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November 10, 2015

Project No. 12-1021-0006

Michelle Unger, B.Sc.
Teck Resources Ltd.
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SUMMARY OF CONSTRUCTED LANDFILL MONITORING RESULTS, SÄ DENA HES MINE, YUKON TERRITORY

Dear Ms. Unger,

Kēyeh Néjeh Golder Corp. (KNG) is pleased to submit this letter report entitled *Summary of Constructed Landfill Monitoring Results, Sä Dena Hes Mine, Yukon Territory* to Teck Resources Ltd. (Teck). The monitoring work was completed at the Sä Dena Hes Mine property near Watson Lake, Yukon, between June and September 2015, and was led by Golder Associates Ltd. (Golder).

The attached technical letter report was prepared on our behalf by Golder, and is based on the scope of work provided to Teck in a work plan dated April 30, 2015.

We trust the information contained in the attached letter report is adequate for your review. Should you have any questions concerning the monitoring results, please contact Andrew Bruemmer at 604-296-2740 or Andrew_Bruemmer@golder.com. For further information about Keyeh Nejeh Golder Corp. or the structure of our team, please contact Jeff Bailey at 250-881-7372 or Jeff_Bailey@golder.com.

Yours very truly,

KĒYEH NEJÉH GOLDER CORP.

Jeff Bailey, M.A., RPCA
Managing Director, Kēyeh Néjeh Golder Corp.

JB/syd

Attachments: Technical Letter Report

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November 10, 2015 Reference No. 1210210006-038-L-Rev0

Michelle Unger, B.Sc.
Teck Resources Limited
Bag 2000
Kimberley, BC
V1A 3E1

SUMMARY OF CONSTRUCTED LANDFILL MONITORING RESULTS, SÄ DENA HES MINE, YUKON TERRITORY

Dear Michelle:

Golder Associates Ltd. (Golder) was retained by Kēyeh Néjeh Golder Corporation (KNG) and Teck Resources Limited (Teck) to monitor groundwater and surface water quality in the vicinity of the constructed landfill facility at the Sä Dena Hes mine. The Sä Dena Hes mine is located approximately 70 km by road from Watson Lake, Yukon (the Site). The landfill was constructed in 2014, as part of the approved Detailed Decommissioning & Reclamation Plan for the mine property.

This letter presents the results of groundwater and surface water monitoring that was completed in 2015.

1.0 BACKGROUND

As part of the overall decommissioning and reclamation of the Site, a landfill was constructed near the former North Creek pump house. The purpose of the landfill was to deposit inert demolition debris from the mill site, former camp and office buildings, as well as miscellaneous Site debris collected throughout the property. Golder understands that deposited, inert materials consist primarily of metal cladding, piping, concrete and wood debris.

In September 2014, Golder completed a Phase II Environmental Site Assessment (ESA) of the constructed landfill at the Site. The overall objective of the Phase II ESA was to document whether waste material deposited at the landfill may have affected local groundwater and/or surface water quality. The results of the Phase II ESA are documented in Golder's letter report entitled "*Environmental Site Assessment – Site Landfill, Sä Dena Hes Mine, Yukon Territory*" (dated December 18, 2014).

In order to evaluate groundwater quality during the Phase II ESA, four groundwater monitoring wells were installed and subsequently sampled on-Site. Additionally, samples were collected from two historical monitoring wells, located approximately 200 m down-gradient of the landfill. Surface water quality was assessed by collecting samples from North Creek, including one background sample collected up-gradient of the landfill and two samples collected down-gradient of the landfill.

The physical characterization results of the Phase II ESA, including stratigraphy and groundwater flow directions, indicated that the landfill was constructed on a sand and gravel soil layer, overlying a silty sand layer that was observed to more than 10 m thick. The groundwater flow direction was determined to be to the east and the depth to groundwater varied from approximately 5.1 m below ground surface (bgs) at MW14-03 to nearly 14.5 m bgs at MW14-02. The screen at MW14-03 was therefore installed at a shallower depth than the other monitoring wells.

Analytical results collected during the Phase II ESA identified exceedances of selected parameters in surface water and groundwater. However, the concentrations were not considered to be due to the construction of the landfill, but attributed to entrained sediments in the water samples.

The findings of the Phase II ESA recommended that an additional monitoring round be completed at the landfill in the spring of 2015 at the 6 monitoring wells and three surface water locations. The purpose of the spring 2015 monitoring event was to establish baseline water quality data for both low-flow and high-flow seasons.

Following an inspection of the landfill by Yukon Government inspectors in summer 2015, it was decided that a second round of groundwater sampling would also be completed in September, 2015.

1.1 Objectives and Scope of Work

The objectives of the 2015 monitoring work as follows:

1) To establish baseline groundwater and surface water quality conditions in landfill area; and

2) To document temporal changes to groundwater and surface water quality.

In order to meet the objectives of the monitoring program, groundwater and surface water sampling events were completed in June and September 2015, with the following proposed scope of work:

- June Sampling Event: Sampling of four newly-installed monitoring wells (MW14-01 to MW14-04), two historical monitoring wells (TH09-91 and TH10-91), and three surface water sampling locations (SW14-01 to SW14-03); and
- September Sampling Event: Sampling of four newly-installed monitoring wells (MW14-01 to MW14-04) and three surface water sampling locations (SW14-01 to SW14-03).

Deviations from the proposed scope of work occurred during both sampling events due to a decline in the water table elevation that resulted in two dry monitoring wells. These instances are discussed in Section 4.1, below.

2.0 REGULATORY FRAMEWORK

In the Yukon Territory, environmental matters pertaining to contaminated sites generally fall under the jurisdiction of Environment Yukon, pursuant to the *Environment Act*

The two key regulations under the *Environment Act* relating to the assessment and remediation of contaminated sites are the Contaminated Sites Regulation (CSR) (Environment Yukon), and the Special Waste Regulations (SWR) (Environment Yukon, updated April 1, 2009).

The CSR provides Generic Numerical Water Standards (Schedule 3) for use in the assessment of water quality at sites subject to investigation (Environment Yukon, 2002). Water Quality Standards are divided into four different categories based on water use and include: standards based on the protection of freshwater and marine aquatic life (AW-F/AW-M), standards based on the use of water for irrigation purposes (IW), standards based on the consumption of water by livestock (LW), and standards based on the consumption of drinking water by humans (DW).

Based on the potential groundwater uses near the Site, water quality standards for the protection of freshwater aquatic life were used to screen the analytical laboratory results.

Environment Yukon *Protocol 6: Application of Water Quality Standards* (Protocol 6) provides guidance on the application of water quality standards to groundwater or receiving water body (surface water). When water monitoring is conducted from surface water, CSR-AW standards should be divided by a factor of 10, to account for dilution effects within the aquifer. The factor of 10 has been applied in the comparison of the surface water results described in Section 4.3 of this letter report.

In addition, the Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME-AW) were included in the assessment of surface water conditions on-Site.

3.0 FIELD METHODS

The field methods adopted by Golder as part of the 2015 monitoring program were similar to those followed during the 2014 sampling activities. The field methods, including health and safety preparation and planning, surface and groundwater sample collection procedures, and Golder's Quality Assurance/Quality Control (QA/QC) program, are documented in detail in the following documents previously submitted to Teck:

- *Environmental Site Assessment – Site Landfill, Sä Dena Hes Mine, Yukon Territory* (Golder Associates Ltd., dated December 18, 2014); and
- *Long Term Groundwater Monitoring Plan, Sä Dena Hes Mine, Yukon Territory* (Golder Associates Ltd., dated July 8, 2015).

Groundwater and surface water sampling events were completed on June 24 and September 3, 2015. Samples collected as part of the 2015 landfill monitoring were submitted to Maxxam Analytics (Maxxam), in Burnaby, BC, for analysis of a combination of potential contaminants of concern (PCOCs) including Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), Volatile Petroleum Hydrocarbons (VPHw), Light and Heavy Extractable Petroleum Hydrocarbons (LEPHw/HEPH), Polycyclic Aromatic Hydrocarbons (PAH), Volatile Organic Compounds (VOCs), dissolved metals and anions. The collected samples were stored in coolers with ice and shipped to Maxxam under standard Golder Chain-of-Custody procedures.

The groundwater and surface water sampling field forms are included in Attachment 1 and the associated Chain of Custody forms and laboratory analytical reports are included in Attachment 2.

The monitoring well and surface water sample locations are shown on Figure 1.

4.0 MONITORING RESULTS

Section 4.0 of this report presents the results of the 2015 monitoring program, including water table elevation measurements, laboratory analytical results, and QA/QC analyses.

4.1 Field Observations

Groundwater samples collected at MW14-01 and MW14-04 during the 2015 monitoring program were generally cloudy in colour, which is considered indicative of the elevated silt content of the soil stratigraphy, while groundwater at historical wells TH09-91 and TH09-10 was clear. Hydrocarbon-like odors or sheen were not observed during groundwater sample collection. Surface water samples were generally clear and odorless.

At each monitoring well location, the depth to water was recorded, and ranged from approximately 5.7 m below ground surface (bgs) to 15.7 m bgs. Depths to groundwater and calculated groundwater elevations are shown on Table 1, attached. Groundwater table elevations were not calculated at MW14-02 and MW14-03 as the water table elevation had fallen to below the bottom of the monitoring wells and they were dry during both sampling events. The groundwater elevation at MW14-01 was also not measured during the June event, as the water table elevation at this location has also fallen below the bottom of the well and the monitoring well was dry. The groundwater elevations, as measured in September 2014 are also shown on Table 1, for comparison purposes.

4.2 Groundwater Analytical Results

The analytical groundwater results are presented on Tables 2A (inorganics), 2B (petroleum hydrocarbons) and 2C (VOCs) at the end of this letter report. Three groundwater samples were collected as part of the monitoring program, as follows:

- June, 2015: MW14-04 only; and
- September, 2015: MW14-01 and MW14-04.

Groundwater samples were not collected at MW14-01 (June sampling event) and MW14-02 and MW14-03 (both sampling events), due to low water table elevations.

Analytical results for dissolved metals, anions, hydrocarbons, and VOCs were less than the applicable CSR AW standards in June and in September.

4.3 Surface Water Analytical Results

The analytical surface water results are presented on Tables 3A (total metals) and 3B (hydrocarbons) at the end of this letter report.

During the June sampling event, zinc concentrations exceeded the CCME guideline of 30 µg/L at SW14-01, SW14-02, and SW14-03. Zinc concentrations at these locations were less than the guideline during the September monitoring event.

During the September monitoring event, concentrations of total metals (aluminum, cadmium, and iron) at SW14-01 exceeded the CCME guidelines. The cadmium concentration also exceeded the applicable CSR standard of 0.06 µg/L.

4.4 Results of QA/QC Analyses

A field duplicate sample was collected at SW14-02 during the June sampling event. The relative percent difference (RPD) and/or difference factor (DF), was calculated for the parameters that were detected by the laboratory. The results are shown on Table 4A (metals) and Table 4B (hydrocarbons), attached to this letter.

Although a RPD was not calculated for zinc, due to a non-detect concentration in the duplicate sample, there is some uncertainty in the results, given the elevated concentration of the parent sample. The duplicate pair results were reviewed and re-analyzed by the laboratory, and the original results were reported to be valid. Golder sampling procedures were followed during sample collection. Given the zinc results at surface water sampling locations SW14-01 and SW14-03, the duplicate non-detect result may not be considered representative of the June water quality conditions.

RPD and/or DF values for remaining parameters that were calculated meet Golder's Data Quality Objectives (DQOs) for this monitoring program.

Golder reviewed Maxxam laboratory reports R2005849 and R2041548 for internal QA/QC issues that were reported by the laboratory. With the exception of laboratory pH values that were reported past recommended hold time, QA/QC issues were not reported by the laboratory. Field pH measurements were recorded during sampling activities, and are considered representative of the water quality conditions.

5.0 DISCUSSION

The following sections of this letter present a discussion of the groundwater and surface water chemistry results, as well as the water table elevations that were observed during the monitoring events.

5.1 Groundwater and Surface Water Chemistry

Analytical groundwater results for samples collected at the landfill monitoring wells in 2015 remained less than CSR AW standards, indicating that groundwater quality has remained relatively unchanged from 2014 and that landfill material does not appear to be affecting the chemistry of the underlying aquifer. Although selected monitoring wells were not sampled during the monitoring events (as described above), a minimum of one groundwater sample was collected at up-gradient (MW14-01) and down-gradient (MW14-04) monitoring well locations, therefore providing representative groundwater data to document potential changes to water quality.

Surface water chemistry results identified zinc exceedances during the June sampling event and exceedances of aluminum, cadmium, and iron, during the September sampling event. The exceedances are not considered to be a result of the landfill material, for the following reasons:

- Zinc exceedances, of similar magnitude, were observed at three sampling locations in June, including the up-gradient sample location SW14-01. Given that the concentrations up-gradient of the landfill were similar to down-gradient conditions, the zinc results may be indicative of an upstream source or a result of particulate matter in the sample. There may also be seasonal influence, as concentrations during the September monitoring round were less than the applicable standards and guidelines at each sampling location. Zinc concentrations in September 2014 were also less than the applicable criteria.

- Aluminum, cadmium, and iron exceedances were observed at SW14-01, up-gradient of the landfill area. Golder understands that constructions works were completed adjacent to North Creek, along the former access road to the landfill, during the month of August, 2015. The works may potentially have contributed to locally elevated turbidity in the creek and subsequent entrainment of suspended sediments during sampling activities. Concentrations of these parameters adjacent to the landfill (SW14-02) and down-gradient of the landfill (SW14-03) were less than applicable criteria, therefore the exceedances are considered to be isolated.

In general, the surface water quality in North Creek appears similar to 2014 and is not considered to be affected by the landfill material.

5.2 Groundwater Elevations

Although the groundwater chemistry appears similar to 2014, the water table elevation in the vicinity of the landfill changed relative to one year ago.

During the June monitoring event, the groundwater table elevation was observed to be more than 1 metre lower than in September, 2014. At MW14-02 and MW14-03 (both dry wells), the water table elevation decreased by a minimum of 1.7 m and 2.0 m, respectively, based on the elevation of the bottom of the monitoring wells. At down-gradient monitoring well locations TH09-91 and TH10-91, the water table elevation was approximately 0.5 m lower than in September, 2014.

The lower water table elevation in June, 2015, relative to September, 2014, is contrary to the anticipated results, as the spring freshet would typically lead to higher water table elevations in the spring than in the fall.

Environment Yukon's Water Resources Branch[1] maintains and prepares Snow Survey Bulletins and Water Supply Forecasts three times annually, after March 1, April 1, and May 1. A review of the bulletins from May 1, 2014, and May 1, 2015 showed large variations between the two years. The bulletins can be summarized as follows:

- At Watson Lake Airport (snow course ID#10AA-SC01) conditions were snow free as of May 1, 2015, while at the same date in 2014, there were 47 cm of snow observed (representing 175 mm of water content);
- Snowpack conditions within the Liard River watershed as of May 1, 2014 were reported to be greater than 150% of normal, while snowpack conditions within the basin as of May 1, 2015 were reported to be 78% of normal; and
- Monthly Precipitation at Watson Lake in May, 2015, was recorded to be less than 50% of normal, while in May, 2014, monthly precipitation at the same location was reported to be approximately 120% of normal.

The above-normal observations made in 2014, combined with the lower than normal observations made in 2015, are considered to have contributed to the variability in the measured water table elevations.

[1] Government of Yukon (2014 and 2015). http://www.env.gov.yk.ca/air-water-waste/snow_survey.php

During the monitoring event in September 2015, the water table elevation at up-gradient location MW14-01 recharged to a similar elevation as observed in September, 2014 (approximately 0.6 m lower in 2015). However, water table elevations at the remaining monitoring locations remained lower than observed in September, 2014 (a minimum of 1.7 m lower at MW14-02 and more than 2.0 m lower at MW14-04).

The decrease in water table elevation at MW14-02, MW14-03, and MW14-04 over the course of the previous year, combined with the relatively stable elevation at MW14-01 during the same time period, suggests that the construction of the landfill may also have influenced water table elevations.

The construction of the Site landfill was completed in early September, 2014, and included capping and compaction of the landfill cells, and construction of a surface water drainage channel to divert surface runoff to North Creek. During the landfill construction, between May and September, 2014, landfill cells were excavated and potentially exposed to increased infiltration during rainfall events, which may have contributed to an increase in the water table elevation. Since the completion of construction, it is anticipated that infiltration rates have decreased and that surface runoff is now diverted via the drainage channel. The change in surface conditions at the landfill, combined with the weather events described above, is considered to have caused a further reduction in the water table elevations in the vicinity of the landfill. The elevations observed in September, 2015 may be considered representative of final conditions at the landfill, though further monitoring would be required to evaluate potential trends, given the snowpack information that indicated lower than normal observations in May 2015.

Golder understands that Teck's Waste Management Permit (Permit #81-020) for the landfill requires that the base of the landfill cells remain a minimum of three metres higher than observed groundwater elevations. Based on the water table elevation observed at MW14-03 in September, 2014, (1026.12 metres above sea level [m.a.s.l]) and the elevation of the bottom of the North Mill Debris Cell (1028.63 m.a.s.l.), there was a 2.5 m separation between the base of the landfill cell and the water table. Therefore, the permit condition was not met during the monitoring event. This observation has been documented by the Yukon Government (YG) as being out of compliance with the permit requirements; YG has since requested a plan be submitted to bring the landfill cells back into compliance.

Since the September 2014 observation at MW14-03, two additional monitoring events have been completed and both indicate that the water table is approximately 4.9 metres lower than the bottom of the landfill cell. This interpretation is based on dry conditions at MW14-03 and the noted elevation of the bottom of the monitoring well screen (1023.72 m.a.s.l). A cross-section of the landfill cell and monitoring well is shown on Figure 2. The water table elevations for 2015 are inferred to be lower than 1023.72 m.a.s.l., in the vicinity of the North Mill Debris cell.

The landfill cell is therefore considered to be in compliance with the permit requirements and, based on the monitoring results for 2015, it is possible that the water table elevation at MW14-03 in 2014, was higher than normal due to construction works.

Continued water table elevation monitoring at MW14-03, in addition to the surrounding monitoring wells, is recommended to document that the landfill cells remain in compliance over the long term.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Golder completed a groundwater and surface water quality and monitoring program at the constructed landfill at the Sä Dena Hes Mine, Yukon Territory. The monitoring program was completed on behalf of KNG and Teck, as part of the overall closure requirements for the mine.

The objectives of the 2015 monitoring work were to establish baseline water quality in the vicinity of the landfill and to document temporal changes to groundwater and/or surface water quality resulting from potential effects of the deposited landfill material. Based on the results of the monitoring program, the objectives have been substantially met. However, baseline conditions were not established at MW14-02 and MW14-03, due to lower groundwater elevations than observed in 2014.

It is recommended that the monitoring work be continued in 2016, in accordance with the long-term monitoring plan that has been developed for the Site. Surface water samples collected in 2016 are recommended to be analyzed for dissolved metals as well as total metals, to support this letter's interpretation that total metals exceedances are due to entrained sediment and not related to soluble metals in the surface water. Finally, it is recommended that monitoring of groundwater elevations be continued, in accordance with the requirements provided by the Yukon Government.

7.0 STUDY LIMITATIONS

This report was prepared for the exclusive use of Teck Resources Ltd. The report, which specifically includes all tables, figures and attachments, is based on data and information collected during the monitoring program conducted by Golder Associates Ltd., and is based solely on the conditions of the property at the time of the field work, supplemented by historical information and data obtained by Golder Associates Ltd., as described in this report.

The assessment of environmental conditions and possible hazards at this site has been made using the results of chemical analyses of discrete surface water and groundwater samples from a limited number of locations. The site conditions between sampling locations have been inferred based on conditions observed at monitoring well locations and surface water monitoring points. Additional study, including further subsurface investigation, can reduce inherent uncertainties associated with this type of study. However, it is never possible, even with exhaustive sampling and testing, to dismiss the possibility that part of a site may be contaminated and remains undetected.

The services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

The content of this report is based on information collected during our investigation, our present understanding of the site conditions, and our professional judgement in light of such information available at the time of this report. This report provides a professional opinion, and therefore no warranty is either expressed, implied or

made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, including excavations, borings, or other studies, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments, as required.

8.0 CLOSURE

We trust that the contents of this letter report are sufficient for your current review purposes. Should you have any questions or concerns, please do not hesitate to contact the undersigned at 604-296-4200.

Yours very truly,

GOLDER ASSOCIATES LTD.

Andrew Bruemmer, P.Eng. (BC, YT)
Project Manager

Gary Hamilton, P.Geo.
Principal, Project Director

AB/GJH/syd

Attachments: Figure 1 – Sample Location Plan
Figure 2 – Cross Section B-B'
Table 1 – Summary of Groundwater Elevations
Tables 2A, 2B, and 2C – Results of Groundwater Analyses
Tables 3A and 3B – Results of Surface Water Analyses
Tables 4A and 4B – Results of QA/QC Analyses
Attachment 1 – Groundwater and Surface Water Sampling Forms
Attachment 2 – Laboratory Analytical Results and Chains of Custody

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LEGEND

- CROSS SECTION B TRANSECT

LANDFILL SITE AND DEPOSITION ZONES

- 2013 CAMP AND OFFICE DEPOSITION CELL
- HISTORICAL DEBRIS DEPOSITION ZONE
- JDS MILL DEMOLITION DEBRIS CELL
- MISCELLANEOUS SITE DEBRIS DEPOSITION CELL
- SURFACE WATER DRAINAGE CHANNEL
- SURFACE WATER SAMPLING LOCATION
- 2014 MONITORING WELL LOCATION
- HISTORICAL MONITORING WELL LOCATION
- CONTOUR - ft
- WATERCOURSE

0 50 100

1:2,500 METERS

REFERENCES

1. CONTOURS OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. LANDFILL SITE AND DEPOSITION ZONES FROM AMEC FIGURE SDH05_FIG_03_R0.
3. ORTHOPHOTO OBTAINED FROM THE CLIENT.
4. DATUM: NAD83 PROJECTION: UTM ZONE 9

CLIENT
TECK RESOURCES LTD.

PROJECT
ESA - SITE LANDFILL
SÄ DENA HES MINE, YT

TITLE
SAMPLE LOCATION PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-11-10
DESIGNED	AB
PREPARED	RH
REVIEWED	AB
APPROVED	GJH

PROJECT NO.	CONTROL	REV.	FIGURE
12-1021-0006	12000	B	1

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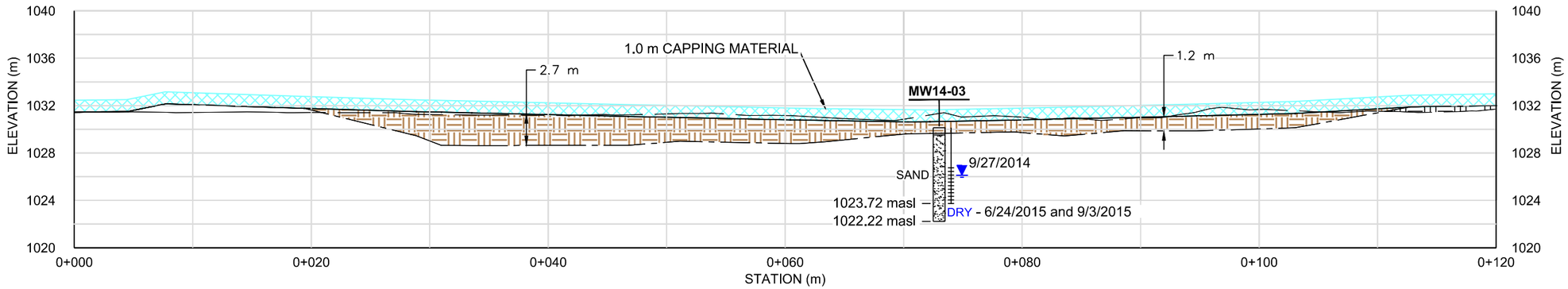

SECTION B-B'

LEGEND

- 2012 LIDAR
- 2014 AS BUILT SURFACE
- LANDFILL CELL BOTTOM
- CAPPING MATERIAL
- MILL DEBRIS DISPOSAL CELL

NOTES

1. MW14-03 WAS OBSERVED TO BE DRY DURING GROUNDWATER MONITORING EVENTS IN JUNE AND SEPTEMBER, 2015. THE WATER TABLE ELEVATION IS THEREFORE INFERRED TO TO BE LOWER THAN THE BOTTOM OF THE WELL SCREEN (1023.72 masl)

REFERENCE

DRAWING IS BASED ON A CAD FILE PROVIDED BY THE CLIENT WHICH WAS COMPLETED BY AMEC FOSTER WHEELER

FILE NO.: SDH05-B-C-MASTER-R0 DATE: 2015/07/29

0 10 20

1:400 METRES

CLIENT
TECK RESOURCES LTD.

PROJECT
ESA - SITE LANDFILL
SÄ DENA HES MINE, YT

TITLE
CROSS SECTION B-B'

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-11-10
PREPARED	RTJ
DESIGN	AB
REVIEW	AB
APPROVED	GJH

PROJECT No.	PHASE	Rev.	FIGURE
12-1021-0006	12000	A	2

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TABLE 1
Summary of Groundwater Elevations
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Monitoring Well Location	TOC[1] Elevation (m)	Ground Elevation (m)	Depth to Bottom[2] (m)	September 27, 2014 Groundwater Elevation (m)	June 24, 2015 Depth to Water[3] (m)	June 24, 2015 Groundwater Elevation[4] (m)	September 3, 2015 Depth to Water[3] (m)	September 3, 2015 Groundwater Elevation[4] (m)
MW14-01	1040.87	1039.87	15.845	1026.75	15.725	1025.15	14.780	1026.09
MW14-02	1034.37	1033.32	16.160	1019.89	NA	NA	NA	NA
MW14-03	1031.26	1030.14	7.200	1026.12	NA	NA	NA	NA
MW14-04	1029.98	1028.82	13.875	1019.85	12.665	1017.31	12.870	1017.11
TH09-91*	1008.60	1008.08	12.155	1003.27	5.755	1002.85	-	-
TH10-91*	1014.38	1013.33	18.910	1003.04	11.770	1002.61	-	-

Notes:
1. TOC = Top of Well Casing
2. Depth to bottom measured from TOC
3. Depth to water measured from TOC
4. Ground Water Elevation = TOC Elevation minus Depth to Water
NA = well dry at time of measurement
* TOC measured from Top of Protective Casing

TABLE 2A
Results of Groundwater Analysis - Dissolved Metals and Inorganics
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Location			TH09-91	TH09-91	TH10-91	TH10-91	MW14-01	MW14-01	MW14-02	MW14-02	MW14-03	MW14-04	MW14-04	MW14-04
Sample ID	Aquatic Life		22807-02	07528-02	22807-01	07528-01	22807-07	7534-07	22807-06	22807-05	22807-04	22807-03	07528-03	7534-08
Date Sampled	CSR-AW	MCS	27-Sep-14	24-Jun-15	27-Sep-14	24-Jun-15	27-Sep-14	3-Sep-15	27-Sep-14	27-Sep-14	27-Sep-14	27-Sep-14	24-Jun-15	3-Sep-15
QA/QC	(freshwater)								FD	FDA				
Physical Tests														
pH (pH units)			7.59	7.23	7.60	7.17	7.32	8.38	7.84	7.84	7.33	7.58	7.64	8.33
Hardness (as $CaCO_3$)			95400	107000	80700	91000	227000	216000	207000	205000	200000	176000	185000	196000
Anions and Nutrients														
Chloride (Cl)			550	740	710	<500	1000	520	870	970	1200	620	540	790
Fluoride (F)	2,000-3,000	H	88	83	63	58	140	110	44	46	69	220	64	49
Nitrate (as N)	400,000		<20	<20	<20	187	187	276	123	131	182	262	386	108
Nitrite (as N)	200-2,000	Cl	<5.0	<5.0	23.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	10.3	12.9
Nitrate and nitrite (as N)	400,000		<20	<20	39	187	187	276	123	131	182	262	397	120
Sulfate (SO_4)	1,000,000		500	<500	<500	<500	21700	8750	1050	1050	19400	20200	7110	6140
Dissolved Metals														
Aluminum			7.2	13.5	<3.0	12.5	23.6	13.5	9.8	11.0	5.0	8.9	29.7	12.9
Antimony	200		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	50		<0.10	<0.10	<0.10	<0.10	0.28	0.23	0.42	0.42	0.31	0.33	0.67	0.60
Barium	10,000		24.0	34.7	19.2	19.8	86.6	81.4	312	317	44.6	57.1	52.7	75.6
Beryllium	53		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron	50,000		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	0.1 - 0.6	H	0.011	<0.010	0.014	<0.010	0.168	0.078	0.036	0.039	2.65	0.09	0.043	0.029
Calcium			30300	34900	24600	28100	73300	69800	66200	65100	69400	58600	64300	67300
Chromium	$10^{VI}/90^{III}$	V	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cobalt	9		<0.50	<0.50	<0.50	<0.50	0.67	<0.50	<0.50	<0.50	0.58	0.75	<0.50	<0.50
Copper	20-90	H	0.31	<0.20	0.84	<0.20	0.59	0.87	0.22	0.32	5.34	0.56	1.29	0.52
Iron			320	8710	2630	4910	39.7	16.9	8.1	8.3	<5.0	9.0	45.5	5.6
Lead	40-160	H	<0.20	<0.20	<0.20	<0.20	0.49	0.26	<0.20	<0.20	0.58	<0.20	0.43	0.22
Lithium			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Magnesium			4750	4720	4700	5050	10600	10100	10100	10300	6520	7130	5960	6810
Manganese			67.3	282	135	204	283	3.5	10.4	10.2	54.4	216	27.9	11.6
Mercury	1		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Molybdenum	10,000		<1.0	<1.0	<1.0	<1.0	2.2	1.8	<1.0	<1.0	1.9	1.9	<1.0	<1.0
Nickel	250-1500	H	<1.0	<1.0	<1.0	<1.0	3.1	<1.0	<1.0	<1.0	1.8	3.1	1.4	<1.0
Potassium			371	406	631	716	1130	830	641	675	915	1140	971	765
Selenium	10		0.12	<0.10	<0.10	<0.10	1.01	0.87	<0.10	<0.10	0.26	0.27	0.23	0.18
Silicon			920	910	560	820	3500	4280	3830	3790	3130	3560	4200	3990
Silver	0.5-15	H	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sodium			954	914	1140	1050	3190	1640	1050	1100	3080	3420	1020	1010
Strontium			130	132	102	98.2	204	203	222	225	259	206	200	218
Sulphur			<3000	<3000	<3000	<3000	7900	3200	<3000	<3000	6300	6700	<3000	<3000
Thallium	3		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tin			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium	1,000		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Uranium	3,000		0.21	<0.10	<0.10	<0.10	0.5	0.47	0.75	0.73	1.2	0.98	0.79	0.66
Vanadium			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc	75 - 2400	H	<5.0	7.2	6.6	5.4	<5.0	49.9	12.5	33.0	22.8	<5.0	23.3	20.8
Zirconium			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Notes:

Results are expressed in micrograms per litre (µg/L), unless otherwise indicated.

Standards shown are from the Yukon Contaminated Sites Regulation Schedule 3 (updated to September 30, 2002).

