for all water source samples are provided in Appendix B.1.

Field parameter measurements for the WS samples are all consistent with a fresh, surface-water source, evidenced by all water source samples having dissolved oxygen above 3 mg/L, oxidizing (positive) oxidation-reduction potential (ORP), and having a specific gravity close to 1.0. No fluorescein was detected in any of the water source samples which were collected prior to addition of fluorescein for preparation of the drill water.

Sample SB_BH01_WS029 was collected during hydraulic testing activities (WP06) and was mixed with a Ca-Na-Cl brine to prevent the water from freezing, which resulted in a distinct chemistry that had higher

electrical conductivity (EC), turbidity, and total dissolved solids (TDS) than the other water source samples.

Major ions for select water samples from SB_BH01 are plotted on a piper plot in Figure 2. Shown as an open square, the brine-impacted water source sample (SB_BH01_WS029) can be clearly distinguished from the other water source samples (closed squares) which plot in tight grouping on the three subplots. The major anion chemistry of the water source samples includes similar proportions of sulfate and bicarbonate with lesser amounts of chloride. The most abundant cation for the water source samples was calcium, with lesser proportions of magnesium, sodium, and potassium.

Table 5 Select Water Chemistry Results – Water Source (WS) Samples

Analyte	Unit	Min.	Max.	Mean	Standard Deviation (σ)	SB_BH01 _WS029
Select Field Parameters and In-Field Analyses						
Fluorescein	ppb	<0.4	<0.4	<0.4	<0.4	<0.4
pH	--	6.0	8.7	7.4	0.6	7.9
Electrical Conductivity (EC)	mS/cm	0.17	0.76	0.29	0.14	7.70
Oxidation Reduction Potential	mV	56	701	487	162	551
Dissolved Oxygen	mg/L	3.0	11.6	6.9	2.2	9.7
Total Dissolved Solids (EC Calculated)	g/L	0.11	0.50	0.19	0.09	4.98
Total Alkalinity (as $CaCO_3$)	mg/L	20	130	65	18	89
Specific Gravity	--	0.980	1.002	0.997	0.006	1.002
Select Isotopic Analyses						
^{3}H (Tritium)	TU	32.3	92.6	50.5	17.9	38.9
^{14}C	pmC	97.0	100.9	99.6	1.2	96.8
$\delta^{18}O$	‰ VSMOW	-7.4	-6.8	-7.1	0.2	-6.7
$\delta^{2}H$ (Deuterium)	‰ VSMOW	-55.9	-51.3	-54.0	1.2	-51.5
^{129}I	atoms/kg	$2.0x10^{7}$	$6.3x10^{7}$	$3.7x10^{7}$	$1.3 x10^{7}$	$5.7x10^{7}$

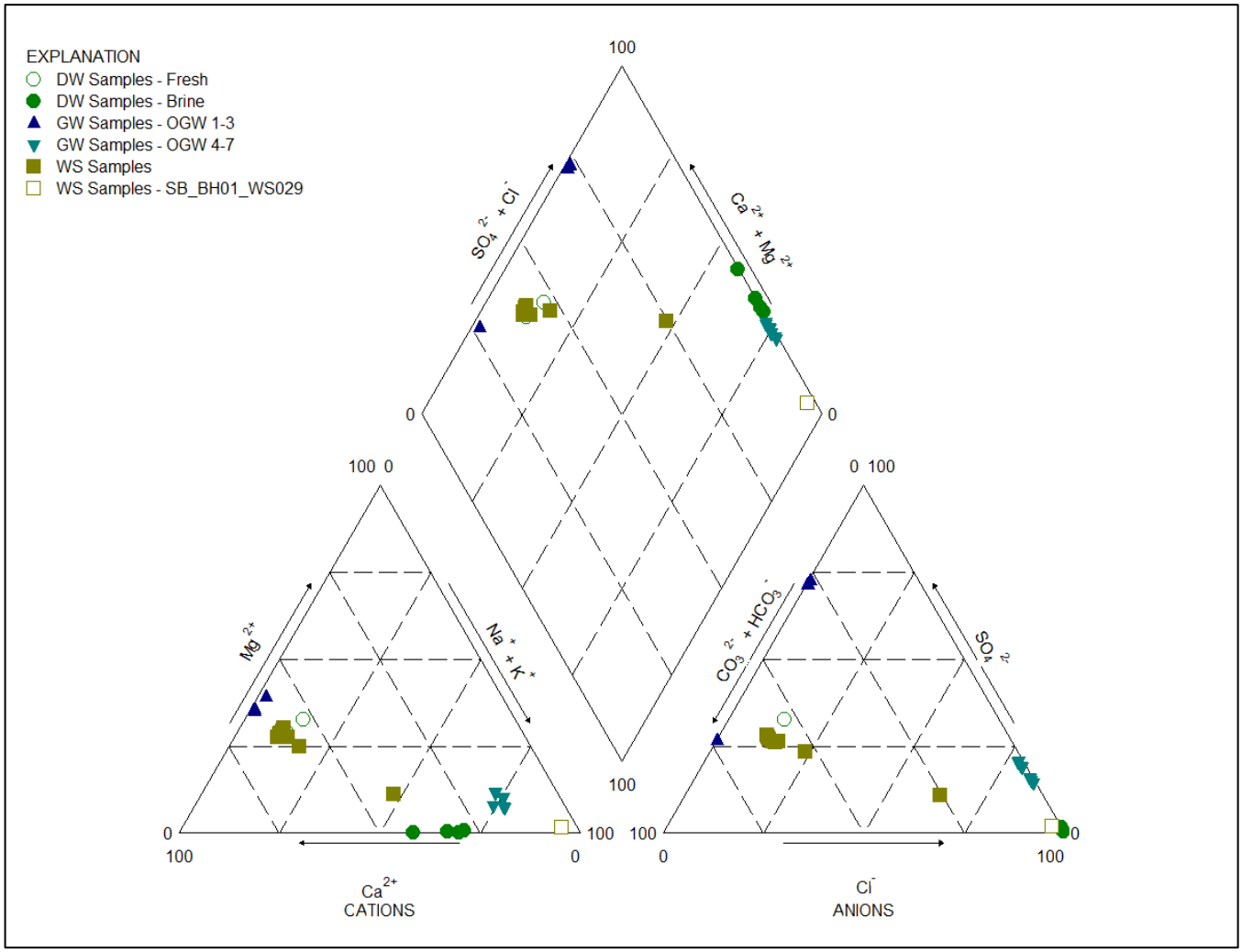

Figure 2 Piper Plot for Select Water Source (WS), Drill Water (DW) and Groundwater (GW) Samples. A value of 0.5 x detection limit (0.5 mg/L) was used as the chloride concentration for sample SB_BH01_GW001. Bicarbonate/carbonate concentrations calculated by advanced speciation method based on total alkalinity and pH.

Isotopic data for the water source samples show consistent but relatively high concentrations of ^{14}C (96.8-100.9 pmC, mean = 99.6 pmC, σ = 1.2 pmC) and tritium (32.3-92.6 TU, mean =50.5 TU, σ = 17.9 TU) that are consistent with modern surface waters in Southwestern Ontario. The elevated tritium is expected with the intake for the Kincardine municipal water supply located only 15 km from the Bruce Power nuclear generating station. Recent regional studies of surface water and shallow groundwater in Ontario have shown high concentrations of tritium near active nuclear power generating stations, including the Bruce Power (Canadian Nuclear Safety Commission 2013, Priebe & Hamilton 2022). ^{129}I concentrations in the water source samples were between $2.0x10^7$ to $6.3x10^7$ atoms/kg (mean = $3.7x10^7$ atoms/kg, σ = $1.3x10^7$ atoms/kg).

On an oxygen (δ18O)-deuterium (δ2H) cross plot (Figure 3) all water source samples plot in a tight grouping with the drill water (DW) samples near the Lake Huron Local Evaporation Line (LEL). δ18O and δ2H values for the water source samples were between -6.7 to -7.4 ‰ (σ = 0.2) and -51.3 to -55.9 (σ = 1.2) VSMOW, respectively.

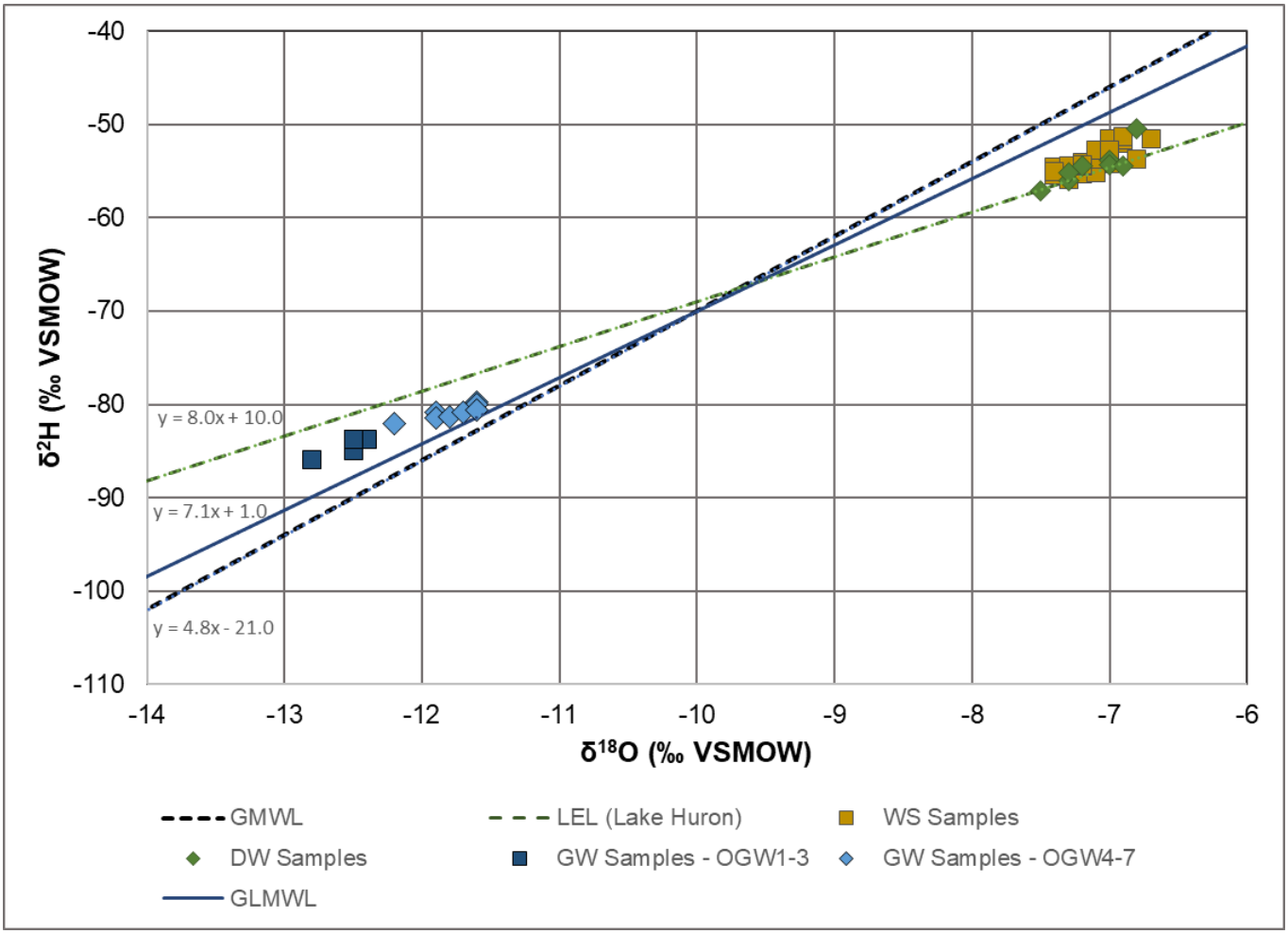

Figure 3 Oxygen ($\delta^{18}O$)– Deuterium ($\delta^{2}H$) Cross-Plot for WP02 and WP07 Water Samples. GMWL = Global Meteoric Water Line, GLMWL = Great Lakes Meteoric Water Line, and LEL = local evaporation line for Lake Huron (Longstaffe et al. n.d.) Both primary and duplicate results for GW samples are shown.

3.4.2 Drill Water (DW) Results

Table 6 provides a summary of key parameters for drill water samples collected as part of OGW (WP07) activities. The seven DW samples discussed here are the pre-purging samples that were collected from the drill fluid at the start of the seven OGW sampling events. Several other DW samples were collected as part of drilling (WP02) but were archived without laboratory analyses, so they are not discussed in this data report. Complete results tables for all DW samples are provided in Appendix B.2.

Comparison of the drill water sample chemistry shows two distinct compositional groupings: the first group of samples are associated with the OGW1 to OGW3 (SB_BH01_DW002, SB_BH01_DW007, SB_BH01_DW013) when a fresh-water based drill fluid was used. The second group of samples are associated with OGW4 to OGW7 (SB_BH01_DW018, SB_BH01_DW019, SB_BH01_DW021, SB_BH01_DW040) when a brine-based drill fluid was used. The two drill fluid types can be easily distinguished by total dissolved solids, electrical conductivity, specific gravity, and major ions.

On a piper plot (Figure 2), the two groupings of drill water samples show distinct ionic compositions. The samples from the fresh water-based drill fluid (open green circles) have similar compositions to the water source samples, with sulfate and bicarbonate as the most significant anions, and calcium as the most significant cation. In contrast, the ionic composition of the brine-based drill water samples (solid green circles) are dominated by chloride and sodium, with relatively smaller proportions of calcium and sulfate.

Table 6 Select Water Chemistry Results – Pre-Purge Drill Water (DW) Samples

Analyte	Unit	Fresh DW Samples			Brine DW Samples			
		SB_BH01_DW002	SB_BH01_DW007	SB_BH01_DW013	SB_BH01_DW018	SB_BH01_DW019	SB_BH01_DW021	SB_BH01_DW040
Select Field Parameters and In-Field Test Analyses								
Fluorescein	ppb	105.6	95.3	48.2	91.8	112.7	94.6	90.3
pH	--	6.7	8.8	8.4	6.9	7.2	8.2	7.0
Electrical Conductivity (EC)	mS/cm	0.61	0.20	0.23	339	212	266	299
Dissolved Oxygen	mg/L	13.4[2]	9.2	2.2	1.7	1.4	2.3	0.9
Total Dissolved Solids (EC Calculated)	g/L	0.45	0.14	0.17	203	127	160	179
Specific Gravity	--	0.996	0.995	0.998	1.098	1.094	1.084	1.093
Select Non-Isotopic Analyses								
Chloride (Cl)	mg/L	13	10	10	71,000	58,000	71,000	88,000
Calcium (Ca)	mg/L	130	20	26	16,000	11,000	17,000	13,000
Sodium (Na)	mg/L	7.6	5.4	5.5	37,000	31,000	27,000	34,000
Select Isotopic Analyses								
^{3}H (Tritium)	TU	37.6	41.5	38.1	35.8	28.7	35.5	57.4
^{14}C	pmC	NV[1]	93.99	97.58	9.67	13.76	53.82	82.02
$\delta^{18}O$	‰ VSMOW	-7.5	-7.0	-7.2	-6.9	-7.3	-7.3	-6.8
$\delta^{2}H$ (Deuterium)	‰ VSMOW	-57.1	-53.9	-54.4	-54.5	-56	-55.2	-50.5
^{129}I	atoms/kg	$2.3x10^7$	$2.9x10^7$	$3.6 x10^7$	$2.4 x10^7$	$2.7 x10^7$	$2.3 x10^7$	$4.2 x10^7$

1. NV = no value, sample failed twice during testing
2. Reported dissolved oxygen for sample SB_BH01_DW002 (13.4 mg/L) exceeds theoretical saturation limit of oxygen based on reported pressure and temperature when the sample was collected.

Water parameters not impacted by addition of salt show consistent results for both the fresh-water based and brine-based DW samples. Except for sample SB_BH01_DW013, drill water fluorescein concentrations were between 90.3-112.7 ppb. All drill water samples were oxidizing (+ ORP) and had field-measured pH values between 6.7-8.8 (neutral to slightly basic).

Except for ^{14}C in SB_BH01_DW018, radioisotope data for the drill water samples show concentrations of ^{14}C (13.76-97.58 pmC) and tritium (28.7-57.4 TU) that are within typical ranges of modern surface waters in Southwestern Ontario and are similar to the water source sample concentrations. ^{129}I concentrations in the drill water samples ($2.3x10^7$ to $4.2x10^7$ atoms/kg) are also consistent with the water source sample concentrations ($2.0x10^7$ to $6.3x10^7$ atoms/kg).

On an oxygen ($\delta^{18}O$)-deuterium ($\delta^{2}H$) cross plot (Figure 3, Section 3.4.1), all drill water samples plot in a tight grouping with the water source samples below the global meteoric water line (GWML) and near the

Lake Huron LEL. $\delta^{18}O$ and $\delta^{2}H$ values for the drill water samples were between -6.8 to -7.5 ‰ and -50.5 to -57.1 VSMOW, respectively.

3.4.3 Groundwater (GW) Results

The following section presents field and laboratory reported results for the primary groundwater samples collected for the seven OGW intervals at SB_BH01. Unless specifically noted, results presented for the groundwater samples in this report have not been corrected for drill water contamination (see Section 3.3). Corrected results are provided separately in Appendix C. Complete results tables for all GW samples are provided in Appendix B.3.

Purge water archive samples and QA/QC samples were also assigned GW sample identification codes in acQuire, but are not discussed in this section because no laboratory analyses were completed on the purge water archive samples and the QA/QC sample results are discussed separately in Section 3.4.4.

Table 7 and Figure 4 provide a summary of key parameters for the seven primary OGW samples. Two distinct groundwater types are observed, based on major ions, total dissolved solids, electrical conductivity, specific gravity, ^{14}C, and the oxygen ($\delta^{18}O$), deuterium ($\delta^{2}H$), and helium isotopic ratios. The two types; shallow fresh waters, and saline waters from intermediate depths are discussed separately in Section 3.4.3.1 and Section 3.4.3.2.