MCS= most conservative standard based on applicable site-specific standards; AW = standards for the protection of freshwater aquatic life

H = Hardness-dependant; V = Valence-dependant; Cl = Chloride concentration-dependant guidelines

QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate

italics denotes detection limits that are greater than applicable standards

TABLE 2B
Results of Groundwater Analysis - Hydrocarbons
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Location			TH09-91	TH09-91	TH10-91	TH10-91	MW14-01	MW14-01	MW14-02	MW14-02	MW14-03	MW14-04	MW14-04	MW14-04
Sample ID	Aquatic Life		22807-02	07528-02	22807-01	07528-01	22807-07	7534-07	22807-05	22807-06	22807-04	22807-03	07528-03	7534-08
Date Sampled	CSR-AW	MCS	27-Sep-14	24-Jun-15	27-Sep-14	24-Jun-15	27-Sep-14	3-Sep-15	27-Sep-14	27-Sep-14	27-Sep-14	27-Sep-14	24-Jun-15	3-Sep-15
QA/QC	(freshwater)								FDA	FD				
BTEXS														
Benzene	4,000		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Ethylbenzene	2,000		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methyl t-butyl ether (MTBE)			<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Styrene	720		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	390		<0.40	<0.40	0.59	<0.40	<0.40	<0.40	<0.40	<0.40	0.42	<0.40	<0.40	<0.40
ortho-Xylene			<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
meta- & para-Xylene			<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylenes, total			<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Hydrocarbons														
EPHw10-19	5,000		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPHw19-32			<200	210	<200	<200	<200	<200	<200	<200	<200	<200	550	<200
LEPHw	500		<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
HEPHw			<200	210	<200	<200	<200	<200	<200	<200	<200	<200	550	<200
Volatile Hydrocarbons (VH6-10)	15,000		<300	<300	370	<300	<300	<300	<300	<300	<300	<300	<300	<300
VPHw (C6-C10)	1,500		<300	<300	370	<300	<300	<300	<300	<300	<300	<300	<300	<300
Polycyclic Aromatic Hydrocarbons														
2-Methylnaphthalene			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	60		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acridine	0.5		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	1		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benz(a)anthracene	1		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.1		<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090
Benzo(b,j)fluoranthene			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	2		<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.021	<0.020	0.020	<0.020
Fluorene	120		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	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
Phenanthrene	3		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene	0.2		<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.026	0.023	0.023	<0.020
Quinoline	34		<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24
High Molecular Weight PAH`s			<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Low Molecular Weight PAH`s			<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24
Total PAH			<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24

Notes:
Results are expressed in micrograms per litre (µg/L), unless otherwise indicated.
Standards shown are from the Yukon Contaminated Sites Regulation Schedule 3 (updated to September 30, 2002).
MCS= most conservative standard based on applicable site-specific standards; AW = standards for the protection of freshwater aquatic life
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate
italics denotes detection limits that are greater than applicable standards

TABLE 2C
Results of Groundwater Analysis - Volatile Organic Compounds
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Location			TH09-91	TH09-91	TH10-91	TH10-91	MW14-01	MW14-01	MW14-02	MW14-02	MW14-03	MW14-04	MW14-04	MW14-04
Sample ID	Aquatic Life		22807-02	07528-02	22807-01	07528-01	22807-07	7534-07	22807-05	22807-06	22807-04	22807-03	07528-03	7534-08
Date Sampled	CSR-AW		27-Sep-14	24-Jun-15	27-Sep-14	24-Jun-15	27-Sep-14	3-Sep-15	27-Sep-14	27-Sep-14	27-Sep-14	27-Sep-14	24-Jun-15	3-Sep-15
QA/QC	(freshwater)	MCS							FDA	FD				
Volatile Organic Compounds														
Bromodichloromethane			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	130		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	13	F	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	20	F	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dibromoethane			<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-dichlorobenzene			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-dichlorobenzene	1500		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-dichlorobenzene	260		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-dichloroethane			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-dichloroethane	1,000		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.87	<0.50	<0.50
1,1-dichloroethene			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-dichloroethene			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	980		<2.0	<2.0	<6.2	<2.0	<4.5	<2.0	<2.0	<4.1	<6.6	<6.1	<2.0	<2.0
1,2-dichloropropane			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-dichloropropene			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-dichloropropene			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-trichloroethane			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50	<0.50
1,1,2-trichloroethane			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	200		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane			<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
1,1,1,2-tetrachloroethane			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-tetrachloroethane			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	1100		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Notes:
Results are expressed in micrograms per litre (µg/L), unless otherwise indicated.
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MCS= most conservative standard based on applicable site-specific standards; AW = standards for the protection of freshwater aquatic life; F = Freshwater dependant guideline
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate
italics denotes detection limits that are greater than applicable standards

TABLE 3A
Results of Surface Water Analysis - Total Metals and Inorganics
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Location	Aquatic Life CSR[1]-AW (freshwater)	MCS	Aquatic Life CCME[2]-AW (freshwater)	MCS	SW14-01	SW14-01	SW14-01	SW14-01	SW14-02	SW14-02	SW14-02	SW14-02	SW14-02	SW14-03	SW14-03	SW14-03	SW14-03	MH12	MH12
Sample ID					20769-01	KW1287	07528-07	7535-03	20769-02	KW1288	07528-05	07528-06	7535-02	20769-03	KW1289	07528-04	7535-01	KS6050	KS6051
Date Sampled					8-Sep-14	11-Oct-14	25-Jun-15	3-Sep-15	8-Sep-14	11-Oct-14	25-Jun-15	25-Jun-15	3-Sep-15	8-Sep-14	11-Oct-14	25-Jun-15	3-Sep-15	26-Sep-14	26-Sep-14
QA/QC											FDA	FD						FDA	FD
Physical Tests																			
pH (field, pH units)			**6.5-9.0**		7.07	7.98	8.11	-	7.62	8.11	8.08	8.08	-	7.74	8.09	7.77	-	8.18	8.16
pH (lab, pH units)			**6.5-9.0**		-	-	-	8.36	-	-	-	-	8.28	-	-	-	8.44	-	-
Hardness (total as $CaCO_3$)					151000	150000	250000	153000	179000	165000	148000	152000	168000	175000	166000	150000	170000	175000	179000
Anions and Nutrients																			
Ammonia (total as N)	131 - 1,840	pH	**0.021-231**	pH,T	-	15	-	-	-	5.3	-	-	-	-	10	-	-	23	32
Chloride (dissolved Cl)			**120,000**		<500	1300	530	570	<500	<500	<500	<500	670	<500	740	580	<500	<500	640
Fluoride (F)	200 - 300	H	**120**		**130**	120	66	120	110	100	100	100	110	110	110	100	110	-	-
Nitrate (as N)	40,000		**13,000**		32	51	121	44	47	62	56	61	63	40	56	54	62	22	22
Nitrite (as N)	20 - 200	Cl	**60**	NO_2-N	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nitrate and nitrite (as N)	40,000				32	51	121	44	47	62	56	61	63	40	56	54	62	22	22
Sulfate (dissolved SO_4)	100,000				6160	5950	38400	5060	11300	10500	9190	8970	11400	10700	10400	8900	11100	9800	9600
Total Metals																			
Aluminum			**5-100**	pH	8.2	28.1	12.2	**183**	9.0	15.2	13.6	8.2	16.7	**236**	33.5	12.5	9.9	60.4	56.1
Antimony	20				<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	5		**5**		1.12	1.11	0.36	1.54	1.07	0.88	1.16	1.14	1.09	1.24	0.82	1.06	0.93	0.90	0.87
Barium	1,000				62.5	62.9	101	68.6	75.6	70.1	60.0	59.7	69.3	81.9	74.3	61.3	69.8	80.6	80.2
Beryllium	5.3				<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
Bismuth					<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
Boron			**1,500**		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	0.01 - 0.06	H	**0.09**		0.034	0.043	0.067	**0.104**	0.056	0.050	0.041	0.043	0.053	**0.13**	0.044	0.038	0.049	0.057	0.047
Calcium					51700	50800	88200	52800	60900	56100	51700	52700	58700	59500	56300	52100	59400	59700	61000
Chromium	$1.0^{VI}/9.0^{III}$	V	$\mathbf{1.0^{VI}/8.9^{II}}$	V	<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
Cobalt	0.9				<0.50	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Copper	2 - 9	H	**2 - 4**	H	<0.50	<0.50	<0.50	0.74	<0.50	<0.50	<0.50	<0.50	<0.50	0.69	<0.50	<0.50	0.74	<0.50	<0.50
Iron			**300**		34	67	18	**356**	20	36	26	25	28	**374**	57	47	10	90	73
Lead	4 - 16	H	**1 - 7**	H	0.47	0.84	<0.20	3.45	1.60	0.61	0.56	0.52	0.51	6.23	1.13	0.79	<0.20	2.21	1.76
Lithium					<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Magnesium					5410	5520	7140	5180	6600	6020	4620	4860	5310	6350	6100	4880	5350	6240	6430
Manganese					27.6	32.2	2.3	36	11.9	11.5	10.2	10.1	10.6	27.1	6.2	5.7	3.9	5.1	3.4
Mercury	0.1		**0.026**		<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	*<0.050*	*<0.050*
Molybdenum	1,000		**73**		1.3	1.3	1.7	1.4	1.3	1.3	1.3	1.2	1.5	1.3	1.3	1.3	1.4	1.2	1.2
Nickel	25 - 150	H	**25 - 150**	H	<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
Potassium					379	312	953	361	602	418	363	362	458	726	408	374	397	430	436
Selenium	1		**1**		0.49	0.54	**1.82**	0.53	0.64	0.62	0.58	0.69	0.65	0.56	0.59	0.57	0.60	0.54	0.53
Silicon					4230	4160	3630	4390	3990	3950	4170	3990	4540	4390	3810	4120	4390	4130	4210
Silver	0.05 - 1.5	H	**0.25**		<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.021	<0.020	<0.020	<0.020	<0.020	<0.020
Sodium					941	843	843	899	1250	984	908	898	964	1060	975	1080	978	1100	1090
Strontium					174	183	336	205	213	214	184	185	223	234	213	178	212	222	227
Sulphur					<3000	<3000	14400	<3000	3300	<3000	<3000	3400	<3000	8600	<3000	3300	3800	<3000	<3000
Thallium	0.3		**0.8**		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.050	<0.050
Tin					<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium	100				<5.0	<5.0	<5.0	8.2	<5.0	<5.0	<5.0	<5.0	<5.0	6.9	<5.0	<5.0	<5.0	<5.0	<5.0
Uranium	300		**15**		0.61	0.65	2.69	0.68	0.91	0.89	0.76	0.72	0.86	0.89	0.88	0.77	0.8	0.93	0.95
Vanadium					<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc	7.5 - 240	H	**30**		<5.0	<5.0	**38.8**	26.4	6.0	<5.0	**46.4**	<5.0	5.5	11.3	<5.0	**30.1**	8.9	5.9	<5.0
Zirconium					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Notes:
Results are expressed in micrograms per litre (µg/L), unless otherwise indicated.
1. Standards shown are from the Yukon Contaminated Sites Regulation Schedule 3 (updated to September 30, 2002), standards divided by a factor of 10 for assumed dilution of groundwater concentrations into surface water receptors.
2. Guidelines shown are from the Canadian Council of Ministers Canadian Environmental Quality Guidelines of the Environment.
MCS= most conservative standard based on applicable site-specific standards; AW = standards for the protection of freshwater aquatic life
pH = pH-dependant; H = Hardness-dependant; V = Valence-dependant; Cl = Chloride-concentration dependant; NO_2-N= nitrite-nitrogen dependant; T = temperature dependant guidelines
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate; *italics* denotes detection limits that are greater than applicable standards

TABLE 3B
Results of Surface Water Analysis - Hydrocarbons
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Location					SW14-01	SW14-01	SW14-01	SW14-02	SW14-02	SW14-02	SW14-02	SW14-03	SW14-03	SW14-03
Sample ID	Aquatic Life CSR[1]-AW (freshwater)	MCS	**Aquatic Life CCME[2]-AW (freshwater)**	MCS	20769-01	07528-07	7535-03	20769-02	07528-05	07528-06	7535-02	20769-03	07528-04	7535-01
Date Sampled					8-Sep-14	25-Jun-15	3-Sep-15	8-Sep-14	25-Jun-15	25-Jun-15	3-Sep-15	8-Sep-14	25-Jun-15	3-Sep-15
QA/QC									FDA	FD				
Volatile Organic Compounds														
Benzene	400		**370**		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Ethylbenzene	200		**90**		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Methyl t-butyl ether (MTBE)			**10000**		<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Styrene	72		**72**		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Toluene	39		**2**		<0.40	<0.40	1.1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
ortho-Xylene					<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
meta- & para-Xylene					<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylenes, total					<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Hydrocarbons														
EPHw10-19	500				<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPHw19-32					<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
LEPHw	50				*<200*	<200	<200	*<200*	*<200*	*<200*	<200	*<200*	*<200*	<200
HEPHw					<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Volatile Hydrocarbons (VH6-10)	1,500				<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
VPHw (C6-C10)	150				*<300*	*<300*	*<300*	*<300*	*<300*	*<300*	*<300*	*<300*	*<300*	*<300*
Polycyclic Aromatic Hydrocarbons														
2-Methylnaphthalene					<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	6.0		**5.8**		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene					<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acridine	0.05		**4.4**		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	0.1		**0.012**		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benz(a)anthracene	0.1		**0.018**		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.01		**0.015**		<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090
Benzo(b,j)fluoranthene					<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene					<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene					<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene					<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene					<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	0.2		**0.04**		<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Fluorene	12		**3**		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene					<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	1		**1.1**		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	0.3		**0.4**		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene	0.02		**0.025**		<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Quinoline	3.4		**3.4**		<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24
High Molecular Weight PAH`s					-	<0.24	<0.050	-	<0.24	<0.24	<0.050	-	<0.24	<0.050
Low Molecular Weight PAH`s					-	<0.050	<0.24	-	<0.050	<0.050	<0.24	-	<0.050	<0.24
Total PAH					-	<0.24	<0.24	-	<0.24	<0.24	<0.24	-	<0.24	<0.24

Notes:
Results are expressed in micrograms per litre (µg/L), unless otherwise indicated.
1. Standards shown are from the Yukon Contaminated Sites Regulation Schedule 3 (updated to September 30, 2002);
standards divided by a factor of 10 for assumed dilution of groundwater concentrations into surface water receptors.
2. Guidelines shown are from the Canadian Council of Ministers Canadian Environmental Quality Guidelines of the Environment.
MCS = most conservative standard based on applicable site-specific standards; AW = standards for the protection of freshwater aquatic life
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate
italics denotes detection limits that are greater than applicable standards

TABLE 4A
QA/QC Results of Surface Water Analysis - Metals and Inorganics
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Location		SW14-02				
Sample ID	Method Detection Limit	07528-05	07528-06	Mean	Relative Percent Difference	Difference Factor (DF)
Date Sampled		25-Jun-15	25-Jun-15			
QA/QC		FDA	FD			
Physical Tests						
Hardness (as $CaCO_3$)	500	148000	152000	150000	3%	NA
Anions and Nutrients						
Chloride (Cl)	500	<500	<500	NC	NC	NA
Fluoride (F)	10	100	100	100	0%	NA
Nitrate (as N)	20	56	61	59	NA	0.25
Nitrite (as N)	5.0	<5.0	<5.0	NC	NC	NA
Nitrate and nitrite (as N)	20	56	61	59	NA	0.25
Sulfate (SO_4)	500	9190	8970	9080	2%	NA
Total Metals						
Aluminum	3.0	13.6	8.2	10.9	NA	1.80
Antimony	0.50	<0.50	<0.50	NC	NC	NA
Arsenic	0.10	1.16	1.14	1.2	2%	NA
Barium	1.0	60.0	59.7	59.9	1%	NA
Beryllium	0.10	<0.10	<0.10	NC	NC	NA
Bismuth	1.0	<1.0	<1.0	NC	NC	NA
Boron	50	<50	<50	NC	NC	NA
Cadmium	0.010	0.041	0.043	0.042	NA	0.20
Calcium	50	51700	52700	52200	2%	NA
Chromium	1.0	<1.0	<1.0	NC	NC	NA
Cobalt	0.50	<0.50	<0.50	NC	NC	NA
Copper	0.20	<0.50	<0.50	NC	NC	NA
Iron	5.0	26	25	26	4%	NA
Lead	0.20	0.56	0.52	0.54	NA	0.20
Lithium	5.0	<5.0	<5.0	NC	NC	NA
Magnesium	50	4620	4860	4740	5%	NA
Manganese	1.0	10.2	10.1	10.2	1%	NA
Mercury	0.010	<0.010	<0.010	NC	NC	NA
Molybdenum	1.0	1.3	1.2	1.3	NA	0.10
Nickel	1.0	<1.0	<1.0	NC	NC	NA
Potassium	50	363	362	363	0%	NA
Selenium	0.10	0.58	0.69	0.64	17%	NA
Silicon	100	4170	3990	4080	4%	NA
Silver	0.020	<0.020	<0.020	NC	NC	NA
Sodium	50	908	898	903	1%	NA
Strontium	1.0	184	185	185	1%	NA
Sulphur	3000	<3000	3400	NC	NC	NA
Thallium	0.050	<0.050	<0.050	NC	NC	NA
Tin	5.0	<5.0	<5.0	NC	NC	NA
Titanium	5.0	<5.0	<5.0	NC	NC	NA
Uranium	0.10	0.76	0.72	0.74	5%	NA
Vanadium	5.0	<5.0	<5.0	NC	NC	NA
Zinc	5.0	46.4	<5.0	NC	NC	NA
Zirconium	0.50	<0.50	<0.50	NC	NC	NA

Notes:
Results are expressed in microgram per litre (µg/L), unless otherwise indicated.
Mean = average of two values.
Relative percent difference = the difference between two values divided by the mean of the two values.
Difference factor = absolute difference between two values divided by the method detection limit.
Difference factor is calculated when the concentration is within five times the detection limit.
Bold text indicates that the RPD or DF exceeds Golder's internal QA/QC guidelines.
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate
NC = not calculated; NA = not applicable

QA/QC Results of Surface Water Analysis - Hydrocarbons
Teck Resources Ltd. - Sä Dena Hes Mine Landfill Groundwater Monitoring
Sä Dena Hes Mine, YT

Location		SW14-02				
Sample ID	Method Detection Limit	07528-05	07528-06	Mean	Relative Percent Difference	Difference Factor (DF)
Date Sampled		25-Jun-15	25-Jun-15			
QA/QC		FDA	FD			
BTEXS						
Benzene	0.40	< 0.40	< 0.40	NC	NC	NA
Ethylbenzene	0.40	< 0.40	< 0.40	NC	NC	NA
Methyl t-butyl ether (MTBE)	4.0	< 4.0	< 4.0	NC	NC	NA
Styrene	0.40	< 0.40	< 0.40	NC	NC	NA
Toluene	0.40	< 0.40	< 0.40	NC	NC	NA
ortho-Xylene	0.40	< 0.40	< 0.40	NC	NC	NA
meta- & para-Xylene	0.40	< 0.40	< 0.40	NC	NC	NA
Xylenes, total	0.40	< 0.40	< 0.40	NC	NC	NA
Extractable Hydrocarbons						
EPH10-19	200	< 200	< 200	NC	NC	NA
EPH19-32	200	< 200	< 200	NC	NC	NA
LEPH	200	< 200	< 200	NC	NC	NA
HEPH	200	< 200	< 200	NC	NC	NA
Volatile Hydrocarbons (VH6-10)	300	< 300	< 300	NC	NC	NA
VPH (C6-C10)	300	< 300	< 300	NC	NC	NA
Polycyclic Aromatic Hydrocarbons						
2-Methylnaphthalene	0.10	< 0.10	< 0.10	NC	NC	NA
Acenaphthene	0.050	< 0.050	< 0.050	NC	NC	NA
Acenaphthylene	0.050	< 0.050	< 0.050	NC	NC	NA
Acridine	0.050	< 0.050	< 0.050	NC	NC	NA
Anthracene	0.010	< 0.010	< 0.010	NC	NC	NA
Benz(a)anthracene	0.010	< 0.010	< 0.010	NC	NC	NA
Benzo(a)pyrene	0.0090	< 0.0090	< 0.0090	NC	NC	NA
Benzo(b,j)fluoranthene	0.050	< 0.050	< 0.050	NC	NC	NA
Benzo(g,h,i)perylene	0.050	< 0.050	< 0.050	NC	NC	NA
Benzo(k)fluoranthene	0.050	< 0.050	< 0.050	NC	NC	NA
Chrysene	0.050	< 0.050	< 0.050	NC	NC	NA
Dibenz(a,h)anthracene	0.050	< 0.050	< 0.050	NC	NC	NA
Fluoranthene	0.020	< 0.020	< 0.020	NC	NC	NA
Fluorene	0.050	< 0.050	< 0.050	NC	NC	NA
Indeno(1,2,3-c,d)pyrene	0.050	< 0.050	< 0.050	NC	NC	NA
Naphthalene	0.10	< 0.10	< 0.10	NC	NC	NA
Phenanthrene	0.050	< 0.050	< 0.050	NC	NC	NA
Pyrene	0.020	< 0.020	< 0.020	NC	NC	NA
Quinoline	0.24	< 0.24	< 0.24	NC	NC	NA
High Molecular Weight PAH`s	0.050	< 0.050	< 0.050	NC	NC	NA
Low Molecular Weight PAH`s	0.24	< 0.24	< 0.24	NC	NC	NA
Total PAH	0.24	< 0.24	< 0.24	NC	NC	NA

Notes:
Results are expressed in micrograms per litre (µg/L), unless otherwise indicated.
Mean = average of two values.
Relative percent difference = the difference between two values divided by the mean of the two values.
Difference factor = absolute difference between two values divided by the method detection limit.
Difference factor is calculated when the concentration is within five times the detection limit.
Bold text indicates that the RPD or DF exceeds Golder's internal QA/QC guidelines.
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate
NC = not calculated; NA = not applicable

ATTACHMENT 1

Groundwater and Surface Water Sampling Forms

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: MW14-01

Project Name: SÄ DENA HES ESA - Closure GW Sampling
Project No.: 12-1021-0006/~~0000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill
Date: Sept 3 /15
Weather: Clear Skies
Temperature: 5°C
Completed By: LC
GPS Coordinates:
Reviewed By:

MONITORING WELL INFORMATION

Time of Measurement: 8:44
Depth to Product: N/A m
Product Thickness: N/A m
Depth to Water (A): 14.780 m below ■ TOP
Depth to Bottom of Well (B): 15.740 m below ■ TOP
Diameter of Standpipe: 51 mm
Well Condition: good

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*2.0 = 1.92 Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump
☐ Waterra
☐ Hydrolift
■ Bailer (Type: 1 L HDPE)
☐ Peristaltic
☐ Submersible
☐ Bladder

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redex) Meter Model:
Organic Vapour Meter Model:

☐ Rental Equipment:
☐ Field Bump
☐ pH4 ☐ pH7
☐ pH10
☐ 1413 us/cm

Pump Details:
☐ D.O. Ampoule
☐ Field Calibration

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = 5.76 litres
Avg. Flow Rate: L/min. ~5L
Start: Finish:
Sample intake depth:

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
8:53	1	3.24	2.93	198	176.8	19.64		clear, no odour
8:55	2	2.81	2.36	338	204.6	17.40		murky brown light
8:57	3	2.66	2.79	351	185.2	16.87		
8:59	4	2.75	2.96	385	176.8	12.39		
9:01	5	2.74	2.86	379	181.5	12.04		

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I (I I) I I I I I I I I I Very Silty

Analysis	Type		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
			Container Size									
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
(BTEX/VPH/VOCs)	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	■ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	3							■ Yes	☐ No	Hydrochloric acid
Anions/[illegible]	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7534-07
Consumables: ☒ ~~Waterra Tubing~~ 5cm ☐ HDPE/Teflon Tubing ☒ Groundwater Filter
Field Dup. ☒ Silicon Tubing 5cm ☐ D.O. Ampoules ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: MW14-02

Project Name:	SÄ DENA HES ESA - Closure GW Sampling	**Project No.:**	12-1021-0006/~~0000~~ 12000/12004
Location:	SÄ DENA HES MINE - Landfill	**Date:**	Sept 3 /15
Weather:	Sunskies **Temperature:** 5°C	**Completed By:**	LC
GPS Coordinates:		**Reviewed By:**	

MONITORING WELL INFORMATION

Time of Measurement: 9:26

Depth to Product: N/A m — Product Thickness: N/A m

Depth to Water (A): — m below ■ TOP NO WATER

Depth to Bottom of Well (B): 16.20X m below ■ TOP

Diameter of Standpipe: 51 mm

Well Condition: good.

Tidally Influenced: ☐ Yes ☒ No

Pressurized: ☐ Yes ■ No

Well Headspace: N/A ppm

One Well Volume:

(B-A)*2.0 = ______ Litres - for a 51 mm (2.0 inch) diameter well

(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump: ☐ Waterra ☐ Hydrolift ■ Bailer (Type: 1 L HDPE) ☐ Peristaltic ☐ Submersible ☐ Bladder

Multimeter Model: YSI 556 MPS

pH/Temp Meter Model:

Conductivity Meter Model:

Dissolved Oxygen Meter Model:

ORP (Redox) Meter Model:

Organic Vapour Meter Model:

☐ Rental Equipment:

☐ Field Bump: ☐ pH4 ☐ pH7 ☐ pH10 ☐ 1413 us/cm

☐ Field Calibration

Pump Details: ______ ☐ D.O. Ampoule

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ______ = ______ litres Start: ______ Finish: ______

Avg. Flow Rate: ______ L/min. Sample intake depth: ______

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
					well dry			

* Record DO in Mg/L, not percentage

Comments:

Odour: ☐ Yes ☐ No If yes ______

Sheen: ☐ Yes ☐ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like

Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
			Container Size									
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	2							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	■ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	2							■ Yes	☐ No	Hydrochloric acid
Anions/TDS	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7534-108 Consumables: ☒ Waterra Tubing 5 cm ☐ HDPE/Teflon Tubing ______ ☒ Groundwater Filter

Field Dup. ______ ☐ Silicon Tubing ______ ☐ D.O. Ampoules ______ ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: MW14-03

Project Name: SÄ DENA HES ESA - Closure GW Sampling
Location: SÄ DENA HES MINE - Landfill
Weather: Clear Skies **Temperature:** 5°C
GPS Coordinates:

Project No.: 12-1021-~~0000/9000~~ 12000/12004
Date: Sept 3 /15
Completed By: LC
Reviewed By:

MONITORING WELL INFORMATION

Time of Measurement: 11:10
Depth to Product: N/A m
Depth to Water (A): — m below ■ TOP NO WATER
Depth to Bottom of Well (B): 7.230 m below ■ TOP
Diameter of Standpipe: 51 mm
Well Condition: good

Product Thickness: N/A m

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*2.0 = ____ Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump
☐ Waterra
☐ Hydrolift
■ Bailer (Type: 1 L HDPE)
☐ Peristaltic
☐ Submersible
☐ Bladder

Pump Details:

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redex) Meter Model:
Organic Vapour Meter Model:

☐ D.O. Ampoule

☐ Rental Equipment:

☐ Field Bump
☐ pH4 ____ ☐ pH7 ____
☐ pH10 ____
☐ 1413 us/cm ____
☐ Field Calibration ____

WELL DEVELOPMENT/PURGING

Purge Volume: Well Vol. X ____ = ____ litres
Avg. Flow Rate: ____ L/min.

Start: ____ Finish: ____
Sample intake depth: ____

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
					well			
					dry			

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☐ No If yes ____
Sheen: ☐ Yes ☐ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		Container Size 40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	☐ Plastic	■ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	■ Plastic	☐ Glass	3							■ Yes	☐ No	Hydrochloric acid
Anions/TDS	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7534-
Field Dup. ____

Consumables: ☐ Waterra Tubing ____ ☐ HDPE/Teflon Tubing ____ ☒ Groundwater Filter
☒ Silicon Tubing SCM ☐ D.O. Ampoules ____ ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: MW14-01

Project Name: SÄ DENA HES ESA - Closure GW Sampling
Project No.: 12-1021-0006/~~0000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill
Date: Sept 3 /15
Weather: Sunny, clear **Temperature:** 5°C
Completed By: LC
GPS Coordinates: majestic
Reviewed By:

MONITORING WELL INFORMATION

Time of Measurement: 9:32
Depth to Product: N/A m
Product Thickness: N/A m
Depth to Water (A): 12.870 m below ■ TOP
Depth to Bottom of Well (B): 14.910 m below ■ TOP
Diameter of Standpipe: 51 mm BTOC
Well Condition: ~~[illegible]~~ damaged @ 12m

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*2.0 = 4.08 Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump
☐ Waterra
☐ Hydrolift
■ Bailer (Type: 1L HDPE)
☐ Peristaltic
☐ Submersible
☐ Bladder

had to make 1/2 bailer to get past bend

Pump Details: past bend

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redex) Meter Model:
Organic Vapour Meter Model:
☐ D.O. Ampoule

☐ Rental Equipment:
☐ Field Bump
☐ pH4 ☐ pH7
☐ pH10
☐ 1413 us/cm
☐ Field Calibration

WELL DEVELOPMENT/PURGING 1+ ~ 5L

Purge Volume: Well. Vol. X ~~3~~ = ~~12.24~~ litres
Avg. Flow Rate: L/min. ~~12.6~~
Start: Finish:
Sample intake depth:

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
10:12	1	5.22	2.73	297	189.1	16.84		
10:14	2	4.32	2.56	298	198.8	13.32		
10:17	3	4.34	2.50	299	194.7	11.86		
10:32	4	4.37	2.56	297	199.3	11.42		
10:39	5	4.37	2.46	297	204.6	12.15		

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I I I I (I) I I Very Silty

Analysis	Type		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
			Container Size									
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
(BTEX/VPH/VOCs)	☐ Plastic	■ Glass	2							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	■ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	2							■ Yes	☐ No	Hydrochloric acid
Anions/~~TDS~~	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7534-08
Field Dup.
Consumables: ☒ ~~Waterra Tubing~~ 5cm ☐ HDPE/Teflon Tubing ☒ Groundwater Filter
☒ Silicon Tubing 5cm ☐ D.O. Ampoules ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: TH09-91

Project Name: SÄ DENA HES ESA - Closure GW Sampling
Project No.: 12-1021-0006/~~9000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill (gravel pit)
Date: June 24/15
Weather: Sunny **Temperature:** 20° C
Completed By: LC
GPS Coordinates:
Reviewed By:

MONITORING WELL INFORMATION

Time of Measurement: 10:44
Depth to Product: N/A m Product Thickness: N/A m
Depth to Water (A): 5.755 m below ■ TOP
Depth to Bottom of Well (B): 12.000 m below ■ TOP
Diameter of Standpipe: ~~51~~ 102 mm
Well Condition: no pvc. metal casing

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*~~2.0~~ 4 = 24.98 Litres - for a ~~51~~ 102 mm (~~2.0~~ 4 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump ☐ Waterra ☐ Hydrolift ■ Bailer (Type: 1 L HDPE) ☐ Peristaltic ☐ Submersible ☐ Bladder

Pump Details:
☐ D.O. Ampoule

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redox) Meter Model:
Organic Vapour Meter Model:

☐ Rental Equipment:
☐ Field Bump
☐ pH4 ☐ pH7
☐ pH10
☐ 1413 us/cm
☐ Field Calibration

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = ~75 litres Start: Finish:
Avg. Flow Rate: L/min. purge 1 well vol till stable Sample intake depth:

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
10:52	5	3.12	7.59	283	-64.7	5.06		silty brown-orange
10:55	10	2.71	7.36	272	-53.1	3.23		"
10:58	15	2.92	7.27	269	-48.3	3.14		"
11:00	20	2.13	7.26	291	-47.6	3.02		"
11:02	25	3.54	7.24	291	-46.7	2.76		"
11:05	30	3.50	7.23	295	-46.4	2.75		"

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I (I) I I I I I Very Silty

Analysis	Type		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
			Container Size									
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	■ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	1							■ Yes	☐ No	Hydrochloric acid
Anions/~~TDS~~	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7528 -02
Field Dup.
Consumables: ☒ Waterra Tubing ☒ Silicon Tubing 5cm ☐ HDPE/Teflon Tubing ☐ D.O. Ampoules ☒ Groundwater Filter ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: TH10-91

Project Name: SÄ DENA HES ESA - Closure GW Sampling
Project No.: 12-1021-0006/~~0000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill (gravel pit)
Date: June 24/15
Weather: Sunny
Temperature: 20°C
Completed By: LC
GPS Coordinates:
Reviewed By:

MONITORING WELL INFORMATION

Time of Measurement: 9:10
Depth to Product: N/A m
Product Thickness: N/A m
Depth to Water (A): 11.770 m below ■ TOP
Depth to Bottom of Well (B): 18.100 m below ■ TOP
Diameter of Standpipe: ~~51~~ 102 mm
Well Condition: no pvc, just metal casing

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*~~2.0~~ 4 = 25.32 Litres - for a ~~51~~ 102 mm (~~2.0~~ 4 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump
☐ Waterra
☐ Hydrolift
■ Bailer (Type: 1 L HDPE)
☐ Peristaltic
☐ Submersible
☐ Bladder

Pump Details:

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redex) Meter Model:
Organic Vapour Meter Model:
☐ D.O. Ampoule

☐ Rental Equipment:
☐ Field Bump
☐ pH4 ☐ pH7
☐ pH10
☐ 1413 us/cm
☐ Field Calibration

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = ~76 litres Start: Finish:
Avg. Flow Rate: L/min. purge 1 well vol. till stable Sample intake depth:

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
9:24	5	2.95	7.41	240	-54.4	3.10		slightly dark/clear, no odour.
9:29	10	3.01	7.22	257	-45.4	2.30		silty brown
9:32	15	2.88	7.23	241	-45.8	3.57		"
9:38	20	2.91	7.19	243	-44.0	3.36		"
9:41	25	2.91	7.16	248	-42.7	3.34		"
9:44	30	3.11	7.17	245	-43.6	3.35		parameters stable.

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I (I) I I I I I I Very Silty

Analysis	Type		Container Size 40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	■ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	1							■ Yes	☐ No	Hydrochloric acid
Anions/~~TDS~~	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7528 -01
Field Dup.

Consumables: ☐ Waterra Tubing ☐ HDPE/Teflon Tubing ☒ Groundwater Filter
☒ Silicon Tubing 5m ☐ D.O. Ampoules ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development ■ Purging/Sampling Well No.: MW14-01

Project Name: SÄ DENA HES ESA - Closure GW Sampling **Project No.:** 12-1021-0006/9000 12000/12004
Location: SÄ DENA HES MINE - Landfill **Date:** June 24/15
Weather: Sunny **Temperature:** 20°C **Completed By:** LC
GPS Coordinates: **Reviewed By:**

MONITORING WELL INFORMATION

Time of Measurement: 14:06
Depth to Product: N/A m Product Thickness: N/A m
Depth to Water (A): 15.725 m below ■ TOP
Depth to Bottom of Well (B): 15.740 m below ■ TOP
Diameter of Standpipe: 51 mm
Well Condition: good - dry

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*2.0 = _____ Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump ☐ Waterra ☐ Hydrolift ■ Bailer (Type: 1 L HDPE) ☐ Peristaltic ☐ Submersible ☐ Bladder
Pump Details:

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redex) Meter Model:
Organic Vapour Meter Model:
☐ D.O. Ampoule

☐ Rental Equipment:
☐ Field Bump
☐ pH4 _____ ☐ pH7 _____
☐ pH10 _____
☐ 1413 us/cm _____
☐ Field Calibration _____

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X _____ = _____ litres Start: _____ Finish: _____
Avg. Flow Rate: _____ L/min. Sample intake depth: _____

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
				insufficient water to sample.				

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☐ No If yes _____
Sheen: ☐ Yes ☐ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		Container Size 40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	☒ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	1							■ Yes	☐ No	Hydrochloric acid
Anions/~~TDS~~	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. No Sample
Field Dup.
Consumables: ☐ Waterra Tubing _____ ☐ HDPE/Teflon Tubing _____ ☐ Groundwater Filter
☐ Silicon Tubing _____ ☐ D.O. Ampoules _____ ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: MW14-02

Project Name: SÄ DENA HES ESA - Closure GW Sampling
Project No.: 12-1021-0006/~~9000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill
Date: June 24/15
Weather: Sunny **Temperature:** 20°C
Completed By: LC
GPS Coordinates:
Reviewed By:

MONITORING WELL INFORMATION

Time of Measurement: 11:39
Depth to Product: N/A m
Product Thickness: N/A m
Depth to Water (A): — m below ■ TOP
Depth to Bottom of Well (B): 16.190 m below ■ TOP
Diameter of Standpipe: 51 mm
Well Condition: good - dry

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*2.0 = ____ Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump ☐ Waterra
☐ Hydrolift
■ Bailer (Type: 1 L HDPE)
☐ Peristaltic
☐ Submersible
☐ Bladder

Pump Details: ____ ☐ D.O. Ampoule

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redex) Meter Model:
Organic Vapour Meter Model:

☐ Rental Equipment:
☐ Field Bump
☐ pH4 ☐ pH7
☐ pH10
☐ 1413 us/cm
☐ Field Calibration

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ____ = ____ litres Start: ____ Finish: ____
Avg. Flow Rate: ____ L/min. Sample intake depth: ____

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. μS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
				well	dry	, no	sample	

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☐ No If yes
Sheen: ☐ Yes ☐ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
			Container Size									
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	■ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	1							■ Yes	☐ No	Hydrochloric acid
Anions/~~TDS~~	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. ~~7528-03~~
Field Dup.

Consumables: ☐ Waterra Tubing ☐ HDPE/Teflon Tubing ☐ Groundwater Filter
☐ Silicon Tubing ☐ D.O. Ampoules ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development
■ Purging/Sampling

Well No.: MW14-03

Project Name: SÄ DENA HES ESA - Closure GW Sampling
Location: SÄ DENA HES MINE - Conth611
Weather: Sunny **Temperature:** 20°C
GPS Coordinates:

Project No.: 12-1021-0006/~~9000~~ 12000/12004
Date: June 24/15
Completed By: LC
Reviewed By:

MONITORING WELL INFORMATION

Time of Measurement: 14:20
Depth to Product: N/A m
Depth to Water (A): — m below ■ TOP
Depth to Bottom of Well (B): 22 m below ■ TOP
Diameter of Standpipe: 51 mm
Well Condition:

Product Thickness: N/A m

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*2.0 = ____ Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump
☐ Waterra
☐ Hydrolift
■ Bailer (Type: 1 L HDPE)
☐ Peristaltic
☐ Submersible
☐ Bladder

Pump Details:

Multimeter Model: YSI 556 MPS
pH/Temp Meter Model:
Conductivity Meter Model:
Dissolved Oxygen Meter Model:
ORP (Redex) Meter Model:
Organic Vapour Meter Model:

☐ D.O. Ampoule

☐ Rental Equipment:

☐ Field Bump
☐ pH4 ____ ☐ pH7 ____
☐ pH10 ____
☐ 1413 us/cm ____

☐ Field Calibration ____

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ____ = ____ litres
Avg. Flow Rate: ____ L/min.

Start: ____ Finish: ____
Sample intake depth: ____

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm *(circle one)*	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☐ No If yes ____
Sheen: ☐ Yes ☐ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear I I I I I I I I I I I I I I I I I I I I I I I I I I I I I Very Silty

Analysis	Type		Container Size 40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	■ Plastic	☒ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	☒ Plastic	■ Glass	1							■ Yes	☐ No	Hydrochloric acid
Anions~~TDS~~	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. no sample.
Field Dup.

Consumables: ☐ Waterra Tubing ____ ☐ HDPE/Teflon Tubing ____ ☐ Groundwater Filter
☐ Silicon Tubing ____ ☐ D.O. Ampoules ____ ☐ Footvalve

GROUNDWATER DEVELOPMENT AND SAMPLING DATA

☐ Development ■ Purging/Sampling Well No.: MW14-04

Project Name: SÄ DENA HES ESA - Closure GW Sampling **Project No.:** 12-1021-0006/~~0000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill **Date:** June 24/15
Weather: Sunny **Temperature:** 20°C **Completed By:** LC
GPS Coordinates: **Reviewed By:**

MONITORING WELL INFORMATION

Time of Measurement: 11:50
Depth to Product: N/A m Product Thickness: N/A m
Depth to Water (A): 12.665 m below ■ TOP
Depth to Bottom of Well (B): 13.920 m below ■ TOP
Diameter of Standpipe: 51 mm
Well Condition: good - impacted @ bottom?

Tidally Influenced: ☐ Yes ☒ No
Pressurized: ☐ Yes ■ No
Well Headspace: N/A ppm
One Well Volume:
(B-A)*2.0 = 2.5 Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = - Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump ☐ Waterra
☐ Hydrolift 0.5L
■ Bailer (Type: 1L HDPE)
☐ Peristaltic
☐ Submersible
☐ Bladder

Multimeter Model: YSI 556 MPS ☐ Rental Equipment:
pH/Temp Meter Model:
Conductivity Meter Model: ☐ Field Bump
Dissolved Oxygen Meter Model: ☐ pH4 ☐ pH7
ORP (Redex) Meter Model: ☐ pH10
Organic Vapour Meter Model: ☐ 1413 us/cm

Pump Details: ☐ D.O. Ampoule ☐ Field Calibration

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X ~~3~~ one = 7.5 litres Start: Finish:
Avg. Flow Rate: L/min. Sample intake depth:

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O_2* (mg/L)	Water Level (m)	Remarks
12:2~~0~~	2	8.88	7.64	528	-69.2	13.35		very silty
	4							
	6	not enough water to purge						1) had to use small bailer, ~1L would fit past bottom near water
	8	(just 1 well vol)						

* Record DO in Mg/L, not percentage

Comments:
Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII Very Silty

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L			
LEPH/HEPH/PAH	☐ Plastic	■ Glass				2				☐ Yes	■ No	Sodium bisulfate
BTEX/VPH/VOCs	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dissolved Metals	~~■~~ Plastic	~~■~~ Glass		1						■ Yes	☐ No	Nitric acid
Dissolved Mercury	~~■~~ Plastic	~~■~~ Glass	1							■ Yes	☐ No	Hydrochloric acid
Anions~~TDS~~	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7528-03 Consumables: ☐ Waterra Tubing ☐ HDPE/Teflon Tubing ☒ Groundwater Filter
Field Dup. ☒ Silicon Tubing 5cm ☐ D.O. Ampoules ☐ Footvalve

1x 0.5 L bailer

SURFACE WATER SAMPLING DATA

SAMPLE NO.: SW14-01

Project Name: SÄ DENA HES ESA - Closure SW Sampling
Project No.: 12-1021-0006/~~0000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill / Powder Mag
Date: Sept 3 /15 **Time:** 12:40
Weather: Clear / Sunny **Temperature:** 5°C
Completed By:
GPS Coordinates:
Reviewed By:

EQUIPMENT LIST

Multimeter	Model:	YSI 556 MPS	☐	Rental Equipment:	
pH/Temp Meter	Model:				
Conductivity Meter	Model:		☐	Field Bump	
Dissolved Oxygen Meter	Model:			☐ pH4	☐ pH7
ORP (Redex) Meter	Model:			☐ pH10	
Organic Vapour Meter	Model:			☐ 1413 us/cm	
☐ D.O. Ampoule			☐	Field Calibration	

STATION INFORMATION

Aquatic Environment: ■ Fresh ☐ Marine ☐ Estuarine Photograph No.(s):
Co-Located Sample(s): Type (sediment): ID:

SURFACE WATER SAMPLING

Method of Sample Collection: ■ Grab ☐ Pump ☐ Other:

Flow

Method: ☐ Flow Meter Model:
☐ Velocity Head Rod (ruler):
☐ Velocity m/s Water Depth cm

Time	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	TDS (g/L)	Redox (ORP)	Diss. O_2 (mg/L) or (%)	Sal (ppt)	Remarks
12:40	3.83	2.32	245	-	211.7	16.85		

Comments:

Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear (|) Very Silty

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L			
LEPH/HEPH/PAH	☐ Plastic	■ Glass			2					☐ Yes	■ No	Sodium bisulfate
BTEX/VPH	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dis/ Total Metals	■ Plastic	☐ Glass		1						☐ Yes	■ No	Nitric acid
Dis/ Total Mercury	☐ Plastic	■ Glass	1							☐ Yes	■ No	Hydrochloric acid
Anions	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7535 - 03 Consumables: ☒ Syringes / Filters Geo Inline ☐ Other
Field Dup. Sam silicone

SURFACE WATER SAMPLING DATA

SAMPLE NO.: SW14-02

Project Name: SÄ DENA HES ESA - Closure SW Sampling
Project No.: 12-1021-0006/~~0000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill
Date: Sept 3/15 **Time:** 12:10
Weather: Clear/Sunny **Temperature:** 5°C
Completed By:
GPS Coordinates:
Reviewed By:

EQUIPMENT LIST

Multimeter	Model:	YSI 556 MPS	☐	Rental Equipment:	
pH/Temp Meter	Model:				
Conductivity Meter	Model:		☐	Field Bump	
Dissolved Oxygen Meter	Model:			☐ pH4	☐ pH7
ORP (Redex) Meter	Model:			☐ pH10	
Organic Vapour Meter	Model:			☐ 1413 us/cm	
☐ D.O. Ampoule			☐	Field Calibration	

STATION INFORMATION

Aquatic Environment: ■ Fresh ☐ Marine ☐ Estuarine Photograph No.(s):
Co-Located Sample(s): Type (sediment): ID:

SURFACE WATER SAMPLING

Method of Sample Collection: ■ Grab ☐ Pump ☐ Other:

Flow

Method: ☐ Flow Meter Model:
☐ Velocity Head Rod (ruler):
☐ Velocity m/s Water Depth cm

Time	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	TDS (g/L)	Redox (ORP)	Diss. O_2 (mg/L) or (%)	Sal (ppt)	Remarks
12:10	3.44	2.08	285	-	223.3	16.29		clear

Comments:
Odour: ☐ Yes ☐ No If yes
Sheen: ☐ Yes ☐ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear | | | | | | | | | | | | | | | | | | | | | | | | | | Very Silty

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L			
LEPH/HEPH/PAH	☐ Plastic	■ Glass			2					☐ Yes	■ No	Sodium bisulfate
BTEX/VPH	☐ Plastic	■ Glass	2							☐ Yes	■ No	Sodium bisulfate
Dis Total Metals	■ Plastic	☐ Glass		2						☐ Yes	■ No	Nitric acid
Dis Total Mercury	☐ Plastic	■ Glass	1							☐ Yes	■ No	Hydrochloric acid
Anions	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7535 - 02 Consumables: ☒ Syringes / Filters Geotline ☐ Other
Field Dup. X Sam silicone

SURFACE WATER SAMPLING DATA

SAMPLE NO.: SW14-03

Project Name:	SÄ DENA HES ESA - Closure SW Sampling	**Project No.:**	12-1021-0006/~~9000~~ 12000/12004
Location:	SÄ DENA HES MINE - Landfill/Gravel Pit	**Date:**	Sept 3/15 **Time:** 11:36
Weather:	**Temperature:**	**Completed By:**	
GPS Coordinates:		**Reviewed By:**	

EQUIPMENT LIST

Multimeter	Model:	YSI 556 MPS	☐ Rental Equipment:	
pH/Temp Meter	Model:			
Conductivity Meter	Model:		☐ Field Bump	☐ pH7
Dissolved Oxygen Meter	Model:		☐ pH4	
ORP (Redex) Meter	Model:		☐ pH10	
Organic Vapour Meter	Model:		☐ 1413 us/cm	
☐ D.O. Ampoule			☐ Field Calibration	

STATION INFORMATION

Aquatic Environment: ■ Fresh ☐ Marine ☐ Estuarine Photograph No.(s):

Co-Located Sample(s): Type (sediment): ID:

SURFACE WATER SAMPLING

Method of Sample Collection: ■ Grab ☐ Pump ☐ Other:

Flow

Method: ☐ Flow Meter Model:

☐ Velocity Head Rod (ruler):

☐ Velocity m/s Water Depth cm

Time	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	TDS (g/L)	Redox (ORP)	Diss. O_2 (mg/L) or (%)	Sal (ppt)	Remarks
11:36	3.04	2.65	287	-	133.7	16.80		clear.

Comments:

Odour: ☐ Yes ☒ No If yes

Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like

Turbidity: Clear (| | |) | | | | | | | | | | | | | | | | | | | | | | | | | | Very Silty

Analysis	Type		Container Size 40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	Filtered		Preservatives
LEPH/HEPH/PAH	☐ Plastic	■ Glass			2					☐ Yes	■ No	Sodium bisulfate
BTEX/VPH	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Dis/ Total Metals	■ Plastic	☐ Glass		2						☐ Yes	■ No	Nitric acid
Dis/ Total Mercury	☐ Plastic	■ Glass	1							☐ Yes	■ No	Hydrochloric acid
Anions	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7535 - 01 Consumables: ☒ Syringes / Filters Geo inline ☐ Other

Field Dup. 5um Silicone

SURFACE WATER SAMPLING DATA

SAMPLE NO.: SW14-01

Project Name: SÄ DENA HES ESA - Closure SW Sampling
Project No.: 12-1021-0006/9000
Location: SÄ DENA HES MINE - Landfill / Pender mag creek
Date: June 25/15 **Time:** 13:15
Weather: Sunny **Temperature:** 20°C
Completed By: LC / SC
GPS Coordinates:
Reviewed By:

EQUIPMENT LIST

Multimeter Model: YSI 556 MPS ☐ Rental Equipment:
pH/Temp Meter Model:
Conductivity Meter Model: ☐ Field Bump
Dissolved Oxygen Meter Model: ☐ pH4 ☐ pH7
ORP (Redex) Meter Model: ☐ pH10
Organic Vapour Meter Model: ☐ 1413 us/cm
☐ D.O. Ampoule ☐ Field Calibration

STATION INFORMATION

Aquatic Environment: ■ Fresh ☐ Marine ☐ Estuarine Photograph No.(s):
Co-Located Sample(s): Type (sediment): ID:

SURFACE WATER SAMPLING

Method of Sample Collection: ■ Grab ☐ Pump ☐ Other:

Flow
Method: ☐ Flow Meter Model:
☐ Velocity Head Rod (ruler):
☐ Velocity m/s Water Depth cm

Time	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. μS/cm or mS/cm (circle one)	TDS (g/L) (pH mV)	Redox (ORP)	Diss. O_2 (mg/L) or (%)	Sal (ppt)	Remarks
13:09	3.71	8.10	796	-93.2	-492.9	13.96		
13:11	3.71	8.11	795	-93.4	-490.0	13.84		

Comments:
Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear (|) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Very Silty

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L			
LEPH/HEPH/PAH	☐ Plastic	■ Glass			2					☐ Yes	■ No	Sodium bisulfate
BTEX/VPH	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Total Metals	■ Plastic	☐ Glass		1						☐ Yes	■ No	Nitric acid
Total Mercury	☐ Plastic	■ Glass	1							☐ Yes	■ No	Hydrochloric acid
Anions	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7528 -07 Consumables: ☐ Syringes / Filters ☐ Other
Field Dup.

SURFACE WATER SAMPLING DATA

SAMPLE NO.: SW14-02

Project Name: SÄ DENA HES ESA - Closure SW Sampling
Project No.: 12-1021-0006/~~0000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill creek
Date: June 25/15 **Time:** 12:40
Weather: sunny **Temperature:** 20°C
Completed By: CC / SC
GPS Coordinates:
Reviewed By:

EQUIPMENT LIST

Multimeter	Model:	YSI 556 MPS	☐	Rental Equipment:	
pH/Temp Meter	Model:				
Conductivity Meter	Model:		☐	Field Bump	
Dissolved Oxygen Meter	Model:			☐ pH4	☐ pH7
ORP (Redex) Meter	Model:			☐ pH10	
Organic Vapour Meter	Model:			☐ 1413 us/cm	
☐ D.O. Ampoule			☐	Field Calibration	

STATION INFORMATION

Aquatic Environment: ■ Fresh ☐ Marine ☐ Estuarine Photograph No.(s):
Co-Located Sample(s): Type (sediment): ID:

SURFACE WATER SAMPLING

Method of Sample Collection: ■ Grab ☐ Pump ☐ Other:

Flow

Method: ☐ Flow Meter Model:
☐ Velocity Head Rod (ruler):
☐ Velocity m/s Water Depth cm

Time	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	TDS (g/L)	Redox (ORP) pH mV	Diss. O_2 (mg/L) or (%)	Sal (ppt)	Remarks
12:36	5.77	8.07	471	-92.4	-506.6			
12:38	5.75	8.08	470	-92.3	-508.2			

Comments:

Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear | | | | | | | | | | | | | | | | | | | | | | Very Silty

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L			
LEPH/HEPH/PAH	☐ Plastic	■ Glass			2					☐ Yes	■ No	Sodium bisulfate
BTEX/VPH	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Total Metals	■ Plastic	☐ Glass		1						☐ Yes	■ No	Nitric acid
Total Mercury	☐ Plastic	■ Glass	1							☐ Yes	■ No	Hydrochloric acid
Anions	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7528 -05 Consumables: ☐ Syringes / Filters ☐ Other
Field Dup. 7528 -06

SURFACE WATER SAMPLING DATA

SAMPLE NO.: SW14-03

Project Name: SÄ DENA HES ESA - Closure SW Sampling
Project No.: 12-1021-0006/~~9000~~ 12000/12004
Location: SÄ DENA HES MINE - Landfill (gravel pit creek)
Date: June 25/15 **Time:** 12:10
Weather: Sunny **Temperature:** 20°C
Completed By: LC / SC
GPS Coordinates:
Reviewed By:

EQUIPMENT LIST

Multimeter	Model:	YSI 556 MPS	☐	Rental Equipment:	
pH/Temp Meter	Model:				
Conductivity Meter	Model:		☐	Field Bump	
Dissolved Oxygen Meter	Model:			☐ pH4	☐ pH7
ORP (Redex) Meter	Model:			☐ pH10	
Organic Vapour Meter	Model:			☐ 1413 us/cm	
☐ D.O. Ampoule			☐	Field Calibration	

STATION INFORMATION

Aquatic Environment: ■ Fresh ☐ Marine ☐ Estuarine Photograph No.(s):
Co-Located Sample(s): Type (sediment): ID:

SURFACE WATER SAMPLING

Method of Sample Collection: ■ Grab ☐ Pump ☐ Other:

Flow

Method: ☐ Flow Meter Model:
☐ Velocity Head Rod (ruler):
☐ Velocity m/s Water Depth cm

Time	Temp. (°C)	pH (Units)	☐ Cond. ■ Specific Cond. µS/cm or mS/cm (circle one)	~~pH~~ TDS (g/L)	Redox (ORP)	Diss. O_2 (mg/L) or (%)	Sal (ppt)	Remarks
12:10	2.40	7.77	487	78.7	426.7	13.59		

Comments:

Odour: ☐ Yes ☒ No If yes
Sheen: ☐ Yes ☒ No If yes ☐ Hydrocarbon-like OR ☐ Metallic-like
Turbidity: Clear (1) | | | | | | | | | | | | | | | | | | | | Very Silty

Analysis	Type		Container Size							Filtered		Preservatives
			40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L			
LEPH/HEPH/PAH	☐ Plastic	■ Glass			2					☐ Yes	■ No	Sodium bisulfate
BTEX/VPH	☐ Plastic	■ Glass	3							☐ Yes	■ No	Sodium bisulfate
Total Metals	■ Plastic	☐ Glass		1						☐ Yes	■ No	Nitric acid
Total Mercury	☐ Plastic	■ Glass	1							☐ Yes	■ No	Hydrochloric acid
Anions	■ Plastic	☐ Glass					1			☐ Yes	■ No	None
	☐ Plastic	☐ Glass								☐ Yes	☐ No	
	☐ Plastic	☐ Glass								☐ Yes	☐ No	

SCN No. 7528 - 04 Consumables: ☐ Syringes / Filters ☐ Other
Field Dup.

ATTACHMENT 2

Laboratory Analytical Results and Chains of Custody

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Your C.O.C. #: 07528

Attention:Andrew Bruemmer

GOLDER ASSOCIATES LTD
Suite 200 - 2920 Virtual Way
VANCOUVER, BC
Canada V5M 0C4

Report Date: 2015/07/30
Report #: R2005849
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B554617
Received: 2015/06/27, 09:20

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/MTBE LH, VH, F1 SIM/MS	4	2015/06/29	2015/06/30	BBY8SOP-00010/11	EPA 8260c R3 m
Chloride by Automated Colourimetry	6	N/A	2015/06/29	BBY6SOP-00011	SM 22 4500-Cl- G m
Chloride by Automated Colourimetry	1	N/A	2015/06/30	BBY6SOP-00011	SM 22 4500-Cl- G m
Fluoride	7	N/A	2015/06/29	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3)	4	N/A	2015/07/03	BBY7SOP-00002	EPA 6020a R1 m
Hardness (calculated as CaCO3)	3	N/A	2015/07/07	BBY7SOP-00002	EPA 6020a R1 m
Mercury (Dissolved) by CVAF	3	N/A	2015/07/07	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Mercury (Total) by CVAF	4	2015/07/07	2015/07/07	BBY7SOP-00015	BCMOE BCLM Oct2013 m
EPH in Water when PAH required	7	2015/07/03	2015/07/03	BBY8SOP-00029	BCMOE EPH w 12/00 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	3	N/A	2015/07/07	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (dissolved)	3	N/A	2015/07/07	BBY7SOP-00002	EPA 6020A R1 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	4	2015/06/27	2015/07/03	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total)	4	2015/06/30	2015/07/03	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total)	2	2015/07/21	2015/07/24	BBY7SOP-00002	EPA 6020A R1 m
Nitrate + Nitrite (N)	7	N/A	2015/06/27	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA	7	N/A	2015/06/27	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N)	7	N/A	2015/06/27	BBY6SOP-00010	SM 22 4500-NO3 I m
PAH in Water by GC/MS (SIM)	7	2015/07/03	2015/07/03	BBY8SOP-00021	EPA 8270d R4 m
Total LMW, HMW, Total PAH Calc	7	N/A	2015/07/06	BBY WI-00033	Auto Calc
Sulphate by Automated Colourimetry	7	N/A	2015/06/29	BBY6SOP-00017	SM 22 4500-SO42- E m
EPH less PAH in Water by GC/FID	7	N/A	2015/07/06	BBY WI-00033	Auto Calc
VOCs, VH, F1, LH in Water by HS GC/MS	3	2015/06/29	2015/06/30	BBY8SOP-00009	EPA 8260c R3 m
Volatile HC-BTEX	3	N/A	2015/06/30	BBY WI-00033	Auto Calc
Volatile HC-BTEX	4	N/A	2015/07/02	BBY WI-00033	Auto Calc

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Your C.O.C. #: 07528

Attention:Andrew Bruemmer

GOLDER ASSOCIATES LTD
Suite 200 - 2920 Virtual Way
VANCOUVER, BC
Canada V5M 0C4

Report Date: 2015/07/30
Report #: R2005849
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B554617
Received: 2015/06/27, 09:20

Encryption Key

Ashley Ling
30 Jul 2015 08:37:10 -07:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashley Ling, Burnaby Senior Project Manager
Email: ALing@maxxam.ca
Phone# (604)639-2616

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B554617
Report Date: 2015/07/30

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		MN9112		MN9113	MN9114	MN9115	MN9115	MN9116		
Sampling Date		2015/06/24 09:45		2015/06/24 11:10	2015/06/24 12:00	2015/06/25 12:10	2015/06/25 12:10	2015/06/25 12:40		
COC Number		07528		07528	07528	07528	07528	07528		
	Units	**07528-01**	**QC Batch**	**07528-02**	**07528-03**	**07528-04**	**07528-04 Lab-Dup**	**07528-05**	**RDL**	**QC Batch**
Misc. Inorganics										
Fluoride (F)	mg/L	0.058	7950722	0.083	0.064	0.100		0.100	0.010	7950722
Anions										
Dissolved Sulphate (SO4)	mg/L	<0.50	7950911	<0.50	7.11	8.90	8.94	9.19	0.50	7950911
Dissolved Chloride (Cl)	mg/L	<0.50	7953265	0.74	0.54	0.58	0.56	<0.50	0.50	7950910

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		MN9117	MN9118		
Sampling Date		2015/06/25 12:40	2015/06/25 13:10		
COC Number		07528	07528		
	Units	**07528-06**	**07528-07**	**RDL**	**QC Batch**
Misc. Inorganics					
Fluoride (F)	mg/L	0.100	0.066	0.010	7950722
Anions					
Dissolved Sulphate (SO4)	mg/L	8.97	38.4	0.50	7950911
Dissolved Chloride (Cl)	mg/L	<0.50	0.53	0.50	7950910

RDL = Reportable Detection Limit

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Maxxam Job #: B554617
Report Date: 2015/07/30

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

BCCSR BTEX/VPH IN WATER (WATER)

Maxxam ID		MN9115	MN9116	MN9117	MN9118		
Sampling Date		2015/06/25 12:10	2015/06/25 12:40	2015/06/25 12:40	2015/06/25 13:10		
COC Number		07528	07528	07528	07528		
	Units	**07528-04**	**07528-05**	**07528-06**	**07528-07**	**RDL**	**QC Batch**
Volatiles							
VPH (VHW6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	300	7948848
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	4.0	7950734
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	7950734
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	7950734
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	7950734
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	7950734
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	7950734
Styrene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	7950734
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	7950734
VH C6-C10	ug/L	<300	<300	<300	<300	300	7950734
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	99	99	99	99		7950734
4-Bromofluorobenzene (sur.)	%	102	102	102	102		7950734
D4-1,2-Dichloroethane (sur.)	%	103	102	103	103		7950734
RDL = Reportable Detection Limit							

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Maxxam Job #: B554617
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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)

Maxxam ID		MN9112	MN9113	MN9114	MN9115	MN9115	MN9116		
Sampling Date		2015/06/24 09:45	2015/06/24 11:10	2015/06/24 12:00	2015/06/25 12:10	2015/06/25 12:10	2015/06/25 12:40		
COC Number		07528	07528	07528	07528	07528	07528		
	Units	**07528-01**	**07528-02**	**07528-03**	**07528-04**	**07528-04 Lab-Dup**	**07528-05**	**RDL**	**QC Batch**
Polycyclic Aromatics									
Low Molecular Weight PAH`s	ug/L	<0.24	<0.24	<0.24	<0.24		<0.24	0.24	7948846
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050		<0.050	0.050	7948846
Total PAH	ug/L	<0.24	<0.24	<0.24	<0.24		<0.24	0.24	7948846
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7954859
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7954859
Quinoline	ug/L	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	0.24	7954859
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7954859
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Fluoranthene	ug/L	<0.020	<0.020	0.020	<0.020	<0.020	<0.020	0.020	7954859
Pyrene	ug/L	<0.020	<0.020	0.023	<0.020	<0.020	<0.020	0.020	7954859
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7954859
Chrysene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Benzo(b&j)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Benzo(a)pyrene	ug/L	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	0.0090	7954859
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7954859
Calculated Parameters									
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20		<0.20	0.20	7948847
HEPH (C19-C32 less PAH)	mg/L	<0.20	0.21	0.55	<0.20		<0.20	0.20	7948847
Ext. Pet. Hydrocarbon									
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7954876
EPH (C19-C32)	mg/L	<0.20	0.21	0.55	<0.20	<0.20	<0.20	0.20	7954876
Surrogate Recovery (%)									
O-TERPHENYL (sur.)	%	101	99	98	98	98	100		7954876
D10-ANTHRACENE (sur.)	%	99	101	97	100	103	99		7954859
D8-ACENAPHTHYLENE (sur.)	%	94	95	94	97	100	95		7954859
D8-NAPHTHALENE (sur.)	%	105	105	102	101	106	101		7954859

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B554617
Report Date: 2015/07/30

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)

Maxxam ID		MN9112	MN9113	MN9114	MN9115	MN9115	MN9116		
Sampling Date		2015/06/24 09:45	2015/06/24 11:10	2015/06/24 12:00	2015/06/25 12:10	2015/06/25 12:10	2015/06/25 12:40		
COC Number		07528	07528	07528	07528	07528	07528		
	Units	**07528-01**	**07528-02**	**07528-03**	**07528-04**	**07528-04 Lab-Dup**	**07528-05**	**RDL**	**QC Batch**
D9-Acridine	%	91	91	67	94	97	93		7954859
TERPHENYL-D14 (sur.)	%	101	101	97	99	102	98		7954859

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)

Maxxam ID		MN9117	MN9118		
Sampling Date		2015/06/25 12:40	2015/06/25 13:10		
COC Number		07528	07528		
	Units	**07528-06**	**07528-07**	**RDL**	**QC Batch**
Polycyclic Aromatics					
Low Molecular Weight PAH`s	ug/L	<0.24	<0.24	0.24	7948846
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	0.050	7948846
Total PAH	ug/L	<0.24	<0.24	0.24	7948846
Naphthalene	ug/L	<0.10	<0.10	0.10	7954859
2-Methylnaphthalene	ug/L	<0.10	<0.10	0.10	7954859
Quinoline	ug/L	<0.24	<0.24	0.24	7954859
Acenaphthylene	ug/L	<0.050	<0.050	0.050	7954859
Acenaphthene	ug/L	<0.050	<0.050	0.050	7954859
Fluorene	ug/L	<0.050	<0.050	0.050	7954859
Phenanthrene	ug/L	<0.050	<0.050	0.050	7954859
Anthracene	ug/L	<0.010	<0.010	0.010	7954859
Acridine	ug/L	<0.050	<0.050	0.050	7954859
Fluoranthene	ug/L	<0.020	<0.020	0.020	7954859
Pyrene	ug/L	<0.020	<0.020	0.020	7954859
Benzo(a)anthracene	ug/L	<0.010	<0.010	0.010	7954859
Chrysene	ug/L	<0.050	<0.050	0.050	7954859
Benzo(b&j)fluoranthene	ug/L	<0.050	<0.050	0.050	7954859
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	0.050	7954859
Benzo(a)pyrene	ug/L	<0.0090	<0.0090	0.0090	7954859
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	0.050	7954859
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	0.050	7954859
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	0.050	7954859
Calculated Parameters					
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	0.20	7948847
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	0.20	7948847
Ext. Pet. Hydrocarbon					
EPH (C10-C19)	mg/L	<0.20	<0.20	0.20	7954876
EPH (C19-C32)	mg/L	<0.20	<0.20	0.20	7954876
Surrogate Recovery (%)					
O-TERPHENYL (sur.)	%	100	100		7954876
D10-ANTHRACENE (sur.)	%	101	99		7954859
D8-ACENAPHTHYLENE (sur.)	%	98	97		7954859
D8-NAPHTHALENE (sur.)	%	102	102		7954859
D9-Acridine	%	96	93		7954859
RDL = Reportable Detection Limit					

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)

Maxxam ID		MN9117	MN9118		
Sampling Date		2015/06/25 12:40	2015/06/25 13:10		
COC Number		07528	07528		
	Units	**07528-06**	**07528-07**	**RDL**	**QC Batch**
TERPHENYL-D14 (sur.)	%	100	97		7954859
RDL = Reportable Detection Limit					

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Maxxam Job #: B554617
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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		MN9112	MN9112	MN9113	MN9114		
Sampling Date		2015/06/24 09:45	2015/06/24 09:45	2015/06/24 11:10	2015/06/24 12:00		
COC Number		07528	07528	07528	07528		
	Units	**07528-01**	**07528-01 Lab-Dup**	**07528-02**	**07528-03**	**RDL**	**QC Batch**
Misc. Inorganics							
Dissolved Hardness (CaCO3)	mg/L	91.0		107	185	0.50	7948899
Elements							
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7958062
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	mg/L	0.0125		0.0135	0.0297	0.0030	7953269
Dissolved Antimony (Sb)	mg/L	<0.00050		<0.00050	<0.00050	0.00050	7953269
Dissolved Arsenic (As)	mg/L	<0.00010		<0.00010	0.00067	0.00010	7953269
Dissolved Barium (Ba)	mg/L	0.0198		0.0347	0.0527	0.0010	7953269
Dissolved Beryllium (Be)	mg/L	<0.00010		<0.00010	<0.00010	0.00010	7953269
Dissolved Bismuth (Bi)	mg/L	<0.0010		<0.0010	<0.0010	0.0010	7953269
Dissolved Boron (B)	mg/L	<0.050		<0.050	<0.050	0.050	7953269
Dissolved Cadmium (Cd)	mg/L	<0.000010		<0.000010	0.000043	0.000010	7953269
Dissolved Chromium (Cr)	mg/L	<0.0010		<0.0010	<0.0010	0.0010	7953269
Dissolved Cobalt (Co)	mg/L	<0.00050		<0.00050	<0.00050	0.00050	7953269
Dissolved Copper (Cu)	mg/L	<0.00020		<0.00020	0.00129	0.00020	7953269
Dissolved Iron (Fe)	mg/L	4.91		8.71	0.0455	0.0050	7953269
Dissolved Lead (Pb)	mg/L	<0.00020		<0.00020	0.00043	0.00020	7953269
Dissolved Lithium (Li)	mg/L	<0.0050		<0.0050	<0.0050	0.0050	7953269
Dissolved Manganese (Mn)	mg/L	0.204		0.282	0.0279	0.0010	7953269
Dissolved Molybdenum (Mo)	mg/L	<0.0010		<0.0010	<0.0010	0.0010	7953269
Dissolved Nickel (Ni)	mg/L	<0.0010		<0.0010	0.0014	0.0010	7953269
Dissolved Selenium (Se)	mg/L	<0.00010		<0.00010	0.00023	0.00010	7953269
Dissolved Silicon (Si)	mg/L	0.82		0.91	4.20	0.10	7953269
Dissolved Silver (Ag)	mg/L	<0.000020		<0.000020	<0.000020	0.000020	7953269
Dissolved Strontium (Sr)	mg/L	0.0982		0.132	0.200	0.0010	7953269
Dissolved Thallium (Tl)	mg/L	<0.000050		<0.000050	<0.000050	0.000050	7953269
Dissolved Tin (Sn)	mg/L	<0.0050		<0.0050	<0.0050	0.0050	7953269
Dissolved Titanium (Ti)	mg/L	<0.0050		<0.0050	<0.0050	0.0050	7953269
Dissolved Uranium (U)	mg/L	<0.00010		<0.00010	0.00079	0.00010	7953269
Dissolved Vanadium (V)	mg/L	<0.0050		<0.0050	<0.0050	0.0050	7953269
Dissolved Zinc (Zn)	mg/L	0.0054		0.0072	0.0233	0.0050	7953269
Dissolved Zirconium (Zr)	mg/L	<0.00050		<0.00050	<0.00050	0.00050	7953269
Dissolved Calcium (Ca)	mg/L	28.1		34.9	64.3	0.050	7948900

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B554617
Report Date: 2015/07/30

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		MN9112	MN9112	MN9113	MN9114		
Sampling Date		2015/06/24 09:45	2015/06/24 09:45	2015/06/24 11:10	2015/06/24 12:00		
COC Number		07528	07528	07528	07528		
	Units	**07528-01**	**07528-01 Lab-Dup**	**07528-02**	**07528-03**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	5.05		4.72	5.96	0.050	7948900
Dissolved Potassium (K)	mg/L	0.716		0.406	0.971	0.050	7948900
Dissolved Sodium (Na)	mg/L	1.05		0.914	1.02	0.050	7948900
Dissolved Sulphur (S)	mg/L	<3.0		<3.0	<3.0	3.0	7948900

RDL = Reportable Detection Limit
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Maxxam Job #: B554617
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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

CSR TOTAL METALS IN WATER WITH CV HG (WATER)

Maxxam ID		MN9115	MN9115	MN9116	MN9117	MN9118		
Sampling Date		2015/06/25 12:10	2015/06/25 12:10	2015/06/25 12:40	2015/06/25 12:40	2015/06/25 13:10		
COC Number		07528	07528	07528	07528	07528		
	Units	**07528-04**	**07528-04 Lab-Dup**	**07528-05**	**07528-06**	**07528-07**	**RDL**	**QC Batch**
Calculated Parameters								
Total Hardness (CaCO3)	mg/L	150		148	157	250	0.50	7948864
Elements								
Total Mercury (Hg)	ug/L	<0.010		<0.010	<0.010	<0.010	0.010	7957999
Total Metals by ICPMS								
Total Aluminum (Al)	mg/L	0.0125	0.0136	0.0136	0.0082	0.0122	0.0030	7952415
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7952415
Total Arsenic (As)	mg/L	0.00106	0.00103	0.00116	0.00114	0.00036	0.00010	7952415
Total Barium (Ba)	mg/L	0.0613	0.0593	0.0600	0.0597	0.101	0.0010	7952415
Total Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	7952415
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7952415
Total Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	7952415
Total Cadmium (Cd)	mg/L	0.000038	0.000037	0.000041	0.000043	0.000067	0.000010	7952415
Total Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7952415
Total Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7952415
Total Copper (Cu)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7952415
Total Iron (Fe)	mg/L	0.047	0.050	0.026	0.025	0.018	0.010	7952415
Total Lead (Pb)	mg/L	0.00079	0.00074	0.00056	0.00052	<0.00020	0.00020	7952415
Total Lithium (Li)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7952415
Total Manganese (Mn)	mg/L	0.0057	0.0058	0.0102	0.0101	0.0023	0.0010	7952415
Total Molybdenum (Mo)	mg/L	0.0013	0.0014	0.0013	0.0012	0.0017	0.0010	7952415
Total Nickel (Ni)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	7952415
Total Selenium (Se)	mg/L	0.00057	0.00057	0.00058	0.00069	0.00182	0.00010	7952415
Total Silicon (Si)	mg/L	4.12	4.01	4.17	3.99	3.63	0.10	7952415
Total Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	7952415
Total Strontium (Sr)	mg/L	0.178	0.184	0.184	0.185	0.336	0.0010	7952415
Total Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	7952415
Total Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7952415
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7952415
Total Uranium (U)	mg/L	0.00077	0.00072	0.00076	0.00072	0.00269	0.00010	7952415
Total Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	7952415
Total Zinc (Zn)	mg/L	0.0301	0.0269	0.0464	<0.0050	0.0388	0.0050	7952415
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	7952415
Total Calcium (Ca)	mg/L	52.1		51.7	54.4	88.2	0.050	7948865

RDL = Reportable Detection Limit
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Maxxam Job #: B554617
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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

CSR TOTAL METALS IN WATER WITH CV HG (WATER)