Table 7 Select Water Chemistry Results – Groundwater (GW) Samples

Analyte[1]	OGW Event	OGW1	OGW2	OGW3	OGW4	OGW5	OGW6	OGW7
	Interval (m)	70.17-75.59	91.57-99.59	113.67-120.59	267.17-273.59	280.57-285.59	316.57-321.59	859.88-880.84
	Units	SB_BH01_GW001	SB_BH01_GW002	SB_BH01_GW006	SB_BH01_GW025	SB_BH01_GW032	SB_BH01_GW039	SB_BH01_GW046
Select Field Parameters, In-Field Test Analyses								
Fluorescein	ppb	2.1	2.8	0.1	0.4	2.4	2.4	2.6
Calculated P_{GW}	--	0.98	0.97	0.99	0.99	0.98	0.98	0.97
pH	--	7.4	6.9	7.2	7.1	7.3	7.0	7.3
Electrical Conductivity (EC)	mS/cm	0.58	1.33	1.31	30.2	32.2	34.8	36.3
ORP	mV	-152	-86	-290[2]	-338	-306	-415	-288
Total Dissolved Solids (EC Calculated)	g/L	0.43	0.98	0.96	22.2	23.7	25.6	26.7
Specific Gravity	--	1	0.998	0.997	1.017	1.019	1.022	1.022
Field Dissolved Oxygen (DO)	mg/L	0.39	0.33	0.32	0.05	0.02	0.02	0.71
Field Sulfide (S^{2-})	mg/L	0	0	0.1	30.5	19.5	23	3.3
Lab Total Alkalinity (as $CaCO_3$)	mg/L	230	190	210	190	210	180	190
Select Non-Isotopic Analyses								
Chloride (Cl)	mg/L	<1.0	1.9	2.1	8,200	9,600	13,000	14,000
Sulphate (SO_4)	mg/L	81	460	540	2,900	3,100	3,100	3,600

Analyte[1]	OGW Event	OGW1	OGW2	OGW3	OGW4	OGW5	OGW6	OGW7
	Interval (m)	70.17-75.59	91.57-99.59	113.67-120.59	267.17-273.59	280.57-285.59	316.57-321.59	859.88-880.84
	Units	SB_BH01_GW001	SB_BH01_GW002	SB_BH01_GW006	SB_BH01_GW025	SB_BH01_GW032	SB_BH01_GW039	SB_BH01_GW046
Calcium (Ca)	mg/L	74	170	190	1,000	980	1,500	1,600
Magnesium (Mg)	mg/L	30	58	63	450	420	430	420
Sodium (Na)	mg/L	2.3	3.0	3.8	5400	6000	8800	7600
Potassium (K)	mg/L	1.6	1.6	1.7	51	42	64	78
Select Isotopic Analyses								
^{3}H (Tritium)	TU	1.7	1.5	1	<0.8	1	2.5	3.1
^{14}C	pmC	35.22	24.37	12.78	<0.54[3]	<0.54	0.71	1.59
$\delta^{18}O$	‰ VSMOW	-12.8	-12.5	-12.5	-11.9	-11.8	-11.6	-11.7
$\delta^{2}H$ (Deuterium)	‰ VSMOW	-85.9	-85	-83.7	-80.9	-81.3	-79.7	-80.8
^{129}I	atoms/kg	$8.6x10^{5}$	$1.4x10^{6}$	$5.4x10^{5}$	$9.8x10^{5}$	$4.2x10^{5}$	$1.7x10^{6}$	$1.2x10^{7}$
$^{3}He/^{4}He$ (Normalized[4])	--	$9.1x10^{-1}$	$5.6x10^{-1}$	$9.6x10^{-1}$	NV[5]	NV[5]	$2.0x10^{-2}$	$5.0x10^{-2}$

1. Results have not been corrected for drill water contamination
2. ORP value from reading collected near the end of purging reported
3. No value was recorded for the primary sample (SB_BH01_GW025), reported ^{14}C is from duplicate sample (SB_BH01_GW026)
4. $^{3}He/^{4}He$ ratio in sample normalized to the isotopic ratio air ($1.36x10^{-6}$)
5. NV = no value, noble gas analyses not completed due to high hydrogen sulfide concentration in samples

On an oxygen ($\delta^{18}O$)-deuterium ($\delta^{2}H$) cross plot (Figure 3), all groundwater samples plot in a grouping above the global meteoric water line (GMWL) and below the Lake Huron LEL. In contrast, all drill water and water source samples plot near the Lake Huron LEL. The groundwater samples are more depleted than the water source and drill water samples in both ^{18}O and deuterium ^{2}H.

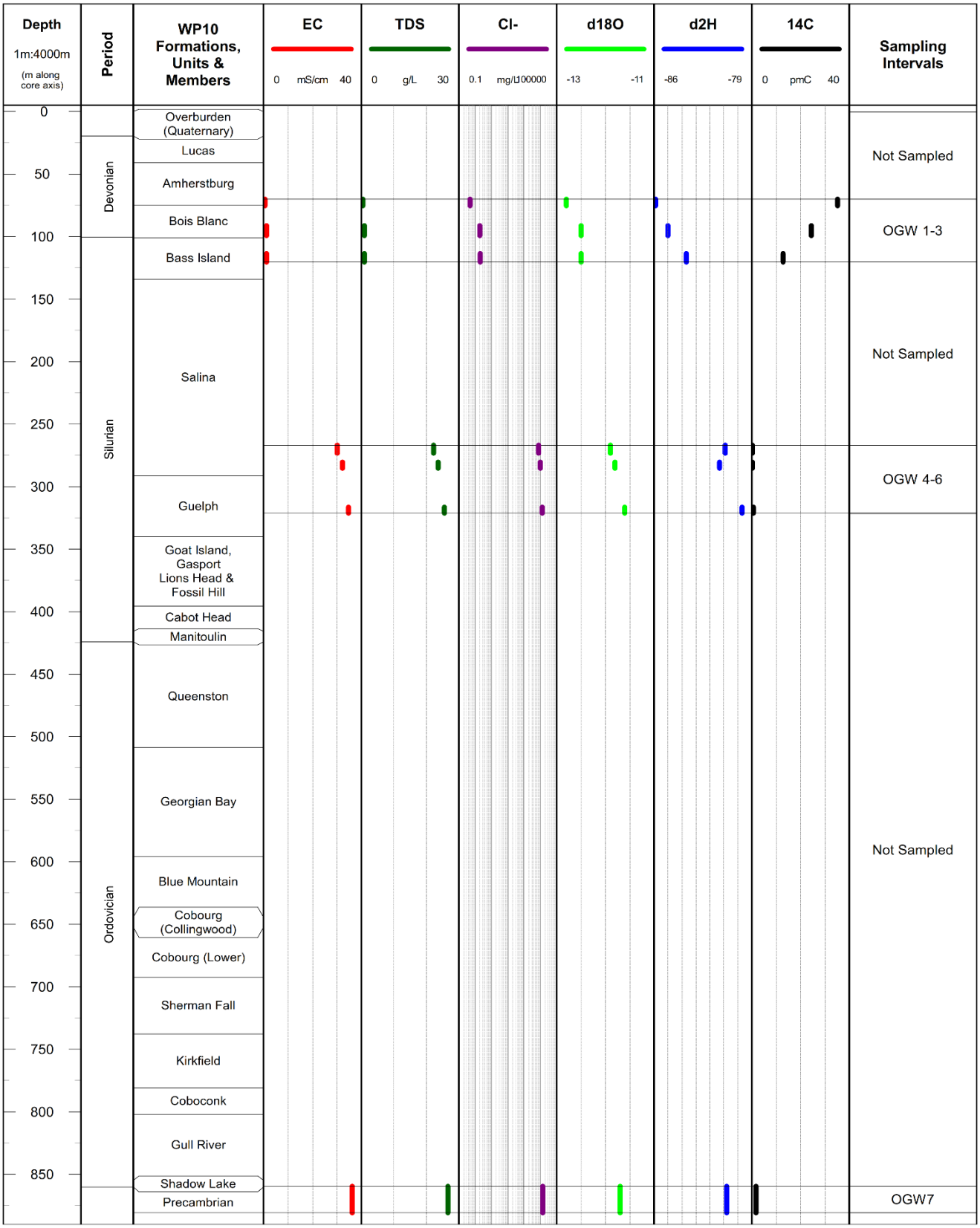

Figure 4 SB_BH01 Groundwater Sample Locations, calculated EC (conductivity), TDS (total dissolved solids), Cl (chloride), and isotopic ratios (18O, 2H, and 14C).

3.4.3.1 *Shallow Groundwater Results – OGW1 (Amherstburg Fm.), OGW2 (Bois Blanc Fm.), and OGW3 (Bass Island Fm.)*

The first group of groundwater samples were from intervals in the shallow bedrock above the Salina Group. The targeted bedrock intervals for this group include the Amherstburg-Bois Blanc contact (OGW1, 70.17-75.59 m), the Bois Blanc Formation (OGW2, 91.57-99.59 m), and the Bass Island Formation (OGW3, 113.67-120.59 m). These three samples were fresh water, with low total dissolved solids (0.43-0.96- g/L), relatively low electrical conductivity (0.58-1.33 mS/cm), and specific gravity close to 1.0.

Dissolved oxygen (DO) measurements recorded using a flow through cell and a Horiba multiparameter probe were 0.0 mg/L for the shallow groundwater samples. DO measurements recorded using a colorimeter decreased with depth from 0.39 mg/L (OGW1) to 0.33 mg/L and 0.32 mg/L (OGW2 and OGW3).

Sulphide was not detected in field and laboratory testing for the OGW1 and OGW2 samples. For the OGW3 sample, sulfide was not detected at the lab, but a low concentration (0.1 mg/L) was measured in the field.

Shown by dark blue triangles on a piper plot (Figure 2), the shallow groundwater samples have a distinct ionic chemistry from the other sample types collected at SB_BH01. The most abundant anion in these samples was sulfate (81-540 mg/L), followed by bicarbonate (232-280- mg/L), and relatively low chloride (≤2.1 mg/L). The most abundant cations in these samples were calcium (74-190 mg/L), followed by magnesium (30-63 mg/L), sodium (2.3-3.8 mg/L), and potassium (1.6-1.7 mg/L).

The shallow groundwater samples are the most depleted in oxygen ($\delta^{18}O$) and deuterium ($\delta^{2}H$) of the water samples that were collected at SB_BH01. On a cross plot (Figure 3), the three shallow groundwater samples plot in a tight grouping above and to the left of the GMWL, with $\delta^{18}O$ values between -12.4 to -12.8 ‰ VSMOW and $\delta^{2}H$ values between -83.7 to -85.9 ‰ VSMOW.

Tritium (^{3}H) and ^{14}C in the shallow groundwater samples both decrease with depth from 1.7 to 1.0 TU and 35.2 to 12.8 pmC, respectively (Figure 4). When corrected for drill water contamination (Appendix C), tritium concentrations in the shallow groundwater samples were between 0.3-1.0 TU, with the corrected values for OGW2 and OGW3 samples both below the laboratory method detection limit of 0.8 TU.

^{129}I concentrations in the shallow groundwater samples ($5.4x10^{5}$ to $1.4x10^{6}$ atoms/kg) were 1-2 orders of magnitude lower than concentrations reported for the drill water and water source samples. The shallow groundwater samples had air-normalized $^{3}He/^{4}He$ ratios between 0.56-0.91.

3.4.3.2 *Intermediate Groundwater Results – OGW4 (Salina A2 Carbonate), OGW5 (Salina A1 Carbonate), and OGW6 (Guelph Fm.)*

The second group of groundwater samples were collected from intermediate depths in Silurian bedrock of the Salina Group and underlying Guelph Formation. The targeted bedrock formation intervals included the Salina A2 Carbonate Unit (OGW4, 267.17-273.59 m), the Salina A1 Carbonate Unit (OGW5, 280.57-285.59 m), and the Guelph Formation (OGW6, 316.57-321.59 m). Groundwater from these three intervals was saline water, with higher total dissolved solids (22.2-25.6 g/L), electrical conductivity (30.2-34.8

mS/cm), and specific gravity (1.017-1.022) than the groundwater samples collected at shallower depths (OGW1-3).

Dissolved oxygen (DO) measurements recorded using a flow through cell and a Horiba multiparameter probe were between 0.0-1.7 mg/L for these three samples. The multiparameter DO measurements likely overestimate DO because the intervals could not be pumped continuously, causing the DO in the flow through cell to increase between pumping events. DO measurements recorded using a colorimeter for the intermediate groundwater samples were between 0.02-0.05 mg/L.

Sulfide was detected in the intermediate groundwater samples, with field measurements between 19.5-30.5 mg/L (S^{2-}). Laboratory reported sulfide concentrations (2.6-14 mg/L) for these samples were lower than the field measurements. Hydrogen sulfide gas was also detected on air monitors at surface during purging and collection of water samples for these intervals. All three samples were strongly reducing, with field ORP readings between -306 to -415 mV.

Shown by light blue inverted triangles on a piper plot (Figure 2), the intermediate groundwater samples have a distinct ionic chemistry from the other sample types collected at SB_BH01. The most abundant anion in these samples was chloride (8,200-13,000 mg/L), with much smaller concentrations of sulfate (2,900-3,100 mg/L). The most abundant cation in these samples was sodium (5,400-8,800 mg/L), with much lower concentrations of calcium (980-1,500 mg/L) and magnesium (420-450 mg/L).

The intermediate groundwater samples are more depleted in oxygen ($\delta^{18}O$) and deuterium ($\delta^{2}H$) than the water source and drill water samples but are less depleted in both isotopes than the shallow groundwater samples. On a cross plot (Figure 3), the three intermediate water samples plot in a tight grouping above and to the left of the GMWL, with $\delta^{18}O$ values between -11.6 to -11.9 ‰ VSMOW and $\delta^{2}H$ values between -79.7 to -81.3 ‰ VSMOW.

Tritium (^{3}H) and ^{14}C in the intermediate groundwater samples show low concentrations of <0.8-2.5 TU and <0.54-0.71 pmC, respectively. When corrected for drill water contamination (Appendix C), tritium concentrations in the intermediate groundwater samples were between 0.4-0-1.8 TU, with the corrected values for OGW4 and OGW5 samples both below the laboratory method detection limit of 0.8 TU. Corrected ^{14}C values were below the laboratory method detection limit (<0.54 pmC) for all three samples.

^{129}I concentrations in the shallow groundwater samples ($4.2x10^{5}$ to $1.7x10^{6}$ atoms/kg) were 1-2 orders of magnitude lower than concentrations reported for the drill water and water source samples. Due to the high levels of hydrogen sulfide in groundwater samples from OGW4 and OGW5, noble gas analyses were not completed. The groundwater sample from OGW6 had an air-normalized $^{3}He/^{4}He$ ratio of 0.02.

3.4.3.3 *Groundwater Results – OGW7 (Shadow Lake -Precambrian)*

The final groundwater sample from OGW7 was intended to be water sourced from the Precambrian crystalline rocks in the bottom of SB_BH01 (859.88-880.84 m). Field indicators of permeability during drilling of this interval were obscured by significant fluid losses to the Guelph Formation and Salina A1/A2 Units above. The interval was isolated using the wireline conveyed packer system and the interval transmissivity was estimated to have a hydraulic conductivity of $1.1x10^{-7}$ m/s based on an initial rising head slug test. Analysis of this slug test was complicated by leakage through the ~860 m of drill rods

during the test. Based on this result, Geofirma and the NWMO decided to attempt to collect an OGW sample from the Shadow Lake – Precambrian interval.

At the time of purging and sampling, field observations indicated that the OGW sampling activities for OGW7 (Precambrian interval) were successful. The water sample obtained from this interval was saline water with total dissolved solids (26.7 g/L), electrical conductivity (36.3 mS/cm), and specific gravity (1.022) measurements like the intermediate groundwater samples (OGW4-6). Geofirma completed the OGW7 sampling at the end of drilling on September 24, 2021.

Results from the subsequent hydraulic testing program (WP06) at SB_BH01 showed that the Precambrian interval had much lower permeability than initially estimated from the rising head slug test completed as part of OGW7. A pulse injection test completed on a 5-meter interval of the Precambrian from 864.00-869.03 m had an estimated hydraulic conductivity of 3.9×10^{-13} m/s. Pressure responses recorded in a transducer below the bottom packer for staddle packer testing also showed very low hydraulic conductivity for the Precambrian and Ordovician rocks throughout the WP06 testing program. For these reasons, it was concluded that there was insufficient permeability in the Precambrian interval to have obtained the purge rates necessary to collect a representative groundwater within the duration of the OGW7 event.

As a result, the water sample and resulting analyses for the OGW7 groundwater sample are interpreted to represent a blend of groundwater sourced from more-permeable bedrock intervals shallower in the borehole, including the Salina A1 Carbonate, Salina A2 Carbonate, and Guelph Formation. Water from the borehole annulus is interpreted to have bypassed the packer seal and entered the drill rods due to packer failure at some time during purging activities.

On a piper plot (Figure 2), the OGW7 sample plots in a tight grouping with the intermediate groundwater samples (OGW4-6). The major anion for this sample was chloride (14,000 mg/L) with a much smaller concentration of sulfate (3,600 mg/L). The most abundant cations in the OGW7 sample were sodium (7,600 mg/L), followed by calcium (1,600 mg/L), and magnesium (420 mg/L).

Generally, the ionic composition and field parameter measurements (e.g. EC, density, and TDS) for the OGW7 sample were similar to the intermediate groundwater samples (OGW4-6). However, parameters that are sensitive to the atmosphere show subtle, but distinguishable difference in the OGW7 sample that include: less reducing ORP (-288 mV), lower sulfide (3.3 mg/L), and higher dissolved oxygen (~0.7 mg/L) than in the OGW4-6 samples.

Tritium (^{3}H) and ^{14}C results provide additional indications of potential atmospheric or drill water contamination of the OGW7 sample. Tritium (^{3}H) and ^{14}C in the OGW7 sample were 3.1 TU and 1.59 pmC, respectively. Both results for the OGW7 sample are low relative to the water source and drill water samples but are high relative to the concentrations measured for the intermediate groundwater samples (OGW4-6). Finally, the ^{129}I concentration in the OGW7 was 1.2×10^{7} atoms/kg, higher than all other groundwater samples and similar in magnitude to the drill water and water source concentrations of ^{129}I.

Combined, these isotopic and water chemistry results provide further evidence of packer bypass during the OGW7 sampling event, indicating that the results for the event are not representative of groundwater from the Shadow Lake Formation and Precambrian.

3.4.4 QA/QC Sample Results

Results from the QA/QC sampling completed by Geofirma are presented for duplicate groundwater samples, tritium free blanks, and rinsate blanks. Additional QA/QC activities that were completed by the University of Ottawa, Bureau Veritas Laboratories, and SGS Laboratories as part of their internal quality management programs are not presented in this report but are provided as part of the laboratory reports that were delivered separately to the NWMO with the accompanying SB_BH01 WP07 data delivery.

3.4.4.1 *Duplicate Sample Results*

Table 8 provides a summary of average RPD that were calculated for each major analyte group based on the laboratory data from primary/duplicate sample sets that were collected as part of OGW2 through OGW7. Complete RPD results are provided in Appendix D.

Table 8 Calculated Average RPD, by Analyte Group, for Primary/Duplicate Sample Sets

Lab and Analyte Group	OGW2 Set	OGW3 Set	OGW4 Set	OGW5 Set	OGW6 Set	OGW7 Set
	Average RPD (%), by Lab/Analyte Group					
BVL – Radionuclides	6	25	31 (6)[1]	76[3]	NV	NV
BVL – Physiochemical Parameters, Anions, and Nutrients	2	1	17 (5)[2]	4	5	11
BVL -Metals	4	2	2	3	1	5

1. RPD for OGW4 ^{234}U = 57%, RPD average for all other radionuclide parameters = 6%
2. RPD for OGW4 total Kjeldahl nitrogen = 133%, RPD average for all other inorganic parameters = 6%
3. RPD for OGW5 ^{234}U = 78% and ^{238}U = 74%
4. NV = all samples were below detection limit or have a primary-duplicate average value < 5x MDL

Sample pairs where the average concentration was below 5x the detection limit were not considered as part of the RPD assessment (MECP 2004). In general, calculated RPD for analyses completed at Bureau Veritas Laboratories (RPD) show acceptable precision (RPD <30%). Metals and anion/inorganic parameters showed very consistent results, with RPD values <15% for most parameters. RPD values calculated for radionuclide parameters at BVL showed less precision, which in part was caused by low concentrations of these radionuclides relative to their method detection limits. Parameters where BVL-reported results for duplicate sets had calculated RPD >30% included:

- OGW3 – Gross Alpha
- OGW4 – ^{234}U, Total Kjeldahl Nitrogen, and Total Nitrogen
- OGW5 - ^{234}U and ^{238}U
- OGW7 – SiO_2 and Sulphide

The RPD method for comparison of duplicate samples is not generally suitable for assessment of isotopic analyses completed at University of Ottawa, where the results are typically presented as isotopic ratios, or the measured parameters are close to the method detection limits. When assessed qualitatively, the isotopic results from University of Ottawa were generally consistent between the primary and duplicate samples.