Maxxam ID		MN9115	MN9115	MN9116	MN9117	MN9118		
Sampling Date		2015/06/25 12:10	2015/06/25 12:10	2015/06/25 12:40	2015/06/25 12:40	2015/06/25 13:10		
COC Number		07528	07528	07528	07528	07528		
	Units	**07528-04**	**07528-04 Lab-Dup**	**07528-05**	**07528-06**	**07528-07**	**RDL**	**QC Batch**
Total Magnesium (Mg)	mg/L	4.88		4.62	5.20	7.14	0.050	7948865
Total Potassium (K)	mg/L	0.374		0.363	0.380	0.953	0.050	7948865
Total Sodium (Na)	mg/L	1.08		0.908	0.902	0.843	0.050	7948865
Total Sulphur (S)	mg/L	3.3		<3.0	<3.0	14.4	3.0	7948865

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		MT6125	MT7798		
Sampling Date		2015/06/26 12:40	2015/06/26 12:40		
COC Number		07528	07528		
	Units	**07528-06 REWORK-1**	**07528-06 REWORK-2**	**RDL**	**QC Batch**
Total Metals by ICPMS					
Total Zinc (Zn)	mg/L	0.0146	0.0567	0.0050	7984937

RDL = Reportable Detection Limit

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GOLDER ASSOCIATES LTD
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Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

NITRITE & NITRATE IN WATER (WATER)

Maxxam ID		MN9112	MN9113	MN9114	MN9115	MN9116	MN9117		
Sampling Date		2015/06/24 09:45	2015/06/24 11:10	2015/06/24 12:00	2015/06/25 12:10	2015/06/25 12:40	2015/06/25 12:40		
COC Number		07528	07528	07528	07528	07528	07528		
	Units	**07528-01**	**07528-02**	**07528-03**	**07528-04**	**07528-05**	**07528-06**	**RDL**	**QC Batch**
ANIONS									
Nitrite (N)	mg/L	<0.0050	<0.0050	0.0103	<0.0050	<0.0050	<0.0050	0.0050	7949032
Calculated Parameters									
Nitrate (N)	mg/L	0.187	<0.020	0.386	0.054	0.056	0.061	0.020	7948939
Nutrients									
Nitrate plus Nitrite (N)	mg/L	0.187	<0.020	0.397	0.054	0.056	0.061	0.020	7949030
RDL = Reportable Detection Limit									

Maxxam ID		MN9118		
Sampling Date		2015/06/25 13:10		
COC Number		07528		
	Units	**07528-07**	**RDL**	**QC Batch**
ANIONS				
Nitrite (N)	mg/L	<0.0050	0.0050	7949032
Calculated Parameters				
Nitrate (N)	mg/L	0.121	0.020	7948939
Nutrients				
Nitrate plus Nitrite (N)	mg/L	0.121	0.020	7949030
RDL = Reportable Detection Limit				

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		MN9112	MN9113	MN9114		
Sampling Date		2015/06/24 09:45	2015/06/24 11:10	2015/06/24 12:00		
COC Number		07528	07528	07528		
	Units	**07528-01**	**07528-02**	**07528-03**	**RDL**	**QC Batch**
Volatiles						
VPH (VHW6 to 10 - BTEX)	ug/L	<300	<300	<300	300	7948848
Chloromethane	ug/L	<1.0	<1.0	<1.0	1.0	7950699
Vinyl chloride	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Chloroethane	ug/L	<1.0	<1.0	<1.0	1.0	7950699
Trichlorofluoromethane	ug/L	<4.0	<4.0	<4.0	4.0	7950699
1,1-dichloroethene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Dichloromethane	ug/L	<2.0	<2.0	<2.0	2.0	7950699
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	1.0	7950699
1,1-dichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7950699
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	1.0	7950699
Chloroform	ug/L	<1.0	<1.0	<1.0	1.0	7950699
1,1,1-trichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7950699
1,2-dichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Carbon tetrachloride	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Benzene	ug/L	<0.40	<0.40	<0.40	0.40	7950699
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	4.0	7950699
1,2-dichloropropane	ug/L	<0.50	<0.50	<0.50	0.50	7950699
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	1.0	7950699
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	1.0	7950699
Bromomethane	ug/L	<1.0	<1.0	<1.0	1.0	7950699
1,1,2-trichloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Trichloroethene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Chlorodibromomethane	ug/L	<1.0	<1.0	<1.0	1.0	7950699
1,2-dibromoethane	ug/L	<0.20	<0.20	<0.20	0.20	7950699
Tetrachloroethene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	1.0	7950699
Toluene	ug/L	<0.40	<0.40	<0.40	0.40	7950699
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	0.40	7950699
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	7950699
Bromoform	ug/L	<1.0	<1.0	<1.0	1.0	7950699
Styrene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
o-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	7950699
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	0.40	7950699
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7950699
RDL = Reportable Detection Limit						

Maxxam Job #: B554617
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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

CSR VOC + VPH IN WATER (WATER)

Maxxam ID		MN9112	MN9113	MN9114		
Sampling Date		2015/06/24 09:45	2015/06/24 11:10	2015/06/24 12:00		
COC Number		07528	07528	07528		
	Units	**07528-01**	**07528-02**	**07528-03**	**RDL**	**QC Batch**
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	7950699
1,2-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
1,3-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
1,4-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
Chlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	7950699
VH C6-C10	ug/L	<300	<300	<300	300	7950699
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	98	100	99		7950699
4-Bromofluorobenzene (sur.)	%	91	94	93		7950699
D4-1,2-Dichloroethane (sur.)	%	100	101	101		7950699
RDL = Reportable Detection Limit						

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

GENERAL COMMENTS

Version 2R[AN6]: Updated report, now with rework results for total zinc.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B554617
Report Date: 2015/07/30

QUALITY ASSURANCE REPORT

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
PHASE:12000/12005 SÄ DENA HES MINE
Site Location: CLOSURE
Sampler Initials: LC

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
7950699	1,4-Difluorobenzene (sur.)	2015/06/29	100	70 - 130	100	70 - 130	100	%		
7950699	4-Bromofluorobenzene (sur.)	2015/06/29	105	70 - 130	103	70 - 130	94	%		
7950699	D4-1,2-Dichloroethane (sur.)	2015/06/29	98	70 - 130	101	70 - 130	98	%		
7950734	1,4-Difluorobenzene (sur.)	2015/06/30	100	70 - 130	101	70 - 130	104	%		
7950734	4-Bromofluorobenzene (sur.)	2015/06/30	101	70 - 130	101	70 - 130	101	%		
7950734	D4-1,2-Dichloroethane (sur.)	2015/06/30	102	70 - 130	100	70 - 130	102	%		
7954859	D10-ANTHRACENE (sur.)	2015/07/03	101	60 - 130	101	60 - 130	96	%		
7954859	D8-ACENAPHTHYLENE (sur.)	2015/07/03	96	50 - 130	94	50 - 130	90	%		
7954859	D8-NAPHTHALENE (sur.)	2015/07/03	103	50 - 130	102	50 - 130	102	%		
7954859	D9-Acridine	2015/07/03	96	50 - 130	96	50 - 130	87	%		
7954859	TERPHENYL-D14 (sur.)	2015/07/03	102	60 - 130	101	60 - 130	100	%		
7954876	O-TERPHENYL (sur.)	2015/07/03	103	50 - 130	102	50 - 130	97	%		
7949030	Nitrate plus Nitrite (N)	2015/06/27	NC	80 - 120	108	80 - 120	<0.020	mg/L	2.9	25
7949032	Nitrite (N)	2015/06/27	NC	80 - 120	106	80 - 120	<0.0050	mg/L	1.5	20
7950699	1,1,1,2-tetrachloroethane	2015/06/30	99	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7950699	1,1,1-trichloroethane	2015/06/30	97	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7950699	1,1,2,2-tetrachloroethane	2015/06/30	93	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
7950699	1,1,2-trichloroethane	2015/06/30	95	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7950699	1,1-dichloroethane	2015/06/30	92	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
7950699	1,1-dichloroethene	2015/06/30			96	70 - 130	<0.50	ug/L	NC	30
7950699	1,2-dibromoethane	2015/06/30	96	70 - 130	95	70 - 130	<0.20	ug/L	NC	30
7950699	1,2-dichlorobenzene	2015/06/30	95	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
7950699	1,2-dichloroethane	2015/06/30	81	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7950699	1,2-dichloropropane	2015/06/30	104	70 - 130	100	70 - 130	<0.50	ug/L	NC	30
7950699	1,3-dichlorobenzene	2015/06/30	96	70 - 130	93	70 - 130	<0.50	ug/L	NC	30
7950699	1,4-dichlorobenzene	2015/06/30	95	70 - 130	91	70 - 130	<0.50	ug/L	NC	30
7950699	Benzene	2015/06/30	NC	70 - 130	96	70 - 130	<0.40	ug/L	NC	30
7950699	Bromodichloromethane	2015/06/30	97	70 - 130	93	70 - 130	<1.0	ug/L	NC	30
7950699	Bromoform	2015/06/30	86	70 - 130	87	70 - 130	<1.0	ug/L	NC	30
7950699	Bromomethane	2015/06/30			91	60 - 140	<1.0	ug/L	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
PHASE:12000/12005 SÄ DENA HES MINE
Site Location: CLOSURE
Sampler Initials: LC

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
7950699	Carbon tetrachloride	2015/06/30	98	70 - 130	91	70 - 130	<0.50	ug/L	NC	30
7950699	Chlorobenzene	2015/06/30	91	70 - 130	88	70 - 130	<0.50	ug/L	NC	30
7950699	Chlorodibromomethane	2015/06/30	98	70 - 130	94	70 - 130	<1.0	ug/L	NC	30
7950699	Chloroethane	2015/06/30	85	60 - 140	81	60 - 140	<1.0	ug/L	NC	30
7950699	Chloroform	2015/06/30	95	70 - 130	91	70 - 130	<1.0	ug/L	NC	30
7950699	Chloromethane	2015/06/30	102	60 - 140	93	60 - 140	<1.0	ug/L	NC	30
7950699	cis-1,2-dichloroethene	2015/06/30	101	70 - 130	96	70 - 130	<1.0	ug/L	NC	30
7950699	cis-1,3-dichloropropene	2015/06/30	81	70 - 130	100	70 - 130	<1.0	ug/L	NC	30
7950699	Dichloromethane	2015/06/30	113	70 - 130	104	70 - 130	<2.0	ug/L	NC	30
7950699	Ethylbenzene	2015/06/30	NC	70 - 130	95	70 - 130	<0.40	ug/L	5.6	30
7950699	m & p-Xylene	2015/06/30	NC	70 - 130	97	70 - 130	<0.40	ug/L	5.3	30
7950699	Methyl-tert-butylether (MTBE)	2015/06/30	109	70 - 130	104	70 - 130	<4.0	ug/L	NC	30
7950699	o-Xylene	2015/06/30	NC	70 - 130	95	70 - 130	<0.40	ug/L	5.7	30
7950699	Styrene	2015/06/30	95	70 - 130	81	70 - 130	<0.50	ug/L	NC	30
7950699	Tetrachloroethene	2015/06/30	101	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
7950699	Toluene	2015/06/30	NC	70 - 130	94	70 - 130	<0.40	ug/L	NC	30
7950699	trans-1,2-dichloroethene	2015/06/30	104	70 - 130	97	70 - 130	<1.0	ug/L	NC	30
7950699	trans-1,3-dichloropropene	2015/06/30	88	70 - 130	98	70 - 130	<1.0	ug/L	NC	30
7950699	Trichloroethene	2015/06/30	104	70 - 130	98	70 - 130	<0.50	ug/L	NC	30
7950699	Trichlorofluoromethane	2015/06/30	120	60 - 140	112	60 - 140	<4.0	ug/L	NC	30
7950699	VH C6-C10	2015/06/30			97	70 - 130	<300	ug/L	1.2	30
7950699	Vinyl chloride	2015/06/30	99	60 - 140	94	60 - 140	<0.50	ug/L	NC	30
7950699	Xylenes (Total)	2015/06/30	NA	70 - 130			<0.40	ug/L	5.4	30
7950722	Fluoride (F)	2015/06/29	NC	80 - 120	94	80 - 120	0.012, RDL=0.010	mg/L	0	20
7950734	Benzene	2015/06/30	103	70 - 130	99	70 - 130	<0.40	ug/L	NC	30
7950734	Ethylbenzene	2015/06/30	106	70 - 130	103	70 - 130	<0.40	ug/L	NC	30
7950734	m & p-Xylene	2015/06/30	105	70 - 130	102	70 - 130	<0.40	ug/L	NC	30
7950734	Methyl-tert-butylether (MTBE)	2015/06/30	98	70 - 130	95	70 - 130	<4.0	ug/L		
7950734	o-Xylene	2015/06/30	96	70 - 130	93	70 - 130	<0.40	ug/L	NC	30

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QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
PHASE:12000/12005 SÄ DENA HES MINE
Site Location: CLOSURE
Sampler Initials: LC

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
7950734	Styrene	2015/06/30	104	70 - 130	101	70 - 130	<0.40	ug/L		
7950734	Toluene	2015/06/30	100	70 - 130	97	70 - 130	<0.40	ug/L	NC	30
7950734	VH C6-C10	2015/06/30			86	70 - 130	<300	ug/L		
7950734	Xylenes (Total)	2015/06/30					<0.40	ug/L	NC	30
7950910	Dissolved Chloride (Cl)	2015/06/29	94	80 - 120	97	80 - 120	<0.50	mg/L	NC	20
7950911	Dissolved Sulphate (SO4)	2015/06/29	96	80 - 120	95	80 - 120	<0.50	mg/L	0.43	20
7952415	Total Aluminum (Al)	2015/07/03	104	80 - 120	105	80 - 120	<0.0030	mg/L	NC	20
7952415	Total Antimony (Sb)	2015/07/03	105	80 - 120	103	80 - 120	<0.00050	mg/L	NC	20
7952415	Total Arsenic (As)	2015/07/03	103	80 - 120	102	80 - 120	<0.00010	mg/L	2.4	20
7952415	Total Barium (Ba)	2015/07/03	NC	80 - 120	101	80 - 120	<0.0010	mg/L	3.3	20
7952415	Total Beryllium (Be)	2015/07/03	104	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
7952415	Total Bismuth (Bi)	2015/07/03	102	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7952415	Total Boron (B)	2015/07/03					<0.050	mg/L	NC	20
7952415	Total Cadmium (Cd)	2015/07/03	101	80 - 120	101	80 - 120	<0.000010	mg/L	NC	20
7952415	Total Chromium (Cr)	2015/07/03	101	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
7952415	Total Cobalt (Co)	2015/07/03	96	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
7952415	Total Copper (Cu)	2015/07/03	97	80 - 120	99	80 - 120	<0.00050	mg/L	NC	20
7952415	Total Iron (Fe)	2015/07/03	102	80 - 120	108	80 - 120	<0.010	mg/L	NC	20
7952415	Total Lead (Pb)	2015/07/03	100	80 - 120	103	80 - 120	<0.00020	mg/L	NC	20
7952415	Total Lithium (Li)	2015/07/03	104	80 - 120	104	80 - 120	<0.0050	mg/L	NC	20
7952415	Total Manganese (Mn)	2015/07/03	NC	80 - 120	101	80 - 120	<0.0010	mg/L	1.8	20
7952415	Total Molybdenum (Mo)	2015/07/03	NC	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
7952415	Total Nickel (Ni)	2015/07/03	97	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20
7952415	Total Selenium (Se)	2015/07/03	102	80 - 120	97	80 - 120	<0.00010	mg/L	0.35	20
7952415	Total Silicon (Si)	2015/07/03					<0.10	mg/L	2.8	20
7952415	Total Silver (Ag)	2015/07/03	99	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
7952415	Total Strontium (Sr)	2015/07/03	NC	80 - 120	97	80 - 120	<0.0010	mg/L	3.4	20
7952415	Total Thallium (Tl)	2015/07/03	100	80 - 120	104	80 - 120	<0.000050	mg/L	NC	20
7952415	Total Tin (Sn)	2015/07/03	104	80 - 120	106	80 - 120	<0.0050	mg/L	NC	20
7952415	Total Titanium (Ti)	2015/07/03	105	80 - 120	103	80 - 120	<0.0050	mg/L	NC	20

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QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
PHASE:12000/12005 SÄ DENA HES MINE
Site Location: CLOSURE
Sampler Initials: LC

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
7952415	Total Uranium (U)	2015/07/03	100	80 - 120	101	80 - 120	<0.00010	mg/L	5.9	20
7952415	Total Vanadium (V)	2015/07/03	101	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7952415	Total Zinc (Zn)	2015/07/03	NC	80 - 120	103	80 - 120	<0.0050	mg/L	11	20
7952415	Total Zirconium (Zr)	2015/07/03					<0.00050	mg/L	NC	20
7953265	Dissolved Chloride (Cl)	2015/06/30	117	80 - 120	101	80 - 120	0.63, RDL=0.50	mg/L		
7953269	Dissolved Aluminum (Al)	2015/07/07	106	80 - 120	113	80 - 120	<0.0030	mg/L	NC	20
7953269	Dissolved Antimony (Sb)	2015/07/07	118	80 - 120	115	80 - 120	<0.00050	mg/L	NC	20
7953269	Dissolved Arsenic (As)	2015/07/07	103	80 - 120	107	80 - 120	<0.00010	mg/L	5.9	20
7953269	Dissolved Barium (Ba)	2015/07/07	NC	80 - 120	109	80 - 120	<0.0010	mg/L	2.7	20
7953269	Dissolved Beryllium (Be)	2015/07/07	101	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
7953269	Dissolved Bismuth (Bi)	2015/07/07	94	80 - 120	113	80 - 120	<0.0010	mg/L	NC	20
7953269	Dissolved Boron (B)	2015/07/07					<0.050	mg/L	NC	20
7953269	Dissolved Cadmium (Cd)	2015/07/07	103	80 - 120	107	80 - 120	<0.000010	mg/L	1.6	20
7953269	Dissolved Chromium (Cr)	2015/07/07	93	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20
7953269	Dissolved Cobalt (Co)	2015/07/07	92	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20
7953269	Dissolved Copper (Cu)	2015/07/07	91	80 - 120	99	80 - 120	<0.00020	mg/L	17	20
7953269	Dissolved Iron (Fe)	2015/07/07	102	80 - 120	115	80 - 120	<0.0050	mg/L	NC	20
7953269	Dissolved Lead (Pb)	2015/07/07	102	80 - 120	110	80 - 120	<0.00020	mg/L	NC	20
7953269	Dissolved Lithium (Li)	2015/07/07	110	80 - 120	108	80 - 120	<0.0050	mg/L	NC	20
7953269	Dissolved Manganese (Mn)	2015/07/07	106	80 - 120	112	80 - 120	<0.0010	mg/L	NC	20
7953269	Dissolved Molybdenum (Mo)	2015/07/07	NC	80 - 120	106	80 - 120	<0.0010	mg/L	NC	20
7953269	Dissolved Nickel (Ni)	2015/07/07	92	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20
7953269	Dissolved Selenium (Se)	2015/07/07	106	80 - 120	103	80 - 120	<0.00010	mg/L	17	20
7953269	Dissolved Silicon (Si)	2015/07/07					<0.10	mg/L	1.4	20
7953269	Dissolved Silver (Ag)	2015/07/07	95	80 - 120	104	80 - 120	<0.000020	mg/L	NC	20
7953269	Dissolved Strontium (Sr)	2015/07/07	NC	80 - 120	108	80 - 120	<0.0010	mg/L	1.0	20
7953269	Dissolved Thallium (Tl)	2015/07/07	100	80 - 120	109	80 - 120	<0.000050	mg/L	NC	20
7953269	Dissolved Tin (Sn)	2015/07/07	102	80 - 120	113	80 - 120	<0.0050	mg/L	NC	20
7953269	Dissolved Titanium (Ti)	2015/07/07	92	80 - 120	112	80 - 120	<0.0050	mg/L	NC	20
7953269	Dissolved Uranium (U)	2015/07/07	NC	80 - 120	101	80 - 120	<0.00010	mg/L	1.5	20

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Maxxam Job #: B554617
Report Date: 2015/07/30

QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
PHASE:12000/12005 SÄ DENA HES MINE
Site Location: CLOSURE
Sampler Initials: LC

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
7953269	Dissolved Vanadium (V)	2015/07/07	88	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
7953269	Dissolved Zinc (Zn)	2015/07/07	93	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
7953269	Dissolved Zirconium (Zr)	2015/07/07					<0.00050	mg/L	NC	20
7954859	2-Methylnaphthalene	2015/07/03	105	50 - 130	101	50 - 130	<0.10	ug/L	NC	40
7954859	Acenaphthene	2015/07/03	105	50 - 130	100	50 - 130	<0.050	ug/L	NC	40
7954859	Acenaphthylene	2015/07/03	105	50 - 130	100	50 - 130	<0.050	ug/L	NC	40
7954859	Acridine	2015/07/03	110	50 - 130	104	50 - 130	<0.050	ug/L	NC	40
7954859	Anthracene	2015/07/03	107	60 - 130	103	60 - 130	<0.010	ug/L	NC	40
7954859	Benzo(a)anthracene	2015/07/03	97	60 - 130	93	60 - 130	<0.010	ug/L	NC	40
7954859	Benzo(a)pyrene	2015/07/03	104	60 - 130	96	60 - 130	<0.0090	ug/L	NC	40
7954859	Benzo(b&j)fluoranthene	2015/07/03	95	60 - 130	100	60 - 130	<0.050	ug/L	NC	40
7954859	Benzo(g,h,i)perylene	2015/07/03	95	60 - 130	91	60 - 130	<0.050	ug/L	NC	40
7954859	Benzo(k)fluoranthene	2015/07/03	93	60 - 130	89	60 - 130	<0.050	ug/L	NC	40
7954859	Chrysene	2015/07/03	102	60 - 130	98	60 - 130	<0.050	ug/L	NC	40
7954859	Dibenz(a,h)anthracene	2015/07/03	98	60 - 130	93	60 - 130	<0.050	ug/L	NC	40
7954859	Fluoranthene	2015/07/03	104	60 - 130	100	60 - 130	<0.020	ug/L	NC	40
7954859	Fluorene	2015/07/03	97	50 - 130	92	50 - 130	<0.050	ug/L	NC	40
7954859	Indeno(1,2,3-cd)pyrene	2015/07/03	101	60 - 130	96	60 - 130	<0.050	ug/L	NC	40
7954859	Naphthalene	2015/07/03	100	50 - 130	98	50 - 130	<0.10	ug/L	NC	40
7954859	Phenanthrene	2015/07/03	102	60 - 130	97	60 - 130	<0.050	ug/L	NC	40
7954859	Pyrene	2015/07/03	106	60 - 130	103	60 - 130	<0.020	ug/L	NC	40
7954859	Quinoline	2015/07/03	124	50 - 130	115	50 - 130	<0.24	ug/L	NC	40
7954876	EPH (C10-C19)	2015/07/03	93	50 - 130	92	50 - 130	<0.20	mg/L	NC	30
7954876	EPH (C19-C32)	2015/07/03	116	50 - 130	116	50 - 130	<0.20	mg/L	NC	30
7957999	Total Mercury (Hg)	2015/07/07	81	80 - 120	82	80 - 120	<0.010	ug/L	NC	20
7958062	Dissolved Mercury (Hg)	2015/07/07	80	80 - 120	80	80 - 120	<0.010	ug/L	NC	20

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Maxxam Job #: B554617
Report Date: 2015/07/30

QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
PHASE:12000/12005 SÄ DENA HES MINE
Site Location: CLOSURE
Sampler Initials: LC

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
7984937	Total Zinc (Zn)	2015/07/24			105	80 - 120	<0.0050	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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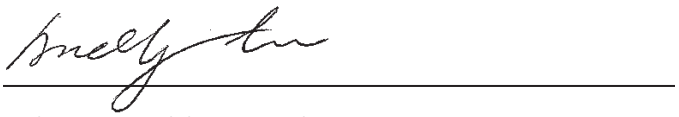
Maxxam Job #: B554617
Report Date: 2015/07/30

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE:12000/12005 SÄ DENA HES MINE CLOSURE
Sampler Initials: LC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

B554617

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 07528 page 1 of 1

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 12-1021-0006/12000/12005			Laboratory Name: Maxxam
Short Title: Sö Dena Hes Mine Closure	Golder Contact: Andrew Bruemmer		Address: 4606 Canada Way, Burnaby, BC
Golder E-mail Address 1: Andrew_Bruemmer@golder.com	Golder E-mail Address 2: Lindsay_Carson@golder.com		Telephone/Fax: 604 639 2616 / Contact: Ashley Ling

Office Name: Vancouver / Whitehorse

EQuIS Facility Code:

EQuIS upload: ☐

Email 3: Erin_Adshead@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	LEPH/HEPH(inc PAH)	BTEX/VPH	VOCs (inc. BTEX/VPH)	Total Metals (inc Hg)	Dissolved Metals (inc Hg)	Anions (Cl, F, NO2, NO3, SO4)	RUSH (Select TAT above)	Remarks (over)
07528-01	TH10-91	1		water	24/06/15	09:45	grab			8	X		X		X	X		SAMPLE#: MW9112
-02	TH09-91	2				11:10												MW9113
-03	MW14-04	3				12:00												MW9114
-04	SW14-03	4			25/06/15	12:10						X		X				MW9115
-05	SW14-02	5				12:40		FDA	7528-06									MW9116
-06	SW14-07	6				12:40		FD	7528-05									MW9117
-07	SW14-01	7				13:10												MW9118
-08																		
-09																		
-10																		
-11																		
-12																		

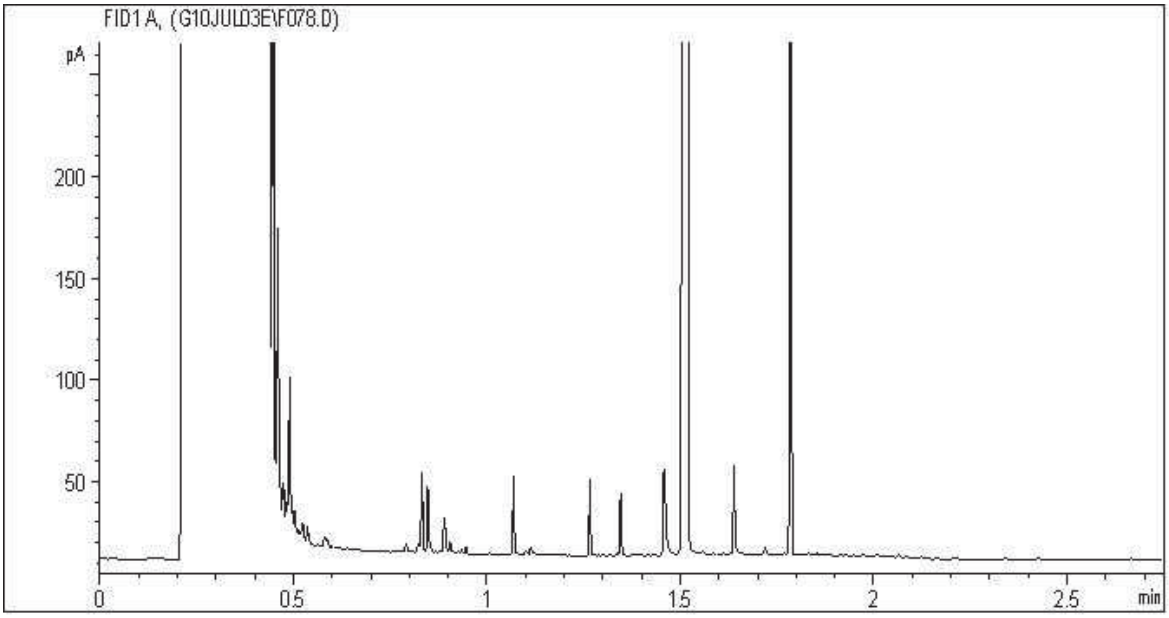
B554617

Sampler's Signature: Lindsay Carson	Relinquished by: Signature	Company: Golder	Date: June 25, 2015	Time	Received by: Signature	Company	
Comments: ON ICE; EDD Lab Report Delivery	Method of Shipment: Bus / Air	Waybill No.:	Received for Lab by: JESSICA KNOX	Date: 2015/06/27	Time: 09:20		
	Shipped by: Greyhound / Air North	Shipment Condition: Seal Intact:	Temp (°C): 8.6, 6.5	Cooler opened by:	Date	Time	

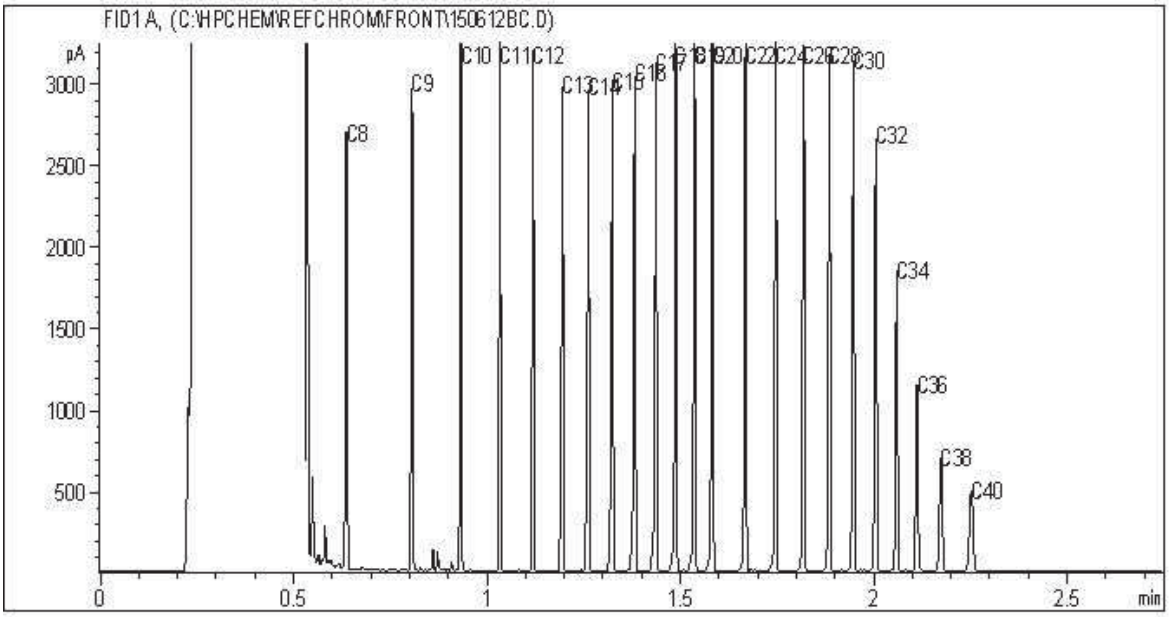
WHITE: Golder Copy YELLOW: Lab Copy

ESED

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

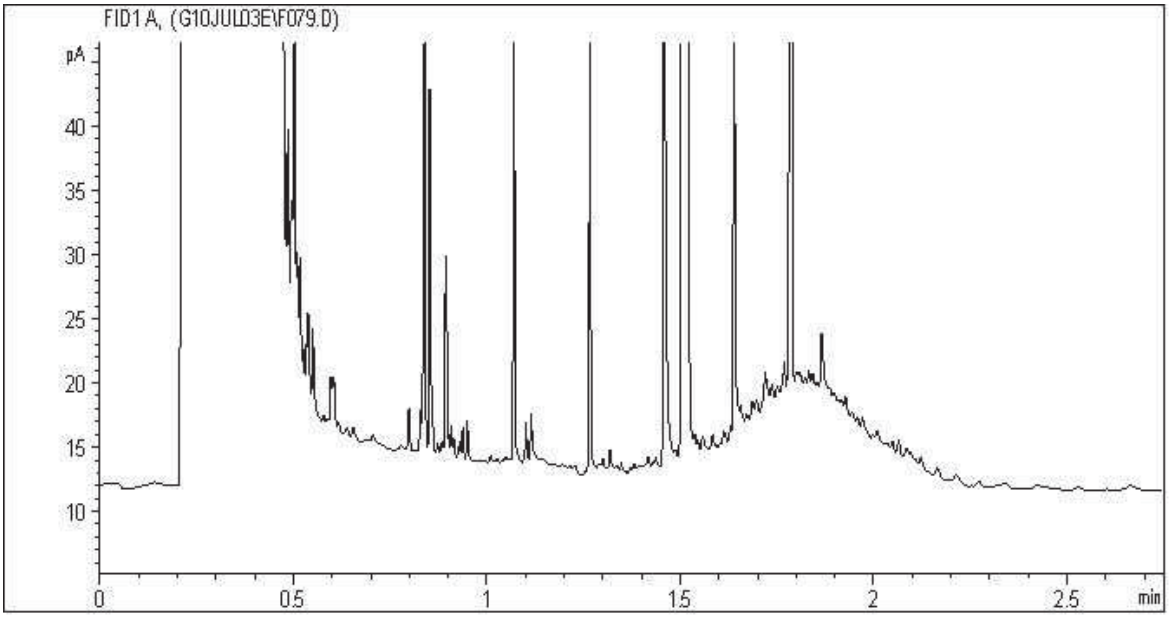


TYPICAL PRODUCT CARBON NUMBER RANGES

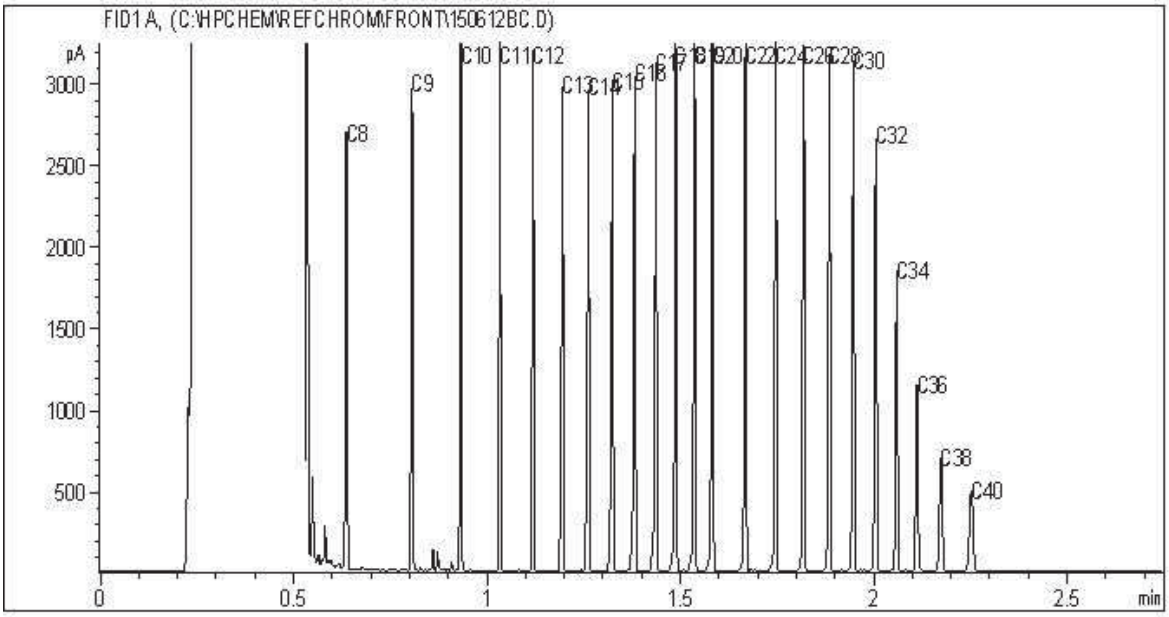
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

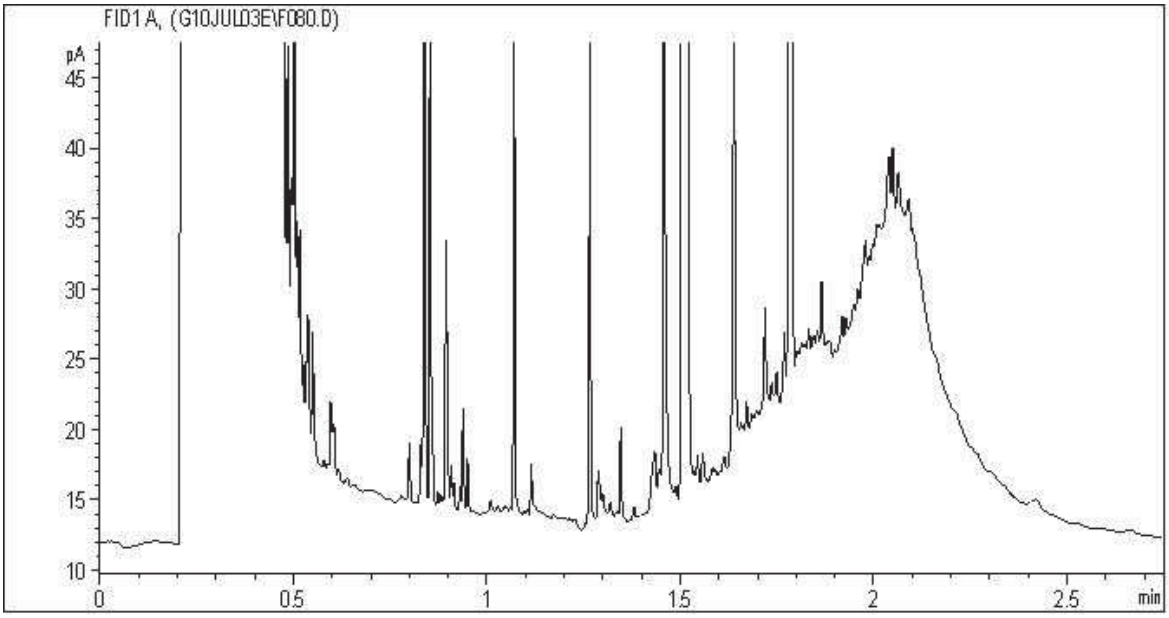


TYPICAL PRODUCT CARBON NUMBER RANGES

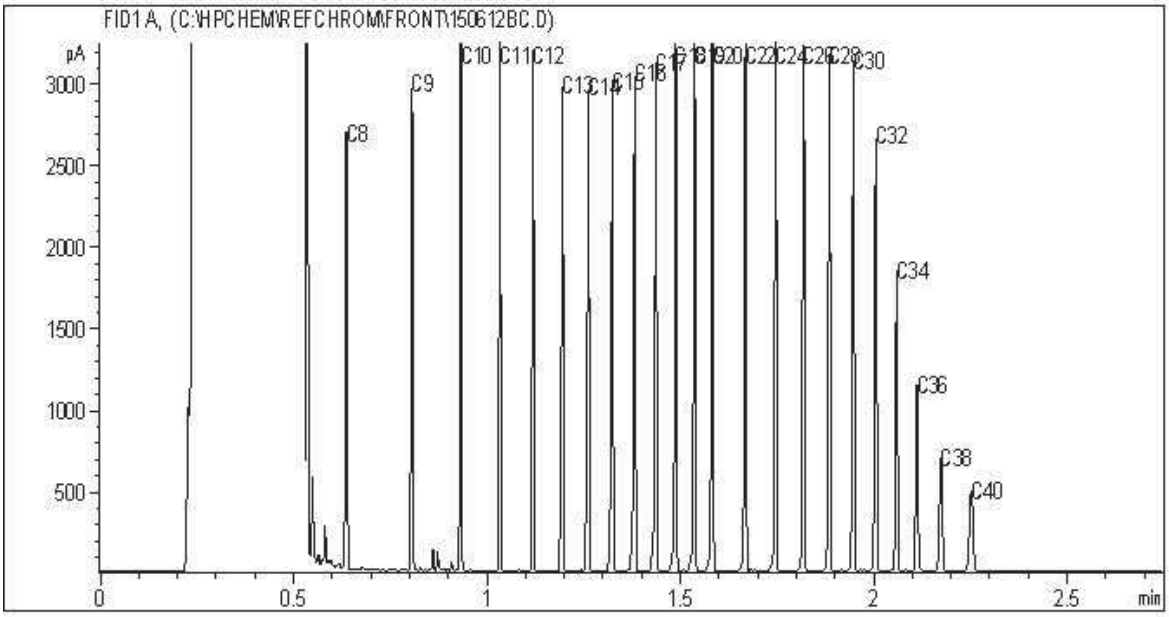
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

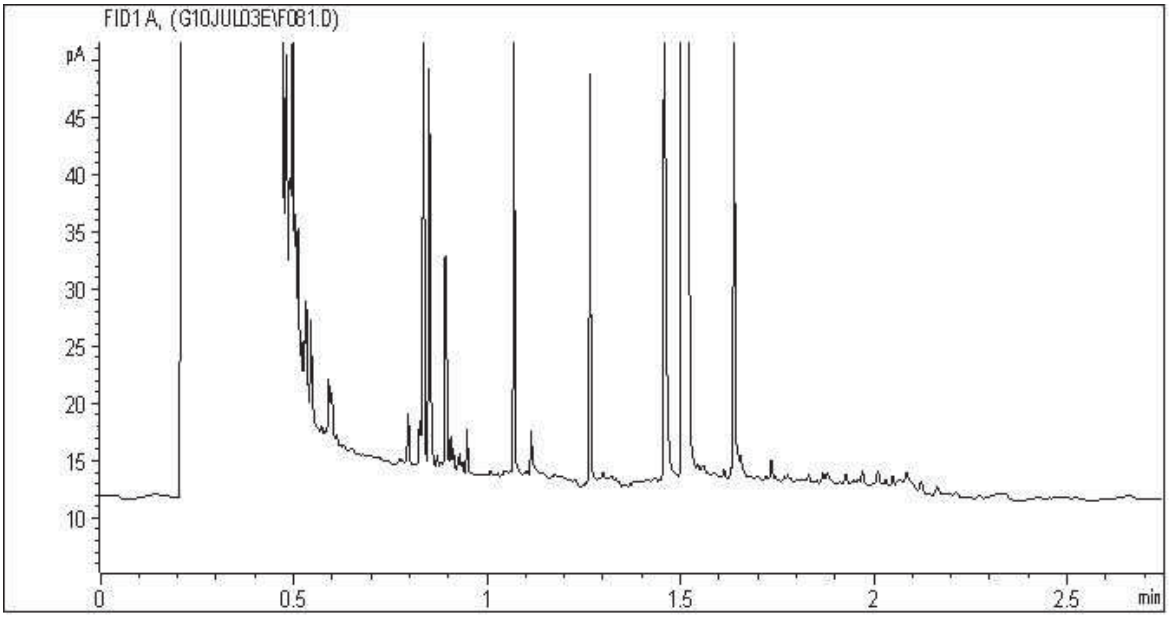


TYPICAL PRODUCT CARBON NUMBER RANGES

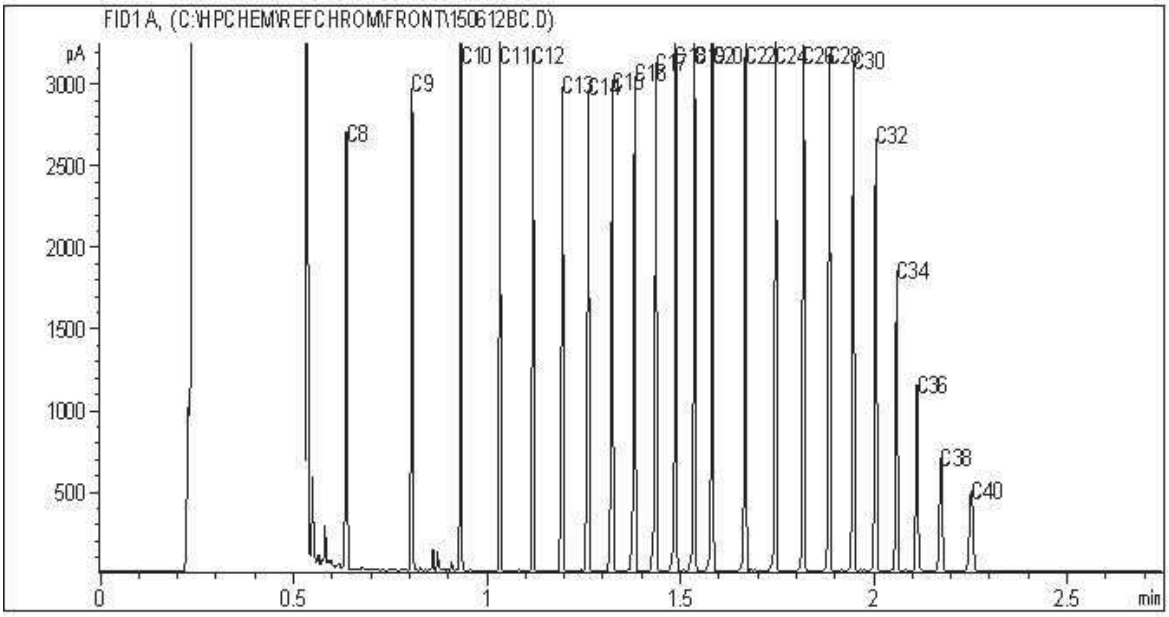
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
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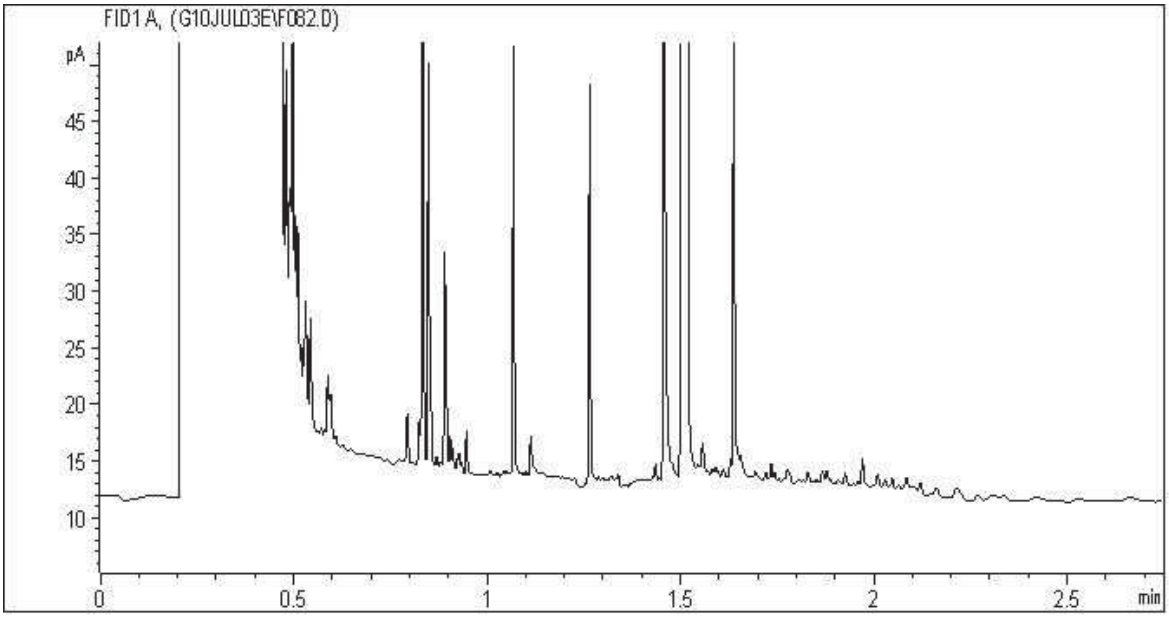
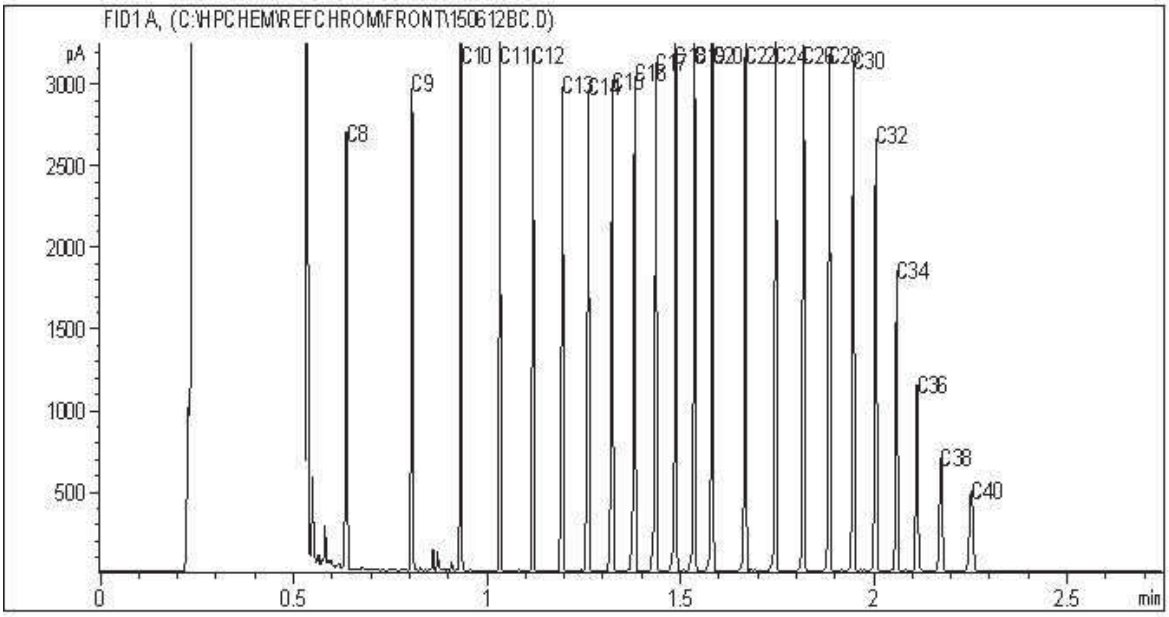
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

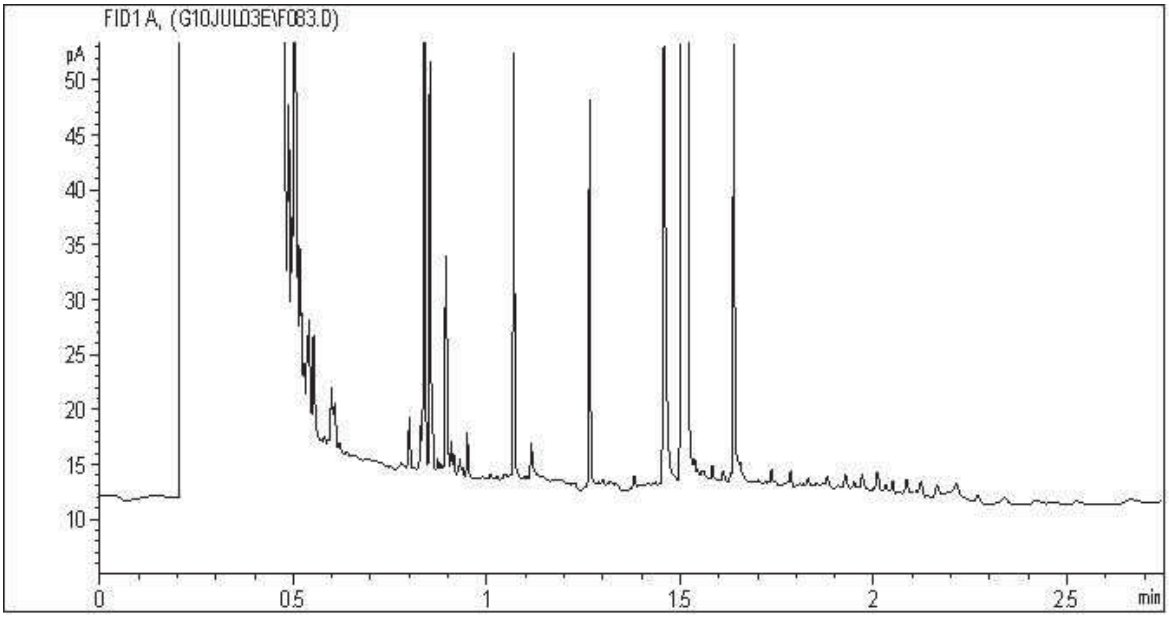


TYPICAL PRODUCT CARBON NUMBER RANGES

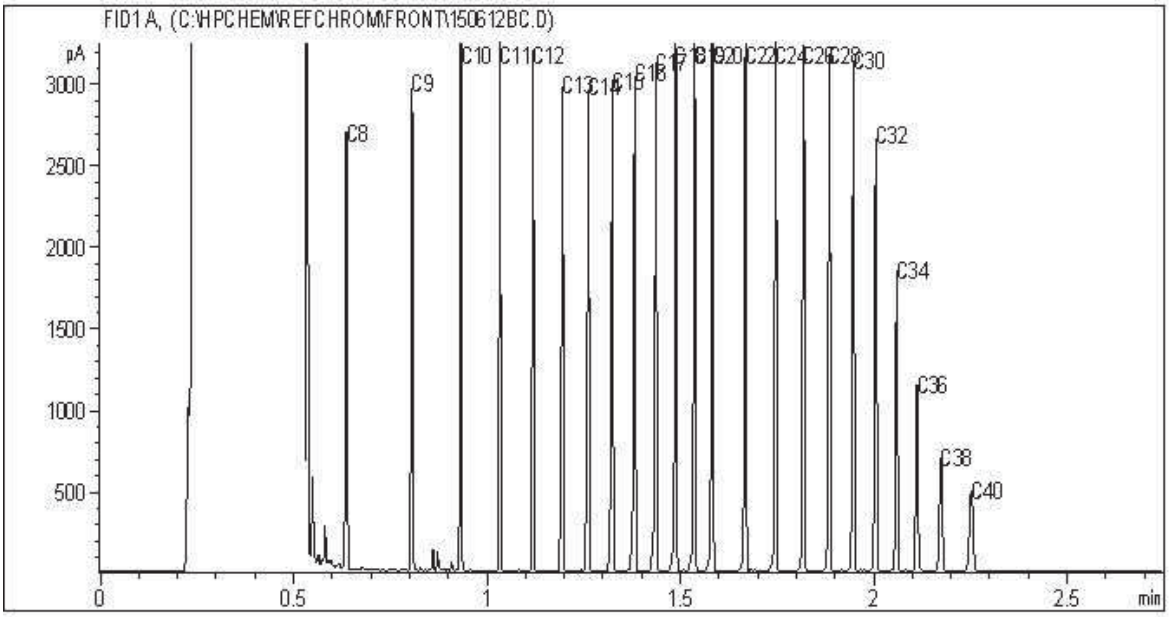
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

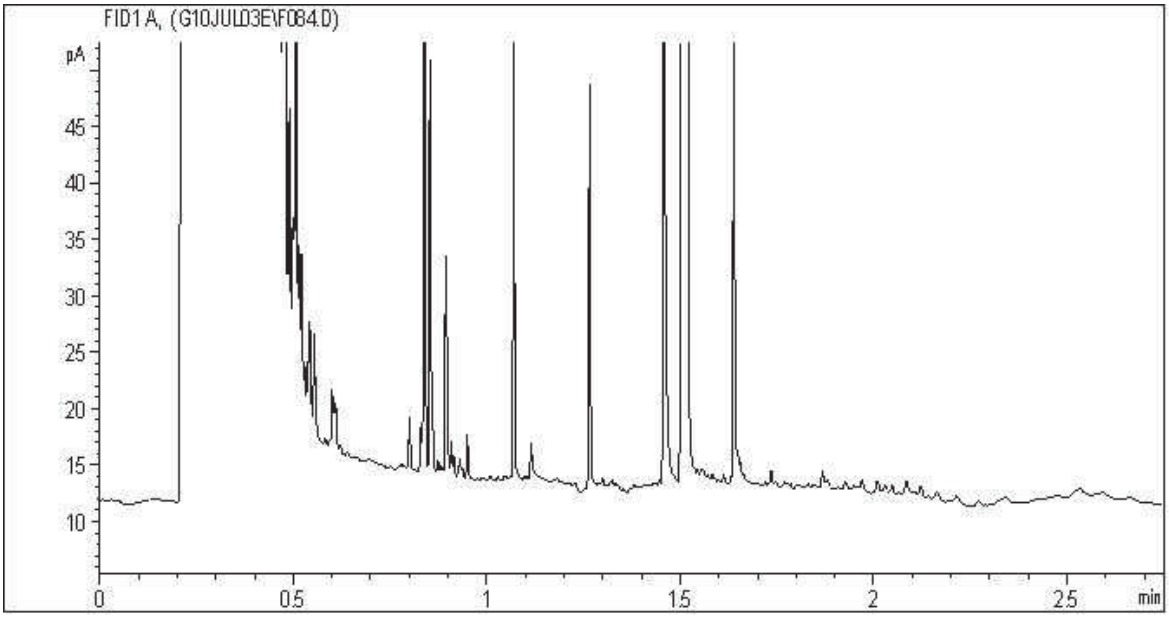


TYPICAL PRODUCT CARBON NUMBER RANGES

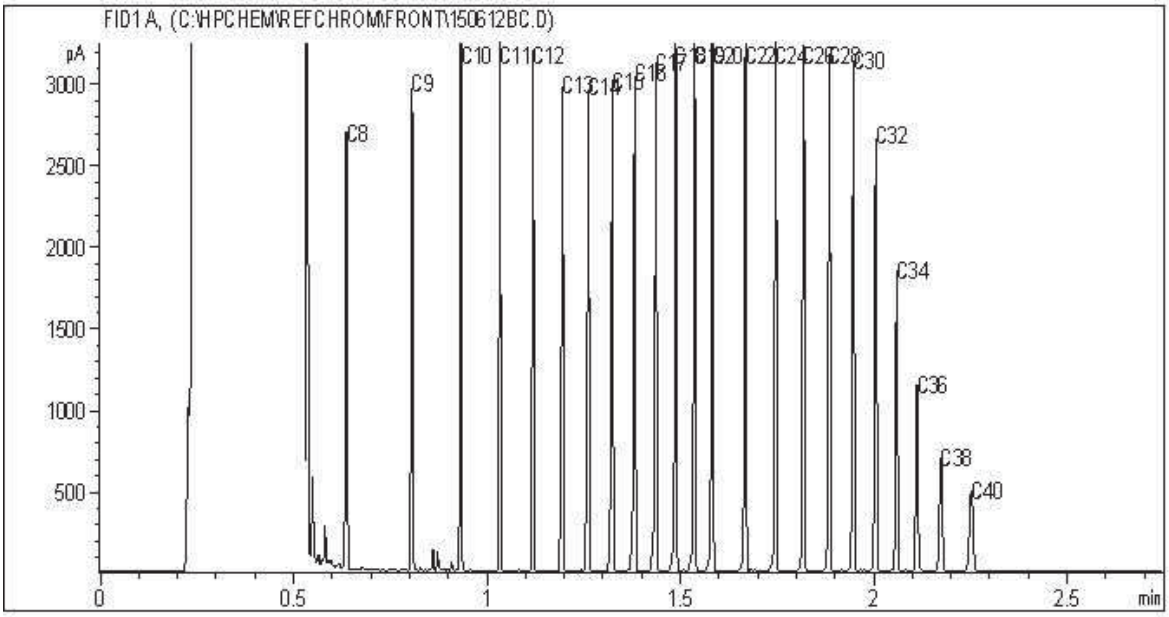
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

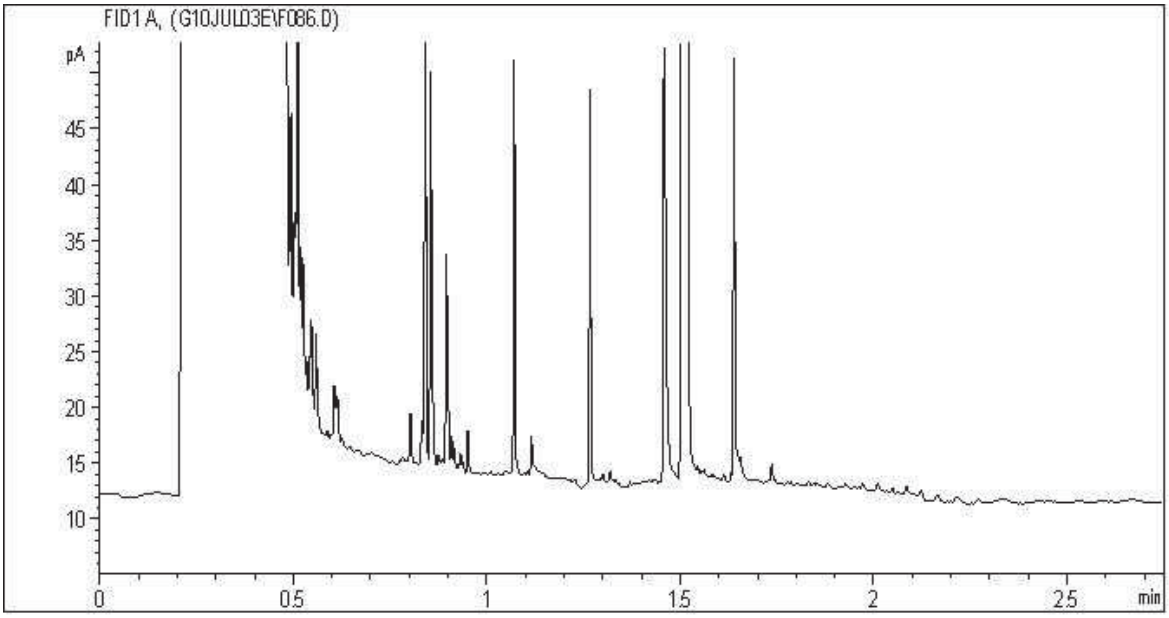


TYPICAL PRODUCT CARBON NUMBER RANGES

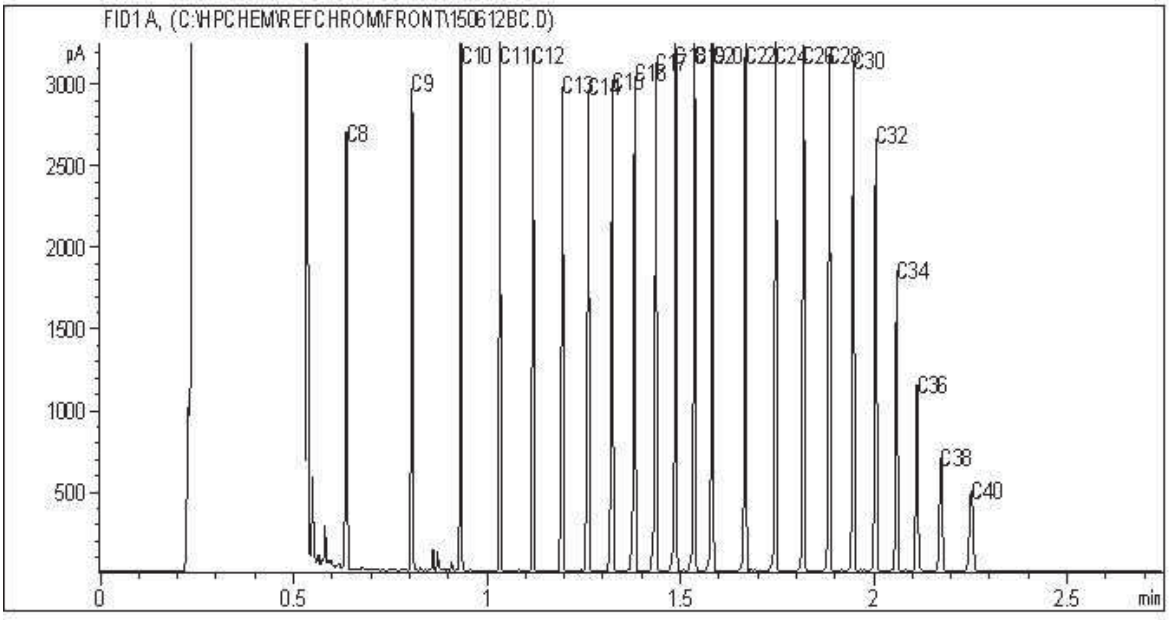
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Your C.O.C. #: 07535, 07534

Attention:Andrew Bruemmer

GOLDER ASSOCIATES LTD
Suite 200 - 2920 Virtual Way
VANCOUVER, BC
Canada V5M 0C4

Report Date: 2015/09/15
Report #: R2041548
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B577651
Received: 2015/09/05, 12:15

Sample Matrix: Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/MTBE LH, VH, F1 SIM/MS	7	2015/09/08	2015/09/08	BBY8SOP-00010/11	EPA 8260c R3 m
BTEX/MTBE LH, VH, F1 SIM/MS	1	2015/09/08	2015/09/10	BBY8SOP-00010/11	EPA 8260c R3 m
Chloride by Automated Colourimetry	12	N/A	2015/09/08	BBY6SOP-00011	SM 22 4500-Cl- G m
COD by Colorimeter	4	2015/09/08	2015/09/09	BBY6SOP-00024	SM 22 5220 D m
Fluoride	12	N/A	2015/09/09	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3)	2	N/A	2015/09/14	BBY7SOP-00002	EPA 6020a R1 m
Hardness Total (calculated as CaCO3)	1	N/A	2015/09/15	BBY7SOP-00002	EPA 6020a R1 m
Hardness (calculated as CaCO3)	9	N/A	2015/09/15	BBY7SOP-00002	EPA 6020a R1 m
Mercury (Dissolved) by CVAF	9	N/A	2015/09/10	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Mercury (Total) by CVAF	2	2015/09/10	2015/09/11	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Mercury (Total) by CVAF	1	2015/09/14	2015/09/14	BBY7SOP-00015	BCMOE BCLM Oct2013 m
EPH in Water when PAH required	10	2015/09/10	2015/09/11	BBY8SOP-00029	BCMOE EPH w 12/00 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	9	N/A	2015/09/15	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (dissolved)	9	N/A	2015/09/13	BBY7SOP-00002	EPA 6020A R1 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	2015/09/05	2015/09/14	BBY7SOP-00002	EPA 6020A R1 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	2015/09/05	2015/09/15	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total)	2	2015/09/09	2015/09/13	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total)	1	2015/09/09	2015/09/15	BBY7SOP-00002	EPA 6020A R1 m
Nitrogen (Total)	2	2015/09/10	2015/09/10	BBY6SOP-00016	SM 22 4500-N C m
Nitrogen (Total)	2	2015/09/10	2015/09/11	BBY6SOP-00016	SM 22 4500-N C m
Ammonia-N (Unpreserved)	4	N/A	2015/09/09	BBY6SOP-00009	SM 22 4500-NH3- G m
Nitrate + Nitrite (N)	12	N/A	2015/09/05	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA	12	N/A	2015/09/05	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N)	12	N/A	2015/09/05	BBY6SOP-00010	SM 22 4500-NO3 I m
PAH in Water by GC/MS (SIM)	4	2015/09/10	2015/09/12	BBY8SOP-00021	EPA 8270d R4 m
PAH in Water by GC/MS (SIM)	5	2015/09/10	2015/09/13	BBY8SOP-00021	EPA 8270d R4 m
PAH in Water by GC/MS (SIM)	1	2015/09/10	2015/09/14	BBY8SOP-00021	EPA 8270d R4 m
Total LMW, HMW, Total PAH Calc	10	N/A	2015/09/14	BBY WI-00033	Auto Calc
pH Water (1)	3	N/A	2015/09/09	BBY6SOP-00026	SM 22 4500-H+ B m
pH Water (1)	9	N/A	2015/09/10	BBY6SOP-00026	SM 22 4500-H+ B m

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Your Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Your C.O.C. #: 07535, 07534

Attention:Andrew Bruemmer

GOLDER ASSOCIATES LTD
Suite 200 - 2920 Virtual Way
VANCOUVER, BC
Canada V5M 0C4

Report Date: 2015/09/15
Report #: R2041548
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B577651
Received: 2015/09/05, 12:15

Sample Matrix: Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Sulphate by Automated Colourimetry	12	N/A	2015/09/08	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue)	2	2015/09/08	2015/09/09	BBY6SOP-00033	SM 22 2540 C m
Total Dissolved Solids (Filt. Residue)	2	2015/09/09	2015/09/10	BBY6SOP-00033	SM 22 2540 C m
EPH less PAH in Water by GC/FID	10	N/A	2015/09/14	BBY WI-00033	Auto Calc
TKN (Calc. TN, N/N) total	4	N/A	2015/09/11	BBY WI-00033	Calculation
Turbidity	4	N/A	2015/09/08	BBY6SOP-00027	SM 22 2130 B m
VOCs, VH, F1, LH in Water by HS GC/MS	2	2015/09/06	2015/09/07	BBY8SOP-00009	EPA 8260c R3 m
Volatile HC-BTEX	2	N/A	2015/09/08	BBY WI-00033	Auto Calc
Volatile HC-BTEX	7	N/A	2015/09/09	BBY WI-00033	Auto Calc
Volatile HC-BTEX	1	N/A	2015/09/10	BBY WI-00033	Auto Calc

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Encryption Key

Graham Rudkin
15 Sep 2015 18:43:42 -07:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashley Ling, Burnaby Senior Project Manager
Email: ALing@maxxam.ca
Phone# (604)639-2616

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		NB7022		NB7023	NB7024		NB7025		
Sampling Date		2015/09/03		2015/09/03	2015/09/03		2015/09/01		
COC Number		07535		07535	07535		07534		
	UNITS	**7535-01**	**QC Batch**	**7535-02**	**7535-03**	**QC Batch**	**7534-01**	**RDL**	**QC Batch**
Demand Parameters									
Chemical Oxygen Demand	mg/L					8030574	39	10	8030574
Misc. Inorganics									
Fluoride (F)	mg/L	0.110	8032425	0.110	0.120	8032425	0.140	0.010	8032434
Anions									
Dissolved Sulphate (SO4)	mg/L	11.1	8031211	11.4	5.06	8031211	60.4	0.50	8031215
Dissolved Chloride (Cl)	mg/L	<0.50	8031210	0.67	0.57	8031210	1.0	0.50	8031213
Nutrients									
Total Total Kjeldahl Nitrogen (Calc)	mg/L						0.133	0.020	8029413
Total Ammonia (N)	mg/L						<0.0050 (1)	0.0050	8032586
Total Nitrogen (N)	mg/L						0.813	0.020	8033607
Physical Properties									
pH	pH	8.44	8032036	8.28	8.36	8031305	8.20	N/A	8032043
Physical Properties									
Total Dissolved Solids	mg/L						196	10	8030474
Turbidity	NTU						336 (2)	0.10	8030862

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Sample arrived to laboratory past recommended hold time.
(2) Sample arrived to laboroatory past recommended hold time.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		NB7026	NB7027	NB7028	NB7028		NB7029		
Sampling Date		2015/09/01	2015/09/02	2015/09/02	2015/09/02		2015/09/02		
COC Number		07534	07534	07534	07534		07534		
	UNITS	**7534-02**	**7534-03**	**7534-04**	**7534-04 Lab-Dup**	**QC Batch**	**7534-05**	**RDL**	**QC Batch**
Demand Parameters									
Chemical Oxygen Demand	mg/L					8030574	28	10	8030574
Misc. Inorganics									
Fluoride (F)	mg/L	0.059	0.370	0.370		8032425	0.370	0.010	8032434
Anions									
Dissolved Sulphate (SO4)	mg/L	31.6	40.7	38.5	39.4	8031211	12.7	0.50	8031215
Dissolved Chloride (Cl)	mg/L	0.99	1.3	1.2	1.2	8031210	1.5	0.50	8031213
Nutrients									
Total Total Kjeldahl Nitrogen (Calc)	mg/L						0.073	0.020	8029413
Total Ammonia (N)	mg/L						<0.0050 (1)	0.0050	8032586
Total Nitrogen (N)	mg/L						0.399	0.020	8033607
Physical Properties									
pH	pH	8.39	8.37	8.39		8032036	8.27	N/A	8032043
Physical Properties									
Total Dissolved Solids	mg/L						182	10	8030474
Turbidity	NTU						285 (1)	0.10	8030862