3.4.4.2 Tritium Free Blank Sample Results

Table 9 provides a summary of the tritium results for tritium free blank samples that were collected during OGW sampling activities at SB_BH01. Tritium concentrations were below method detection limits for all blank samples and suggest that no significant atmospheric exposure occurred during sampling and transport of the associated tritium samples from OGW2-7. No tritium free blank was collected as part of the first OGW sampling event (OGW1), where no QA/QC samples were collected.

Table 9 Tritium Free Blank Results Summary

Analyte	OGW Event	OGW2	OGW3	OGW4	OGW5	OGW6	OGW7
	Units	SB_BH01_GW005	SB_BH01_GW011	SB_BH01_GW027	SB_BH01_GW034	SB_BH01_GW041	SB_BH01_GW048
^{3}H (Tritium)	TU	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

5.4.4.3 Rinsate Blank Sample Results

Table 10 provides a summary of the results for rinsate blank samples that were collected during OGW sampling activities at SB_BH01. Aluminum, calcium, magnesium, sodium, and strontium were detected in at least one of the six rinsate blank samples that were submitted. The concentrations of the metals that were detected in the rinsate samples were low and were several orders of magnitude lower than the respective concentrations for the same metals in the associated groundwater samples. All other analyzed parameters were not detected in the rinsate blank samples.

Table 10 Rinsate Blank Sample Results (Detections Bolded)

Analyte	OGW Event	OGW2	OGW3	OGW4	OGW5	OGW6	OGW7
	Units	SB_BH01_GW004	SB_BH01_GW007	SB_BH01_GW021	SB_BH01_GW031	SB_BH01_GW035	SB_BH01_GW045
Anions and Nutrients							
Bromide (Br)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloride (Cl)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoride (F)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Iodide (I)	mg/L	<0.10	<0.10	<0.10	<1.0	<2.0	<0.10
Nitrate (NO3)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrite (NO2)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate + Nitrite	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
OrthoPhosphate (PO4)	mg/L	<0.010	<0.010	<1.0	<1.0	<0.010	<0.010
Sulphate (SO4)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Analyte	OGW Event	OGW2	OGW3	OGW4	OGW5	OGW6	OGW7
	Units	SB_BH01_GW004	SB_BH01_GW007	SB_BH01_GW021	SB_BH01_GW031	SB_BH01_GW035	SB_BH01_GW045
Metals							
Aluminum (Al)	mg/L	<0.0049	<0.0049	<0.0049	<0.0049	**0.0059**	<0.049
Boron (B)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Calcium (Ca)	mg/L	**0.3**	**1.2**	<0.20	**0.32**	<0.20	<200
Iron (Fe)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium (Li)	mg/L	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005
Magnesium (Mg)	mg/L	**0.054**	**0.07**	<0.05	0.078	<0.050	<0.05
Potassium (K)	mg/L	<0.200	<0.200	<0.20	<0.20	<0.20	<0.2
Ruthenium (Ru)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	--
Silicon (Si)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05
Sodium (Na)	mg/L	**0.13**	**0.13**	**0.11**	**0.11**	**0.22**	<0.1
Strontium (Sr)	mg/L	<0.0010	**0.0016**	<0.0010	**0.0051**	<0.0010	<0.001
Sulfur (S)	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	--

4 CONCLUSIONS

Geofirma Engineering Ltd. completed sampling of source water, drill water, and groundwater as part of drilling (WP02) and opportunistic groundwater sampling (WP07) activities at SB_BH01, the first of two boreholes in the South Bruce Site that were drilled as part of the NWMO's Phase 2 Geoscientific Preliminary Field Investigations. All water sampling activities were completed by Geofirma, with the laboratory analyses completed by the University of Ottawa, Bureau Veritas Laboratories, and SGS Laboratories.

A total of 111 water samples were collected at SB_BH01, including 31 water source (WS) samples, 32 drill water (DW) samples, and 48 groundwater (GW) samples. 7 primary groundwater samples were collected, with the rest of the GW-assigned samples consisting of duplicates (6), tritium free blanks (6), rinsate blanks (6), and archive samples collected during purging (23).

Seven intervals were selected during drilling for opportunistic groundwater sampling based on evidence from core and drilling indicators (fluid loss, decreased pump pressure). Required purge volumes were between 3,400 L to 47,000 L per interval to meet the targeted sampling criteria. The seven intervals that were selected for OGW sampling activities were the following:

- Three intervals in the shallow bedrock above the Salina Formation
  - OGW1: Amherstburg-Bois Blanc Contact (70.17-75.59 m)
  - OGW2: Bois Blanc Formation (91.57-99.59 m)
  - OGW3: Bass Island Formation (113.67-120.59 m)
- Three intervals in the intermediate-depth bedrock
  - OGW4: Salina A2 Carbonate Unit (267.17-273.59 m)
  - OGW5: Salina A1 Carbonate Unit (280.57-285.59 m)
  - OGW6 Guelph Formation (316.57-321.59 m)
- One interval (OGW7) that included the bottom of the Shadow Lake Formation and the Precambrian (859.88-880.84 m)

The water source samples had consistent geochemical properties that were typical for surface water from Lake Huron in Southwestern Ontario. The water source samples at SB_BH01 had elevated dissolved oxygen (>3 mg/L), were oxidizing (+ ORP), and had low TDS (<0.5 g/L). Tritium and ^{14}C in the water source samples were between 32.3-92.6 TU and 97.0-100.9 pmC, respectively. Oxygen ($\delta^{18}O$) and deuterium ($\delta^{2}H$) for the water source samples plot in a tight grouping near the Lake Huron LEL, with $\delta^{18}O$ values between -6.8 to -7.4 ‰ VSMOW and $\delta^{2}H$ values between -51.3 to -55.9 ‰ VSMOW.

Drill water samples from SB_BH01 could be assigned to two distinct groups based on their chemical composition. The first group of drill water samples were similar to the water source samples, with low TDS (0.14-0.45 g/L) and EC (0.20-0.61 mS/cm). The second group of drill water samples had high TDS (127-203 g/L) and EC (212-339 mS/cm). Tritium and ^{14}C in the water source samples were between 28.7-41.5 TU and 9.67-97.58 pmC, respectively. Oxygen ($\delta^{18}O$) and deuterium ($\delta^{2}H$) for the drill water

samples plot in a tight grouping with the water source samples near the Lake Huron LEL, with $\delta^{18}O$ values between -6.8 to -7.5 ‰ VSMOW and $\delta^{2}H$ values between -50.5 to -57.1 ‰ VSMOW.

Two groundwater types are present in samples from SB_BH01 that can be distinguished by the major ions, total dissolved solids, electrical conductivity, specific gravity, ^{14}C, and the oxygen ($\delta^{18}O$) and deuterium ($\delta^{2}H$) isotopic ratios. Notable results for the groundwater samples include:

- The first group of groundwater samples were collected from three intervals in the shallow bedrock above the Salina Group. The shallow groundwater samples were fresh water, with low total dissolved solids (0.43-0.98 g/L), relatively low electrical conductivity (0.58-1.33 mS/cm), and specific gravity close to 1.0. Tritium (^{3}H) and ^{14}C in the shallow groundwater samples both decrease with depth from 1.7-1.0 TU and 35.2-12.8 pmC, respectively. Drill water corrected tritium concentrations in the shallow groundwater samples were between 0.3-1.0 TU. $\delta^{18}O$ and $\delta^{2}H$ values for the shallow groundwater samples were between -12.4 to -12.8 ‰ and -83.7 to -85.9 ‰ VSMOW, respectively.

- The second group of groundwater samples were saline water samples collected from intermediate depths in Silurian bedrock of the Salina Group and underlying Guelph Formation. The intermediate groundwater samples had higher total dissolved solids (22.2-25.6 g/L), electrical conductivity (30.2-34.8 mS/cm), and specific gravity (1.017-1.022) than the groundwater samples collected at shallower depths (OGW1-3). Tritium and ^{14}C in the intermediate groundwater samples had low concentrations of <0.8-2.5 TU and <0.54-0.71 pmC, respectively. Drill water-corrected tritium and ^{14}C concentrations were between 0.4-0-1.8 TU and <0.54 pmC, respectively. $\delta^{18}O$ and $\delta^{2}H$ values for the intermediate groundwater samples were between -11.6 to -11.9 ‰ and -79.7 to -81.3 ‰ VSMOW, respectively.

- On an oxygen ($\delta^{18}O$)-deuterium ($\delta^{2}H$) cross plot (Figure 3), all groundwater samples plot in a grouping to the left and above the global meteoric water line (GMWL). The shallow groundwater samples (OGW1-3) are the most depleted of all water samples that were collected.

- ^{129}I concentrations in the shallow groundwater samples were approximately 1-2 orders of magnitude lower than concentrations reported for the drill water and water source samples.

- Air-normalized $^{3}He/^{4}He$ ratios were between 0.49-0.96 for the shallow groundwater samples and 0.02 for the sample from OGW6. Due to high concentrations of hydrogen sulfide, noble gas analyses were not completed on OGW4 and OGW5 groundwater samples.

The deepest OGW interval in SB_BH01, which targeted the Precambrian (OGW7), was purged and sampled, but subsequent review of the water chemistry results, and post-drilling packer testing results (WP06) suggest that packer bypass or a packer failure occurred some time during purging of the interval. As a result, the sampled water for the OGW7 interval is interpreted to have not come from the Precambrian, but instead was sourced primarily from permeable intervals above in the Salina Group and Guelph Formation.

5 REFERENCES

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Appendix A

List of Samples Collected at SB_BH01

Appendix A - List of Samples Collected at SB_BH01

Sample ID	Work Package	From (m)	To (m)	Date Sampled	Comments
SB_BH01_DW001	2	0.00	60.59	2-Jun-21	50m drill water archive sample (#1).
SB_BH01_DW002	7	70.17	75.59	13-Jun-21	OGW1 pre-purge drill water sample
SB_BH01_DW007	7	91.57	99.59	16-Jun-21	OGW2 pre-purge drill water sample
SB_BH01_DW012	2	120.59	120.59	20-Jun-21	100m drill water archive sample (#2)
SB_BH01_DW013	7	113.67	120.59	20-Jun-21	OGW 3 Pre-purge drill water sample
SB_BH01_DW014	7	154.00	154.02	16-Jul-21	Drlll water additive sample after addition of CaCl2 and NaCl salts
SB_BH01_DW015	2	162.59	165.59	16-Jul-21	150m drill water archive sample (#3)
SB_BH01_DW016	2	201.59	204.59	18-Jul-21	200m drill water archive sample (#4)
SB_BH01_DW017	2	255.59	255.59	20-Jul-21	250m drill water archive sample (#5)
SB_BH01_DW018	7	267.59	273.59	20-Jul-21	OGW4 Pre-purge drill water sample
SB_BH01_DW019	7	280.57	285.59	27-Jul-21	OGW5 Pre-purge drill water sample
SB_BH01_DW020	2	297.59	300.40	30-Jul-21	300m drill water archive sample (#6)
SB_BH01_DW021	7	316.57	321.59	31-Jul-21	OGW6 Pre-purge drill water sample
SB_BH01_DW022	2	348.59	351.59	4-Aug-21	350m drill water archive sample (#7)
SB_BH01_DW023	2	376.00	376.00	5-Aug-21	400m drill water archive sample (#8)alysis.
SB_BH01_DW024	2	426.59	426.59	9-Aug-21	2nd 400m drill water archive sample (#9)
SB_BH01_DW025	2	444.59	444.59	10-Aug-21	450m drill water archive sample (#10)
SB_BH01_DW026	2	504.59	504.59	14-Aug-21	500m drill water archive sample (#11)
SB_BH01_DW027	2	540.59	543.59	16-Aug-21	MICROBIO. Sample associated with SB_BH01_MB001 and SB_BH01_MB002
SB_BH01_DW028	2	543.59	543.59	16-Aug-21	MICROBIO. Duplicate sample for SB_BH01_DW027
SB_BH01_DW029	2	552.59	552.59	16-Aug-21	550m drill water archive sample (#12)
SB_BH01_DW030	2	597.60	600.60	25-Aug-21	600m drill water archive sample (#13)
SB_BH01_DW031	2	654.60	657.60	28-Aug-21	650m drill water archive sample (#14)
SB_BH01_DW032	2	657.60	660.60	29-Aug-21	MICROBIO. Sample associated with SB_BH01_MB003 and SB_BH01_MB004
SB_BH01_DW033	2	699.60	702.62	30-Aug-21	700m drill water archive sample (#15
SB_BH01_DW034	2	747.61	750.61	9-Sep-21	750m drill water archive sample (#16)
SB_BH01_DW035	2	798.60	801.60	13-Sep-21	800m drill water archive sample (#17)
SB_BH01_DW036	2	828.60	830.60	14-Sep-21	MICROBIO. Sample associated with SB_BH01_MB005 and SB_BH01_MB006
SB_BH01_DW037	2	830.60	831.60	14-Sep-21	MICROBIO. Duplicate sample for SB_BH01_DW036
SB_BH01_DW038	2	849.60	852.60	15-Sep-21	850m drill water archive sample (#18)
SB_BH01_DW039	2	879.60	880.84	18-Sep-21	End of hole drill water sample
SB_BH01_DW040	7	859.88	879.59	20-Sep-21	OGW7 Pre-purge drill water sample
SB_BH01_GW001	7	70.17	75.59	15-Jun-21	OGW1 Primary sample
SB_BH01_GW002	7	91.57	99.59	18-Jun-21	OGW2 Primary sample
SB_BH01_GW003	7	91.57	99.59	18-Jun-21	OGW2 Duplicate sample
SB_BH01_GW004	7	91.57	99.59	18-Jun-21	OGW2 Rinsate sample
SB_BH01_GW005	7	91.57	99.59	18-Jun-21	OGW2 Tritium free blank
SB_BH01_GW006	7	113.67	120.59	21-Jun-21	OGW3 Primary sample
SB_BH01_GW007	7	113.67	120.59	21-Jun-21	OGW3 Rinsate sample
SB_BH01_GW008	7	113.67	120.59	21-Jun-21	OGW3 Purge water archive sample #1
SB_BH01_GW009	7	113.67	120.59	21-Jun-21	OGW3 Purge water archive sample #2
SB_BH01_GW010	7	113.67	120.59	21-Jun-21	OGW3 Duplicate sample
SB_BH01_GW011	7	113.67	120.59	21-Jun-21	OGW3 Field blank (Tritium free water) blank
SB_BH01_GW012	7	70.17	75.59	14-Jun-21	Previous ID: SB_BH01_DW003 - OGW1 Purge water archive #1
SB_BH01_GW013	7	70.17	75.59	14-Jun-21	Previous ID: SB_BH01_DW004 - OGW1 Purge water archive #2
SB_BH01_GW014	7	70.17	75.59	14-Jun-21	Previous ID: SB_BH01_DW005 - OGW1 Purge water archive #3
SB_BH01_GW015	7	70.17	75.59	15-Jun-21	Previous ID: SB_BH01_DW006 - OGW1 Purge water archive #4
SB_BH01_GW016	7	91.57	99.59	17-Jun-21	Previous ID: SB_BH01_DW008 - OGW2 Purge water archive #1
SB_BH01_GW017	7	91.57	99.59	17-Jun-21	Previous ID: SB_BH01_DW009 - OGW2 Purge water archive #2
SB_BH01_GW018	7	91.57	99.59	17-Jun-21	Previous ID: SB_BH01_DW010 - OGW2 Purge water archive #3
SB_BH01_GW019	7	91.57	99.59	17-Jun-21	Previous ID: SB_BH01_DW011 - OGW2 Purge water archive #4
SB_BH01_GW020	7	267.19	273.59	22-Jul-21	OGW4 Purge water archive sample #1
SB_BH01_GW021	7	267.19	273.59	24-Jul-21	OGW4 Rinsate sample
SB_BH01_GW022	7	267.19	273.59	25-Jul-21	OGW4 Purge water archive sample #2
SB_BH01_GW023	7	267.19	273.59	25-Jul-21	OGW4 Purge water archive sample #3
SB_BH01_GW024	7	267.19	273.59	26-Jul-21	OGW4 Purge water archive sample #4.
SB_BH01_GW025	7	267.19	273.59	26-Jul-21	OGW4 Primary sample
SB_BH01_GW026	7	267.19	273.59	26-Jul-21	OGW4 Duplicate sample
SB_BH01_GW027	7	267.19	273.59	26-Jul-21	OGW4 Field (Tritium free water) blank
SB_BH01_GW028	7	280.57	285.59	28-Jul-21	OGW5 Purge water archive sample #1
SB_BH01_GW029	7	280.57	285.59	28-Jul-21	OGW5 Purge water archive sample #2
SB_BH01_GW030	7	280.57	285.59	28-Jul-21	OGW5 Purge water archive sample #3
SB_BH01_GW031	7	280.57	285.59	28-Jul-21	OGW5 Rinsate sample
SB_BH01_GW032	7	280.57	285.59	29-Jul-21	OGW5 Primary sample
SB_BH01_GW033	7	280.57	285.59	29-Jul-21	OGW5 Duplicate sample

Appendix A - List of Samples Collected at SB_BH01

Sample ID	Work Package	From (m)	To (m)	Date Sampled	Comments
SB_BH01_GW034	7	280.57	285.59	29-Jul-21	OGW5 Field blank
SB_BH01_GW035	7	316.57	321.59	1-Aug-21	OGW6 Rinsate sample
SB_BH01_GW036	7	316.57	321.59	1-Aug-21	OGW6 Purge water archive sample #1.
SB_BH01_GW037	7	316.57	321.59	1-Aug-21	OGW6 Purge water archive sample #2
SB_BH01_GW038	7	316.57	321.59	2-Aug-21	OGW6 Purge water archive Sample #3
SB_BH01_GW039	7	316.57	321.59	2-Aug-21	OGW6 Primary Sample
SB_BH01_GW040	7	316.57	321.59	2-Aug-21	OGW6 Duplicate sample
SB_BH01_GW041	7	316.57	321.59	2-Aug-21	OGW6 Field blank sample
SB_BH01_GW042	7	859.88	880.84	21-Sep-21	OGW7 Purge water archive Sample #1
SB_BH01_GW043	7	859.88	880.84	21-Sep-21	OGW7 Purge water archive Sample #2
SB_BH01_GW044	7	859.88	880.84	22-Sep-21	OGW7 Purge water archive Sample #3
SB_BH01_GW045	7	859.88	880.84	24-Sep-21	OGW7 Rinsate sample.
SB_BH01_GW046	7	859.88	880.84	23-Sep-21	OGW7 Primary sample
SB_BH01_GW047	7	859.88	880.84	23-Sep-21	OGW7 Duplicate sample
SB_BH01_GW048	7	859.88	880.84	25-Sep-21	OGW7 Field Blank sample
SB_BH01_WS001	2	--	--	30-Apr-21	Water source sample
SB_BH01_WS002	2	--	--	2-Jun-21	Water source sample
SB_BH01_WS003	2	--	--	16-Jun-21	Water source sample
SB_BH01_WS004	2	--	--	1-Jul-21	Water source sample
SB_BH01_WS005	2	--	--	19-Jul-21	Water source sample
SB_BH01_WS006	2	--	--	3-Aug-21	Water source sample
SB_BH01_WS007	2	--	--	6-Aug-21	Water source sample
SB_BH01_WS008	2	--	--	7-Aug-21	Water source sample
SB_BH01_WS009	2	--	--	8-Aug-21	Water source sample
SB_BH01_WS010	2	--	--	9-Aug-21	Water source sample
SB_BH01_WS011	2	--	--	10-Aug-21	Water source sample
SB_BH01_WS012	2	--	--	11-Aug-21	Water source sample
SB_BH01_WS013	2	--	--	12-Aug-21	Water source sample
SB_BH01_WS014	2	--	--	13-Aug-21	Water source sample
SB_BH01_WS015	2	--	--	16-Aug-21	Water source sample
SB_BH01_WS016	2	--	--	17-Aug-21	Water source sample
SB_BH01_WS017	2	--	--	20-Aug-21	Water source sample
SB_BH01_WS018	2	--	--	22-Aug-21	Water source sample
SB_BH01_WS019	2	--	--	23-Aug-21	Water source sample
SB_BH01_WS020	2	--	--	27-Aug-21	Water source sample
SB_BH01_WS021	2	--	--	27-Aug-21	Water source sample
SB_BH01_WS022	2	--	--	30-Aug-21	Water source sample
SB_BH01_WS023	2	--	--	2-Sep-21	Water source sample
SB_BH01_WS024	2	--	--	5-Sep-21	Water source sample
SB_BH01_WS025	2	--	--	7-Sep-21	Water source sample
SB_BH01_WS026	2	--	--	12-Sep-21	Water source sample
SB_BH01_WS027	2	--	--	13-Sep-21	Water source sample
SB_BH01_WS028	2	--	--	19-Sep-21	Water source sample
SB_BH01_WS029	2	--	--	7-Jan-22	Water source sample, NaCl and CaCl2 added before sampling to prevent freezing
SB_BH01_WS030	2	--	--	13-Jan-22	Water source sample
SB_BH01_WS031	2	--	--	10-Apr-22	Water source sample