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable

(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		NB7030		NB7031		NB7032		
Sampling Date		2015/09/02		2015/09/03		2015/09/03		
COC Number		07534		07534		07534		
	UNITS	**7534-06**	**QC Batch**	**7534-07**	**QC Batch**	**7534-08**	**RDL**	**QC Batch**
Demand Parameters								
Chemical Oxygen Demand	mg/L	59	8030723		8030723		10	8030723
Misc. Inorganics								
Fluoride (F)	mg/L	0.070	8032434	0.110	8032425	0.049	0.010	8032425
Anions								
Dissolved Sulphate (SO4)	mg/L	51.7	8031215	8.75	8031211	6.14	0.50	8031211
Dissolved Chloride (Cl)	mg/L	1.2	8031213	0.52	8031210	0.79	0.50	8031210
Nutrients								
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.73	8029413				0.10	
Total Ammonia (N)	mg/L	<0.0050 (1)	8032586				0.0050	
Total Nitrogen (N)	mg/L	2.31	8034012				0.10	
Physical Properties								
pH	pH	8.25	8032043	8.38	8032036	8.33	N/A	8031305
Physical Properties								
Total Dissolved Solids	mg/L	230	8031666				10	
Turbidity	NTU	2630 (2)	8030862				1.0	

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

(2) RDL raised due to sample dilution; Sample analysed past hold time: sample was received on the hold time expiry date which did not allow sufficient time for preparation and analysis.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		NB7033		
Sampling Date		2015/09/03		
COC Number		07534		
	UNITS	**7534-09**	**RDL**	**QC Batch**
Demand Parameters				
Chemical Oxygen Demand	mg/L	19	10	8030723
Misc. Inorganics				
Fluoride (F)	mg/L	0.640	0.010	8032434
Anions				
Dissolved Sulphate (SO4)	mg/L	122	0.50	8031215
Dissolved Chloride (Cl)	mg/L	1.2	0.50	8031213
Nutrients				
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.025	0.020	8029413
Total Ammonia (N)	mg/L	<0.0050 (1)	0.0050	8032586
Total Nitrogen (N)	mg/L	0.025	0.020	8034012
Physical Properties				
pH	pH	8.20	N/A	8032043
Physical Properties				
Total Dissolved Solids	mg/L	606	10	8031666
Turbidity	NTU	57.5 (1)	0.10	8030862

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Sample analysed past recommended hold time.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

BCCSR BTEX/VPH IN WATER (WATER)

Maxxam ID		NB7022	NB7023	NB7024	NB7026	NB7027	NB7028	NB7029		
Sampling Date		2015/09/03	2015/09/03	2015/09/03	2015/09/01	2015/09/02	2015/09/02	2015/09/02		
COC Number		07535	07535	07535	07534	07534	07534	07534		
	UNITS	**7535-01**	**7535-02**	**7535-03**	**7534-02**	**7534-03**	**7534-04**	**7534-05**	**RDL**	**QC Batch**
Volatiles										
VPH (VHW6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	<300	<300	<300	300	8029128
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	8030664
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8030664
Toluene	ug/L	<0.40	<0.40	1.1	<0.40	<0.40	<0.40	<0.40	0.40	8030664
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8030664
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8030664
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8030664
Styrene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8030664
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	8030664
VH C6-C10	ug/L	<300	<300	<300	<300	<300	<300	<300	300	8030664
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	107	106	107	106	107	107	107		8030664
4-Bromofluorobenzene (sur.)	%	99	101	102	100	101	100	100		8030664
D4-1,2-Dichloroethane (sur.)	%	96	96	103	95	96	95	95		8030664
RDL = Reportable Detection Limit										

Maxxam ID		NB7030		
Sampling Date		2015/09/02		
COC Number		07534		
	UNITS	**7534-06**	**RDL**	**QC Batch**
Volatiles				
VPH (VHW6 to 10 - BTEX)	ug/L	<300	300	8029128
Methyl-tert-butylether (MTBE)	ug/L	<4.0	4.0	8030664
Benzene	ug/L	<0.40	0.40	8030664
Toluene	ug/L	<0.40	0.40	8030664
Ethylbenzene	ug/L	<0.40	0.40	8030664
m & p-Xylene	ug/L	<0.40	0.40	8030664
o-Xylene	ug/L	<0.40	0.40	8030664
Styrene	ug/L	<0.40	0.40	8030664
Xylenes (Total)	ug/L	<0.40	0.40	8030664
VH C6-C10	ug/L	<300	300	8030664
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	106		8030664
4-Bromofluorobenzene (sur.)	%	100		8030664
D4-1,2-Dichloroethane (sur.)	%	94		8030664
RDL = Reportable Detection Limit				

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Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)

Maxxam ID		NB7022	NB7023	NB7024	NB7026	NB7027	NB7028		
Sampling Date		2015/09/03	2015/09/03	2015/09/03	2015/09/01	2015/09/02	2015/09/02		
COC Number		07535	07535	07535	07534	07534	07534		
	UNITS	**7535-01**	**7535-02**	**7535-03**	**7534-02**	**7534-03**	**7534-04**	**RDL**	**QC Batch**
Polycyclic Aromatics									
Low Molecular Weight PAH`s	ug/L	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	0.24	8029125
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8029125
Total PAH	ug/L	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	0.24	8029125
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	8033449
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	8033449
Quinoline	ug/L	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	0.24	8033449
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	8033449
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	8033449
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	8033449
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	8033449
Chrysene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(b&j)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(a)pyrene	ug/L	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	<0.0090	0.0090	8033449
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Calculated Parameters									
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	8029127
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	8029127
Ext. Pet. Hydrocarbon									
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	8033463
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	8033463
Surrogate Recovery (%)									
O-TERPHENYL (sur.)	%	102	102	103	104	103	103		8033463
D10-ANTHRACENE (sur.)	%	87	86	83	84	119	89		8033449
D8-ACENAPHTHYLENE (sur.)	%	99	94	92	98	90	100		8033449
D8-NAPHTHALENE (sur.)	%	87	85	85	87	90	84		8033449
D9-Acridine	%	74	73	72	69	98	74		8033449
TERPHENYL-D14 (sur.)	%	66	66	65	62	96	72		8033449
RDL = Reportable Detection Limit									

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)

Maxxam ID		NB7029	NB7030	NB7031	NB7032		
Sampling Date		2015/09/02	2015/09/02	2015/09/03	2015/09/03		
COC Number		07534	07534	07534	07534		
	UNITS	**7534-05**	**7534-06**	**7534-07**	**7534-08**	**RDL**	**QC Batch**
Polycyclic Aromatics							
Low Molecular Weight PAH`s	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8029125
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8029125
Total PAH	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8029125
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8033449
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	8033449
Quinoline	ug/L	<0.24	<0.24	<0.24	<0.24	0.24	8033449
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010 (1)	0.010	8033449
Acridine	ug/L	<0.050	<0.050	<0.050 (1)	<0.050	0.050	8033449
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	8033449
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	8033449
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	8033449
Chrysene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(b&j)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(a)pyrene	ug/L	<0.0090	<0.0090	<0.0090	<0.0090	0.0090	8033449
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Dibenz(a,h)anthracene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	8033449
Calculated Parameters							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8029127
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8029127
Ext. Pet. Hydrocarbon							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8033463
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	8033463
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	104	101	104	102		8033463
D10-ANTHRACENE (sur.)	%	86	85	86	86		8033449
D8-ACENAPHTHYLENE (sur.)	%	99	98	97	96		8033449
D8-NAPHTHALENE (sur.)	%	79	76	79	70		8033449
D9-Acridine	%	72	67	67	60		8033449

RDL = Reportable Detection Limit
(1) Detection limits raised due to matrix interference.

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

LEPH & HEPH WITH CSR/CCME PAH IN WATER (WATER)

Maxxam ID		NB7029	NB7030	NB7031	NB7032		
Sampling Date		2015/09/02	2015/09/02	2015/09/03	2015/09/03		
COC Number		07534	07534	07534	07534		
	UNITS	**7534-05**	**7534-06**	**7534-07**	**7534-08**	**RDL**	**QC Batch**
TERPHENYL-D14 (sur.)	%	64	61	60	56 (1)		8033449

RDL = Reportable Detection Limit

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		NB7025	NB7026	NB7027	NB7028	NB7029		
Sampling Date		2015/09/01	2015/09/01	2015/09/02	2015/09/02	2015/09/02		
COC Number		07534	07534	07534	07534	07534		
	UNITS	**7534-01**	**7534-02**	**7534-03**	**7534-04**	**7534-05**	**RDL**	**QC Batch**
Misc. Inorganics								
Dissolved Hardness (CaCO3)	mg/L	154	241	249	257	162	0.50	8029115
Elements								
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	8033470
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0208	0.0084	0.0231	0.0142	0.0062	0.0030	8032148
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	8032148
Dissolved Arsenic (As)	mg/L	0.00043	0.00088	0.00254	0.00243	0.00018	0.00010	8032148
Dissolved Barium (Ba)	mg/L	0.0164	0.0086	0.0248	0.0258	0.0236	0.0010	8032148
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	8032148
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	8032148
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8032148
Dissolved Cadmium (Cd)	mg/L	0.00298	0.000058	0.000069	0.000013	0.00119	0.000010	8032148
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	8032148
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	0.00131	0.00126	<0.00050	0.00050	8032148
Dissolved Copper (Cu)	mg/L	0.00142	0.00112	0.00025	<0.00020	0.00037	0.00020	8032148
Dissolved Iron (Fe)	mg/L	0.0302	0.0111	2.15	2.10	0.0151	0.0050	8032148
Dissolved Lead (Pb)	mg/L	0.00620	0.00174	0.00186	0.00127	0.00182	0.00020	8032148
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	0.0082	0.0089	<0.0050	0.0050	8032148
Dissolved Manganese (Mn)	mg/L	0.0025	0.0016	1.57	1.59	0.0050	0.0010	8032148
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0020	0.0029	0.0032	<0.0010	0.0010	8032148
Dissolved Nickel (Ni)	mg/L	<0.0010	<0.0010	0.0020	0.0020	<0.0010	0.0010	8032148
Dissolved Selenium (Se)	mg/L	0.00162	0.00177	<0.00010	<0.00010	0.00146	0.00010	8032148
Dissolved Silicon (Si)	mg/L	2.32	4.02	7.73	7.89	3.42	0.10	8032148
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	8032148
Dissolved Strontium (Sr)	mg/L	0.0935	0.347	0.433	0.469	0.144	0.0010	8032148
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	8032148
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	8032148
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	8032148
Dissolved Uranium (U)	mg/L	0.00046	0.00269	0.00461	0.00488	0.00071	0.00010	8032148
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	8032148
Dissolved Zinc (Zn)	mg/L	0.159	0.0471	0.320	0.302	0.242	0.0050	8032148
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	8032148
Dissolved Calcium (Ca)	mg/L	57.6	82.9	71.7	73.5	59.3	0.050	8029123
Dissolved Magnesium (Mg)	mg/L	2.35	8.28	17.1	17.8	3.43	0.050	8029123
Dissolved Potassium (K)	mg/L	0.636	0.996	3.23	3.24	0.709	0.050	8029123
RDL = Reportable Detection Limit								

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		NB7025	NB7026	NB7027	NB7028	NB7029		
Sampling Date		2015/09/01	2015/09/01	2015/09/02	2015/09/02	2015/09/02		
COC Number		07534	07534	07534	07534	07534		
	UNITS	**7534-01**	**7534-02**	**7534-03**	**7534-04**	**7534-05**	**RDL**	**QC Batch**
Dissolved Sodium (Na)	mg/L	0.755	1.87	9.63	9.72	0.745	0.050	8029123
Dissolved Sulphur (S)	mg/L	24.2	11.7	16.0	14.6	<3.0	3.0	8029123
RDL = Reportable Detection Limit								

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Sampler Initials: AM

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		NB7030	NB7031	NB7032	NB7033	NB7033		
Sampling Date		2015/09/02	2015/09/03	2015/09/03	2015/09/03	2015/09/03		
COC Number		07534	07534	07534	07534	07534		
	UNITS	**7534-06**	**7534-07**	**7534-08**	**7534-09**	**7534-09 Lab-Dup**	**RDL**	**QC Batch**
Misc. Inorganics								
Dissolved Hardness (CaCO3)	mg/L	166	216	196	323		0.50	8029115
Elements								
Dissolved Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	8033470
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	mg/L	0.0123	0.0135	0.0129	0.0150	0.0147	0.0030	8032148
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	8032148
Dissolved Arsenic (As)	mg/L	0.00069	0.00023	0.00060	0.0225	0.0236	0.00010	8032148
Dissolved Barium (Ba)	mg/L	0.0582	0.0814	0.0756	0.0279	0.0279	0.0010	8032148
Dissolved Beryllium (Be)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	8032148
Dissolved Bismuth (Bi)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	8032148
Dissolved Boron (B)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	8032148
Dissolved Cadmium (Cd)	mg/L	0.000072	0.000078	0.000029	0.000470	0.000474	0.000010	8032148
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	8032148
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	<0.00050	0.00302	0.00293	0.00050	8032148
Dissolved Copper (Cu)	mg/L	0.00071	0.00087	0.00052	0.00097	0.00085	0.00020	8032148
Dissolved Iron (Fe)	mg/L	0.0212	0.0169	0.0056	0.479	0.462	0.0050	8032148
Dissolved Lead (Pb)	mg/L	0.00209	0.00026	0.00022	0.00216	0.00209	0.00020	8032148
Dissolved Lithium (Li)	mg/L	<0.0050	<0.0050	<0.0050	0.0083	0.0087	0.0050	8032148
Dissolved Manganese (Mn)	mg/L	0.0013	0.0035	0.0116	0.338	0.340	0.0010	8032148
Dissolved Molybdenum (Mo)	mg/L	<0.0010	0.0018	<0.0010	0.0363	0.0367	0.0010	8032148
Dissolved Nickel (Ni)	mg/L	<0.0010	<0.0010	<0.0010	0.0311	0.0304	0.0010	8032148
Dissolved Selenium (Se)	mg/L	0.00336	0.00087	0.00018	0.00012	0.00013	0.00010	8032148
Dissolved Silicon (Si)	mg/L	4.61	4.28	3.99	17.0	15.8	0.10	8032148
Dissolved Silver (Ag)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000020	8032148
Dissolved Strontium (Sr)	mg/L	0.180	0.203	0.218	0.346	0.342	0.0010	8032148
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	8032148
Dissolved Tin (Sn)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	8032148
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	8032148
Dissolved Uranium (U)	mg/L	0.00075	0.00047	0.00066	0.0104	0.0103	0.00010	8032148
Dissolved Vanadium (V)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	8032148
Dissolved Zinc (Zn)	mg/L	0.0122	0.0499	0.0208	1.46	1.48	0.0050	8032148
Dissolved Zirconium (Zr)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	8032148
Dissolved Calcium (Ca)	mg/L	60.4	69.8	67.3	118		0.050	8029123
Dissolved Magnesium (Mg)	mg/L	3.63	10.1	6.81	7.14		0.050	8029123

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		NB7030	NB7031	NB7032	NB7033	NB7033		
Sampling Date		2015/09/02	2015/09/03	2015/09/03	2015/09/03	2015/09/03		
COC Number		07534	07534	07534	07534	07534		
	UNITS	**7534-06**	**7534-07**	**7534-08**	**7534-09**	**7534-09 Lab-Dup**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	0.499	0.830	0.765	1.79		0.050	8029123
Dissolved Sodium (Na)	mg/L	0.868	1.64	1.01	8.12		0.050	8029123
Dissolved Sulphur (S)	mg/L	17.3	3.2	<3.0	37.3		3.0	8029123

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

CSR TOTAL METALS IN WATER WITH CV HG (WATER)

Maxxam ID		NB7022	NB7023		NB7024		
Sampling Date		2015/09/03	2015/09/03		2015/09/03		
COC Number		07535	07535		07535		
	UNITS	**7535-01**	**7535-02**	**QC Batch**	**7535-03**	**RDL**	**QC Batch**
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	170	168	8029122	153	0.50	8029122
Elements							
Total Mercury (Hg)	ug/L	<0.010	<0.010	8033763	<0.010	0.010	8036756
Total Metals by ICPMS							
Total Aluminum (Al)	mg/L	0.0099	0.0167	8032152	0.183	0.0030	8031879
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	8032152	<0.00050	0.00050	8031879
Total Arsenic (As)	mg/L	0.00093	0.00109	8032152	0.00154	0.00010	8031879
Total Barium (Ba)	mg/L	0.0698	0.0693	8032152	0.0686	0.0010	8031879
Total Beryllium (Be)	mg/L	<0.00010	<0.00010	8032152	<0.00010	0.00010	8031879
Total Bismuth (Bi)	mg/L	<0.0010	<0.0010	8032152	<0.0010	0.0010	8031879
Total Boron (B)	mg/L	<0.050	<0.050	8032152	<0.050	0.050	8031879
Total Cadmium (Cd)	mg/L	0.000049	0.000053	8032152	0.000104	0.000010	8031879
Total Chromium (Cr)	mg/L	<0.0010	<0.0010	8032152	<0.0010	0.0010	8031879
Total Cobalt (Co)	mg/L	<0.00050	<0.00050	8032152	<0.00050	0.00050	8031879
Total Copper (Cu)	mg/L	0.00074	<0.00050	8032152	0.00074	0.00050	8031879
Total Iron (Fe)	mg/L	0.010	0.028	8032152	0.356	0.010	8031879
Total Lead (Pb)	mg/L	<0.00020	0.00051	8032152	0.00345	0.00020	8031879
Total Lithium (Li)	mg/L	<0.0050	<0.0050	8032152	<0.0050	0.0050	8031879
Total Manganese (Mn)	mg/L	0.0039	0.0106	8032152	0.0360	0.0010	8031879
Total Molybdenum (Mo)	mg/L	0.0014	0.0015	8032152	0.0014	0.0010	8031879
Total Nickel (Ni)	mg/L	<0.0010	<0.0010	8032152	<0.0010	0.0010	8031879
Total Selenium (Se)	mg/L	0.00060	0.00065	8032152	0.00053	0.00010	8031879
Total Silicon (Si)	mg/L	4.39	4.54	8032152	4.39	0.10	8031879
Total Silver (Ag)	mg/L	<0.000020	<0.000020	8032152	<0.000020	0.000020	8031879
Total Strontium (Sr)	mg/L	0.212	0.223	8032152	0.205	0.0010	8031879
Total Thallium (Tl)	mg/L	<0.000050	<0.000050	8032152	<0.000050	0.000050	8031879
Total Tin (Sn)	mg/L	<0.0050	<0.0050	8032152	<0.0050	0.0050	8031879
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	8032152	0.0082	0.0050	8031879
Total Uranium (U)	mg/L	0.00080	0.00086	8032152	0.00068	0.00010	8031879
Total Vanadium (V)	mg/L	<0.0050	<0.0050	8032152	<0.0050	0.0050	8031879
Total Zinc (Zn)	mg/L	0.0089	0.0055	8032152	0.0264	0.0050	8031879
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	8032152	<0.00050	0.00050	8031879
Total Calcium (Ca)	mg/L	59.4	58.7	8029124	52.8	0.050	8029124
Total Magnesium (Mg)	mg/L	5.35	5.31	8029124	5.18	0.050	8029124
Total Potassium (K)	mg/L	0.397	0.458	8029124	0.361	0.050	8029124
RDL = Reportable Detection Limit							

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GOLDER ASSOCIATES LTD
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Site Location: PHASE#: 12000/12004
Sampler Initials: AM

CSR TOTAL METALS IN WATER WITH CV HG (WATER)

Maxxam ID		NB7022	NB7023		NB7024		
Sampling Date		2015/09/03	2015/09/03		2015/09/03		
COC Number		07535	07535		07535		
	UNITS	**7535-01**	**7535-02**	**QC Batch**	**7535-03**	**RDL**	**QC Batch**
Total Sodium (Na)	mg/L	0.978	0.964	8029124	0.899	0.050	8029124
Total Sulphur (S)	mg/L	3.8	<3.0	8029124	<3.0	3.0	8029124
RDL = Reportable Detection Limit							

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NITRITE & NITRATE IN WATER (WATER)

Maxxam ID		NB7022	NB7023	NB7024	NB7025	NB7026	NB7027		
Sampling Date		2015/09/03	2015/09/03	2015/09/03	2015/09/01	2015/09/01	2015/09/02		
COC Number		07535	07535	07535	07534	07534	07534		
	UNITS	**7535-01**	**7535-02**	**7535-03**	**7534-01**	**7534-02**	**7534-03**	**RDL**	**QC Batch**
ANIONS									
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050 (1)	<0.0050 (1)	0.0051	0.0050	8029521
Calculated Parameters									
Nitrate (N)	mg/L	0.062	0.063	0.044	0.679	0.619	<0.020	0.020	8029103
Nutrients									
Nitrate plus Nitrite (N)	mg/L	0.062	0.063	0.044	0.679 (1)	0.619 (1)	<0.020	0.020	8029520

RDL = Reportable Detection Limit
(1) Sample arrived to laboratory past recommended hold time.

Maxxam ID		NB7028	NB7029	NB7029	NB7030	NB7031	NB7032		
Sampling Date		2015/09/02	2015/09/02	2015/09/02	2015/09/02	2015/09/03	2015/09/03		
COC Number		07534	07534	07534	07534	07534	07534		
	UNITS	**7534-04**	**7534-05**	**7534-05 Lab-Dup**	**7534-06**	**7534-07**	**7534-08**	**RDL**	**QC Batch**
ANIONS									
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0129	0.0050	8029521
Calculated Parameters									
Nitrate (N)	mg/L	<0.020	0.326		1.59	0.276	0.108	0.020	8029103
Nutrients									
Nitrate plus Nitrite (N)	mg/L	<0.020	0.326	0.328	1.59	0.276	0.120	0.020	8029520

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		NB7033		
Sampling Date		2015/09/03		
COC Number		07534		
	UNITS	**7534-09**	**RDL**	**QC Batch**
ANIONS				
Nitrite (N)	mg/L	0.0076	0.0050	8029521
Calculated Parameters				
Nitrate (N)	mg/L	<0.020	0.020	8029103
Nutrients				
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	8029520

RDL = Reportable Detection Limit

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CSR VOC + VPH IN WATER (WATER)

Maxxam ID		NB7031	NB7032		
Sampling Date		2015/09/03	2015/09/03		
COC Number		07534	07534		
	UNITS	**7534-07**	**7534-08**	**RDL**	**QC Batch**
Volatiles					
VPH (VHW6 to 10 - BTEX)	ug/L	<300	<300	300	8029128
Chloromethane	ug/L	<1.0	<1.0	1.0	8029752
Vinyl chloride	ug/L	<0.50	<0.50	0.50	8029752
Chloroethane	ug/L	<1.0	<1.0	1.0	8029752
Trichlorofluoromethane	ug/L	<4.0	<4.0	4.0	8029752
1,1-dichloroethene	ug/L	<0.50	<0.50	0.50	8029752
Dichloromethane	ug/L	<2.0	<2.0	2.0	8029752
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	1.0	8029752
1,1-dichloroethane	ug/L	<0.50	<0.50	0.50	8029752
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	1.0	8029752
Chloroform	ug/L	<1.0	<1.0	1.0	8029752
1,1,1-trichloroethane	ug/L	<0.50	<0.50	0.50	8029752
1,2-dichloroethane	ug/L	<0.50	<0.50	0.50	8029752
Carbon tetrachloride	ug/L	<0.50	<0.50	0.50	8029752
Benzene	ug/L	<0.40	<0.40	0.40	8029752
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	4.0	8029752
1,2-dichloropropane	ug/L	<0.50	<0.50	0.50	8029752
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	1.0	8029752
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	1.0	8029752
Bromomethane	ug/L	<1.0	<1.0	1.0	8029752
1,1,2-trichloroethane	ug/L	<0.50	<0.50	0.50	8029752
Trichloroethene	ug/L	<0.50	<0.50	0.50	8029752
Chlorodibromomethane	ug/L	<1.0	<1.0	1.0	8029752
1,2-dibromoethane	ug/L	<0.20	<0.20	0.20	8029752
Tetrachloroethene	ug/L	<0.50	<0.50	0.50	8029752
Bromodichloromethane	ug/L	<1.0	<1.0	1.0	8029752
Toluene	ug/L	<0.40	<0.40	0.40	8029752
Ethylbenzene	ug/L	<0.40	<0.40	0.40	8029752
m & p-Xylene	ug/L	<0.40	<0.40	0.40	8029752
Bromoform	ug/L	<1.0	<1.0	1.0	8029752
Styrene	ug/L	<0.50	<0.50	0.50	8029752
o-Xylene	ug/L	<0.40	<0.40	0.40	8029752
Xylenes (Total)	ug/L	<0.40	<0.40	0.40	8029752
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	0.50	8029752
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	0.50	8029752
RDL = Reportable Detection Limit					

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CSR VOC + VPH IN WATER (WATER)

Maxxam ID		NB7031	NB7032		
Sampling Date		2015/09/03	2015/09/03		
COC Number		07534	07534		
	UNITS	**7534-07**	**7534-08**	**RDL**	**QC Batch**
1,2-dichlorobenzene	ug/L	<0.50	<0.50	0.50	8029752
1,3-dichlorobenzene	ug/L	<0.50	<0.50	0.50	8029752
1,4-dichlorobenzene	ug/L	<0.50	<0.50	0.50	8029752
Chlorobenzene	ug/L	<0.50	<0.50	0.50	8029752
VH C6-C10	ug/L	<300	<300	300	8029752
Surrogate Recovery (%)					
1,4-Difluorobenzene (sur.)	%	99	100		8029752
4-Bromofluorobenzene (sur.)	%	93	93		8029752
D4-1,2-Dichloroethane (sur.)	%	106	105		8029752
RDL = Reportable Detection Limit					

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8029752	1,4-Difluorobenzene (sur.)	2015/09/06	101	70 - 130	101	70 - 130	100	%		
8029752	4-Bromofluorobenzene (sur.)	2015/09/06	104	70 - 130	103	70 - 130	93	%		
8029752	D4-1,2-Dichloroethane (sur.)	2015/09/06	102	70 - 130	101	70 - 130	98	%		
8030664	1,4-Difluorobenzene (sur.)	2015/09/08	105	70 - 130	105	70 - 130	106	%		
8030664	4-Bromofluorobenzene (sur.)	2015/09/08	100	70 - 130	99	70 - 130	100	%		
8030664	D4-1,2-Dichloroethane (sur.)	2015/09/08	92	70 - 130	93	70 - 130	94	%		
8033449	D10-ANTHRACENE (sur.)	2015/09/12	91	60 - 130	88	60 - 130	96	%		
8033449	D8-ACENAPHTHYLENE (sur.)	2015/09/12	99	50 - 130	96	50 - 130	102	%		
8033449	D8-NAPHTHALENE (sur.)	2015/09/12	70	50 - 130	70	50 - 130	89	%		
8033449	D9-Acridine	2015/09/12	77	50 - 130	76	50 - 130	83	%		
8033449	TERPHENYL-D14 (sur.)	2015/09/12	75	60 - 130	71	60 - 130	81	%		
8033463	O-TERPHENYL (sur.)	2015/09/11	104	50 - 130	101	50 - 130	103	%		
8029520	Nitrate plus Nitrite (N)	2015/09/05	NC	80 - 120	107	80 - 120	<0.020	mg/L	0.52	25
8029521	Nitrite (N)	2015/09/05	102	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
8029752	1,1,1,2-tetrachloroethane	2015/09/06	93	70 - 130	91	70 - 130	<0.50	ug/L		
8029752	1,1,1-trichloroethane	2015/09/06	95	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
8029752	1,1,2,2-tetrachloroethane	2015/09/06	100	70 - 130	95	70 - 130	<0.50	ug/L		
8029752	1,1,2-trichloroethane	2015/09/06	93	70 - 130	92	70 - 130	<0.50	ug/L		
8029752	1,1-dichloroethane	2015/09/06	93	70 - 130	92	70 - 130	<0.50	ug/L	NC	30
8029752	1,1-dichloroethene	2015/09/06	106	70 - 130	105	70 - 130	<0.50	ug/L	NC	30
8029752	1,2-dibromoethane	2015/09/06	96	70 - 130	93	70 - 130	<0.20	ug/L		
8029752	1,2-dichlorobenzene	2015/09/06	101	70 - 130	98	70 - 130	<0.50	ug/L		
8029752	1,2-dichloroethane	2015/09/06	92	70 - 130	91	70 - 130	<0.50	ug/L	1.4	30
8029752	1,2-dichloropropane	2015/09/06	95	70 - 130	95	70 - 130	<0.50	ug/L		
8029752	1,3-dichlorobenzene	2015/09/06	102	70 - 130	99	70 - 130	<0.50	ug/L		
8029752	1,4-dichlorobenzene	2015/09/06	100	70 - 130	96	70 - 130	<0.50	ug/L		
8029752	Benzene	2015/09/06	98	70 - 130	97	70 - 130	<0.40	ug/L		
8029752	Bromodichloromethane	2015/09/06	95	70 - 130	93	70 - 130	<1.0	ug/L		
8029752	Bromoform	2015/09/06	95	70 - 130	90	70 - 130	<1.0	ug/L		
8029752	Bromomethane	2015/09/06	103	60 - 140	101	60 - 140	<1.0	ug/L		
8029752	Carbon tetrachloride	2015/09/06	96	70 - 130	95	70 - 130	<0.50	ug/L		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8029752	Chlorobenzene	2015/09/06	97	70 - 130	96	70 - 130	<0.50	ug/L		
8029752	Chlorodibromomethane	2015/09/06	93	70 - 130	91	70 - 130	<1.0	ug/L		
8029752	Chloroethane	2015/09/06	84	60 - 140	86	60 - 140	<1.0	ug/L	NC	30
8029752	Chloroform	2015/09/06	95	70 - 130	94	70 - 130	<1.0	ug/L		
8029752	Chloromethane	2015/09/06	87	60 - 140	87	60 - 140	<1.0	ug/L	NC	30
8029752	cis-1,2-dichloroethene	2015/09/06	102	70 - 130	101	70 - 130	<1.0	ug/L	NC	30
8029752	cis-1,3-dichloropropene	2015/09/06	103	70 - 130	101	70 - 130	<1.0	ug/L		
8029752	Dichloromethane	2015/09/06	109	70 - 130	107	70 - 130	<2.0	ug/L	NC	30
8029752	Ethylbenzene	2015/09/06	96	70 - 130	94	70 - 130	<0.40	ug/L		
8029752	m & p-Xylene	2015/09/06	101	70 - 130	98	70 - 130	<0.40	ug/L		
8029752	Methyl-tert-butylether (MTBE)	2015/09/06	99	70 - 130	97	70 - 130	<4.0	ug/L		
8029752	o-Xylene	2015/09/06	100	70 - 130	97	70 - 130	<0.40	ug/L		
8029752	Styrene	2015/09/06	101	70 - 130	97	70 - 130	<0.50	ug/L		
8029752	Tetrachloroethene	2015/09/06	94	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
8029752	Toluene	2015/09/06	94	70 - 130	93	70 - 130	<0.40	ug/L		
8029752	trans-1,2-dichloroethene	2015/09/06	91	70 - 130	89	70 - 130	<1.0	ug/L	NC	30
8029752	trans-1,3-dichloropropene	2015/09/06	99	70 - 130	100	70 - 130	<1.0	ug/L		
8029752	Trichloroethene	2015/09/06	96	70 - 130	94	70 - 130	<0.50	ug/L	NC	30
8029752	Trichlorofluoromethane	2015/09/06	113	60 - 140	112	60 - 140	<4.0	ug/L		
8029752	VH C6-C10	2015/09/06			119	70 - 130	<300	ug/L		
8029752	Vinyl chloride	2015/09/06	97	60 - 140	95	60 - 140	<0.50	ug/L	NC	30
8029752	Xylenes (Total)	2015/09/06					<0.40	ug/L		
8030474	Total Dissolved Solids	2015/09/09	99	80 - 120	116	80 - 120	10, RDL=10	mg/L	2.0	20
8030574	Chemical Oxygen Demand	2015/09/09	99	80 - 120	101	80 - 120	<10	mg/L	NC	20
8030664	Benzene	2015/09/08	91	70 - 130	90	70 - 130	<0.40	ug/L	NC	30
8030664	Ethylbenzene	2015/09/08	92	70 - 130	93	70 - 130	<0.40	ug/L	NC	30
8030664	m & p-Xylene	2015/09/08	93	70 - 130	93	70 - 130	<0.40	ug/L	1.5	30
8030664	Methyl-tert-butylether (MTBE)	2015/09/08	96	70 - 130	94	70 - 130	<4.0	ug/L		
8030664	o-Xylene	2015/09/08	94	70 - 130	94	70 - 130	<0.40	ug/L	0.91	30
8030664	Styrene	2015/09/08	93	70 - 130	93	70 - 130	<0.40	ug/L	NC	30
8030664	Toluene	2015/09/08	90	70 - 130	90	70 - 130	<0.40	ug/L	1.0	30

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QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
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			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8030664	VH C6-C10	2015/09/08			84	70 - 130	<300	ug/L	NC	30
8030664	Xylenes (Total)	2015/09/08					<0.40	ug/L	0.65	30
8030723	Chemical Oxygen Demand	2015/09/09	97	80 - 120	107	80 - 120	<10	mg/L	NC	20
8030862	Turbidity	2015/09/08			102	80 - 120	<0.10	NTU	NC (1)	20
8031210	Dissolved Chloride (Cl)	2015/09/08	93	80 - 120	98	80 - 120	<0.50	mg/L	NC	20
8031211	Dissolved Sulphate (SO4)	2015/09/08	NC	80 - 120	90	80 - 120	<0.50	mg/L	2.3	20
8031213	Dissolved Chloride (Cl)	2015/09/08	102	80 - 120	97	80 - 120	0.50, RDL=0.50	mg/L	NC	20
8031215	Dissolved Sulphate (SO4)	2015/09/08	NC	80 - 120	90	80 - 120	<0.50	mg/L	1.6	20
8031305	pH	2015/09/09			102	97 - 103			0	N/A
8031666	Total Dissolved Solids	2015/09/10	NC	80 - 120	102	80 - 120	<10	mg/L	3.0	20
8031879	Total Aluminum (Al)	2015/09/15	105	80 - 120	112	80 - 120	0.0035, RDL=0.0030	mg/L	9.3	20
8031879	Total Antimony (Sb)	2015/09/15	112	80 - 120	113	80 - 120	<0.00050	mg/L	NC	20
8031879	Total Arsenic (As)	2015/09/15	97	80 - 120	101	80 - 120	<0.00010	mg/L	NC	20
8031879	Total Barium (Ba)	2015/09/15	NC	80 - 120	106	80 - 120	<0.0010	mg/L	5.0	20
8031879	Total Beryllium (Be)	2015/09/15	105	80 - 120	98	80 - 120	<0.00010	mg/L	NC	20
8031879	Total Bismuth (Bi)	2015/09/15	104	80 - 120	108	80 - 120	<0.0010	mg/L	NC	20
8031879	Total Boron (B)	2015/09/15					<0.050	mg/L	NC	20
8031879	Total Cadmium (Cd)	2015/09/15	106	80 - 120	105	80 - 120	<0.000010	mg/L	NC	20
8031879	Total Chromium (Cr)	2015/09/15	98	80 - 120	104	80 - 120	<0.0010	mg/L	NC	20
8031879	Total Cobalt (Co)	2015/09/15	97	80 - 120	97	80 - 120	<0.00050	mg/L	NC	20
8031879	Total Copper (Cu)	2015/09/15	NC	80 - 120	103	80 - 120	<0.00050	mg/L	1.8	20
8031879	Total Iron (Fe)	2015/09/15	NC	80 - 120	113	80 - 120	<0.010	mg/L	1.2	20
8031879	Total Lead (Pb)	2015/09/15	111	80 - 120	109	80 - 120	<0.00020	mg/L	5.9	20
8031879	Total Lithium (Li)	2015/09/15	109	80 - 120	100	80 - 120	<0.0050	mg/L	NC	20
8031879	Total Manganese (Mn)	2015/09/15	NC	80 - 120	105	80 - 120	<0.0010	mg/L	1.3	20
8031879	Total Molybdenum (Mo)	2015/09/15	107	80 - 120	114	80 - 120	<0.0010	mg/L	NC	20
8031879	Total Nickel (Ni)	2015/09/15	93	80 - 120	95	80 - 120	<0.0010	mg/L	NC	20
8031879	Total Selenium (Se)	2015/09/15	98	80 - 120	100	80 - 120	<0.00010	mg/L	NC	20
8031879	Total Silicon (Si)	2015/09/15					<0.10	mg/L	3.8	20
8031879	Total Silver (Ag)	2015/09/15	91	80 - 120	108	80 - 120	<0.000020	mg/L	NC	20

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8031879	Total Strontium (Sr)	2015/09/15	NC	80 - 120	107	80 - 120	<0.0010	mg/L	6.9	20
8031879	Total Thallium (Tl)	2015/09/15	106	80 - 120	102	80 - 120	<0.000050	mg/L	NC	20
8031879	Total Tin (Sn)	2015/09/15	NC	80 - 120	112	80 - 120	<0.0050	mg/L	NC	20
8031879	Total Titanium (Ti)	2015/09/15	105	80 - 120	92	80 - 120	<0.0050	mg/L	NC	20
8031879	Total Uranium (U)	2015/09/15	109	80 - 120	108	80 - 120	<0.00010	mg/L	NC	20
8031879	Total Vanadium (V)	2015/09/15	100	80 - 120	103	80 - 120	<0.0050	mg/L	NC	20
8031879	Total Zinc (Zn)	2015/09/15	NC	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20
8031879	Total Zirconium (Zr)	2015/09/15					<0.00050	mg/L	NC	20
8032036	pH	2015/09/10			102	97 - 103			0.13	N/A
8032043	pH	2015/09/10			102	97 - 103				
8032148	Dissolved Aluminum (Al)	2015/09/13	100	80 - 120	114	80 - 120	<0.0030	mg/L	NC	20
8032148	Dissolved Antimony (Sb)	2015/09/13	103	80 - 120	105	80 - 120	<0.00050	mg/L	NC	20
8032148	Dissolved Arsenic (As)	2015/09/13	NC	80 - 120	107	80 - 120	<0.00010	mg/L	4.9	20
8032148	Dissolved Barium (Ba)	2015/09/13	NC	80 - 120	105	80 - 120	<0.0010	mg/L	0.061	20
8032148	Dissolved Beryllium (Be)	2015/09/13	103	80 - 120	93	80 - 120	<0.00010	mg/L	NC	20
8032148	Dissolved Bismuth (Bi)	2015/09/13	95	80 - 120	108	80 - 120	<0.0010	mg/L	NC	20
8032148	Dissolved Boron (B)	2015/09/13					<0.050	mg/L	NC	20
8032148	Dissolved Cadmium (Cd)	2015/09/13	99	80 - 120	105	80 - 120	<0.000010	mg/L	0.85	20
8032148	Dissolved Chromium (Cr)	2015/09/13	103	80 - 120	110	80 - 120	<0.0010	mg/L	NC	20
8032148	Dissolved Cobalt (Co)	2015/09/13	98	80 - 120	110	80 - 120	<0.00050	mg/L	2.8	20
8032148	Dissolved Copper (Cu)	2015/09/13	95	80 - 120	97	80 - 120	<0.00020	mg/L	NC	20
8032148	Dissolved Iron (Fe)	2015/09/13	NC	80 - 120	98	80 - 120	<0.0050	mg/L	3.6	20
8032148	Dissolved Lead (Pb)	2015/09/13	93	80 - 120	98	80 - 120	<0.00020	mg/L	3.6	20
8032148	Dissolved Lithium (Li)	2015/09/13	NC	80 - 120	114	80 - 120	<0.0050	mg/L	NC	20
8032148	Dissolved Manganese (Mn)	2015/09/13	NC	80 - 120	108	80 - 120	<0.0010	mg/L	0.55	20
8032148	Dissolved Molybdenum (Mo)	2015/09/13	NC	80 - 120	97	80 - 120	<0.0010	mg/L	1.1	20
8032148	Dissolved Nickel (Ni)	2015/09/13	NC	80 - 120	113	80 - 120	<0.0010	mg/L	2.1	20
8032148	Dissolved Selenium (Se)	2015/09/13	102	80 - 120	107	80 - 120	<0.00010	mg/L	NC	20
8032148	Dissolved Silicon (Si)	2015/09/13					<0.10	mg/L	6.9	20
8032148	Dissolved Silver (Ag)	2015/09/13	96	80 - 120	92	80 - 120	<0.000020	mg/L	NC	20
8032148	Dissolved Strontium (Sr)	2015/09/13	NC	80 - 120	103	80 - 120	<0.0010	mg/L	1.3	20

Maxxam Job #: B577651
Report Date: 2015/09/15

QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8032148	Dissolved Thallium (Tl)	2015/09/13	87	80 - 120	107	80 - 120	<0.000050	mg/L	NC	20
8032148	Dissolved Tin (Sn)	2015/09/13	104	80 - 120	105	80 - 120	<0.0050	mg/L	NC	20
8032148	Dissolved Titanium (Ti)	2015/09/13	97	80 - 120	102	80 - 120	<0.0050	mg/L	NC	20
8032148	Dissolved Uranium (U)	2015/09/13	NC	80 - 120	104	80 - 120	<0.00010	mg/L	0.79	20
8032148	Dissolved Vanadium (V)	2015/09/13	108	80 - 120	108	80 - 120	<0.0050	mg/L	NC	20
8032148	Dissolved Zinc (Zn)	2015/09/13	NC	80 - 120	109	80 - 120	<0.0050	mg/L	1.0	20
8032148	Dissolved Zirconium (Zr)	2015/09/13					<0.00050	mg/L	NC	20
8032152	Total Aluminum (Al)	2015/09/14	176 (2)	80 - 120	108	80 - 120	<0.0030	mg/L	NC	20
8032152	Total Antimony (Sb)	2015/09/14	108	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
8032152	Total Arsenic (As)	2015/09/14	106	80 - 120	103	80 - 120	<0.00010	mg/L	4.4	20
8032152	Total Barium (Ba)	2015/09/14	108	80 - 120	105	80 - 120	<0.0010	mg/L	NC	20
8032152	Total Beryllium (Be)	2015/09/14	112	80 - 120	105	80 - 120	<0.00010	mg/L	NC	20
8032152	Total Bismuth (Bi)	2015/09/14	101	80 - 120	95	80 - 120	<0.0010	mg/L	NC	20
8032152	Total Boron (B)	2015/09/14					<0.050	mg/L	NC	20
8032152	Total Cadmium (Cd)	2015/09/14	102	80 - 120	96	80 - 120	<0.000010	mg/L	NC	20
8032152	Total Chromium (Cr)	2015/09/14	98	80 - 120	93	80 - 120	<0.0010	mg/L	NC	20
8032152	Total Cobalt (Co)	2015/09/14	96	80 - 120	94	80 - 120	<0.00050	mg/L	NC	20
8032152	Total Copper (Cu)	2015/09/14	93	80 - 120	95	80 - 120	<0.00050	mg/L	NC	20
8032152	Total Iron (Fe)	2015/09/14	112	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
8032152	Total Lead (Pb)	2015/09/14	97	80 - 120	92	80 - 120	<0.00020	mg/L	NC	20
8032152	Total Lithium (Li)	2015/09/14	102	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20
8032152	Total Manganese (Mn)	2015/09/14	NC	80 - 120	96	80 - 120	<0.0010	mg/L	4.9	20
8032152	Total Molybdenum (Mo)	2015/09/14	107	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20
8032152	Total Nickel (Ni)	2015/09/14	96	80 - 120	94	80 - 120	<0.0010	mg/L	NC	20
8032152	Total Selenium (Se)	2015/09/14	102	80 - 120	94	80 - 120	<0.00010	mg/L	NC	20
8032152	Total Silicon (Si)	2015/09/14					<0.10	mg/L	1.6	20
8032152	Total Silver (Ag)	2015/09/14	97	80 - 120	95	80 - 120	<0.000020	mg/L	NC	20
8032152	Total Strontium (Sr)	2015/09/14	NC	80 - 120	97	80 - 120	<0.0010	mg/L	0.14	20
8032152	Total Thallium (Tl)	2015/09/14	99	80 - 120	93	80 - 120	<0.000050	mg/L	NC	20
8032152	Total Tin (Sn)	2015/09/14	105	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20
8032152	Total Titanium (Ti)	2015/09/14	97	80 - 120	94	80 - 120	<0.0050	mg/L	NC	20

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Maxxam Job #: B577651
Report Date: 2015/09/15

QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8032152	Total Uranium (U)	2015/09/14	95	80 - 120	87	80 - 120	<0.00010	mg/L	NC	20
8032152	Total Vanadium (V)	2015/09/14	98	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
8032152	Total Zinc (Zn)	2015/09/14	NC	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20
8032152	Total Zirconium (Zr)	2015/09/13					<0.00050	mg/L		
8032425	Fluoride (F)	2015/09/09	104	80 - 120	100	80 - 120	<0.010	mg/L	0	20
8032434	Fluoride (F)	2015/09/09	104	80 - 120	102	80 - 120	<0.010	mg/L	0	20
8032586	Total Ammonia (N)	2015/09/09	97	80 - 120	101	80 - 120	<0.0050	mg/L	NC	20
8033449	2-Methylnaphthalene	2015/09/13	75	50 - 130	104	50 - 130	<0.10	ug/L	15	40
8033449	Acenaphthene	2015/09/13	91	50 - 130	99	50 - 130	<0.050	ug/L	NC (3)	40
8033449	Acenaphthylene	2015/09/13	93	50 - 130	99	50 - 130	<0.050	ug/L	NC (3)	40
8033449	Acridine	2015/09/13	71	50 - 130	98	50 - 130	<0.050	ug/L	NC	40
8033449	Anthracene	2015/09/13	90	60 - 130	104	60 - 130	<0.010	ug/L	NC	40
8033449	Benzo(a)anthracene	2015/09/13	89	60 - 130	98	60 - 130	<0.010	ug/L	NC	40
8033449	Benzo(a)pyrene	2015/09/13	93	60 - 130	100	60 - 130	<0.0090	ug/L	NC	40
8033449	Benzo(b&j)fluoranthene	2015/09/13	92	60 - 130	101	60 - 130	<0.050	ug/L	NC	40
8033449	Benzo(g,h,i)perylene	2015/09/13	82	60 - 130	99	60 - 130	<0.050	ug/L	NC	40
8033449	Benzo(k)fluoranthene	2015/09/13	87	60 - 130	99	60 - 130	<0.050	ug/L	NC	40
8033449	Chrysene	2015/09/13	92	60 - 130	98	60 - 130	<0.050	ug/L	NC	40
8033449	Dibenz(a,h)anthracene	2015/09/13	85	60 - 130	100	60 - 130	<0.050	ug/L	NC	40
8033449	Fluoranthene	2015/09/13	59 (2)	60 - 130	95	60 - 130	<0.020	ug/L	NC	40
8033449	Fluorene	2015/09/13	86	50 - 130	98	50 - 130	<0.050	ug/L	9.3 (3)	40
8033449	Indeno(1,2,3-cd)pyrene	2015/09/13	86	60 - 130	100	60 - 130	<0.050	ug/L	NC	40
8033449	Naphthalene	2015/09/13	68	50 - 130	112	50 - 130	<0.10	ug/L	NC (3)	40
8033449	Phenanthrene	2015/09/13	86	60 - 130	101	60 - 130	<0.050	ug/L	NC	40
8033449	Pyrene	2015/09/13	64	60 - 130	96	60 - 130	<0.020	ug/L	NC	40
8033449	Quinoline	2015/09/13	110	50 - 130	110	50 - 130	<0.24	ug/L	NC (3)	40
8033463	EPH (C10-C19)	2015/09/11	NC	50 - 130	110	50 - 130	<0.20	mg/L	NC	30
8033463	EPH (C19-C32)	2015/09/11	130	50 - 130	119	50 - 130	<0.20	mg/L	NC	30
8033470	Dissolved Mercury (Hg)	2015/09/10	91	80 - 120	92	80 - 120	<0.010	ug/L	NC	20
8033607	Total Nitrogen (N)	2015/09/10	NC	80 - 120	91	80 - 120	<0.020	mg/L	0.50	20
8033763	Total Mercury (Hg)	2015/09/11	97	80 - 120	94	80 - 120	<0.010	ug/L	NC	20

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Maxxam Job #: B577651
Report Date: 2015/09/15

QUALITY ASSURANCE REPORT(CONT'D)

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8034012	Total Nitrogen (N)	2015/09/11			90	80 - 120	<0.020	mg/L		
8036756	Total Mercury (Hg)	2015/09/14	87	80 - 120	89	80 - 120	<0.010	ug/L	NC	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Sample analysed past recommended hold time.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) Detection limits raised due to matrix interference.

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Maxxam Job #: B577651
Report Date: 2015/09/15

GOLDER ASSOCIATES LTD
Client Project #: 12-1021-0006
Site Location: PHASE#: 12000/12004
Sampler Initials: AM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Rob Reinert, Data Validation Coordinator

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 07535 page 2 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 12-1078-0006 / 12000 / 12004		Laboratory Name: Maxxam	
Short Title: Sai Dam Hs Mine Closure	Golder Contact: Andrea Brummer	Address: 4606 Canada Way Burnaby BC	
Golder E-mail Address 1: Andrea_Brummer@golder.com	Golder E-mail Address 2: Lindsay_Carson@golder.com	Telephone/Fax: 604 639 2616	Contact: Ashley Ling

Office Name: Vancouver / Whitehorse

EQuIS Facility Code: _____
EQuIS upload: ☐

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	Ultrace PAH	BTEX/VPH	Dis. Metals (inc Hg)	Tot Metals (inc Hg)	Anions (Cl, F, Nitrate, Nitrite, SO4)	pH				RUSH (Select TAT above)	MAXXAM JOB # B577651 LAB. I.D. Remarks (over)
7535-01	SW14-03	1		H_2O	3/9/15					8	X	X	X	X	X	X					NB7022
-02	SW14-02	2		↓	↓					↓	↓	↓	↓	↓	↓	↓					NB7023
-03	SW14-01	3		↓	↓					↓	↓	↓	↓	↓	↓	↓					NB7024
-04																					
-05																					
-06																					
-07																					
-08																					
-09																					
-10																					
-11																					
-12																					

B577651

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: Sept. 4/2015	Time	Received by: Signature	Company
Comments: ON ICE EDD Lab Reports * ug/L UNITS *	Method of Shipment:	Waybill No.:	Received for Lab by: Nahed Amer	Date		Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 1, 1, 1	Cooler opened by:	Date: 2015/09/05	Time: 10:15

WHITE: Golder Copy **YELLOW:** Lab Copy 2, 1, 1

CS: N/PA

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 07534 page 1 of 2

B577651

20 Vancouver, British Columbia, Canada V6M 0A3
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 12-1021-0006/12000/12004		Laboratory Name: Maxxam	
Short Title: Sia Dena Hes Mine Closure	Golder Contact: Andrew Braemmer	Address: 4606 Canada Way Burnaby BC	
Golder E-mail Address 1: Andrew_Braemmer@golder.com	Golder E-mail Address 2: Lindsay_Carson@golder.com	Telephone/Fax: 604 639 2616	Contact: Ashley Lang

Office Name: Vancouver / Whitehorse

EQuIS Facility Code: _____
EQuIS upload: ☐

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	LEPH/HEPH (inc. PAH)	BTEX/VPH	VOCs (inc. BTEX/VPH)	Dis. Metals (inc. Hg)	Anions (F, NO_2, NO_3, S)	General (Nutrients, TDS, Turbidity)	pH			RUSH (Select TAT above)	MAXXAM JOB # B577651 B577652 OPS 2015/09/08 LAB I.D. Remarks (over)
7534 - 01	MW13-13	1		H_2O	1/9/15					8				X	X	X	X	NB7025			-02 HOLD (LEPH/HEPH, BTEX/VPH)
- 02	MW13-10	2			1/9/15						X	X		X	X		X				NB7026
- 03	MW13-07	3			2/9/15			FDM	7534-04		X	X		X	X		X				NB7027
- 04	MW13-07	4			2/9/15			FD	7534-03		X	X		X	X		X				NB7028
- 05	MW13-01	5			2/9/15						X	X		X	X	X	X				NB7029
- 06	MW13-05	6			2/9/15						X	X		X	X	X	X				NB7030
- 07	MW19-01	7			3/9/15						X		X	X	X		X				NB7031
- 08	MW14-04	8			3/9/15						X		X	X	X		X				NB7032
- 09	MW13-06	9			3/9/15						[redacted]	[redacted]		X	X	X	X		NB7033		-09 HOLD (LEPH/HEPH, BTEX/VPH)
- 10																					
- 11																					
- 12																					

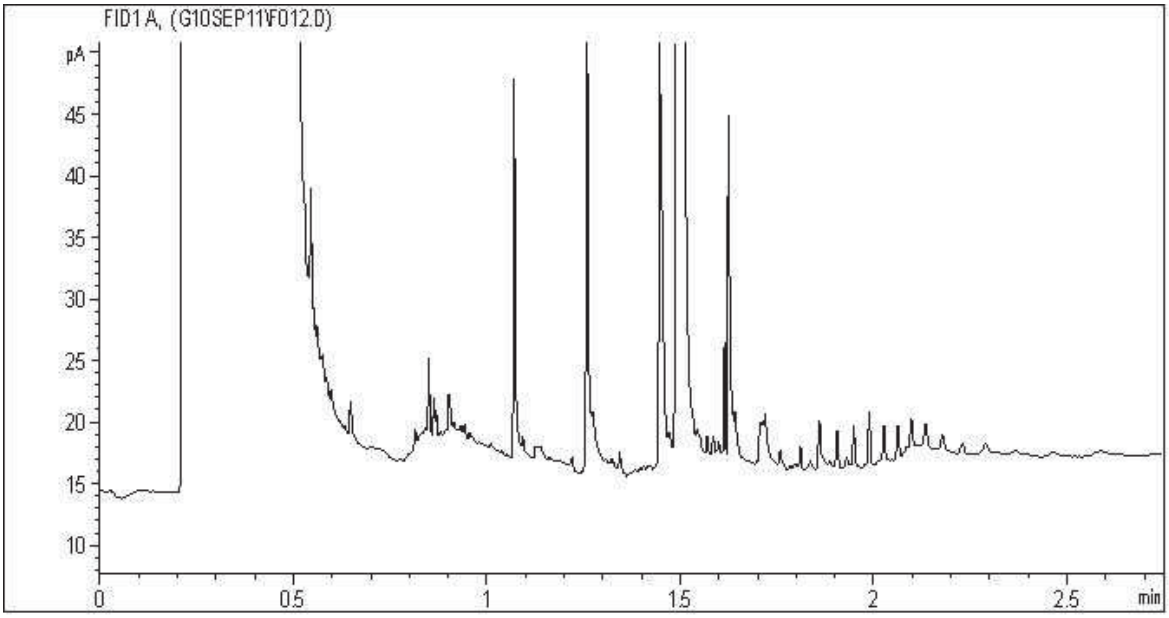
Sampler's Signature: [redacted]	Relinquished by: Signature: [redacted]	Company: Golder	Date: Sept 4, 2015	Time	Received by: Signature / Company
Comments: INVOICE EDD Lab Reports * ug/L UNITS *	Method of Shipment: [redacted]	Waybill No.:	Received for Lab by: Naked Pmer	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 1,1,1	Cooler opened by:	Date: 2015/09/05 Time: 12:15