-- = no depth assigned for water source samples

Appendix B

SB_BH01 Water Chemistry Results Tables

B.1. Water Source (WS) Samples
B.2. Drill Water (DW) Samples
B.3. Groundwater (GW) Samples

			Sample ID	SB_BH01_ WS001	SB_BH01_ WS002	SB_BH01_ WS003	SB_BH01_ WS004	SB_BH01_ WS005	SB_BH01_ WS006	SB_BH01_ WS007	SB_BH01_ WS008	SB_BH01_ WS009	SB_BH01_ WS010	SB_BH01_ WS011	SB_BH01_ WS012	SB_BH01_ WS013	SB_BH01_ WS014	SB_BH01_ WS015	SB_BH01_ WS016	SB_BH01_ WS017	SB_BH01_ WS018	SB_BH01_ WS019	SB_BH01_ WS020	SB_BH01_ WS021	SB_BH01_ WS022	SB_BH01_ WS023	SB_BH01_ WS024	SB_BH01_ WS025
	Units	Method	Detection Limit/ Range	Full	Full	Full	Full	Full	Full	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Reduced	Full	Reduced	Reduced	Reduced	Reduced
Field Measurements																												
Field pH	units	JIS Z 8802 pH measurement method	0 to 14	7.0	6.8	6.7	6.6	6.8	6.9	8.1	7.6	7.7	7.6	8.1	7.6	8.3	7.6	6.8	7.2	7.7	6.9	7.2	7.9	7.4	8.4	7.6	6.8	7.7
Field Temp	Degrees C	--	-10 to 55	9.3	15.2	16.6	19.4	21.7	19.8	23.5	23.7	21.2	23.4	23.1	22.1	22.7	23.5	24.6	24.1	23.8	23.8	26.0	22.5	25.4	23.7	21.8	22.4	18.3
Field EC	mS/cm	4-AC-Electrode method	100	0.228	0.227	0.244	0.238	0.254	0.28	0.56	0.255	0.264	0.263	0.276	0.238	0.303	0.236	0.207	0.228	0.212	0.222	0.204	0.269	0.288	0.33	0.171	0.198	0.656
Field ORP	mV	Electrode Equilibrium Analysis	2000	482	677	657	589	585	660	65	4.85	499	567	382	701	401	437	614	56	539	538	443	468	564	497	547	467	288
Field Multimeter Dissolved Oxygen	mg/L	3-Electrode Polarographic Method	50	11.62	10.26	11.1	7.44	6.37	6.41	5.01	8.5	4.51	6.13	4.2	5.74	5.86	7.2	5.04	4.54	5.71	5.67	4.98	4.99	4.81	5.01	4.4	6.32	9.39
Field Turbidity	NTU	Transmitting and Scattering Method	800	0	0	0	0	0	0	8.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68.2
Field TDS	g/L	Calculated from EC	100	0.148	0.148	0.159	0.155	0.165	0.182	0.364	0.166	0.172	0.171	0.179	0.155	0.197	0.153	0.135	0.148	0.138	0.144	0.133	0.175	0.187	0.215	0.111	0.129	0.426
Field Fluorescein	ppb	Fluorometer	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Field Alkalinity	mg/L CaCO3	Phenolphthalein & Total Alkalinity (HACH 8203)	10 to 4000	49	70	65	55	62	53	50	50	50	98	60	69	20	76	68	64	65	85	59	78	67	56	79	62	66
Field Density	SG	Gravimetric by Hydrometer	--	1	1	0.998	0.996	0.998	1	1	1	1	1	1	0.997	1	1	1	0.98	1	1	0.99	1	0.98	0.99	1	1	0.997
Field Analy. Ferrous Iron	mg/L	1,10-Phenanthroline Method (HACH 8146)	3	0.00	0.00	0.00	0.03	0.05	0.03	0.02	0.02	0.00	0.07	0.11	0.02	0.00	0.02	0.04	0.02	0.03	0.07	0.04	0.00	0.00	0.23	0.03	0.03	0.22
Field Analy. Sulphide	mg/L	USEPA Methylene Blue Method (HACH 8131)	0.7	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Laboratory Measurements - Physicochemical Parameters, Major Anions, and Nutrients																												
pH-Lab	units	SM 4500H+ B m	--	7.77	7.59	7.53	7.93	7.69	7.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.75	--	--	--	--
Alkalinity-Bicarbonate	mg/L	SM 23 2320 B m	1	66	65	65	67	65	65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	66	--	--	--	--
Alkalinity Total as CaCO3	mg/L	SM 23 2320 B m	1	66	65	65	68	65	66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	66	--	--	--	--
Total Ammonia as N (NH4+NH3)	mg/L	USGS I-2522-90 m	0.05	0.081	<0.05	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--
Dissolved Bromide (Br)	mg/L	SM 23 4110 B m	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Chloride (Cl)	mg/L	SM 23 4110 B m	1	11	10	9	10	12	21	15	12	17	12	12	10	13	11	10	10	9.3	9.7	9.8	9.9	12	9.8	11	10	82
Fluoride (F)	mg/L	SM 23 4500-F C m	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.25	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	--	<0.10	--	--	--	--
Dissolved Iodide (I)	mg/L	Dionex #03035 R09 m	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.35	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate (NO3)	mg/L	SM 23 4500NO31/NO2B	0.1	0.49	0.29	0.27	0.38	0.26	0.26	--	--	--	--	--	0.22	0.22	0.22	0.3	0.3	0.26	0.25	0.27	0.25	0.22	0.24	0.24	0.26	0.27
Nitrite (NO2)	mg/L	SM 23 4500NO31/NO2B	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--	--	--	--	--	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate + Nitrite	mg/L	SM 23 4500NO31/NO2B	0.1	0.49	0.29	0.27	0.38	0.26	0.26	--	--	--	--	--	0.22	0.22	0.22	0.3	0.3	0.26	0.25	0.27	0.25	0.22	0.24	0.24	0.26	0.27
Total Kjeldahl Nitrogen	mg/L	OMOE E3516 m	0.1	0.53	<0.10	<0.10	<0.10	<0.10	0.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.10	--	--	--	--
Total Nitrogen	mg/L	Calculated from Nitrogen Species	0.1	1	0.29	0.27	0.38	0.26	0.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2	--	--	--	--
OrthoPhosphate (PO4)	mg/L	EPA 365.1 m	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Phosphorus (Ptot)	mg/L	SM 23 4500 P B H m	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.005	--	--	--	--
Dissolved Sulphate (SO4)	mg/L	SM 23 4410 B m	1	28	28	29	30	28	28	26	26	26	26	26	27	26	27	27	27	26	27	27	26	28	28	28	28	130
Sulphide as S	mg/L	SM 23 4500-S G m	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved Sulfur (S)	mg/L	EPA 6010D m	0.5	9.3	9.3	9.2	9.3	9.2	9.4	9.3	9.4	9.4	9.4	9.3	9.4	9.3	9.4	9.3	9.1	9.4	9.4	9.4	--	9.2	--	--	--	--
Dissolved Organic Carbon (DOC)	mg/L	SM 23 5310 B m	0.4	1.3	1.5	1.4	1.6	1.2	1.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.4	--	--	--	--
Total Organic Carbon (TOC)	mg/L	SM 23 5310B m	0.4	1.5	1.5	1.6	1.6	1.3	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.7	--	--	--	--
Reactive Silica (SiO2)	mg/L	EPA370.1 R1978 m	0.05	1.1	1.7	1.8	1.6	1.8	1.8	1.6	1.6	1.6	1.6	1.6	1.7	1.5	1.6	--	--	--	--	--	--	1.9	1.8	1.7	1.7	2.9
Laboratory Measurements - Metals																												
Dissolved Aluminum (Al)	mg/L	EPA 6020B m	0.0049	0.023	0.031	0.038	0.046	0.046	0.043	0.018	0.043	0.046	0.042	0.026	0.069	0.042	0.061	0.056	0.06	0.052	0.063	0.062	0.082	0.075	0.073	0.078	0.088	0.019
Dissolved Boron (B)	mg/L	EPA 6020B m	0.01	0.014	0.015	0.015	0.02	0.015	0.017	0.015	0.015	0.015	0.016	0.015	0.014	0.015	0.014	0.013	0.012	0.014	0.014	0.014	0.015	0.013	0.014	0.014	0.015	0.034
Dissolved Calcium (Ca)	mg/L	EPA 6020B m	0.2	28	27	26	26	26	30	27	26	28	25	27	27	28	27	25	25	24	25	25	27	26	25	26	27	89
Dissolved Iron (Fe)	mg/L	EPA 6020B m	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	0.02	<0.02	<0.02	<0.02	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	--	<0.02	--	--	--	--
Dissolved Lithium (Li)	mg/L	EPA 6020B m	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.015
Dissolved Magnesium (Mg)	mg/L	EPA 6020B m	0.05	7.7	7.8	7.7	7	7.3	7.8	7.3	7.1	7.3	7.3	7.2	7.7	7.6	7.5	7.2	7.1	7.2	7.3	7.2	7.6	8.1	8	7.7	7.5	8.1
Dissolved Potassium (K)	mg/L	EPA 6020B m	0.2	2.1	1.1	1.1	0.96	0.99	1.1	1	1.4	1.2	1.1	1	1	1.2	1.1	0.92	0.92	0.93	0.94	0.93	0.97	0.91	0.92	0.95	0.97	1.4
Total Ruthenium (Ru)	mg/L	MA.200-Met.1.2 R7 m	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.002	--	--	--	--
Dissolved Silicon (Si)	mg/L	EPA 6020B m	0.05	0.65	0.88	0.84	0.71	0.78	0.85	0.69	0.73	0.75	0.71	0.67	0.8	0.76	0.75	0.73	0.73	0.75	0.76	0.77	0.8	0.83	0.8	0.77	0.77	1.3
Dissolved Sodium (Na)	mg/L	EPA 6020B m	0.1	5	5	5	4.7	6.1	9.7	7.4	7.1	9.1	5.7	6	5	7.4	5.8	4.7	4.6	4.7	4.9	4.8	5	5	5	4.9	4.8	32
Dissolved Strontium (Sr)	mg/L	EPA 6020B m	0.001	0.12	0.11	0.11	0.12	0.12	0.16	0.14	0.12	0.14	0.12	0.12	0.12	0.13	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.1	0.1	0.11	0.11	1.4
Dissolved Cerium (CE)	ug/L	MA.200-Met.1.2 R5 m	0.3	--	<0.30	<0.30	<0.30	<0.30	<0.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Praesedymium (Pr)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	<0.40	<0.40	<0.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Neodymium (Nd)	ug/L	MA.200-Met.1.2 R5 m	3	--	<3.0	<3.0	<3.0	<3.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Samarium (Sm)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Europium (Eu)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	<0.40	<0.40	<0.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Gadolinium (Gd)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Terbium (Tb)	ug/L	MA.200-Met.1.2 R5 m	1	--	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Disprosium (Dy)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Holmium (Ho)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	<0.40	<0.40	<0.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Erbium (Er)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Thulium (Tm)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	<0.40	<0.40	<0.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Ytterbium (Yb)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Laboratory Measurements - Isotopes																												
Potassium-40 (40K)	Bq/kg	Calculated from Total K	0.006	0.067	0.035	0.035	0.030	0.031	0.035	0.032	0.044	0.038	0.035	0.032	0.032	0.038	0.035	0.029	0.029	0.030	0.030	0.030	0.031	0.029	0.029	0.030	0.031	0.044
Radon-222 (222Rn)	Bq/kg	Gamma Spectrometry	10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	--	--	--	--
Total alpha activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.10	--	--	--	--
Total beta activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.10	--	--	--	--
Uranium-234 (234U)	Bq/kg	Alpha Spectrometry	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.035	--	--	--	0.016	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--	--	<0.010	--	--	--	--
Uranium-238 (238U)	Bq/kg	Alpha Spectrometry	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.037	--	--	--	0.014	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	--	--	<0.010	--	--	--	--
Oxygen-18 of water (d18O)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-7.2	-7.3	-7.3	-7.3	-7.2	-7.0	-7.1	-7.2	-7.1	-7.1	-7.4	-7.1	-7.1	-6.9	-7	-7.1	-7.1	-7.3	-7.4	-6.8	-7.2	-7.2	-6.9	-7	-7.1
Deuterium of water (d2H)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-54.7	-54.9	-55.9	-54.8	-55.3	-54.5	-54.5	-54.1	-54.7	-54.3	-54.6	-53.8	-53.9	-52	-54.2	-53.6	-55.2	-54.4	-55.4	-53.7	-54.4	-54.3	-51.7	-51.6	-53.7
Tritium (3H)	TU	Liquid Scintillation Spectroscopy	0.8	33.3	39.5	35.6	34	33.6	76.8	59.3	43.3	38.2	36.9	36.2	35.9	37.3	35.3	35.1	32.3	64.4	50	63.6	92.6	80.2	83.8	69.3	66.6	34.4
Carbon-13 of DIC (d13C-DIC)	‰ VPDB	OI Analytical Model TIC/TOC Analyzer	--	1.3	1.2	1.2	0.7	1	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3	--	--	--	--
Carbon-14 of DIC (14C-DIC)	pmC	Accelerator Mass Spectrometer (AMS)	0.53	99.59	100.07	99.98	99.6	99.84	100.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100.62	--	--	--	--
Chlorine-37 (d37Cl)	‰ VSMOC	Isotope Ratio Mass Spectrometry (IRMS)	--	1.04	0.77	1.72	-0.06	-0.25	-0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-0.49	--	--	--	--
Chlorine-36 (36Cl/Cl)	--	Accelerator Mass Spectrometer (AMS)	--	2.65E-13	2.9E-13	2.91E-13	2.75E-13	2.22E-13	1.35E-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.76E-13	--	--	--	--
Iodine-129 (129I)	atoms/kg	Accelerator Mass Spectrometer (AMS)	--	2.56E+07	2.04E+07	3.03E+07	3.24E+07	3.51E+07	3.44E+07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.55E+07	--	--	--	--
Strontium isotope ratio (87Sr/86Sr)	--	Thermal Ionization Mass Spectrometry (TIMS)	--	0.7095364	0.7097311	0.7097386	0.7095146	0.7095269	0.7094079	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.7092937	--	--	--	--

-- = Not reported or no value measured

			Sample ID	SB_BH01_ WS026	SB_BH01_ WS027	SB_BH01_ WS028	SB_BH01_ WS029	SB_BH01_ WS030	SB_BH01_ WS031
	Units	Method	Detection Limit/ Range	Reduced	Reduced	Reduced	Full	Full	Full
Field Measurements									
Field pH	units	JIS Z 8802 pH measurement method	0 to 14	7.7	7.8	8.2	7.9	6.0	7.0
Field Temp	Degrees C	--	-10 to 55	23.0	21.1	22.0	4.3	10.1	15.1
Field EC	mS/cm	4-AC-Electrode method	100	0.402	0.2	0.23	7.66	0.286	0.763
Field ORP	mV	Electrode Equilibrium Analysis	2000	290	646	356	551	660	440
Field Multimeter Dissolved Oxygen	mg/L	3-Electrode Polarographic Method	50	3	6.79	9.28	9.72	10.33	7.03
Field Turbidity	NTU	Transmitting and Scattering Method	800	0	0	16	23.8	0	0.1
Field TDS	g/L	Calculated from EC	100	0.261	0.130	0.150	4.596	0.186	0.496
Field Fluorescein	ppb	Fluorometer	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Field Alkalinity	mg/L CaCO3	Phenolphthalein & Total Alkalinity (HACH 8203)	10 to 4000	61	63	59	89	130	75
Field Density	SG	Gravimetric by Hydrometer	--	1	0.997	1.002	1.002	0.997	1
Field Analy. Ferrous Iron	mg/L	1,10-Phenanthroline Method (HACH 8146)	3	0.11	0.02	0.00	0.07	0.00	0.00
Field Analy. Sulphide	mg/L	USEPA Methylene Blue Method (HACH 8131)	0.7	0.00	0.00	0.00	0.04	0.02	0.01
Laboratory Measurements - Physicochemical Parameters, Major Anions, and Nutrients									
pH-Lab	units	SM 4500H+ B m	--	--	--	--	7.53	7.79	7.44
Alkalinity-Bicarbonate	mg/L	SM 23 2320 B m	1	--	--	--	73	85	72
Alkalinity Total as CaCO3	mg/L	SM 23 2320 B m	1	--	--	--	73	85	73
Total Ammonia as N (NH4+NH3)	mg/L	USGS I-2522-90 m	0.05	--	--	--	<0.05	<0.05	<0.05
Dissolved Bromide (Br)	mg/L	SM 23 4110 B m	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Chloride (Cl)	mg/L	SM 23 4110 B m	1	36	9.9	12	2200	16	130
Fluoride (F)	mg/L	SM 23 4500-F C m	0.1	--	--	--	<0.10	<0.10	<0.10
Dissolved Iodide (I)	mg/L	Dionex #03035 R09 m	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate (NO3)	mg/L	SM 23 4500NO31/NO2B	0.1	0.24	0.27	0.3	0.44	0.77	0.35
Nitrite (NO2)	mg/L	SM 23 4500NO31/NO2B	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate + Nitrite	mg/L	SM 23 4500NO31/NO2B	0.1	0.24	0.27	0.3	0.44	0.77	0.35
Total Kjeldahl Nitrogen	mg/L	OMOE E3516 m	0.1	--	--	--	0.21	<0.10	<0.10
Total Nitrogen	mg/L	Calculated from Nitrogen Species	0.1	--	--	--	0.65	0.77	0.35
OrthoPhosphate (PO4)	mg/L	EPA 365.1 m	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Phosphorus (Ptot)	mg/L	SM 23 4500 P B H m	0.004	--	--	--	0.007	<0.004	<0.004
Dissolved Sulphate (SO4)	mg/L	SM 23 4410 B m	1	78	28	28	58	37	30
Sulphide as S	mg/L	SM 23 4500-S G m	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	,0.02
Dissolved Sulfur (S)	mg/L	EPA 6010D m	0.5	27	9.1	--	19	11	9.1
Dissolved Organic Carbon (DOC)	mg/L	SM 23 5310 B m	0.4	--	--	--	6.9	1.3	1.5
Total Organic Carbon (TOC)	mg/L	SM 23 5310B m	0.4	--	--	--	7.1	1.5	1.6
Reactive Silica (SiO2)	mg/L	EPA370.1 R1978 m	0.05	--	--	--	2.1	2.3	2
Laboratory Measurements - Metals									
Dissolved Aluminum (Al)	mg/L	EPA 6020B m	0.0049	0.022	0.045	0.063	0.01	0.024	0.032
Dissolved Boron (B)	mg/L	EPA 6020B m	0.01	0.027	0.016	0.014	0.034	0.015	0.02
Dissolved Calcium (Ca)	mg/L	EPA 6020B m	0.2	59	29	26	44	34	47
Dissolved Iron (Fe)	mg/L	EPA 6020B m	0.02	--	--	--	<0.02	0.02	<0.02
Dissolved Lithium (Li)	mg/L	EPA 6020B m	0.005	0.0078	<0.005	<0.005	0.011	<0.005	0.017
Dissolved Magnesium (Mg)	mg/L	EPA 6020B m	0.05	8.3	8	7.6	11	9.6	7.6
Dissolved Potassium (K)	mg/L	EPA 6020B m	0.2	1.2	0.99	1	1.7	1.1	1.6
Total Ruthenium (Ru)	mg/L	MA.200-Met.1.2 R7 m	0.002	--	--	--	<0.002	<0.002	<0.002
Dissolved Silicon (Si)	mg/L	EPA 6020B m	0.05	1.4	0.82	0.82	0.98	1	0.94
Dissolved Sodium (Na)	mg/L	EPA 6020B m	0.1	17	5.7	5.3	1300	6.2	62
Dissolved Strontium (Sr)	mg/L	EPA 6020B m	0.001	1.3	0.14	0.12	0.37	0.17	0.39
Dissolved Cerium (CE)	ug/L	MA.200-Met.1.2 R5 m	0.3	--	--	--	--	--	--
Dissolved Praesedymium (Pr)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	--	--	--	--	--
Dissolved Neodymium (Nd)	ug/L	MA.200-Met.1.2 R5 m	3	--	--	--	--	--	--
Dissolved Samarium (Sm)	ug/L	MA.200-Met.1.2 R5 m	2	--	--	--	--	--	--
Dissolved Europium (Eu)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	--	--	--	--	--
Dissolved Gadolinium (Gd)	ug/L	MA.200-Met.1.2 R5 m	2	--	--	--	--	--	--
Dissolved Terbium (Tb)	ug/L	MA.200-Met.1.2 R5 m	1	--	--	--	--	--	--
Dissolved Disprosium (Dy)	ug/L	MA.200-Met.1.2 R5 m	2	--	--	--	--	--	--
Dissolved Holmium (Ho)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	--	--	--	--	--
Dissolved Erbium (Er)	ug/L	MA.200-Met.1.2 R5 m	2	--	--	--	--	--	--
Dissolved Thulium (Tm)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	--	--	--	--	--
Dissolved Ytterbium (Yb)	ug/L	MA.200-Met.1.2 R5 m	2	--	--	--	--	--	--
Laboratory Measurements - Isotopes									
Potassium-40 (40K)	Bq/kg	Calculated from Total K	0.006	0.038	0.031	0.032	0.054	0.035	0.051
Radon-222 (222Rn)	Bq/kg	Gamma Spectrometry	10	--	--	--	<10	<10	<10
Total alpha activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	--	--	--	<0.10	<0.10	<0.10
Total beta activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	--	--	--	<0.10	<0.10	<0.10
Uranium-234 (234U)	Bq/kg	Alpha Spectrometry	0.01	--	--	--	0.019	<0.010	<0.010
Uranium-238 (238U)	Bq/kg	Alpha Spectrometry	0.01	--	--	--	0.022	<0.010	<0.010
Oxygen-18 of water (d18O)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-6.9	-7.1	-7	-6.7	-7.4	-7.2
Deuterium of water (d2H)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-51.3	-52.8	-52.7	-51.5	-55.1	-54.3
Tritium (3H)	TU	Liquid Scintillation Spectroscopy	0.8	60.6	52.3	57.7	38.9	34.9	61.9
Carbon-13 of DIC (d13C-DIC)	‰ VPDB	OI Analytical Model TIC/TOC Analyzer	--	--	--	--	-0.07	-1.2	-0.96
Carbon-14 of DIC (14C-DIC)	pmC	Accelerator Mass Spectrometer (AMS)	0.53	--	--	--	96.78	96.98	98.47
Chlorine-37 (d37Cl)	‰ VSMOC	Isotope Ratio Mass Spectrometry (IRMS)	--	--	--	--	0.42	0.12	-0.1
Chlorine-36 (36Cl/Cl)	--	Accelerator Mass Spectrometer (AMS)	--	--	--	--	1.82E-15	2.09E-13	2.12E-14
Iodine-129 (129I)	atoms/kg	Accelerator Mass Spectrometer (AMS)	--	--	--	--	5.71E+07	5.38E+07	6.28E+07
Strontium isotope ratio (87Sr/86Sr)	--	Thermal Ionization Mass Spectrometry (TIMS)	--	--	--	--	0.7096937	0.7091	0.70867

-- = Not reported or no value measured

			Sample ID	SB_BH01_DW002	SB_BH01_DW007	SB_BH01_DW013	SB_BH01_DW014	SB_BH01_DW018	SB_BH01_DW019	SB_BH01_DW021	SB_BH01_DW040
	Comments:	Method	Detection Limit/Range	OGW 1 pre-purge	OGW 2 pre-purge sample	OGW 3 pre-purge sample	Drill Water Archive	OGW 4 pre-purge sample	OGW 5 pre-purge sample	OGW 6 pre-purge sample	OGW 7 pre-purge sample
Field Measurements											
Field pH	units	JIS Z 8802 pH measurement method	0 to 14	6.7	8.8	8.4	10.3	6.9	7.2	8.2	7.0
Field Temp	Degrees C	--	-10 to 55	23.0	17.1	18.6	26.3	22.0	21.1	22.1	24.8
Field EC	mS/cm	4-AC-Electrode method	100	0.61	0.196	0.226	>100	339	212	266	299
Field ORP	mV	Electrode Equilibrium Analysis	2000	180	141	37	-22	125	-5	116	-41
Field Multimeter Dissolved Oxygen	mg/L	3-Electrode Polarographic Method	50	13.41	9.2	2.21	4.91	1.71	1.38	2.27	0.9
Field Turbidity	NTU	Transmitting and Scattering Method	800	163	254	165	613	57800	0	355	209
Field TDS	g/L	Calculated from EC	100	0.448	0.144	0.166	--	203	127	160	179
Field Fluorescein	ppb	Fluorometer	0.4	105.63	95.26	48.23	49.08	91.81	112.7	94.63	90.27
Field Alkalinity	mg/L CaCO3	Phenolphthalein & Total Alkalinity (HACH 8203)	10 to 4000	221	63	55	--	38.9	13	14	59
Field Density	SG	Gravimetric by Hydrometer	--	0.996	0.995	0.998	1.1	1.098	1.094	1.084	1.093
Field Analy. Ferrous	mg/L	1,10-Phenanthroline Method (HACH 8146)	3	2.17	0	0.07	--	0.45	0.03	0.35	1.35
Field Analy. Sulphide	mg/L	USEPA Methylene Blue Method (HACH 8131)	0.7	0.07	0.06	0.06	--	0.2	0.18	0.5	0.44
Total Colloids	ug/L	By Filtration	<2	<11	<11	< 2	--	1040	156	136	86
Cation/Anion Difference	--	Calculated	--	4.01	0.52	17.24	--	9.11	7.31	0.76	-7.25
Laboratory Measurements - Physicochemical Parameters, Major Anions and Nutrients											
pH-Lab	units	SM 4500H+ B m	--	11.8	9.04	8.13	10	7.25	7.14	7.77	6.49
Alkalinity-Bicarbonate	mg/L	SM 23 2320 B m	1	<1.0	44	66	38	42	32	26	11
Alkalinity Total as CaCO3	mg/L	SM 23 2320 B m	1	310	49	67	79	42	32	26	11
Total Ammonia as N (NH4+NH3)	mg/L	USGS I-2522-90 m	0.05	0.077	<0.050	<0.050	0.95	1.5	1.5	0.85	2
Dissolved Bromide (Br)	mg/L	SM 23 4110 B m	1	<1.0	<1.0	<1.0	320	<500	220	410	<500
Dissolved Chloride (Cl)	mg/L	SM 23 4110 B m	1	13	10	10	90000	71000	58000	71000	88000
Fluoride (F)	mg/L	SM 23 4500-F C m	0.1	0.22	0.12	<0.10	<0.10	0.11	0.16	<0.10	<0.10
Dissolved Iodide (I)	mg/L	Dionex #03035 R09 m	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<2.0	<2.0	<2.0
Nitrate (NO3)	mg/L	SM 23 4500NO31/NO2B	0.1	0.32	0.33	0.21	0.35	<1.0	0.2	<1.0	0.29
Nitrite (NO2)	mg/L	SM 23 4500NO31/NO2B	0.01	<0.010	<0.010	0.017	<0.10	<0.10	0.061	<0.10	<0.10
Nitrate + Nitrite	mg/L	SM 23 4500NO31/NO2B	0.1	0.32	0.33	0.23	0.35	<1.0	0.26	<1.0	0.29
Total Kjeldahl Nitrogen	mg/L	OMOE E3516 m	0.1	0.3	0.33	0.2	2.6	1.8	2.1	4.9	<5.0
Total Nitrogen	mg/L	Calculated from Nitrogen Species	0.1	0.62	0.66	0.43	3	1.8	2.4	4.9	<5.0
OrthoPhosphate (PO4)	mg/L	EPA 365.1 m	0.01	<0.010	<0.20	<0.10	0.075	<0.010	<0.20	0.091	<0.010
Total Phosphorus (Ptot)	mg/L	SM 23 4500 P B H m	0.004	0.074	0.01	0.086	<0.08	0.9	3.3	0.13	0.1
Dissolved Sulphate (SO4)	mg/L	SM 23 4410 B m	1	32	31	30	120	1400	1100	380	<500
Sulphide as S	mg/L	SM 23 4500-S G m	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Dissolved Sulfur (S)	mg/L	EPA 6010D m	0.5	9.4	10	9.6	46	370	390	140	38
Dissolved Organic Carbon (DOC)	mg/L	SM 23 5310 B m	0.4	3.4	1.5	2.1	3.5	4	1.7	3.3	3.1
Total Organic Carbon (TOC)	mg/L	SM 23 5310B m	0.4	4.7	3.8	2.3	3.9	21	15	3.4	4.2
Reactive Silica (SiO2)	mg/L	EPA370.1 R1978 m	0.05	9.7	9.2	2.3	170	20	16	39	48
Laboratory Measurements - Metals											
Dissolved Aluminum (Al)	mg/L	EPA 6020B m	0.0049	0.3	0.014	0.0085	<2.5	<0.0049	<0.0049	0.085	<0.250
Dissolved Boron (B)	mg/L	EPA 6020B m	0.01	0.03	0.024	0.047	4.4	4.1	3.4	4.8	4.1
Dissolved Calcium (Ca)	mg/L	EPA 6020B m	0.2	130	20	26	15000	16000	11000	17000	13000
Dissolved Iron (Fe)	mg/L	EPA 6020B m	0.02	<0.02	<0.02	<0.02	<0.2	<0.2	<0.2	0.3	1.5
Dissolved Lithium (Li)	mg/L	EPA 6020B m	0.005	0.028	<0.0050	<0.0050	12	12	8.1	14	12
Dissolved Magnesium (Mg)	mg/L	EPA 6020B m	0.05	0.085	7.5	7.8	9.1	100	140	13	12
Dissolved Potassium (K)	mg/L	EPA 6020B m	0.2	16	1.7	1.3	590	670	420	670	500
Total Ruthenium (Ru)	mg/L	MA.200-Met.1.2 R7 m	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Dissolved Silicon (Si)	mg/L	EPA 6020B m	0.05	5.7	4.1	1	2.8	<0.050	<0.050	0.93	<2.500
Dissolved Sodium (Na)	mg/L	EPA 6020B m	0.1	7.6	5.4	5.5	37000	37000	31000	27000	34000
Dissolved Strontium (Sr)	mg/L	EPA 6020B m	0.001	0.56	0.11	0.14	230	280	200	270	230
Dissolved Cerium (CE)	ug/L	MA.200-Met.1.2 R5 m	0.3	<0.30	0.42	<0.30	0.72	16	63	0.95	<0.30
Dissolved Praesedymium (Pr)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	2.5	7.2	<0.40	<0.40
Dissolved Neodymium (Nd)	ug/L	MA.200-Met.1.2 R5 m	3	<3.0	<3.0	<3.0	<3.0	7.3	28	<3.0	<3.0
Dissolved Samarium (Sm)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	<2.0	5.4	<2.0	<2.0
Dissolved Europium (Eu)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	0.41	1.4	<0.40	<0.40
Dissolved Gadolinium (Gd)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	<2.0	5	<2.0	<2.0
Dissolved Terbium (Tb)	ug/L	MA.200-Met.1.2 R5 m	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Disprosium (Dy)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	<2.0	3.9	<2.0	<2.0
Dissolved Holmium (Ho)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	0.7	<0.40	<0.40
Dissolved Erbium (Er)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0
Dissolved Thulium (Tm)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Dissolved Ytterbium (Yb)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Laboratory Measurements - Isotopes											
Potassium-40 (40K)	Bq/kg	Calculated from Total K	0.006	0.508	0.053	0.041	17.025	20.728	12.186	19.619	14.52
Radon-222 (222Rn)	Bq/kg	Gamma Spectrometry	10	<10	<10	<10	<10	<10	13	13	<10
Total alpha activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	0.3	<0.10	<0.10	<1.3	<2.8	<6.2	<14.6	<16
Total beta activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	0.76	<0.10	<0.10	<4.1	23	16	18	<12
Uranium-234 (234U)	Bq/kg	Alpha Spectrometry	0.01	0.123	<0.010	<0.010	0.21	0.22	0.31	0.08	0.12
Uranium-238 (238U)	Bq/kg	Alpha Spectrometry	0.01	0.123	<0.010	<0.010	0.21	0.22	0.24	0.08	0.12
Oxygen-18 of water (d18O)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-7.5	-7	-7.2	-7	-6.9	-7.3	-7.3	-6.8
Deuterium of water (d2H)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-57.1	-53.9	-54.4	-54.3	-54.5	-56	-55.2	-50.5
Tritium (3H)	TU	Liquid Scintillation Spectroscopy	0.8	37.6	41.5	38.1	34.9	35.8	28.7	35.5	57.4
Carbon-13 of DIC (d13C-DIC)	‰ VPDB	OI Analytical Model TIC/TOC Analyzer	--	-12.8	-2.2	0.5	-30.4	-1	-2.8	-18.1	-8.3
Carbon-14 of DIC (14C-DIC)	pmC	Accelerator Mass Spectrometer (AMS)	0.53	Sample Failed	93.99	97.58	67.29	9.67	13.76	53.82	82.02
Chlorine-37 (d37Cl)	‰ VSMOC	Isotope Ratio Mass Spectrometry (IRMS)	--	0.58	-0.2	0.45	0.44	0.76	-0.2	-0.67	-0.75
Chlorine-36 (36Cl/Cl)	--	Accelerator Mass Spectrometer (AMS)	--	2.15E-13	2.8E-13	2.82E-13	4.43E-15	4.52E-15	3.26E-15	6.97E-15	2.69E-15
Iodine-129 (129I)	atoms/kg	Accelerator Mass Spectrometer (AMS)	--	2.34E+07	2.89E+07	3.62E+07	2.29E+07	2.37E+07	2.73E+07	2.34E+07	4.24E+07
Strontium isotope ratio (87Sr/86Sr)	--	Thermal Ionization Mass Spectrometry (TIMS)	--	0.709245718	0.709639998	0.709381405	0.708243215	0.708363732	0.708419229	0.708244419	0.707774793
Laboratory Measurements - Noble Gas Isotopes											
3He	cc/g	Mass Spectrometry	--	1.6E-14	4.3E-13	4.2E-13	--	Not Analyzed	Not Analyzed	--	--
4He	cc/g	Mass Spectrometry	--	5.0E-09	2.9E-07	3.9E-09	--	Not Analyzed	Not Analyzed	--	--
He Total	cc/g	Mass Spectrometry	--	5.0E-09	2.9E-07	3.9E-09	--	Not Analyzed	Not Analyzed	--	--
20Ne	cc/g	Mass Spectrometry	--	2.8E-08	1.4E-06	4.1E-08	--	Not Analyzed	Not Analyzed	--	--
22Ne	cc/g	Mass Spectrometry	--	2.2E-09	1.4E-07	3.5E-09	--	Not Analyzed	Not Analyzed	--	--
Ne Total	cc/g	Mass Spectrometry	--	3.0E-08	1.6E-06	4.4E-08	--	Not Analyzed	Not Analyzed	--	--
36Ar	cc/g	Mass Spectrometry	--	8.5E-08	2.3E-06	3.3E-07	--	Not Analyzed	Not Analyzed	--	--
40Ar	cc/g	Mass Spectrometry	--	2.7E-05	8.2E-04	1.3E-04	--	Not Analyzed	Not Analyzed	--	--
Ar Total	cc/g	Mass Spectrometry	--	2.7E-05	8.2E-04	1.3E-04	--	Not Analyzed	Not Analyzed	--	--
Kr Total	cc/g	Mass Spectrometry	--	7.9E-09	9.8E-08	2.8E-08	--	Not Analyzed	Not Analyzed	--	--
Xe Total	cc/g	Mass Spectrometry	--	1.4E-09	9.7E-09	3.8E-09	--	Not Analyzed	Not Analyzed	--	--

-- = Not reported or no value measured

			Sample ID	SB_BH01_GW001	SB_BH01_GW002	SB_BH01_GW003	SB_BH01_GW004	SB_BH01_GW005	SB_BH01_GW006	SB_BH01_GW007	SB_BH01_GW010	SB_BH01_GW011	SB_BH01_GW021	SB_BH01_GW025	SB_BH01_GW026	SB_BH01_GW027	SB_BH01_GW031	SB_BH01_GW032	SB_BH01_GW033	SB_BH01_GW034
	Comments	Method	Detection Limit/Range	OGW 1 primary	OGW 2 primary	OGW 2 duplicate	OGW 2 rinsate	OGW 2 field blank	OGW 3 primary	OGW 3 rinsate	OGW 3 duplicate	OGW 3 field blank	OGW 4 rinsate	OGW 4 primary	OGW 4 duplicate	OGW 4 field blank	OGW 5 rinsate	OGW 5 primary	OGW 5 duplicate	OGW 5 field blank
Field Measurements																				
Field pH	units	JIS Z 8802 pH measurement method	0 to 14	7.4	6.9	6.9	--	--	7.2	--	7.2	--	--	7.1	7.1	--	--	7.3	7.3	--
Field Temp	Degrees C	--	-10 to 55	13.5	12.5	12.5	--	--	13.4	--	13.4	--	--	11.8	11.8	--	--	13.4	13.4	--
Field EC	mS/cm	4-AC-Electrode method	100	0.584	1.33	1.33	--	--	1.31	--	1.31	--	--	30.2	30.2	--	--	32.2	32.2	--
Field ORP	mV	Electrode Equilibrium Analysis	2000	-152	-86	-86	--	--	-570	--	-570	--	--	-338	-338	--	--	-306	-306	--
Field Multimeter Dissolved Oxygen	mg/L	3-Electrode Polarographic Method	50	0	0	0	--	--	0	--	0	--	--	0	0	--	--	1.72	1.72	--
Field Turbidity	NTU	Transmitting and Scattering Method	800	0	0	0	--	--	4.5	--	4.5	--	--	8	8	--	--	222	222	--
Field TDS	g/L	Calculated from EC	100	0.429	0.978	0.978	--	--	0.963	--	0.963	--	--	22.2	22.2	--	--	23.7	23.7	--
Field Fluorescein	ppb	Fluorometer	0.4	2.14	2.81	2.81	--	--	<0.4	--	<0.4	--	--	0.41	0.41	--	--	2.40	2.40	--
Field Alkalinity	mg/L CaCO3	Phenolphthalein & Total Alkalinity (HACH 8203)	10 to 4000	209	193	193	--	--	177	--	177	--	--	104	104	--	--	106	106	--
Field Density	SG	Gravimetric by Hydrometer	--	1	0.998	0.998	--	--	0.997	--	0.999	--	--	1.017	1.017	--	--	1.019	1.019	--
Field Analy. Dissolved Oxygen	µg/L	Indigo Carmine Method (HACH Method 8316)	10 to 1000	0.385	0.331	0.331	--	--	0.316	--	0.314	--	--	0.053	0.053	--	--	0.02	0.02	--
Field Analy. Ferrous	mg/L	1,10-Phenanthroline Method (HACH 8146)	3	0.04	0.63	0.63	--	--	2.15	--	2.15	--	--	0.08	0.08	--	--	0.1	0.1	--
Field Analy. Sulphide	mg/L	USEPA[1] Methylene Blue Method (HACH 8131)	0.7	0	0	0	--	--	0.06	--	0.06	--	--	30.5	30.5	--	--	19.5	19.5	--
Total Colloid	ug/L	By Filtration	<2	<3	< 2	< 2	--	--	< 2	--	< 2	--	--	32	58	--	--	129	12	--
Cation/Anion Difference	--	Calculated	--	23.67	7.93	7.69	--	--	6.48	--	6.86	--	--	4.83	-1.29	--	--	1.23	1.82	--
Laboratory Measurements - Physicochemical Parameters, Major Anions and Nutrients																				
pH-Lab	units	SM 4500H+ B m	--	7.94	7.8	7.91	--	--	7.74	--	7.79	--	6.66	7.69	7.82	--	6.72	7.72	7.8	--
Alkalinity-Bicarbonate	mg/L	SM 23 2320 B m	1	220	190	190	--	--	210	--	200	--	1.7	190	180	--	2.3	210	210	--
Alkalinity Total as CaCO3	mg/L	SM 23 2320 B m	1	230	190	190	--	--	210	--	210	--	1.7	190	180	--	2.3	210	210	--
Total Ammonia as N (NH4+NH3)	mg/L	USGS I-2522-90 m	0.05	<0.050	<0.050	<0.050	--	--	<0.050	--	<0.050	--		4.1	4.2	--	<0.050	3.4	3.4	--
Dissolved Bromide (Br)	mg/L	SM 23 4110 B m	1	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	--	<1.0	<50	<50	--	<1.0	<50	<50	--
Dissolved Chloride (Cl)	mg/L	SM 23 4110 B m	1	<1.0	1.9	1.5	<1.0	--	2.1	<1.0	1.7	--	<1.0	8200	9300	--	<1.0	9600	9700	--
Fluoride (F)	mg/L	SM 23 4500-F C m	0.1	0.94	1.2	1.1	<0.10	--	1.4	<0.10	1.4	--	<0.10	1.5	1.6	--	<0.10	1.5	1.5	--
Dissolved Iodide (I)	mg/L	Dionex #03035 R09 m	0.1	<0.10	<0.10	<0.10	<0.10	--	<0.10	<0.10	<0.10	--	<0.10	<2.0	<2.0	--	<1.0	<1.0	<1.0	--
Nitrate (NO3)	mg/L	SM 23 4500NO31/NO2B	0.1	<0.10	<0.10	<0.10	<0.10	--	<0.10	<0.10	<0.10	--	<0.10	4.05	<0.10	--	<0.10	<0.10	<0.10	--
Nitrite (NO2)	mg/L	SM 23 4500NO31/NO2B	0.01	<0.010	<0.010	<0.010	<0.010	--	<0.010	<0.010	<0.010	--	<0.010	1.04	<0.010	--	<0.010	<0.010	<0.010	--
Nitrate + Nitrite	mg/L	SM 23 4500NO31/NO2B	0.1	<0.10	<0.10	<0.10	<0.10	--	<0.10	<0.10	<0.10	--	<0.10	5.08	<0.10	--	<0.10	<0.10	<0.10	--
Total Kjeldahl Nitrogen	mg/L	OMOE E3516 m	0.1	<0.10	--	--	--	--	<0.10	--	<0.10	--	0.14	21	4.2	--	<0.10	3.9	3.4	--
Total Nitrogen	mg/L	Calculated from Nitrogen Species	0.1	<0.10	<0.10	<0.10	--	--	<0.10	--	<0.10	--	0.14	26	4.2	--	<0.10	3.9	3.4	--
OrthoPhosphate (PO4)	mg/L	EPA 365.1 m	0.01	<0.010	<0.010	<0.010	<0.010	--	<0.010	<0.010	<0.010	--	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	--
Total Phosphorus (Ptot)	mg/L	SM 23 4500 P B H m	0.004	0.005	0.014	0.015	--	--	0.02	--	0.017	--	0.018	0.24	0.25	--	0.007	0.12	0.11	--
Dissolved Sulphate (SO4)	mg/L	SM 23 4410 B m	1	81	460	460	<1.0	--	540	<1.0	540	--	<1.0	2900	3300	--	<1.0	3100	3100	--
Sulphide as S	mg/L	SM 23 4500-S G m	0.02	<0.020	<0.020	<0.020	--	--	<0.020	--	<0.020	--	--	14	14	--	--	2.5	2.9	--
Dissolved Sulfur (S)	mg/L	EPA 6010D m	0.5	29	160	160	<0.5	--	180	<0.5	180	--	<0.5	1200	1200	--	<0.5	1300	1300	--
Dissolved Organic Carbon (DOC)	mg/L	SM 23 5310 B m	0.4	<0.40	0.48	<0.40	--	--	0.4	--	<0.40	--	--	<0.40	<0.40	--	--	<0.40	<0.40	--
Total Organic Carbon (TOC)	mg/L	SM 23 5310B m	0.4	0.6	0.47	<0.40	--	--	<0.40	--	0.4	--	--	<0.40	<0.40	--	--	0.47	0.52	--
Reactive Silica (SiO2)	mg/L	EPA370.1 R1978 m	0.05	8.1	9.8	10	--	--	9.3		9.8	--	--	7.5	7.2	--	--	7.7	6.9	--
Laboratory Measurements - Metals																				
Dissolved Aluminum (Al)	mg/L	EPA 6020B m	0.0049	0.0074	<0.0049	<0.0049	<0.0049	--	<0.0049	<0.0049	<0.0049	--	<0.0049	<0.0049	<0.0049	--	<0.0049	<0.0049	<0.0049	--
Dissolved Boron (B)	mg/L	EPA 6020B m	0.01	0.032	0.067	0.068	<0.010	--	0.077	<0.010	0.078	--	<0.010	3.5	3.5	--	<0.010	2.9	2.9	--
Dissolved Calcium (Ca)	mg/L	EPA 6020B m	0.2	74	170	170	0.3	--	190	1.2	190	--	<0.20	1000	1000	--	0.32	980	1000	--
Dissolved Iron (Fe)	mg/L	EPA 6020B m	0.02	0.08	0.54	0.64	<0.02	--	2.2	<0.02	2.2	--	<0.02	<0.02	<0.02	--	<0.02	<0.2	<0.2	--
Dissolved Lithium (Li)	mg/L	EPA 6020B m	0.005	0.0056	0.011	0.01	<0.0050	--	0.011	<0.0050	0.01	--	<0.005	0.78	0.76	--	<0.0050	0.61	0.65	--
Dissolved Magnesium (Mg)	mg/L	EPA 6020B m	0.05	30	58	57	0.054	--	63	0.07	63	--	<0.05	450	460	--	0.078	420	440	--
Dissolved Potassium (K)	mg/L	EPA 6020B m	0.2	1.6	1.6	1.5	<0.200	--	1.7	<0.200	1.6	--	<0.20	51	53	--	<0.20	42	44	--
Total Ruthenium (Ru)	mg/L	MA.200-Met.1.2 R7 m	0.002	<0.0020	<0.0020	<0.0020	<0.0020	--	<0.0020	<0.0020	<0.0020	--	<0.0020	<0.0020	<0.0020	--	<0.0020	<0.0020	<0.0020	--
Dissolved Silicon (Si)	mg/L	EPA 6020B m	0.05	3.7	4.6	4.7	<0.050	--	4.3	<0.050	4.2	--	<0.050	3.5	3.7	--	<0.050	3.3	3.3	--
Dissolved Sodium (Na)	mg/L	EPA 6020B m	0.1	2.3	3	3	0.13	--	3.8	0.13	3.7	--	0.11	5400	5400	--	0.11	6000	6100	--
Dissolved Strontium (Sr)	mg/L	EPA 6020B m	0.001	1.6	5.4	5.2	<0.0010	--	16	0.0016	16	--	<0.0010	18	18	--	0.0051	17	18	--
Dissolved Cerium (CE)	ug/L	MA.200-Met.1.2 R5 m	0.3	<0.30	<0.30	<0.30	<0.30	--	<0.30	<0.30	<0.30	--	<0.30	<0.30	<0.30	--	<0.30	<0.30	0.53	--
Dissolved Praesedymium (Pr)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--
Dissolved Neodymium (Nd)	ug/L	MA.200-Met.1.2 R5 m	3	<3.0	<3.0	<3.0	<3.0	--	<3.0	<3.0	<3.0	--	<3.0	<3.0	<3.0	--	<3.0	<3.0	<3.0	--
Dissolved Samarium (Sm)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--
Dissolved Europium (Eu)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--
Dissolved Gadolinium (Gd)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--
Dissolved Terbium (Tb)	ug/L	MA.200-Met.1.2 R5 m	1	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	--
Dissolved Disprosium (Dy)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--
Dissolved Holmium (Ho)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--
Dissolved Erbium (Er)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--
Dissolved Thulium (Tm)	ug/L	MA.200-Met.1.2 R5 m	0.4	<0.40	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--	<0.40	<0.40	<0.40	--
Dissolved Ytterbium (Yb)	ug/L	MA.200-Met.1.2 R5 m	2	<2.0	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--	<2.0	<2.0	<2.0	--
Laboratory Measurements - Isotopes																				
Potassium-40 (40K)	Bq/kg	Calculated from Total K	0.006	0.051	0.051	0.048	<0.006	--	0.054	<0.006	0.051	--	<0.006	1.592	1.682	--	0.006	1.308	1.397	--
Radon-222 (222Rn)	Bq/kg	Gamma Spectrometry	10	22	53	47	--	--	<10	--	<10	--	--	14	12	--	--	15	14	--
Total alpha activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	0.11	<0.10	<0.10	--	--	0.6	--	0.43	--	--	<6.1	<2.9	--	--	<2.0	<0.10	--
Total beta activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	<0.10	<0.10	<0.10	--	--	0.17	--	0.13	--	--	1.7	1.6	--	--	<0.87	1.3	--
Uranium-234 (234U)	Bq/kg	Alpha Spectrometry	0.01	0.085	0.116	0.115	--	--	0.109	--	0.128	--	--	0.039	0.07	--	--	0.11	0.048	--
Uranium-238 (238U)	Bq/kg	Alpha Spectrometry	0.01	0.026	0.026	0.025	--	--	0.022	--	0.048	--	--	0.046	0.041	--	--	0.1	0.046	--
Oxygen-18 of water (d18O)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-12.8	-12.5	-12.4	--	--	-12.5	--	-12.5	--	--	-11.9	-11.9	--	--	-11.8	-12.2	--
Deuterium of water (d2H)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	-85.9	-85	-83.7	--	--	-83.7	--	-83.8	--	--	-80.9	-81.4	--	--	-81.3	-82	--
Tritium (3H)	TU	Liquid Scintillation Spectroscopy	0.8	1.7	1.5	1.1	--	<0.8	1	--	0.9	<0.8	--	<0.8	1	<0.8	--	1	<0.8	<0.8
Carbon-13 of DIC (d13C-DIC)	‰ VPDB	OI Analytical Model TIC/TOC Analyzer	--	-10.5	-9.4	-8.9	--	--	-7.9	--	-7.9	--	--	-2.2	-2.2	--	--	-1.4	-1.3	--
Carbon-14 of DIC (14C-DIC)	pmC	Accelerator Mass Spectrometer (AMS)	0.53	35.22	24.37	24.43	--	54.2	12.78	--	12.43	53.74	--	Tests Failed	<0.53	47.25	--	<0.54	<0.53	54.41
Chlorine-37 (d37Cl)	‰ VSMOC	Isotope Ratio Mass Spectrometry (IRMS)	--	-0.3	-0.4	-0.76	--	--	-0.92	--	-0.96	--	--	-0.5	-0.77	--	--	-0.32	1.78	--
Chlorine-36 (36Cl/Cl)	--	Accelerator Mass Spectrometer (AMS)	--	6.39E-14	4.78E-14	4.71E-14	--	--	4.22E-14	--	3.77E-14	--	--	1.98E-15	6.77E-15	--	--	6.34E-15	4.26E-15	--
Iodine-129 (129I)	atoms/kg	Accelerator Mass Spectrometer (AMS)	--	8.58E+05	1.38E+06	9.17E+05	--	--	5.36E+05	--	5.58E+05	--	--	9.81E+05	3.84E+05	--	--	4.15E+05	2.79E+05	--
Strontium isotope ratio (87Sr/86Sr)	--	Thermal Ionization Mass Spectrometry (TIMS)	--	0.708657115	0.708454362	0.708503255	--	--	0.70847073	--	0.708460804	--	--	0.709595348	0.709035164	--	--	0.709084813	0.709611867	--
Laboratory Measurements - Noble Gas Isotopes																				
3He	cc/g	Mass Spectrometry	--	4.7E-14	4.3E-15	6.8E-15	--	--	9.8E-15	--	6.4E-15	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
4He	cc/g	Mass Spectrometry	--	3.7E-08	5.5E-09	8.2E-09	--	--	7.4E-09	--	9.4E-09	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
He Total	cc/g	Mass Spectrometry	--	3.7E-08	5.5E-09	8.2E-09	--	--	7.4E-09	--	9.4E-09	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
20Ne	cc/g	Mass Spectrometry	--	2.2E-07	2.5E-08	3.3E-08	--	--	2.6E-08	--	3.5E-08	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
22Ne	cc/g	Mass Spectrometry	--	2.2E-08	2.4E-09	3.3E-09	--	--	2.6E-09	--	3.5E-09	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
Ne Total	cc/g	Mass Spectrometry	--	2.4E-07	2.8E-08	3.7E-08	--	--	2.9E-08	--	3.8E-08	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
36Ar	cc/g	Mass Spectrometry	--	7.4E-07	2.1E-07	2.4E-07	--	--	1.8E-07	--	2.6E-07	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
40Ar	cc/g	Mass Spectrometry	--	2.6E-04	9.0E-05	1.0E-04	--	--	8.4E-05	--	1.1E-04	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
Ar Total	cc/g	Mass Spectrometry	--	2.6E-04	9.1E-05	1.0E-04	--	--	8.4E-05	--	1.1E-04	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
Kr Total	cc/g	Mass Spectrometry	--	5.7E-08	2.8E-08	3.0E-08	--	--	2.5E-08	--	3.4E-08	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--
Xe Total	cc/g	Mass Spectrometry	--	8.3E-09	5.5E-09	5.6E-09	--	--	4.9E-09	--	6.2E-09	--	--	Not Analyzed - High H_2S		--	--	Not Analyzed - High H_2S		--

-- = Not reported or no value measured

			Sample ID	SB_BH01_GW035	SB_BH01_GW039	SB_BH01_GW040	SB_BH01_GW041	SB_BH01_GW042	SB_BH01_GW044	SB_BH01_GW045	SB_BH01_GW046	SB_BH01_GW047	SB_BH01_GW048
	Comments	Method	Detection Limit/Range	OGW 6 rinsate	OGW 6 primary	OGW 6 duplicate	OGW 6 field blank	OGW 7 Archive #1	OGW 7 Archive #2	OGW 7 rinsate	OGW 7 primary	OGW 7 duplicate	OGW 7 field blank
Field Measurements													
Field pH	units	JIS Z 8802 pH measurement method	0 to 14	--	7.0	7.0	--	7.6	7.2	--	7.3	7.3	--
Field Temp	Degrees C	--	-10 to 55	--	10.8	10.8	--	20.0	16.9	--	14.4	14.4	--
Field EC	mS/cm	4-AC-Electrode method	100	--	34.8	34.8	--	214	43.6	--	36.3	36.3	--
Field ORP	mV	Electrode Equilibrium Analysis	2000	--	-415	-415	--	-400	-380	--	-288	-288	--
Field Multimeter Dissolved Oxygen	mg/L	3-Electrode Polarographic Method	50	--	0.1	0.1	--	5.21	0	--	0.66	0.66	--
Field Turbidity	NTU	Transmitting and Scattering Method	800	--	0	0	--	0	326	--	210	210	--
Field TDS	g/L	Calculated from EC	100	--	25.6	25.6	--	157	32.0	--	26.7	26.7	--
Field Fluorescein	ppb	Fluorometer	0.4	--	2.37	2.37	--	98.45	7.36	--	2.61	2.61	--
Field Alkalinity	mg/L CaCO3	Phenolphthalein & Total Alkalinity (HACH 8203)	10 to 4000	--	88	88	--	48	192	--	220	220	--
Field Density	SG	Gravimetric by Hydrometer	--	--	1.022	1.022	--	1.092	1.03	--	1.022	1.022	--
Field Analy. Dissolved Oxygen	µg/L	Indigo Carmine Method (HACH Method 8316)	10 to 1000	--	0.0225	0.0225	--	0	0.49	--	0.71	0.71	--
Field Analy. Ferrous	mg/L	1,10-Phenanthroline Method (HACH 8146)	3	--	0.14	0.14	--	4.6	6.95	--	0.34	0.34	--
Field Analy. Sulphide	mg/L	USEPA[1] Methylene Blue Method (HACH 8131)	0.7	--	23	23	--	0.06	1.75	--	3.3	3.3	--
Total Colloid	ug/L	By Filtration	<2	--	22	22	--	--	--	--	21	21	--
Cation/Anion Difference	--	Calculated	--	--	6.69	-0.86	--	--	--	--	-2.62	-1.84	--
Laboratory Measurements - Physicochemical Parameters, Major Anions and Nutrients													
pH-Lab	units	SM 4500H+ B m	--	6.52	7.65	7.71	--	6.86	7.27	6.3	7.81	7.84	--
Alkalinity-Bicarbonate	mg/L	SM 23 2320 B m	1	1.4	180	180	--	14	130	1	190	190	--
Alkalinity Total as CaCO3	mg/L	SM 23 2320 B m	1	1.4	180	180	--	14	130	1	190	190	--
Total Ammonia as N (NH4+NH3)	mg/L	USGS I-2522-90 m	0.05	<0.050	4	4	--	--	--	--	2.8	2.9	--
Dissolved Bromide (Br)	mg/L	SM 23 4110 B m	1	<1.0	<100	<100	--	<1000	<50	<1.0	<50	<100	--
Dissolved Chloride (Cl)	mg/L	SM 23 4110 B m	1	<1.0	13000	15000	--	78000	17000	<1.0	14000	14000	--
Fluoride (F)	mg/L	SM 23 4500-F C m	0.1	<0.10	1.3	1.3	--	<0.10	1	<0.10	1.3	1.3	--
Dissolved Iodide (I)	mg/L	Dionex #03035 R09 m	0.1	<2.0	<2.0	<2.0	--	<0.10	<0.10	<0.10	<0.10	<0.10	--
Nitrate (NO3)	mg/L	SM 23 4500NO31/NO2B	0.1	<0.10	<0.50	<0.50	--	<0.50	<0.50	<0.10	<0.10	<0.10	--
Nitrite (NO2)	mg/L	SM 23 4500NO31/NO2B	0.01	<0.010	<0.050	<0.050	--	<0.050	<0.050	<0.010	<0.010	<0.010	--
Nitrate + Nitrite	mg/L	SM 23 4500NO31/NO2B	0.1	<0.10	<0.50	<0.50	--	<0.50	<0.50	<0.10	<0.10	<0.10	--
Total Kjeldahl Nitrogen	mg/L	OMOE E3516 m	0.1	<0.10	4.4	4.5	--	--	--	--	3.2	3.1	--
Total Nitrogen	mg/L	Calculated from Nitrogen Species	0.1	<0.10	4.4	4.5	--	--	--	--	3.2	3.1	--
OrthoPhosphate (PO4)	mg/L	EPA 365.1 m	0.01	<0.010	<1.0	<1.0	--	<0.010	<0.010	<0.010	<0.010	<0.010	--
Total Phosphorus (Ptot)	mg/L	SM 23 4500 P B H m	0.004	<0.004	0.068	0.067	--	--	--	--	0.13	0.1	--
Dissolved Sulphate (SO4)	mg/L	SM 23 4410 B m	1	<1.0	3100	3400	--	<1000	3100	<1.0	3600	3500	--
Sulphide as S	mg/L	SM 23 4500-S G m	0.02	--	2.6	3.1	--	--	--	--	0.54	0.91	--
Dissolved Sulfur (S)	mg/L	EPA 6010D m	0.5	<0.5	1300	1300	--	56	1000	--	1100	1100	--
Dissolved Organic Carbon (DOC)	mg/L	SM 23 5310 B m	0.4	--	<0.40	<0.40	--	--	--	--	0.56	0.52	--
Total Organic Carbon (TOC)	mg/L	SM 23 5310B m	0.4	--	0.55	0.56	--	--	--	--	0.89	0.79	--
Reactive Silica (SiO2)	mg/L	EPA370.1 R1978 m	0.05	37	19	21	--	--	--	--	11	15	--
Laboratory Measurements - Metals													
Dissolved Aluminum (Al)	mg/L	EPA 6020B m	0.0049	0.0059	<0.0049	<0.0049	--	0.1	<0.049	<0.049	<0.049	<0.049	--
Dissolved Boron (B)	mg/L	EPA 6020B m	0.01	<0.010	2.8	2.8	--	3.6	3	<0.01	2.9	2.9	--
Dissolved Calcium (Ca)	mg/L	EPA 6020B m	0.2	<0.20	1500	1500	--	13000	2300	<200	1600	1600	--
Dissolved Iron (Fe)	mg/L	EPA 6020B m	0.02	<0.02	<0.2	<0.2	--	2.4	17	<0.02	3.1	3.6	--
Dissolved Lithium (Li)	mg/L	EPA 6020B m	0.005	<0.0050	1	1	--	11	1.8	<0.005	1.1	1.2	--
Dissolved Magnesium (Mg)	mg/L	EPA 6020B m	0.05	<0.050	430	440	--	32	410	<0.05	420	430	--
Dissolved Potassium (K)	mg/L	EPA 6020B m	0.2	<0.20	64	64	--	560	100	<0.2	78	70	--
Total Ruthenium (Ru)	mg/L	MA.200-Met.1.2 R7 m	0.002	<0.0020	<0.0020	<0.0020	--	--	--	--	<0.0020	<0.0020	--
Dissolved Silicon (Si)	mg/L	EPA 6020B m	0.05	<0.050	3.2	3.2	--	0.86	3.7	<0.05	4.1	4.2	--
Dissolved Sodium (Na)	mg/L	EPA 6020B m	0.1	0.22	8800	8600	--	34000	9400	<0.1	7600	7700	--
Dissolved Strontium (Sr)	mg/L	EPA 6020B m	0.001	<0.0010	26	25	--	220	41	<0.001	29	29	--
Dissolved Cerium (CE)	ug/L	MA.200-Met.1.2 R5 m	0.3	--	<0.30	<0.30	--	--	--	--	<0.30	1.6	--
Dissolved Praesedymium (Pr)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	--	--	--	--	<0.40	<0.40	--
Dissolved Neodymium (Nd)	ug/L	MA.200-Met.1.2 R5 m	3	--	<3.0	<3.0	--	--	--	--	<3.0	<3.0	--
Dissolved Samarium (Sm)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	--	--	--	--	<2.0	<2.0	--
Dissolved Europium (Eu)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	--	--	--	--	<0.40	<0.40	--
Dissolved Gadolinium (Gd)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	--	--	--	--	<2.0	<2.0	--
Dissolved Terbium (Tb)	ug/L	MA.200-Met.1.2 R5 m	1	--	<1.0	<1.0	--	--	--	--	<1.0	<1.0	--
Dissolved Disprosium (Dy)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	--	--	--	--	<2.0	<2.0	--
Dissolved Holmium (Ho)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	--	--	--	--	<0.40	<0.40	--
Dissolved Erbium (Er)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	--	--	--	--	<2.0	<2.0	--
Dissolved Thulium (Tm)	ug/L	MA.200-Met.1.2 R5 m	0.4	--	<0.40	<0.40	--	--	--	--	<0.40	<0.40	--
Dissolved Ytterbium (Yb)	ug/L	MA.200-Met.1.2 R5 m	2	--	<2.0	<2.0	--	--	--	--	<2.0	<2.0	--
Laboratory Measurements - Isotopes													
Potassium-40 (40K)	Bq/kg	Calculated from Total K	0.006	<0.006	1.988	2.031	--	17.775	3.174	<0.006	2.423	2.222	--
Radon-222 (222Rn)	Bq/kg	Gamma Spectrometry	10	--	<10	<10	--	--	--	--	<10	<10	--
Total alpha activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	--	<5.0	<5.0	--	--	--	--	<5.4	<6.0	--
Total beta activity	Bq/kg	Gas Flow Proportional Counter (GFPC)	0.1	--	<5.0	<5.0	--	--	--	--	<6.0	<3.8	--
Uranium-234 (234U)	Bq/kg	Alpha Spectrometry	0.01	--	0.037	0.035	--	--	--	--	0.016	0.011	--
Uranium-238 (238U)	Bq/kg	Alpha Spectrometry	0.01	--	0.034	0.037	--	--	--	--	0.014	0.01	--
Oxygen-18 of water (d18O)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	--	-11.6	-11.6	--	--	--	--	-11.7	-11.6	--
Deuterium of water (d2H)	‰ VSMOW	Integrated Cavity Output Spectroscopy (ICOS)	--	--	-79.7	-80	--	--	--	--	-80.8	-80.6	--
Tritium (3H)	TU	Liquid Scintillation Spectroscopy	0.8	--	2.5	2.2	<0.8	--	--	--	3.1	2.5	<0.8
Carbon-13 of DIC (d13C-DIC)	‰ VPDB	OI Analytical Model TIC/TOC Analyzer	--	--	-0.8	-0.9	--	--	--	--	0.2	0.1	--
Carbon-14 of DIC (14C-DIC)	pmC	Accelerator Mass Spectrometer (AMS)	0.53	--	0.71	<0.53	47.23	--	--	--	1.59	1.28	38.26
Chlorine-37 (d37Cl)	‰ VSMOC	Isotope Ratio Mass Spectrometry (IRMS)	--	--	1.38	0.6	--	--	--	--	-0.52	0.07	--
Chlorine-36 (36Cl/Cl)	--	Accelerator Mass Spectrometer (AMS)	--	--	3.92E-15	5.59E-15	--	--	--	--	3.09E-15	7.04E-15	--
Iodine-129 (129I)	atoms/kg	Accelerator Mass Spectrometer (AMS)	--	--	1.70E+06	1.52E+06	--	--	--	--	1.24E+07	1.29E+07	--
Strontium isotope ratio (87Sr/86Sr)	--	Thermal Ionization Mass Spectrometry (TIMS)	--	--	0.709794217	0.709308037	--	--	--	--	0.70834345	0.708339171	--
Laboratory Measurements - Noble Gas Isotopes													
3He	cc/g	Mass Spectrometry	--	--	1.0E-11	1.1E-11	--	--	--	--	2.8E-15	3.1E-15	--
4He	cc/g	Mass Spectrometry	--	--	3.7E-04	2.5E-04	--	--	--	--	4.0E-08	4.6E-08	--
He Total	cc/g	Mass Spectrometry	--	--	3.7E-04	2.5E-04	--	--	--	--	4.0E-08	4.6E-08	--
20Ne	cc/g	Mass Spectrometry	--	--	3.7E-07	4.5E-07	--	--	--	--	Insufficent Mass	Insufficent Mass	--
22Ne	cc/g	Mass Spectrometry	--	--	3.5E-08	4.3E-08	--	--	--	--	Insufficent Mass	Insufficent Mass	--
Ne Total	cc/g	Mass Spectrometry	--	--	4.0E-07	4.9E-07	--	--	--	--	Insufficent Mass	Insufficent Mass	--
36Ar	cc/g	Mass Spectrometry	--	--	2.1E-06	2.2E-06	--	--	--	--	Insufficent Mass	Insufficent Mass	--
40Ar	cc/g	Mass Spectrometry	--	--	5.8E-04	6.4E-04	--	--	--	--	Insufficent Mass	Insufficent Mass	--
Ar Total	cc/g	Mass Spectrometry	--	--	5.8E-04	6.4E-04	--	--	--	--	Insufficent Mass	Insufficent Mass	--
Kr Total	cc/g	Mass Spectrometry	--	--	1.3E-07	1.5E-07	--	--	--	--	Insufficent Mass	Insufficent Mass	--
Xe Total	cc/g	Mass Spectrometry	--	--	2.0E-08	2.0E-08	--	--	--	--	Insufficent Mass	Insufficent Mass	--

-- = Not reported or no value measured

Appendix C

Groundwater Results
Drill Water Contamination Correction

	Sample Type	Drill Water Corrected Results for Primary Groundwater (GW) Samples						
	Sample ID	SB_BH01_GW001	SB_BH01_GW002	SB_BH01_GW006	SB_BH01_GW025	SB_BH01_GW032	SB_BH01_GW039	SB_BH01_GW046
	Comments	OGW 1 primary	OGW 2 primary	OGW 3 primary	OGW 4 primary	OGW 5 primary	OGW 6 primary	OGW 7 primary
Calculated Proportion of Groundwater								
P_{GW}	--	0.980	0.971	0.992	0.996	0.979	0.975	0.971
Field Measurements								
Field pH	units	*7.4*	*6.9*	*7.2*	*7.1*	*7.3*	*7.0*	*7.3*
Field Temp	Degrees C	*13.5*	*12.5*	*13.4*	*11.8*	*13.4*	*10.8*	*14.4*
Field EC	mS/cm	*0.6*	*1.3*	*1.3*	*30.2*	*32.2*	*34.8*	*36.3*
Field ORP	mV	*-152.0*	*-86.0*	-290.0	*-338.0*	*-306.0*	*-415.0*	*-288.0*
Field MM DO	mg/L	*0.0*	*0.0*	*0.0*	*0.0*	*1.7*	*0.1*	*0.7*
Field Turbidity	NTU	*0.0*	*0.0*	*4.5*	*8.0*	*222.0*	*0.0*	*210.0*
Field TDS	g/L	*0.43*	*0.98*	*0.96*	*22.2*	*23.7*	*25.6*	*26.7*
Field Alkalinity	mg/L CaCO3	*209.0*	*193.0*	*177.0*	*104.0*	*106.0*	*88.0*	*220.0*
Field Density	SG	0.98	0.97	0.99	1.01	1.00	0.99	0.99
Field Analy. DO	mg/L	*0.4*	*0.3*	*0.3*	*0.1*	*0.0*	*0.0*	*0.7*
Field Analy. Ferrous	mg/L	0.00	0.63	2.15	0.08	0.10	0.13	0.30
Field Analy. Sulphide	mg/L	0.00	0.00	0.06	30.50	19.50	22.99	3.29
Total Colloid	mg/L	*<3*	*< 2*	*< 2*	*32*	*129*	*22*	*21*
Laboratory Measurments - Physiochemical Parameters, Major Anions, and Nutrients								
pH-Lab	units	*7.9*	*7.8*	*7.7*	*7.7*	*7.7*	*7.7*	*7.8*
Alkalinity-Bicarbonate	mg/L	*220.0*	*190*	*210*	*190*	*210*	*180*	*190*
Alkalinity Total as CaCO3	mg/L	*230.0*	*190*	*210*	*190*	*210*	*180*	*190*
Total Ammonia as N (NH4+NH3)	mg/L	<0.050	<0.050	<0.050	4.093	3.367	3.978	2.740
Bromide (Br)	mg/L	<1.0	<1.0	<1.0	<50	<50	<100	<50
Chloride (Cl)	mg/L	<1.0	2	2	7881	8339	11179	11377
Fluoride (F)	mg/L	0.9	1.2	N/A	1.5	1.5	N/A	N/A
Iodide (I)	mg/L	<0.10	<0.10	<0.10	<2.0	<1.0	<2.0	<0.10
Nitrate (NO3)	mg/L	<0.10	<0.10	<0.10	N/A	<0.10	<0.50	<0.10
Nitrite (NO2)	mg/L	<0.010	<0.010	<0.010	N/A	<0.010	<0.050	<0.010
Nitrate + Nitrite	mg/L	<0.10	<0.10	<0.10	N/A	<0.10	<0.50	<0.10
Total Kjeldahl Nitrogen	mg/L	<0.10	N/A	<0.10	20.99	3.85	4.27	N/A
Total Nitrogen	mg/L	<0.10	<0.10	<0.10	25.99	3.85	4.27	N/A
OrthoPhosphate (PO4)	mg/L	<0.010	<0.010	<0.010	<1.0	<1.0	<1.0	<0.010
Total Phosphorus (Ptot)	mg/L	0.003	0.014	0.019	0.236	0.048	0.065	0.127
Sulphate (SO4)	mg/L	80.3	459.1	539.7	2893.7	3076.1	3090.3	N/A
Sulphide as S	mg/L	<0.020	<0.020	<0.020	N/A	N/A	N/A	N/A
Sulfur (S) diss	mg/L	29	160	180	1198	1292	1296	1099
Dissolved Organic Carbon (DOC)	mg/L	<0.40	0.43	0.38	<0.40	<0.40	<0.40	0.47
Total Organic Carbon (TOC)	mg/L	0.50	0.35	<0.40	<0.40	0.14	0.46	0.76
Reactive Silica (SiO2)	mg/L	7.90	9.52	9.28	7.41	7.35	18.00	9.57
Laboratory Measurments - Metals								
Aluminum (Al) diss.	mg/L	0.0012	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.049
Boron (B) diss.	mg/L	0.03	0.07	0.08	3.48	2.83	2.68	2.78
Calcium (Ca) diss.	mg/L	71	169	190	928	741	1064	1212
Iron (Fe) diss.	mg/L	N/A	N/A	N/A	<0.02	<0.2	<0.2	3.1
Lithium (Li) diss.	mg/L	0.01	N/A	N/A	0.73	0.43	0.64	0.74
Magnesium (Mg) diss.	mg/L	30.0	57.8	62.9	449.6	417.0	429.7	419.6
Potassium (K) diss.	mg/L	1.3	1.5	1.7	48.0	32.9	46.8	63.1
Ruthenium (Ru) diss.	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silicon (Si) diss	mg/L	3.6	4.5	4.3	N/A	N/A	3.2	N/A
Sodium (Na) diss.	mg/L	2	3	4	5234	5326	8108	6586
Strontium (Sr) diss.	mg/L	1.6	5.4	16.0	16.7	12.7	19.1	22.1
Cerium (CE)	ug/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Praesedymium (Pr)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Neodymium (Nd)	ug/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Samarium (Sm)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Europium (Eu)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Gadolinium (Gd)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Terbium (Tb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Disprosium (Dy)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Holmium (Ho)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Erbium (Er)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Thulium (Tm)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Ytterbium (Yb)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Laboratory Measurments - Isotopes								
Potassium-40 (40K)	Bq/kg	0.040	0.049	0.054	1.499	1.043	1.485	1.990
Radon-222 (222Rn)	Bq/kg	N/A	N/A	<10	N/A	14.7	<10	<10
Total alpha activity	Bq/kg	0.10	<0.10	N/A	<6.1	<2.0	<5.0	<5.4
Total beta activity	Bq/kg	<0.10	<0.10	N/A	1.60	<0.87	<5.0	<6.0
Uranium-234 (234U)	Bq/kg	0.082	N/A	N/A	0.038	0.103	0.035	0.012
Uranium-238 (238U)	Bq/kg	0.023	N/A	N/A	0.045	0.095	0.032	0.010
Oxygen-18 of water (d18O)	‰ VSMOW	-12.6	-12.3	-12.4	-11.9	-11.6	-11.4	-11.5
Deuterium of water (d2H)	‰ VSMOW	-84.7	-83.4	-83.2	-80.7	-80.1	-78.3	-79.3
Tritium (3H)	TU	0.92	0.24	0.68	<0.8	0.38	1.59	1.39
Carbon-13 of DIC (d13C-DIC)	‰ VPDB	-10.24	-9.33	-7.90	-2.20	-1.34	-0.34	0.45
Carbon-14 of DIC (14C-DIC)	pmC	N/A	21.51	11.96	<0.53	<0.54	<0.54	<0.54
Chlorine-37 (d37Cl)	‰ SMOC	-0.31	-0.39	-0.92	-0.50	-0.32	1.40	-0.50
Chlorine-36 (36Cl/Cl)	--	5.94E-14	3.93E-14	3.98E-14	1.96E-15	6.27E-15	3.74E-15	3.01E-15
Iodine-129 (129I)	atoms/kg	3.74E+05	5.02E+05	2.33E+05	8.74E+05	-1.79E+05	1.10E+06	1.11E+07
Strontium isotope ratio (87Sr/86Sr)	--	0.6940	0.6869	0.7025	0.7064	0.6937	0.6916	0.6872

Notes:

N/A	detected in GW sample but concentration in DW sample is below method detection limit, GW value cannot be corrected
< ##	concentration below method detection limit in GW sample
	duplicate GW or other value used for GW result
12.34	no correction applied, GW sample result shown

Appendix D

Relative Percent Difference (RPD) Calculations

Parameter	Units	RDL	OGW2						OGW3					
			SB_BH01_GW002	SB_BH01_GW003	Difference	Average	5 X RDL	RPD %	SB_BH01_GW006	SB_BH01_GW010	Difference	Average	5 X RDL	RPD %
Laborartory - Isotopes														
Gross Alpha	Bq/L	0.10	<0.10	<0.10	--	--	0.5	--	0.6	0.43	0.17	0.515	0.5	33
Gross Beta	Bq/L	0.10	<0.10	<0.10	--	--	0.5	--	0.17	0.13	0.04	0.15	0.5	--
Radon-222	Bq/L	10	53	47	6	50	50	12	<10	<10	--	--	50	--
Uranium-234	Bq/L	0.010	0.116	0.115	0.001	0.1155	0.05	1	0.109	0.128	0.019	0.1185	0.05	16
Uranium-235	Bq/L	0.010	<0.010	<0.010	--	--	0.05	--	<0.010	<0.010	--	--	0.05	--
Uranium-238	Bq/L	0.010	0.026	0.025	0.001	0.0255	0.05	--	0.022	0.048	0.026	0.035	0.05	--
Laboratory - Calculated Values														
Total Nitrogen (N)	mg/L	0.10	<0.10	<0.10	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Laboratory - Rare Earth Metals														
Total Cerium (Ce)	ug/L	0.30	<0.30	<0.30	--	--	1.5	--	<0.30	<0.30	--	--	1.5	--
Total Dysprosium (Dy)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Erbium (Er)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Europium (Eu)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Gadolinium (Gd)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Holmium (Ho)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Lanthanum (La)	ug/L	0.50	<0.50	<0.50	--	--	2.5	--	<0.50	<0.50	--	--	2.5	--
Total Lutetium (Lu)	ug/L	1.0	<1.0	<1.0	--	--	5	--	<1.0	<1.0	--	--	5	--
Total Neodymium (Nd)	ug/L	3.0	<3.0	<3.0	--	--	15	--	<3.0	<3.0	--	--	15	--
Total Praseodymium (Pr)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Ruthenium (Ru)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Samarium (Sm)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Scandium (Sc)	ug/L	5.0	<5.0	<5.0	--	--	25	--	<5.0	<5.0	--	--	25	--
Total Terbium (Tb)	ug/L	1.0	<1.0	<1.0	--	--	5	--	<1.0	<1.0	--	--	5	--
Total Thulium (Tm)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Ytterbium (Yb)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Yttrium (Y)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Laboratory - Physiochemical Parameters, Anions, and Nutrients														
Total Ammonia-N	mg/L	0.050	<0.050	<0.050	--	--	0.25	--	<0.050	<0.050	--	--	0.25	--
Fluoride (F-)	mg/L	0.10	1.2	1.1	0.1	1.15	0.5	9	1.4	1.4	0	1.4	0.5	0
Dissolved Iodide	mg/L	0.10	<0.10	<0.10	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Total Kjeldahl Nitrogen (TKN)	mg/L	N/A	--	--	--	--	--	--	<0.10	<0.10	--	--	--	--
Dissolved Organic Carbon	mg/L	0.40	0.48	<0.40	--	--	2	--	0.40	<0.40	--	--	2	--
Total Organic Carbon (TOC)	mg/L	0.40	0.47	<0.40	--	--	2	--	<0.40	0.40	--	--	2	--
Orthophosphate (P)	mg/L	0.010	<0.010	<0.010	--	--	0.05	--	<0.010	<0.010	--	--	0.05	--
Laboratory - pH	pH		7.80	7.91	0.11	7.855	0	1	7.74	7.79	0.05	7.765	0	1
Total Phosphorus	mg/L	0.004	0.014	0.015	0.001	0.0145	0.02	--	0.020	0.017	0.003	0.0185	0.02	--
Reactive Silica (SiO2)	mg/L	0.10	9.8	10	0.2	9.9	0.5	2	9.3	9.8	0.5	9.55	0.5	5
Laboratory - Sulfide	mg/L	0.020	<0.020	<0.020	--	--	0.1	--	<0.020	<0.020	--	--	0.1	--
Laboratory - Alkalinity (Total as CaCO3)	mg/L	1.0	190	190	0	190	5	0	210	210	0	210	5	0
Nitrite (N)	mg/L	0.010	<0.010	<0.010			0.05	--	<0.010	<0.010	--	--	0.05	--
Dissolved Chloride (Cl-)	mg/L	1.0	1.9	1.5	0.4	1.7	5	--	2.1	1.7	0.4	1.9	5	--
Nitrate (N)	mg/L	0.10	<0.10	<0.10	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Nitrate + Nitrite (N)	mg/L	0.10	<0.10	<0.10	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Dissolved Bromide (Br-)	mg/L	1.0	<1.0	<1.0	--	--	5	--	<1.0	<1.0	--	--	5	--
Dissolved Sulphate (SO4)	mg/L	1.0	460	460	0	460	5	0	540	540	0	540	5	0
Dissolved Sulphur (S)	mg/L	0.5	160	160	0	160	2.5	0	180	180	0	180	2.5	0
Laboratory - Metals														
Dissolved Iron (Fe)	mg/L	0.02	0.54	0.64	0.1	0.59	0.1	17	2.2	2.2	0	2.2	0.1	0
Dissolved Aluminum (Al)	ug/L	4.9	<4.9	<4.9	--	--	24.5	--	<4.9	<4.9	--	--	24.5	
Dissolved Boron (B)	ug/L	10	67	68	1	67.5	50	1	77	78	1	77.5	50	1
Dissolved Calcium (Ca)	ug/L	400	170000	170000	0	170000	2000	0	190000	190000	0	190000	2000	0
Dissolved Lithium (Li)	ug/L	5.0	11	10	1	10.5	25	--	11	10	1	10.5	25	--
Dissolved Magnesium (Mg)	ug/L	50	58000	57000	1000	57500	250	2	63000	63000	0	63000	250	0
Dissolved Potassium (K)	ug/L	200	1600	1500	100	1550	1000	6	1700	1600	100	1650	1000	6
Dissolved Silicon (Si)	ug/L	50	4600	4700	100	4650	250	2	4300	4200	100	4250	250	2
Dissolved Sodium (Na)	ug/L	100	3000	3000	0	3000	500	0	3800	3700	100	3750	500	3
Dissolved Strontium (Sr)	ug/L	1.0	5400	5200	200	5300	5	4	16000	16000	0	16000	5	0

Legend	
Sample concentration(s) below detection limit so RPD cannot be calculated, or average value below 5X detection limit, or RPD cannot be calculated.	--
Calculated RPD exceeds 30%	###
Reported Detection Limit	RDL

Parameter	Units	RDL	OGW4						OGW5					
			SB_BH01_GW025	SB_BH01_GW026	Difference	Average	5 X RDL	RPD %	SB_BH01_GW032	SB_BH01_GW033	Difference	Average	5 X RDL	RPD %
Laborartory - Isotopes														
Gross Alpha	Bq/L	0.10	<6.1	<2.9	--	--	0.5	--	<2.0	<0.10	--	--	0.5	--
Gross Beta	Bq/L	0.10	1.7	1.6	0.1	1.65	0.5	6	<0.87	1.3	--	--	0.5	--
Radon-222	Bq/L	10	14	12	2	13	50	--	15	14	1	14.5	50	--
Uranium-234	Bq/L	0.010	0.039	0.07	0.031	0.0545	0.05	57	0.11	0.048	0.062	0.079	0.05	78
Uranium-235	Bq/L	0.010	<0.012	<0.010	--	--	0.05	--	<0.017	<0.016	--	--	0.05	--
Uranium-238	Bq/L	0.010	0.046	0.041	0.005	0.0435	0.05	--	0.1	0.046	0.054	0.073	0.05	74
Laboratory - Calculated Values														
Total Nitrogen (N)	mg/L	0.10	26	4.2	21.8	15.1	0.5	144	3.9	3.4	0.5	3.65	0.5	14
Laboratory - Rare Earth Metals														
Total Cerium (Ce)	ug/L	0.30	<0.30	<0.30	--	--	1.5	--	<0.30	0.53	--	--	1.5	--
Total Dysprosium (Dy)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Erbium (Er)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Europium (Eu)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Gadolinium (Gd)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Holmium (Ho)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Lanthanum (La)	ug/L	0.50	<0.50	<0.50	--	--	2.5	--	<0.50	<0.50	--	--	2.5	--
Total Lutetium (Lu)	ug/L	1.0	<1.0	<1.0	--	--	5	--	<1.0	<1.0	--	--	5	--
Total Neodymium (Nd)	ug/L	3.0	<3.0	<3.0	--	--	15	--	<3.0	<3.0	--	--	15	--
Total Praseodymium (Pr)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Ruthenium (Ru)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Samarium (Sm)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Scandium (Sc)	ug/L	5.0	<5.0	<5.0	--	--	25	--	<5.0	<5.0	--	--	25	--
Total Terbium (Tb)	ug/L	1.0	<1.0	<1.0	--	--	5	--	<1.0	<1.0	--	--	5	--
Total Thulium (Tm)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Ytterbium (Yb)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Yttrium (Y)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Laboratory - Physiochemical Parameters, Anions, and Nutrients														
Total Ammonia-N	mg/L	0.050	4.1	4.2	0.1	4.15	0.25	2	3.4	3.4	0	3.4	0.25	0
Fluoride (F-)	mg/L	0.10	1.5	1.6	0.1	1.55	0.5	6	1.5	1.5	0	1.5	0.5	0
Dissolved Iodide	mg/L	0.10	<2.0	<2.0	--	--	0.5	--	<1.0	<1.0	--	--	0.5	--
Total Kjeldahl Nitrogen (TKN)	mg/L	N/A	21	4.2	16.8	12.6	--	133	3.9	3.4	0.5	3.65	--	--
Dissolved Organic Carbon	mg/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Organic Carbon (TOC)	mg/L	0.40	<0.40	<0.40	--	--	2	--	0.47	0.52	0.05	0.495	2	--
Orthophosphate (P)	mg/L	0.010	<1.0	<1.0	--	--	0.05	--	<1.0	<1.0	--	--	0.05	--
Laboratory - pH	pH		7.69	7.82	0.13	7.755	0	2	7.72	7.8	0.08	7.76	0	1
Total Phosphorus	mg/L	0.004	0.240	0.25	0.01	0.245	0.02	4	0.120	0.11	0.01	0.115	0.02	9
Reactive Silica (SiO2)	mg/L	0.10	7.5	7.2	0.3	7.35	0.5	4	7.7	6.9	0.8	7.3	0.5	11
Laboratory - Sulfide	mg/L	0.020	14	14	0	14	0.1	0	2.5	2.9	0.4	2.7	0.1	15
Laboratory - Alkalinity (Total as CaCO3)	mg/L	1.0	190	180	10	185	5	5	210	210	0	210	5	0
Nitrite (N)	mg/L	0.010	1.04	<0.010	--	--	0.05	--	<0.010	<0.010	--	--	0.05	--
Dissolved Chloride (Cl-)	mg/L	1.0	8,200.0	9300	1100	8750	5	13	9,600.0	9700	100	9650	5	1
Nitrate (N)	mg/L	0.10	4.05	<0.10	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Nitrate + Nitrite (N)	mg/L	0.10	5.08	<0.10	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Dissolved Bromide (Br-)	mg/L	1.0	<50	<50	--	--	5	--	<50	<50	--	--	5	--
Dissolved Sulphate (SO4)	mg/L	1.0	2900	3300	400	3100	5	13	3100	3100	0	3100	5	0
Dissolved Sulphur (S)	mg/L	0.5	1200	1200	0	1200	2.5	0	1300	1300	0	1300	2.5	0
Laboratory - Metals														
Dissolved Iron (Fe)	mg/L	0.02	<0.2	<0.2	--	--	0.1	--	<0.2	<0.2	--	--	0.1	--
Dissolved Aluminum (Al)	ug/L	4.9	<25	<25	--	--	24.5	--	<25	<25	--	--	24.5	--
Dissolved Boron (B)	ug/L	10	3500	3500	0	3500	50	0	2900	2900	0	2900	50	0
Dissolved Calcium (Ca)	ug/L	400	1000000	1000000	0	1000000	2000	0	980000	1000000	20000	990000	2000	2
Dissolved Lithium (Li)	ug/L	5.0	780	760	20	770	25	3	610	650	40	630	25	6
Dissolved Magnesium (Mg)	ug/L	50	450000	460000	10000	455000	250	2	420000	440000	20000	430000	250	5
Dissolved Potassium (K)	ug/L	200	51000	53000	2000	52000	1000	4	42000	44000	2000	43000	1000	5
Dissolved Silicon (Si)	ug/L	50	3500	3700	200	3600	250	6	3300	3300	0	3300	250	0
Dissolved Sodium (Na)	ug/L	100	5400000	5400000	0	5400000	500	0	6000000	6100000	100000	6050000	500	2
Dissolved Strontium (Sr)	ug/L	1.0	18000	18000	0	18000	5	0	17000	18000	1000	17500	5	6

Legend	
Sample concentration(s) below detection limit so RPD cannot be calculated, or average value below 5X detection limit, or RPD cannot be calculated.	--
Calculated RPD exceeds 30%	###
Reported Detection Limit	RDL

Parameter	Units	RDL	OGW6						OGW7					
			SB_BH01_GW039	SB_BH01_GW040	Difference	Average	5 X RDL	RPD %	SB_BH01_GW046	SB_BH01_GW0047	Difference	Average	5 X RDL	RPD %
Laborartory - Isotopes														
Gross Alpha	Bq/L	0.10	<5.0	<5.0	--	--	0.5	--	<5.4	<6.0	--	--	0.5	--
Gross Beta	Bq/L	0.10	<5.0	<5.0	--	--	0.5	--	<6.0	<3.8	--	--	0.5	--
Radon-222	Bq/L	10	<10	<10	--	--	50	--	<10	<10	--	--	50	--
Uranium-234	Bq/L	0.010	0.037	0.035	0.002	0.036	0.05	--	0.016	0.011	0.005	0.0135	0.05	--
Uranium-235	Bq/L	0.010	<0.014	<0.011	--	--	0.05	--	<0.010	<0.010	--	--	0.05	--
Uranium-238	Bq/L	0.010	0.034	0.037	0.003	0.0355	0.05	--	0.014	0.01	0.004	0.012	0.05	--
Laboratory - Calculated Values														
Total Nitrogen (N)	mg/L	0.10	4.4	4.5	0.1	4.45	0.5	2	3.2	3.1	0.1	3.15	0.5	3
Laboratory - Rare Earth Metals														
Total Cerium (Ce)	ug/L	0.30	<0.30	<0.30	--	--	1.5	--	<0.30	1.6	--	--	1.5	--
Total Dysprosium (Dy)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Erbium (Er)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Europium (Eu)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Gadolinium (Gd)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Holmium (Ho)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Lanthanum (La)	ug/L	0.50	<0.50	<0.50	--	--	2.5	--	<0.50	1	--	--	2.5	--
Total Lutetium (Lu)	ug/L	1.0	<1.0	<1.0	--	--	5	--	<1.0	<1.0	--	--	5	--
Total Neodymium (Nd)	ug/L	3.0	<3.0	<3.0	--	--	15	--	<3.0	<3.0	--	--	15	--
Total Praseodymium (Pr)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Ruthenium (Ru)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Samarium (Sm)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Scandium (Sc)	ug/L	5.0	<5.0	<5.0	--	--	25	--	<5.0	<5.0	--	--	25	--
Total Terbium (Tb)	ug/L	1.0	<1.0	<1.0	--	--	5	--	<1.0	<1.0	--	--	5	--
Total Thulium (Tm)	ug/L	0.40	<0.40	<0.40	--	--	2	--	<0.40	<0.40	--	--	2	--
Total Ytterbium (Yb)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Total Yttrium (Y)	ug/L	2.0	<2.0	<2.0	--	--	10	--	<2.0	<2.0	--	--	10	--
Laboratory - Physiochemical Parameters, Anions, and Nutrients														
Total Ammonia-N	mg/L	0.050	4	4	0	4	0.25	0	2.8	2.9	0.1	2.85	0.25	4
Fluoride (F-)	mg/L	0.10	1.3	1.3	0	1.3	0.5	0	1.3	1.3	0	1.3	0.5	0
Dissolved Iodide	mg/L	0.10	<2.0	<2.0	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Total Kjeldahl Nitrogen (TKN)	mg/L	N/A	4.4	4.5	0.1	4.45	--	2	3.2	3.1	0.1	3.15	--	3
Dissolved Organic Carbon	mg/L	0.40	<0.40	<0.40	--	--	2	--	0.56	0.52	0.04	0.54	2	--
Total Organic Carbon (TOC)	mg/L	0.40	0.55	0.56	0.01	0.555	2	--	0.89	0.79	0.1	0.84	2	--
Orthophosphate (P)	mg/L	0.010	<1.0	<1.0	--	--	0.05	--	<0.010	<0.010	--	--	0.05	--
Laboratory - pH	pH		7.65	7.71	0.06	7.68	0	1	7.81	7.84	0.03	7.825	0	0
Total Phosphorus	mg/L	0.004	0.068	0.067	0.001	0.0675	0.02	1	0.130	0.1	0.03	0.115	0.02	26
Reactive Silica (SiO2)	mg/L	0.10	19.0	21	2	20	0.5	10	11.0	15	4	13	0.5	31
Laboratory - Sulfide	mg/L	0.020	2.6	3.1	0.5	2.85	0.1	18	0.54	0.91	0.37	0.725	0.1	51
Laboratory - Alkalinity (Total as CaCO3)	mg/L	1.0	180	180	0	180	5	0	190	190	0	190	5	0
Nitrite (N)	mg/L	0.010	<0.050	<0.050	--	--	0.05	--	<0.010	<0.010	--	--	0.05	--
Dissolved Chloride (Cl-)	mg/L	1.0	13,000.0	15000	2000	14000	5	14	14,000.0	14000	0	14000	5	0
Nitrate (N)	mg/L	0.10	<0.50	<0.50	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Nitrate + Nitrite (N)	mg/L	0.10	<0.50	<0.50	--	--	0.5	--	<0.10	<0.10	--	--	0.5	--
Dissolved Bromide (Br-)	mg/L	1.0	<100	<100	--	--	5	--	<50	<100	--	--	5	--
Dissolved Sulphate (SO4)	mg/L	1.0	3100	3400	300	3250	5	9	3600	3500	100	3550	5	3
Dissolved Sulphur (S)	mg/L	0.5	1300	1300	0	1300	2.5	0	1100	1100	0	1100	2.5	0
Laboratory - Metals														
Dissolved Iron (Fe)	mg/L	0.02	<0.2	<0.2	--	--	0.1	--	3.1	3.6	0.5	3.35	0.1	15
Dissolved Aluminum (Al)	ug/L	4.9	<25	<25	--	--	24.5	--	<49	<49	--	--	24.5	--
Dissolved Boron (B)	ug/L	10	2800	2800	0	2800	50	0	2900	2900	0	2900	50	0
Dissolved Calcium (Ca)	ug/L	400	1500000	1500000	0	1500000	2000	0	1600000	1600000	0	1600000	2000	0
Dissolved Lithium (Li)	ug/L	5.0	1000	1000	0	1000	25	0	1100	1200	100	1150	25	9
Dissolved Magnesium (Mg)	ug/L	50	430000	440000	10000	435000	250	2	420000	430000	10000	425000	250	2
Dissolved Potassium (K)	ug/L	200	64000	64000	0	64000	1000	0	78000	70000	8000	74000	1000	11
Dissolved Silicon (Si)	ug/L	50	3200	3200	0	3200	250	0	4100	4200	100	4150	250	2
Dissolved Sodium (Na)	ug/L	100	8800000	8600000	200000	8700000	500	2	7600000	7700000	100000	7650000	500	1
Dissolved Strontium (Sr)	ug/L	1.0	26000	25000	1000	25500	5	4	29000	29000	0	29000	5	0

Legend	
Sample concentration(s) below detection limit so RPD cannot be calculated, or average value below 5X detection limit, or RPD cannot be calculated.	--
Calculated RPD exceeds 30%	###
Reported Detection Limit	RDL