WHITE: Golder Copy YELLOW: Lab Copy 2,1,1

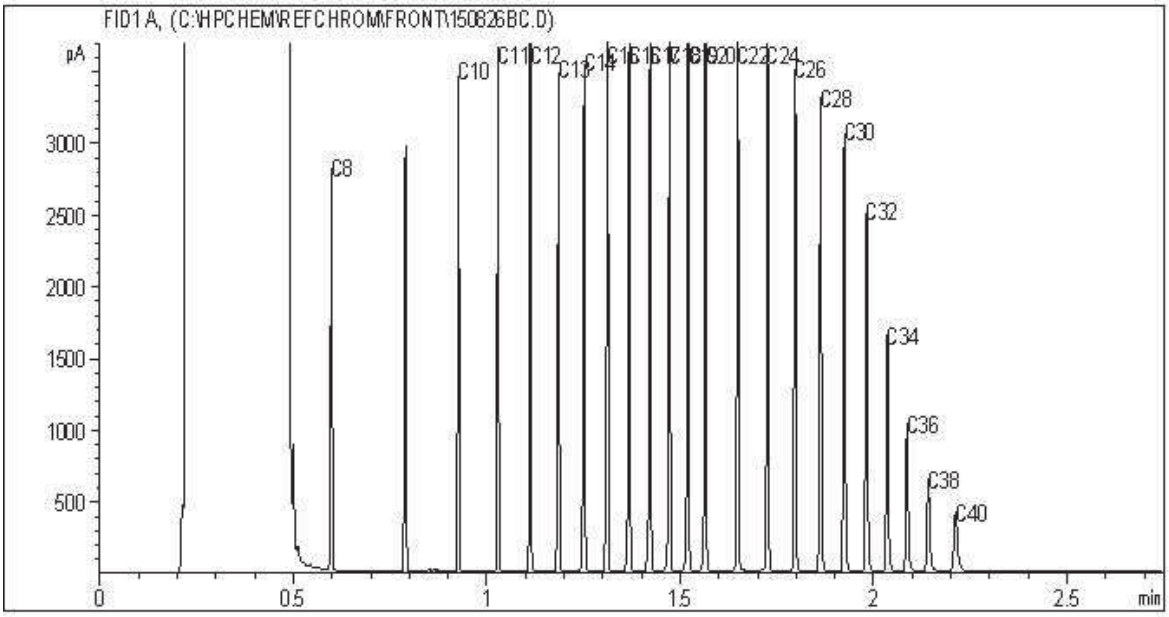
CS: N/A

ESED

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram

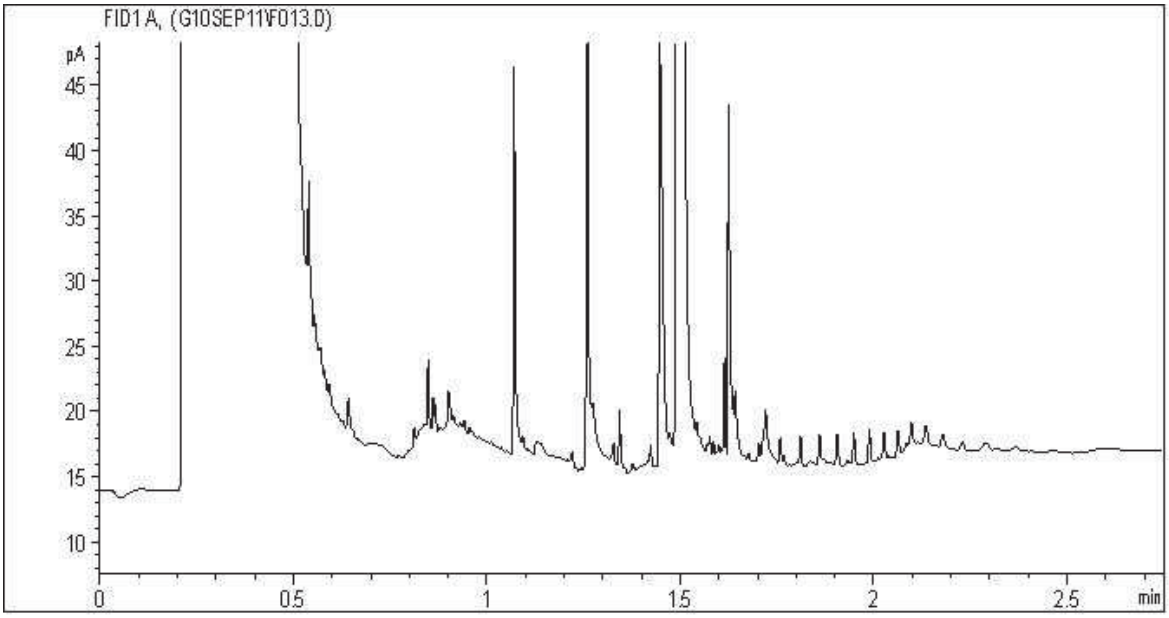


TYPICAL PRODUCT CARBON NUMBER RANGES

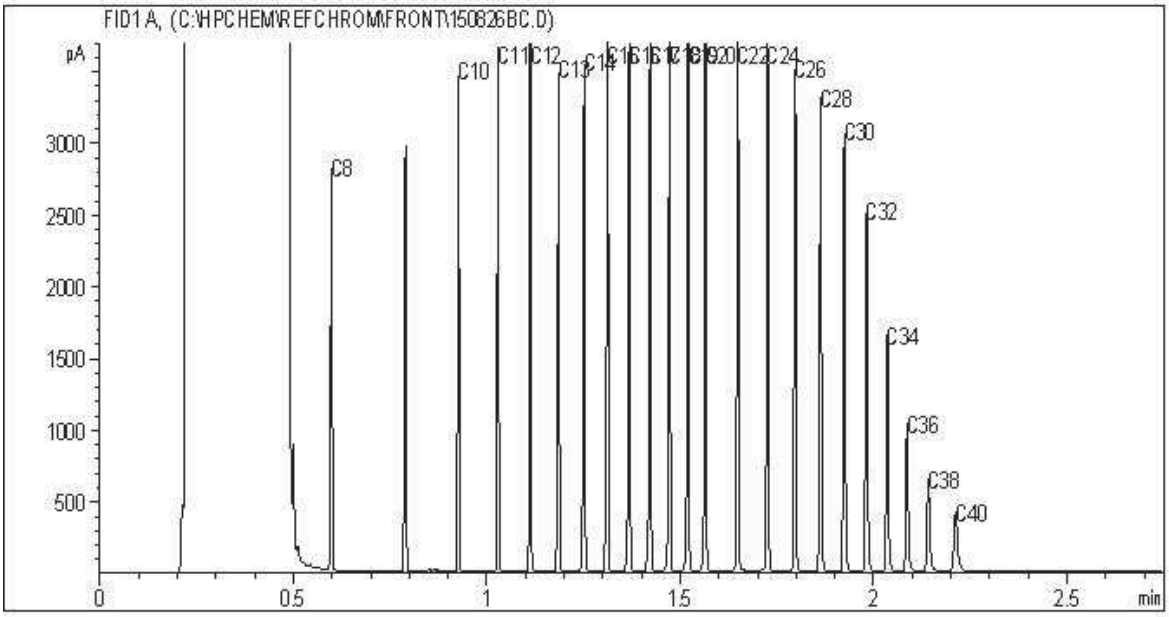
Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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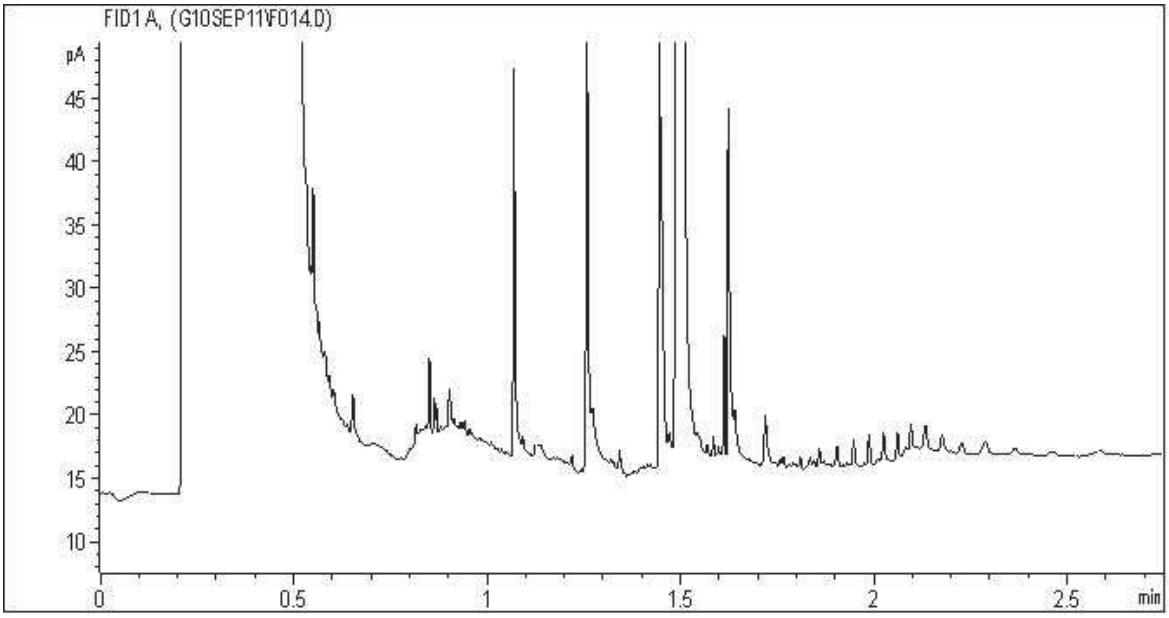
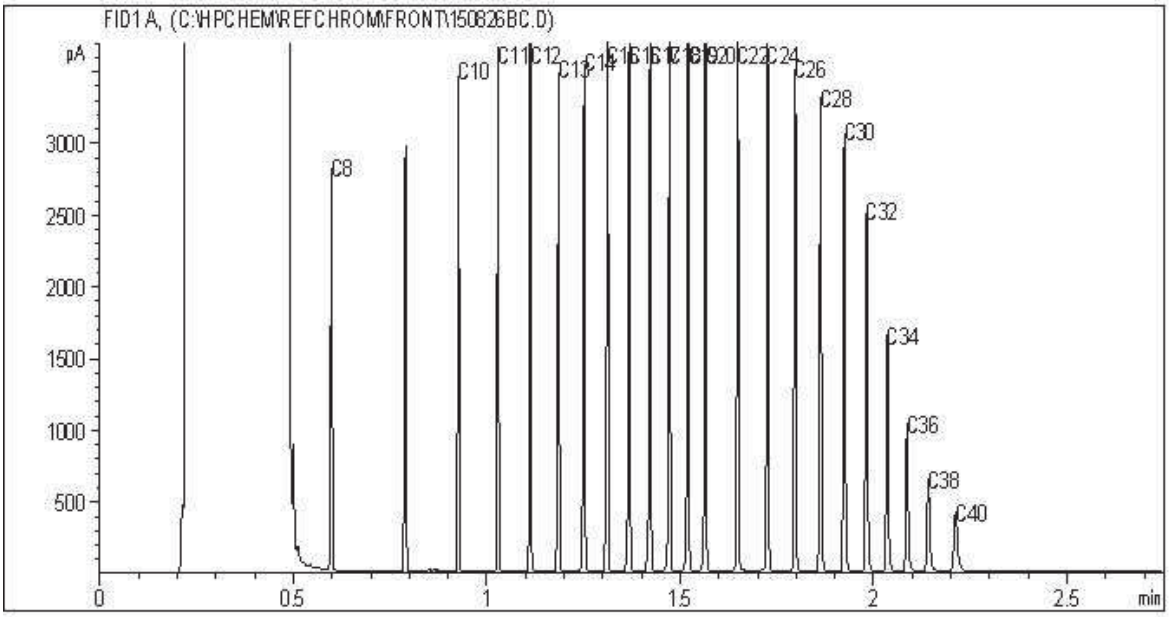
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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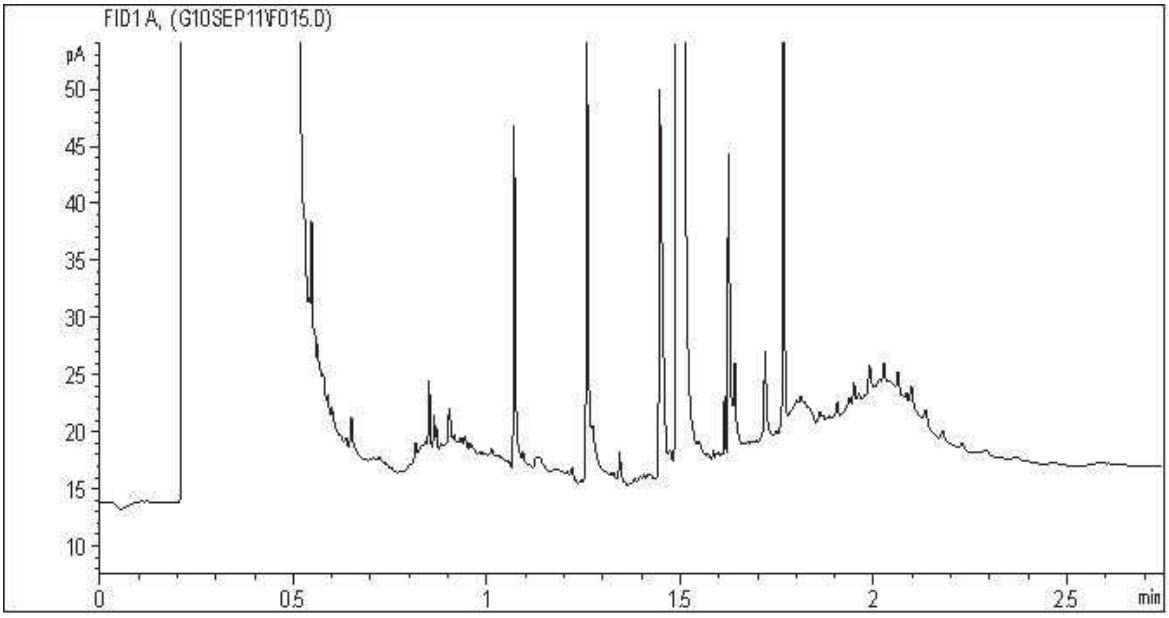
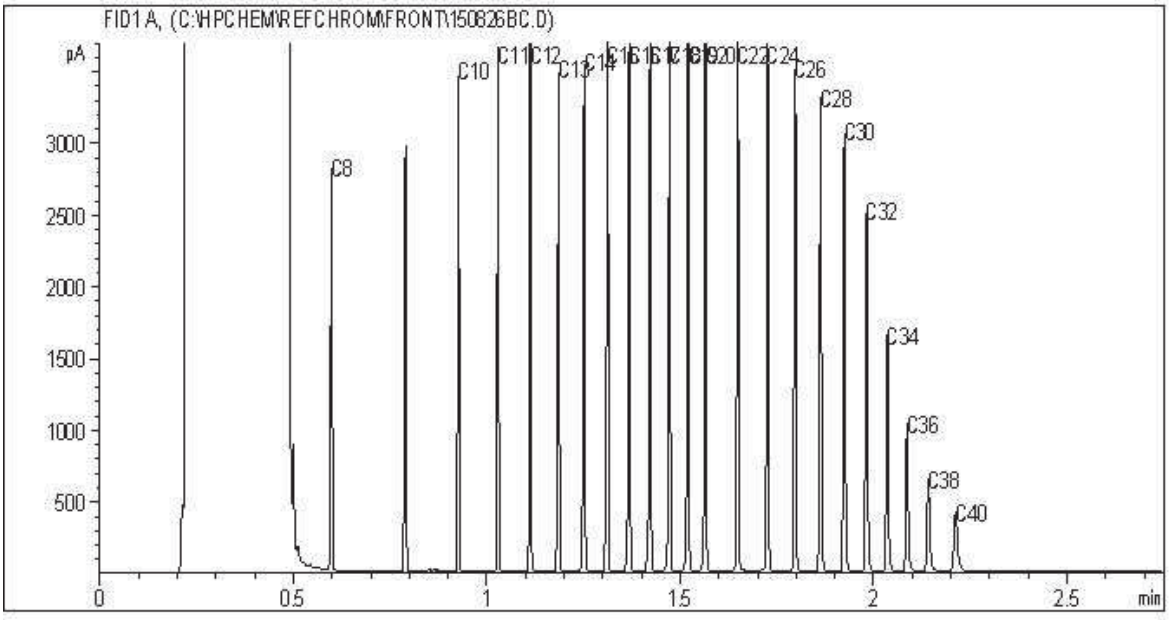
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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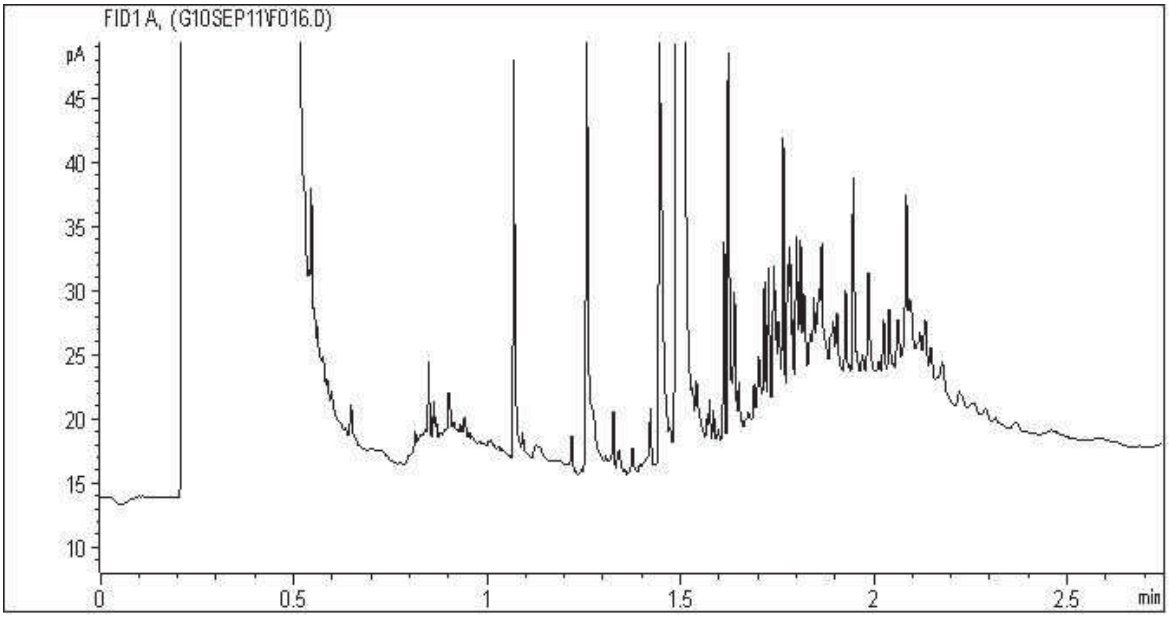
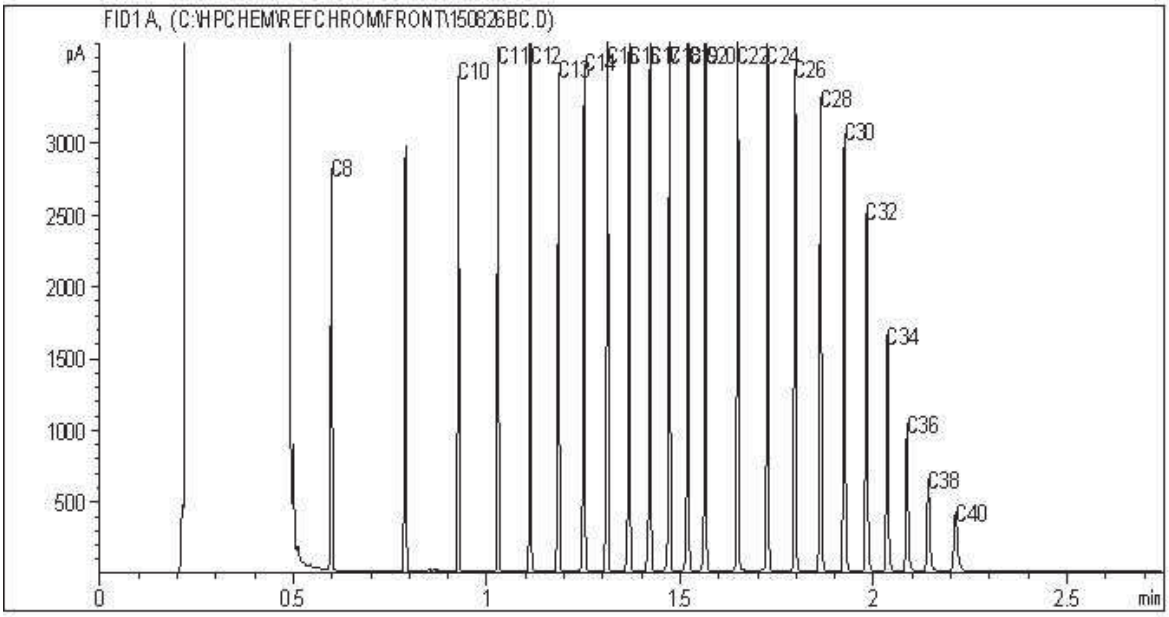
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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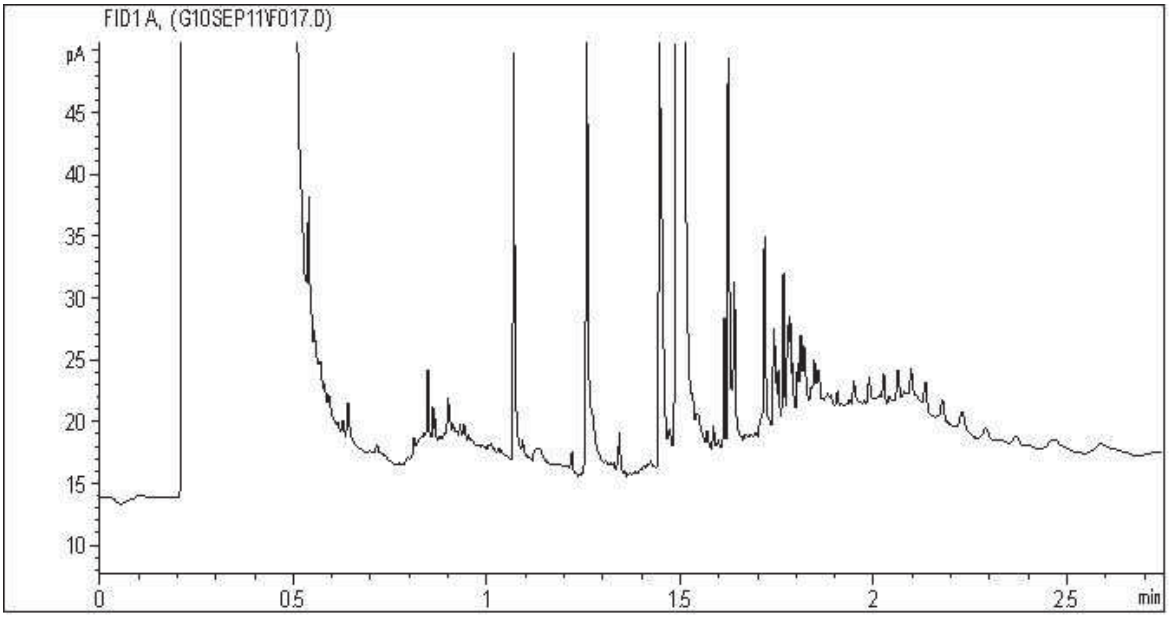
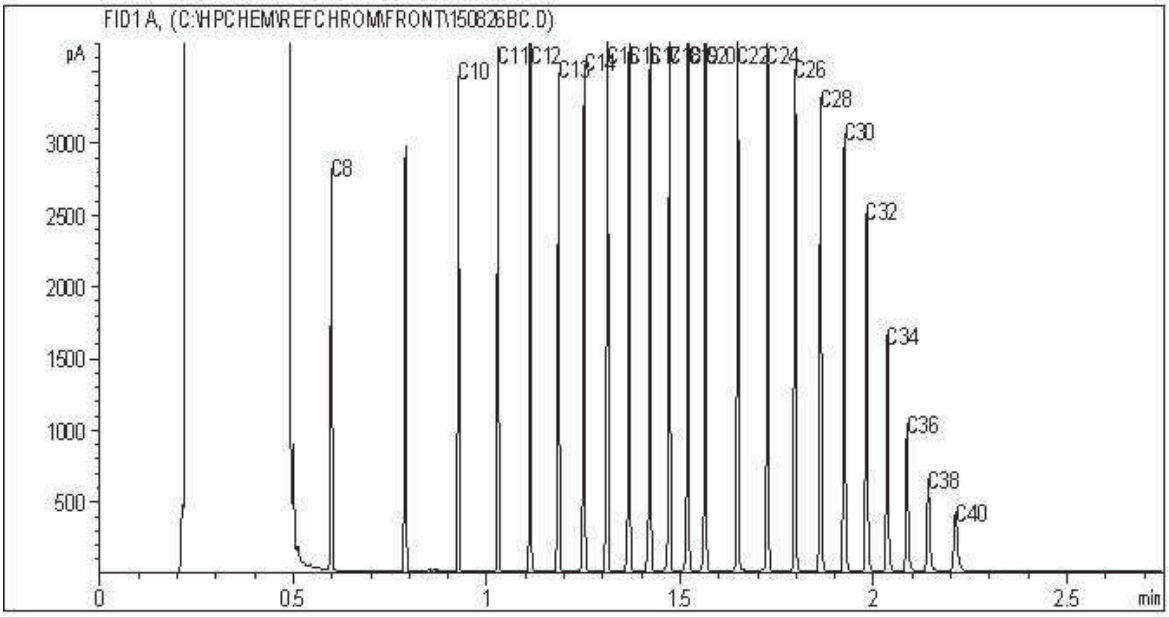
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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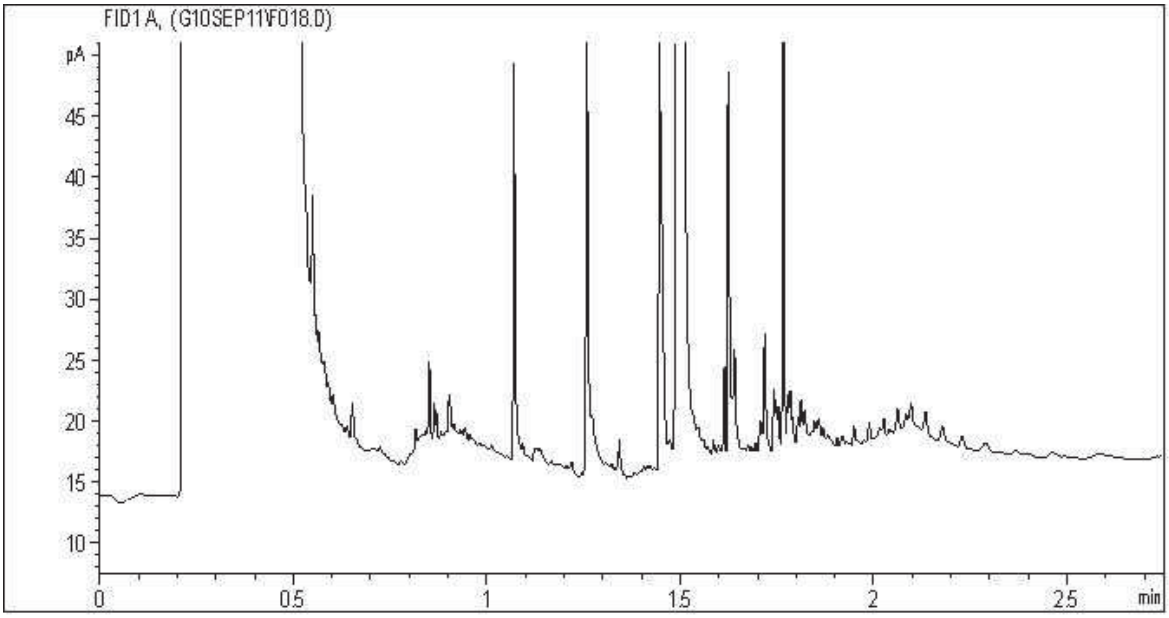
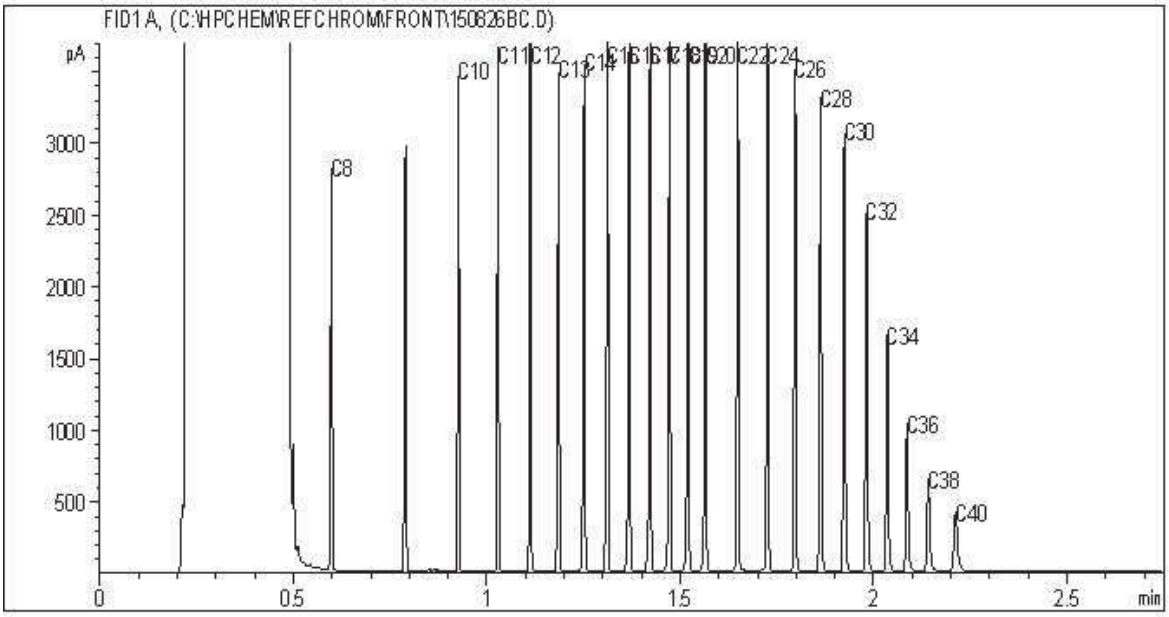
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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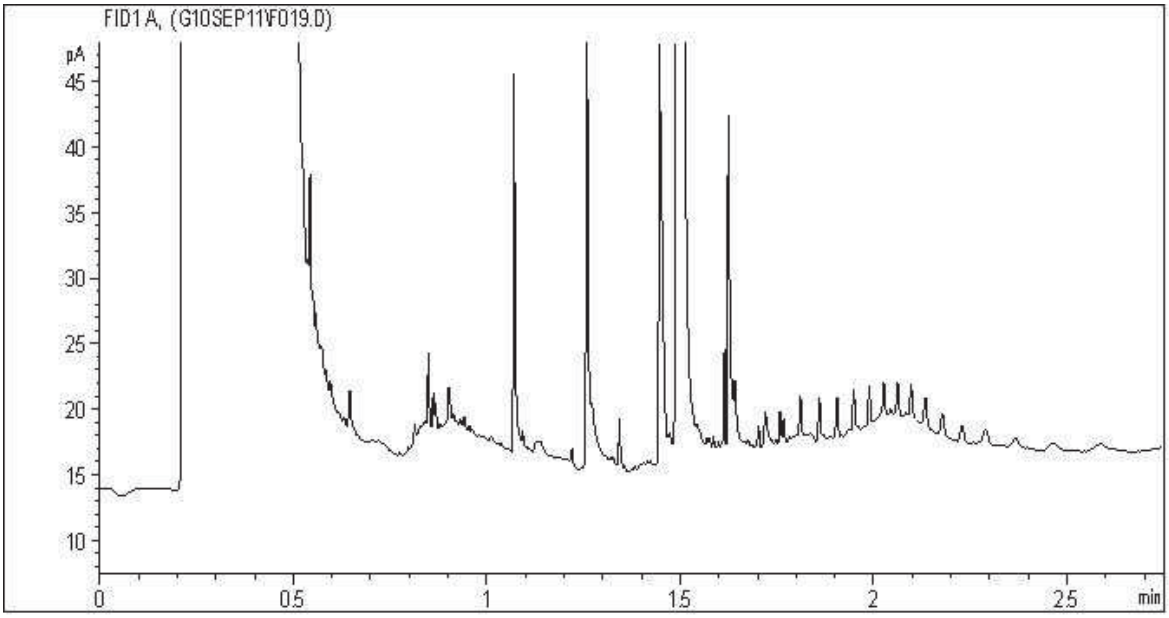
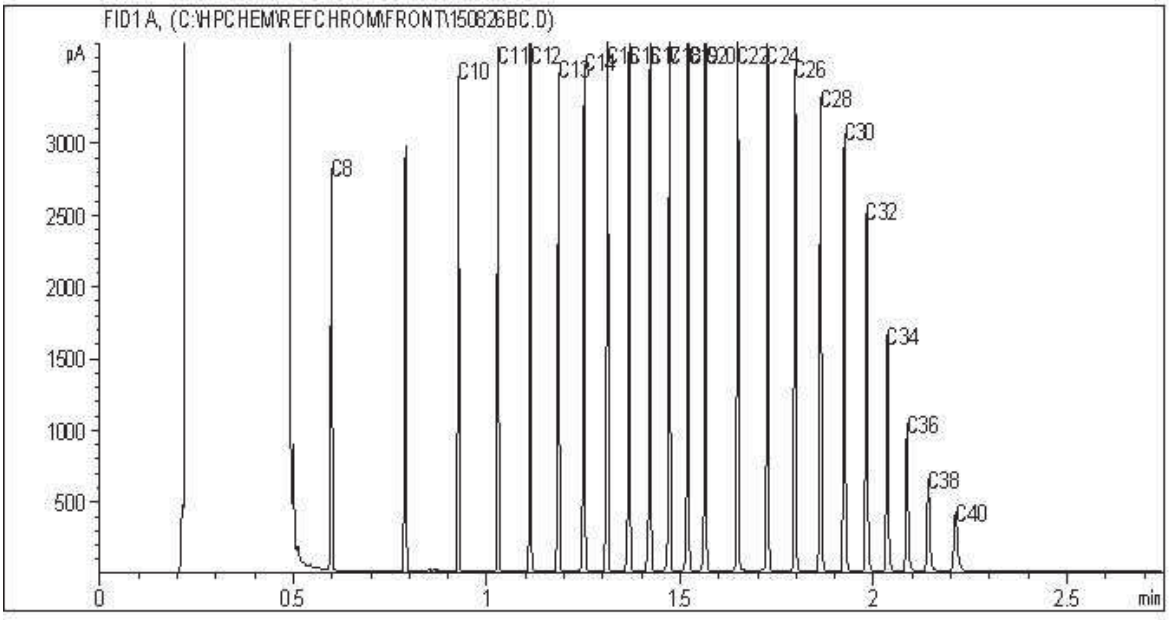
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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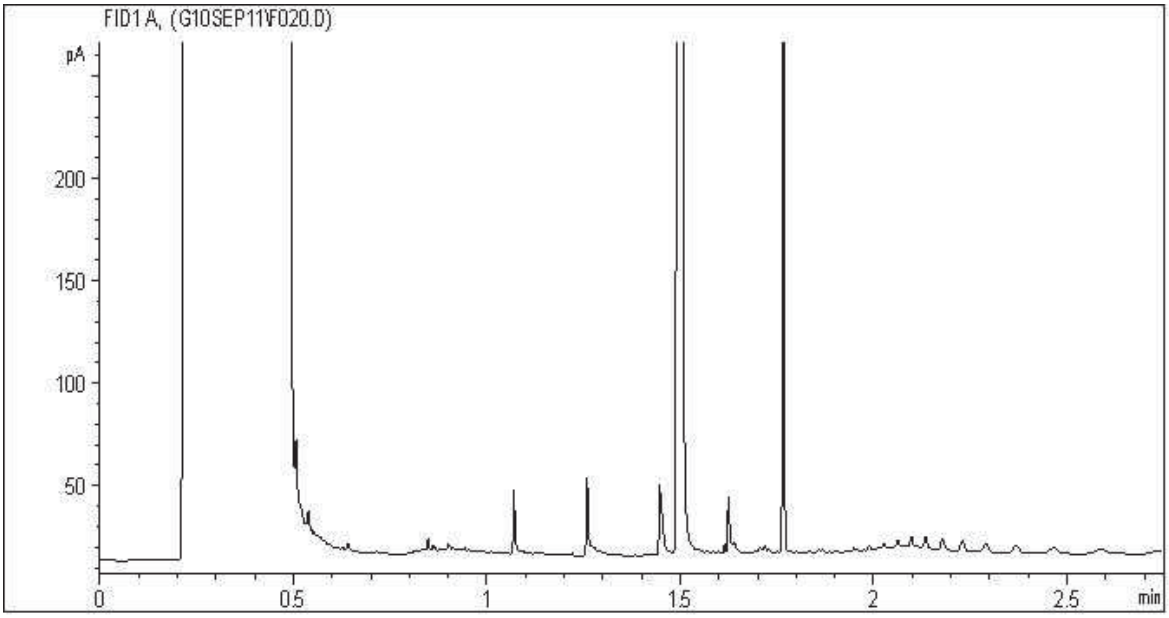
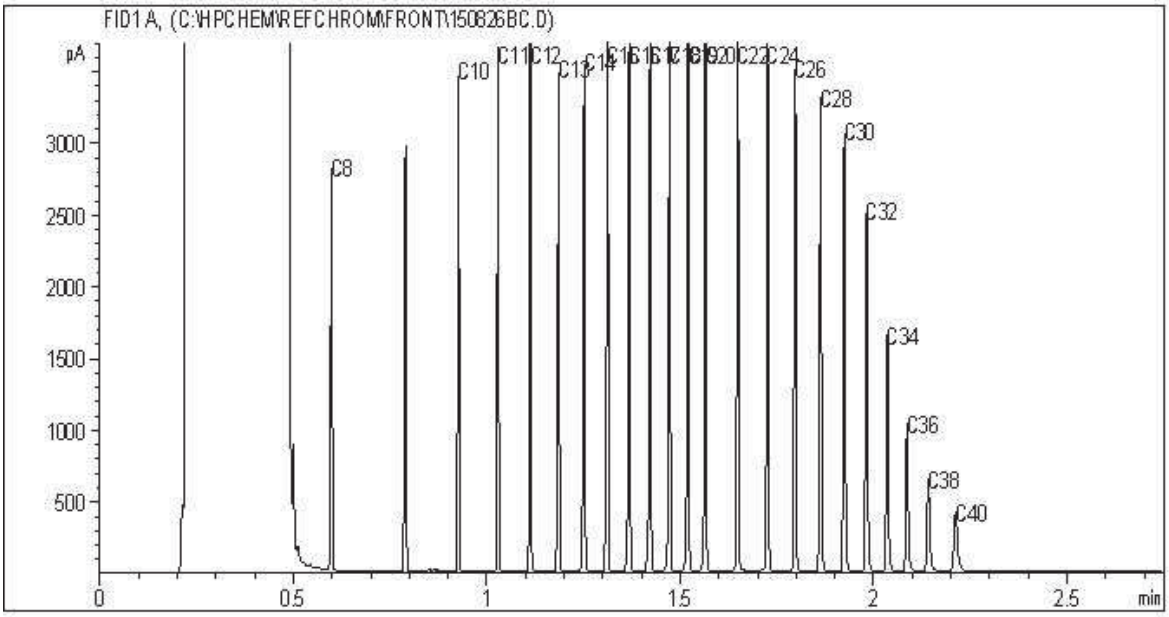
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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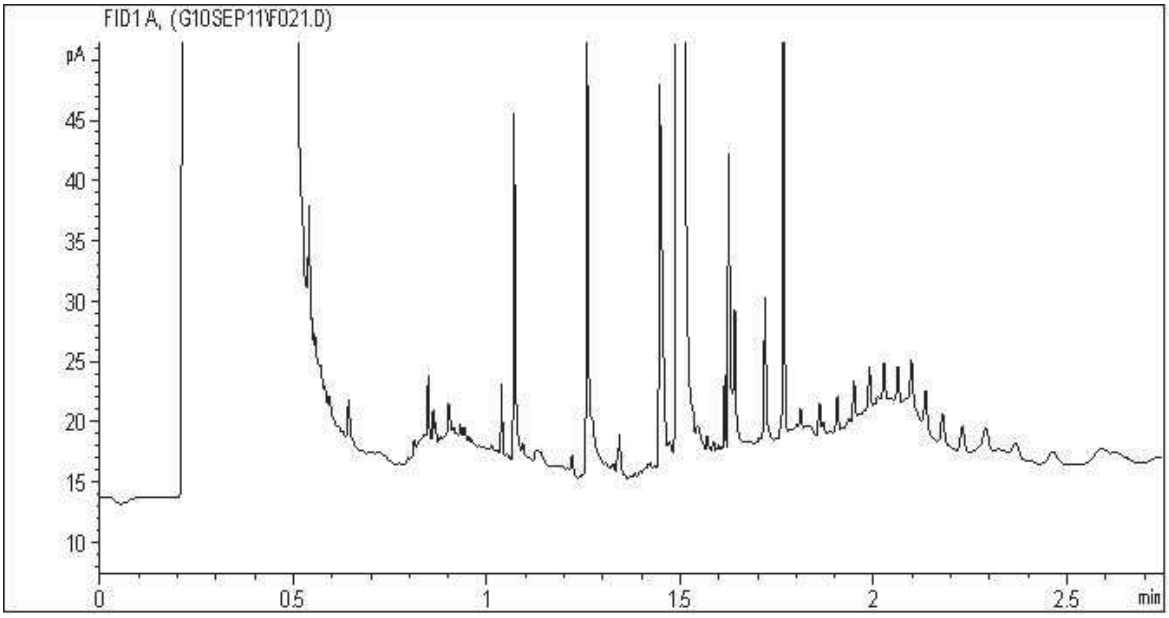
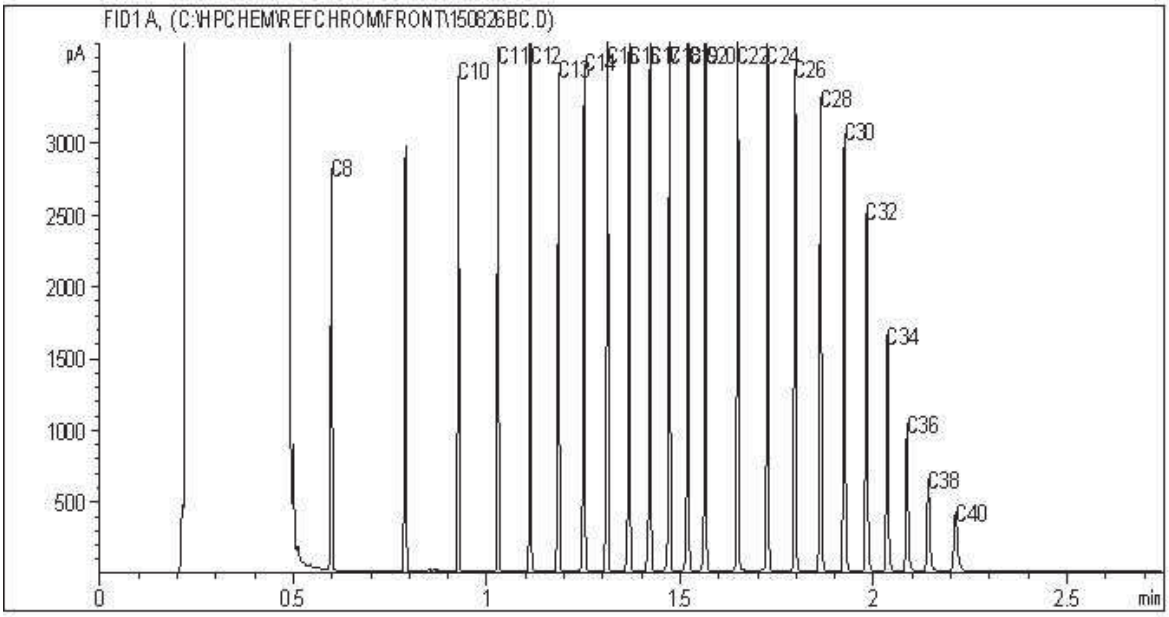
EPH in Water when PAH required Chromatogram



Carbon Range Distribution - Reference Chromatogram



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Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 07528 page 1 of 1

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 12-1021-0006/12000/12005		Laboratory Name: Maxxam	
Short Title: Sü Dena Hes Mine Closure	Golder Contact: Andrew Bruemmer	Address: 4606 Canada Way, Burnaby, BC	
Golder E-mail Address 1: Andrew_Bruemmer@golder.com	Golder E-mail Address 2: Lindsay_Carson @golder.com	Telephone/Fax: 604 639 2616	Contact: Ashley Ling

Office Name: Vancouver / Whitehorse

Email 3: Erin_Adshead@golder.com

EQuIS Facility Code: _____

EQuIS upload: ☐

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	LEPH/HEPH (inc. PAH)	BTEX/VPH	VOCs (inc. BTEX/VPH)	Total Metals (inc. Hg)	Dissolved Metals (inc. Hg)	Anions (Cl, F, NO2, NO3, SO4)				RUSH (Select TAT above)	Remarks (over)
07528-01	TH10-91	1		water	24/06/15	09:45	grab			8	X		X		X	X					
-02	TH09-91	2		↓	↓	11:10	↓			↓	↓		↓		↓	↓					
-03	MW14-04	3			↓	12:00							↓		↓						
-04	SW14-03	4			25/06/15	12:10						X		X							
-05	SW14-02	5				12:40		FDA	7528-06			↓		↓							
-06	SW14-02	6			↓	12:40		FD	7528-05												
-07	SW14-01	7		↓	↓	13:10				↓	↓	↓		↓		↓					
-08																					
-09																					
-10																					
-11																					
-12																					

Sampler's Signature: Lindsay Carson	Relinquished by: Signature	Company: Golder	Date: June 25, 2015	Time	Received by: Signature	Company
Comments: ON ICE EDD Lab Report Delivery	Method of Shipment: Bus / Air	Waybill No.:	Received for Lab by:		Date	Time
	Shipped by: Greyhound / Air North	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 07534 page 1 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 12-1021-0006/12000/12004		Laboratory Name: [redacted] Maxxam	
Short Title: Sä Dena Hes Mine Closure	Golder Contact: Andrew Bruemmer	Address: 4606 Canada Way Burnaby BC	
Golder E-mail Address 1: Andrew_Bruemmer @golder.com	Golder E-mail Address 2: Lindsay_Carson @golder.com	Telephone/Fax: 604 639 2616	Contact: Ashley Ling

Office Name: Vancouver / Whitehorse

EQuIS Facility Code: _____
EQuIS upload: ☐

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	LEPH/HEPH (inc. PAH)	BTEX/VPH	VOCs (inc. BTEX/VPH)	Dis. Metals (inc. Hg)	Anions (Cl, F, NO_2, NO_3, SO_4)	General (Nutrients, TDS, Turbidity)	pH			RUSH (Select TAT above)	Remarks (over)
7534 - 01	MW13-13	1		H_2O	1/9/15					8				X	X	X	X			← -01 HOLD	(LEPH/HEPH BTEX/VPH)
- 02	MW13-10	2			1/9/15						X	X		X	X		X				
- 03	MW13-07	3			2/9/15			FDA	7534-04		X	X		X	X		X				
- 04	MW13-07	4			2/9/15			FD	7534-03		X	X		X	X		X				
- 05	MW13-01	5			2/9/15						X	X		X	X	X	X				
- 06	MW13-05	6			2/9/15						X	X		X	X	X	X				
- 07	MW19-01	7			3/9/15						X		X	X	X		X				
- 08	MW14-04	8			3/9/15						X		X	X	X		X				
- 09	MW13-06	9			3/9/15						[redacted]	[redacted]		X	X	X	X			← -09 HOLD	(LEPH/HEPH BTEX/VPH)
- 10																					
- 11																					
- 12																					

Sampler's Signature: [redacted]	Relinquished by: Signature [redacted]	Company Golder	Date Sept 4, 2015	Time	Received by: Signature	Company
Comments: ON ICE EDD Lab Reports * ug/L UNITS *	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 07535 page 2 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 12-1021-0006 / 120000 / 12004		Laboratory Name: Maxxam	
Short Title: Sai Dene Hs Mine Closure	Golder Contact: Andrea Bruemmer	Address: 4606 Canada Way Burnaby BC	
Golder E-mail Address 1: AndreaBruemmer@golder.com	Golder E-mail Address 2: LindsayCarson@golder.com	Telephone/Fax: 604 639 2616	Contact: Ashley Ling

Office Name: Vancouver / Whitehorse

EQuIS Facility Code: _____
EQuIS upload: ☐

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☐ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	LEH/HEPH (inc. PAH)	BTEX/VPH	Dis. Metals (inc Hg)	Tot Metals (inc Hg)	Anions (Cl, F, NO_2, NO_3, SO_4)	pH				RUSH (Select TAT above)	Remarks (over)
7535 - 01	SW14-03	1		H_2O	3/9/15					8	X	X	X	X	X	X					
- 02	SW14-02	2		↓	↓					↓	↓	↓	↓	↓	↓	↓					
- 03	SW14-01	3		↓	↓					↓	↓	↓	↓	↓	↓	↓					
- 04																					
- 05																					
- 06																					
- 07																					
- 08																					
- 09																					
- 10																					
- 11																					
- 12																					

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: Sept. 4/2015	Time	Received by: Signature	Company
Comments: ON ICE EDD Lab Reports * ug/L UNITS *	Method of Shipment:	Waybill No.:	Received for Lab by:		Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED