Water Resources Audit Report

Icy Waters, Yukon

Water Resources Branch
February 9, 2023

The Water Resource Branch (WRB) strives for water stewardship in the Yukon and is committed to responsible and collaborative management, protection and conservation of the territory's valuable water. As technical scientific experts in water resources, we provide advice for compliance and inspection purposes, and conduct reviews of projects undergoing water licensing and environmental assessment processes.

One of WRB's responsibilities is to conduct audits of various undertakings that use or deposit waste to water. Audits are undertaken to improve our knowledge and understanding of a project's effects on the receiving water environment, with the intention of identifying emerging issues and sharing enhanced understanding of existing water quality and quantity conditions to support technical advice and input into assessment, licensing, and post-licensing processes. The opinions and recommendations expressed in this report are based on relevant data, reports, field observations, interpretation/analyses of scientific information available to WRB. Such opinions and recommendations are subject to evolve as further information becomes available. We are also acknowledging that indigenous ways of knowing are not included in this report, nonetheless, they are relevant and they support responsive care of the land and water.

While WRB provides support to inspectors on enforcement and compliance matters related to water licences, it is not WRB's role to determine or enforce compliance. As such, the findings of this report should not be considered as a determination of compliance with any existing permit or licence.

Executive summary

Icy Waters Ltd. (IWL) is an aquaculture facility located on Fish Lake Road within the Whitehorse city limits. Their water use license (MS21-034) was renewed in June 2022 and in anticipation of this licensing event, WRB conducted water quality sampling in the Whitehorse area in October of 2021. When developing this study, WRB considered inquiries from members of the public and other studies of the watershed and designed a sampling program that encompassed the entire watershed including Fish Creek, Porter Creek and McIntyre Creek. This study focused primarily around IWL as the holder of water license MS21-034 authorizing them to discharge effluent into Porter Creek and McIntyre Creek, as well as utilize water from Fish Creek and the Porter Creek headwaters for various aquaculture processes. Another water licence HY12-065 authorizes ATCO Electric Yukon to use water in Fish Creek and McIntyre Creek to produce hydroelectricity. In addition, there are other water users and land uses in the watershed.

The catchment has seen many changes over time including land use changes, installation of hydrological controls, a fish farm and other developments which have potential impact. As such, a watershed-scale approach allowed WRB to consider and investigate many of these factors.

The primary objectives of this audit were to;

1) Characterize and investigate water quality on Fish Creek, Porter Creek and McIntyre Creek to support ongoing license and planning initiatives.
    a. How does water quality in Fish Creek, Porter Creek and McIntyre Creek differ from upstream to downstream?
    b. Relevant to license Effluent Quality Standards (EQS), what is the water quality of effluent discharging from the IWL site?
    c. How have historic mining, dumping and other activities impacted Fish Creek, McIntyre Creek and Porter Creek?
2) Develop and refine a water balance for Hidden Lake and understand the relationship between Porter Creek discharge, IWL and Hidden Lake water levels.

A major investigation conducted during this report was surrounding the connectivity of Porter Creek and Hidden Lake, the latter of which has experienced drastic water level fluctuation in the recent past. WRB conducted additional fieldwork during the summer of 2021 to monitor water levels in Hidden Lake as well as measure groundwater infiltration. The data collected was used in tandem with historic records and satellite imagery to develop a water balance for Hidden Lake that could be used to explain the variability in water level. This connectivity was also assessed to determine what impact IWL may have on Hidden Lake water levels due to their site footprint encompassing the headwaters of Porter Creek. Stable isotopes of water were sampled to further analyze potential mixing of different source water on the IWL site. IWL monitors flow at their Porter Creek and McIntyre Creek discharge points, and this data was assessed with other flow data available to develop an understanding of flow regimes in Porter Creek.

Another requirement of the water license MS21-034 is that IWL collect monthly water quality samples at several locations to monitor water quality in and around their site. This data is presented in this report and compared to Effluent Quality Standards (EQS) within the license, which have changed over time. WRB also used historic benthic data as an indicator for aquatic health and to assess the potential impact effluent discharge in the creeks.

General water quality was assessed on each watercourse with respect to all potential impacts that may be present, including hydro controls and generation, fish farming, historic mining and dumping activity, recreational use of both motorized and non-motorized vehicles and residential developments. Hydrocarbon samples were collected at 10 locations.

The key findings of the 2021 audit are as follows;

1) There is minimal water quality data available for Fish Creek, however based on the October 2021 sampling event and prior sampling efforts, water quality was good, with no exceedances of CCME guidelines, and there were no hydrocarbons detected (5.2).

2) The IWL monitoring location PS-2b on Porter Creek has a lengthy historic record as per license monitoring requirements. As expected, the aquaculture is releasing phosphate in the creek, sometimes at concentrations exceeding EQS. IWL is closely monitoring phosphorus and has a plan in place to limit its release in the receiving environment. Section 7.2 present the evolution of Total phosphorus and other parameters over time.
3) Of the three creeks studied, McIntyre Creek has the most water quality data coming largely from IWL sampling efforts. In addition to a robust water quality record, there is also benthic invertebrate data that can be used to identify changes in water quality. Total Phosphorus concentration has exceeded EQS a number of times in the past at PS-5a however we do not see a concerning trend in phosphorus in the downstream water quality stations in McIntyre Creek (6.2). Additionally, regular changes to licence Total Phosphorus EQS do not appear to have a notable impact on downstream Total Phosphorus concentrations. IWL has developed a phosphorus management plan to mitigate potential impact of the fish farm on phosphorus in both, McIntyre and Porter creeks (6.2).
4) Based on available data there is no clear indication that IWL has an impact on Hidden Lake water levels. Fluctuations in water level over the past two decades are more likely attributed to a combination of historic modifications to the flow path and present day beaver activity in the reaches of Porter Creek downstream of the dump access road (7.3).

Water Resources Branch recommends the following as a result of this audit;

1) Implementation and maintenance of the Phosphorus Management plan submitted by IWL to reduce Total Phosphorus in effluent discharged by IWL.
2) More detailed benthic invertebrate methodology and reporting.
3) Investigation of the discrepancy between the Porter Creek flows reported by the City of Whitehorse Landfill monitoring program and the Porter Creek flows reported by IWL.
4) The Isotopic signature of the water at PS-1 and PS-2b appeared to be somewhat different, and that difference cannot be explained by the flow of

water through the IWL fish hatchery. Investigating this difference further would provide more insight into sources of input into Porter Creek across the IWL site.

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2. Background and objectives

2.1 Overview and history of the watershed

The watershed studied is primarily comprised of three watercourses; Fish Creek, Porter Creek and McIntyre Creek. The Fish/Porter/McIntyre creeks system extends from Łu Zil Män (Fish Lake) into Whitehorse city limits via Fish Creek, and into Hidden Lake and the Yukon River via Porter and McIntyre Creeks respectively. The system is hydrologically complex, variable, and heavily regulated by past and ongoing activities. Naming confusion of watercourses and waterbodies in the system is prevalent, with different names being applied by different sources. For the purpose of this report;

- Fish Creek will be understood as beginning at Łu Zil Män (Fish Lake) and flowing through Louise Lake, continuing to ATCO Headpond 1 where it flows through the turbine at Plant 1 and beneath Łu Zil Män (Fish Lake) road, joining McIntyre Creek upstream of Copper Haul Road.

- McIntyre Creek will be understood as flowing adjacent to Copper Haul Road then passing beneath it and flowing northeast through Headpond 2 (commonly known as Pumphouse Pond) and through the turbine at Plant 2, where it continues north passing beneath the Alaska Highway and through the Takhini and Yukon University areas until flowing into the Yukon River east of Range Road. Mcintyre Creek collects a number of tributaries along this flow path.

- Porter Creek begins as a collection of seeping groundwater springs within the footprint of IWL site, leaving to the north and flowing along the Alaska Highway before passing beneath it and Centennial Street towards Holly Street and finally through Versluce Meadows into Hidden Lake.

IWL facility has been in operation since 1987 and is located in Whitehorse on Łu Zil Män (Fish Lake) road, approximately 4 km from the Alaska Highway. The aquaculture operation includes hatchery, broodstock production and egg incubation, as well as a

processing facility. The operation currently utilizes water from Fish Creek, as well as consolidates water at the headwaters of Porter Creek, which emerges both within and around the footprint of the IWL site on the southeast slope of Haeckel Hill. Water taken from Fish Creek is returned to McIntyre Creek, and water used from the Porter Creek headwaters is returned to Porter Creek. Both of these discharge points have a water quality standard associated and are monitored on a monthly basis.

IWL and ATCO have an agreement in place to articulate the conditions for water use and sharing amongst the two companies. Water flows from ATCO's tailrace of Plant 1 toward IWL's Tank Farm before returning it to McIntyre Creek flowing into Headpond 2. Licence MS21-034 was recently renewed until 2032, and includes a description of water use and deposit of waste that states IWL is authorized to use water from Porter Creek and Fish Creek, as well as from the tailrace of ATCO Plant 1 at a combined rate not to exceed 38,880 cubic meters per day as measured at PS-5a in McIntyre Creek.

Accessible via Łu Zil Män (Fish Lake) Road, the Fish Creek watercourse is one of the most controlled creeks in the Yukon. Much of what will be referred to as Fish Creek is manmade, as prior to hydro development in the 1950's, Łu Zil Män (Fish Lake) used to drain into Franklin Lake and to the Ibex River. It should be noted that what is commonly referred to as the Jackson Lakes is actually two distinct lakes – Franklin (southwest) and Louise (northeast). ATCO Electric Yukon continues to operate a number of hydro control or generation structures in the system. On the downstream end of Fish Creek, a portion of the water used by ATCO for hydro generation at Plant 1 is diverted to IWL where they utilize that water before returning it to what becomes McIntyre Creek. Both companies have a water license that authorizes them to use water from their respective sources.

Prior to hydro development, the Porter Creek headwaters presumably extended further west towards Louise Lake. Today, the origin of Porter Creek emerges within the footprint of the IWL site as groundwater springs that provide a steady supply of cold, clean groundwater for use in the more delicate aquaculture processes. Porter Creek water utilized by IWL is primarily kept separate from the Fish Creek/McIntyre water utilized by the same facility, and then returned to its regular watercourse. After leaving the IWL site,

Porter Creek flows through primarily residential development towards Holly Street where it passes through a culvert, around Versleuce Meadows and finally ends at Hidden Lake in the Porter Creek neighbourhood. Porter Creek and Hidden Lake are unique in that there is no outlet or surface flow leaving Hidden Lake, which can cause significant variability in the lake level.

Prior to this audit, a number of studies were conducted in the watershed, including a study of Fish Creek by WRB in 2018 in collaboration with Kwanlin Dün First Nation (KDFN) (Government of Yukon 2019). The 2018 study was conducted to address concerns KDFN had at the time in regards to significant recreational use of the area surrounding Łu Zil Män (Fish Lake) and its potential impact on Fish Creek. Samples collected for the study yielded no conclusive evidence of human or animal waste impacting the water quality of Fish Creek, however a single sampling event is not adequate to address changes over time. The report generated from this sampling in 2018 can be shared upon request.

In 2009 a study on nutrients in McIntyre Creek was conducted in response to concerns of the impact of fish farm effluent discharge to McIntyre Creek. The purpose of this study was to apply the CCME Guidance Framework for the management of phosphorus in freshwater systems (CCME 2004) to McIntyre Creek and area reference waters. The nutrient study was performed over a two-year period (2007-08) and concluded that a change in trophic status had occurred in Pumphouse Pond primarily due to effluent discharge from IWL (Yukon Environment 2009).

The following illustration (Figure 1) provides an artistic rendering of the whole watershed, from Łu Zil Män (Fish Lake) to the Yukon River.

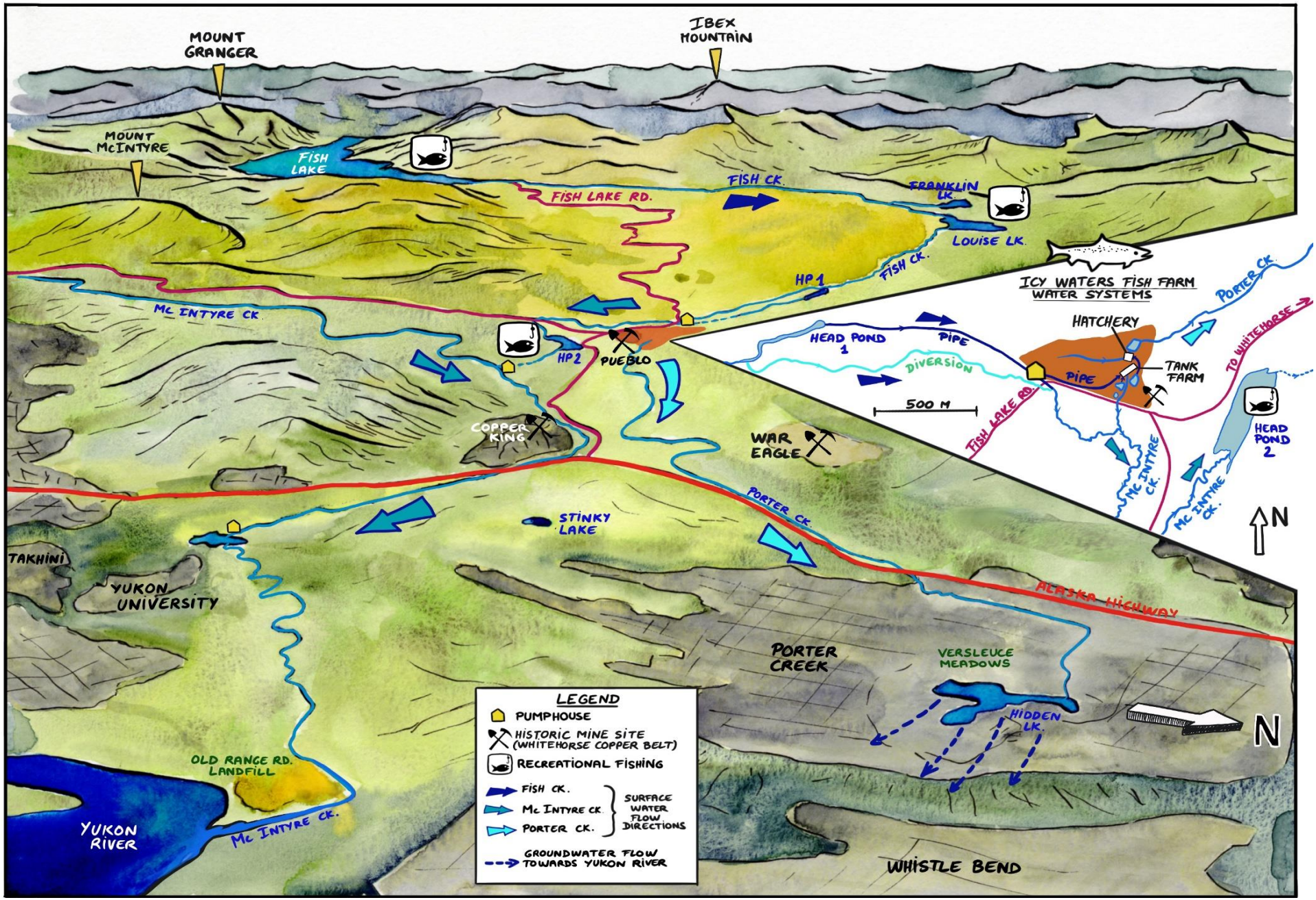


Figure 1. Illustration produced by Esther Bordet at Yukon Graphic Recording, 2022.

2.2 Audit objectives

There were a number of compelling reasons why WRB decided to conduct this audit. The reasons came from a combination of public and private sources which are listed below;

- Fish Creek, Porter Creek and McIntyre Creek are all easily accessible and are frequently recreated by many people, including local residents and tourists. Given that a large number of people frequent these creeks for recreational purposes, there is significant public interest surrounding these watercourses. There is substantial concern from residential property owners as well as recreationalists regarding the management of these watercourses and the desire to see them protected and maintained. For this reason and others, there have been many forms of public interest and actions in the recent past that have contributed to this water quality audit as many feel emotionally attached to specific areas in these watersheds.

- In 2020, the development of a local area plan for the Łu Zil Män (Fish Lake) area was initiated by the Kwanlin Dün First Nation (KDFN) and the Government of Yukon (YG) (Government of Yukon 2022).

- In 2021, the mandate letter from Premier Sandy Silver to Minister Clarke included the action to begin the process of creating a park in the lower reach of McIntyre Creek.

- In 2022, IWL renewed their water licence (Licence MS21-034), following an assessment of impacts by YESAB (Project number 2021-0106)

- Water levels in Łu Zil Män (Fish Lake), Franklin Lake and Louise Lake are influenced by ATCO using control structures, as per their water licence (License HY12-065). A changing climate, increased snowpack and precipitation have created challenges requiring more management action in recent years.

- In 2021, WRB received a number of public inquiries regarding water levels being low in Hidden Lake, in the Porter Creek neighborhood, which is also a popular recreational area.

Given the broad public interest and the complexity of the systems in the watershed, WRB decided to take a watershed-scale approach to document the water uses and outputs at a broad scale.

The objectives of this study were to:

1) Characterize and investigate water quality in Fish Creek, Porter Creek and McIntyre Creek to support ongoing license and planning initiatives by:
    a) Comparing water quality upstream and downstream of the hydro system infrastructures, residences, the fish farm facility and the historic dumping sites
    b) Assessing the potential effect of the effluent discharge from the Fish Farm operation on McIntyre Creek using benthic invertebrate community data
2) Understand why water levels fluctuate in Hidden Lake and assess the water inputs and outputs.

3. Sampling and Methodologies

3.1 Water quality sampling and field monitoring

In order to support audit objectives, WRB conducted surface water quality sampling which included:

- Fish Creek from the headwater at Łu Zil Män (Fish Lake) to the confluence with McIntyre Creek, after partial diversion of flow from ATCO Plant #1 to the IWL site
- Porter Creek from the IWL site to Hidden Lake
- McIntyre Creek from the IWL site to the Yukon River

Field sampling was conducted on October 28 – 29, 2021. WRB began sampling on the downstream extents of each watercourse, working from downstream to upstream to avoid impacting water quality during sampling. Sampling began on the 28th with

downstream locations on McIntyre and Porter Creeks respectively, followed by the Fish Creek and IWL sites on the 29th. Air temperatures were between 0°C and 10°C over the course of sampling with no precipitation. During sampling, WRB crews encountered members of the public who expressed interest in the work and shared anecdotal information regarding lake levels and changes they have personally witnessed over time.

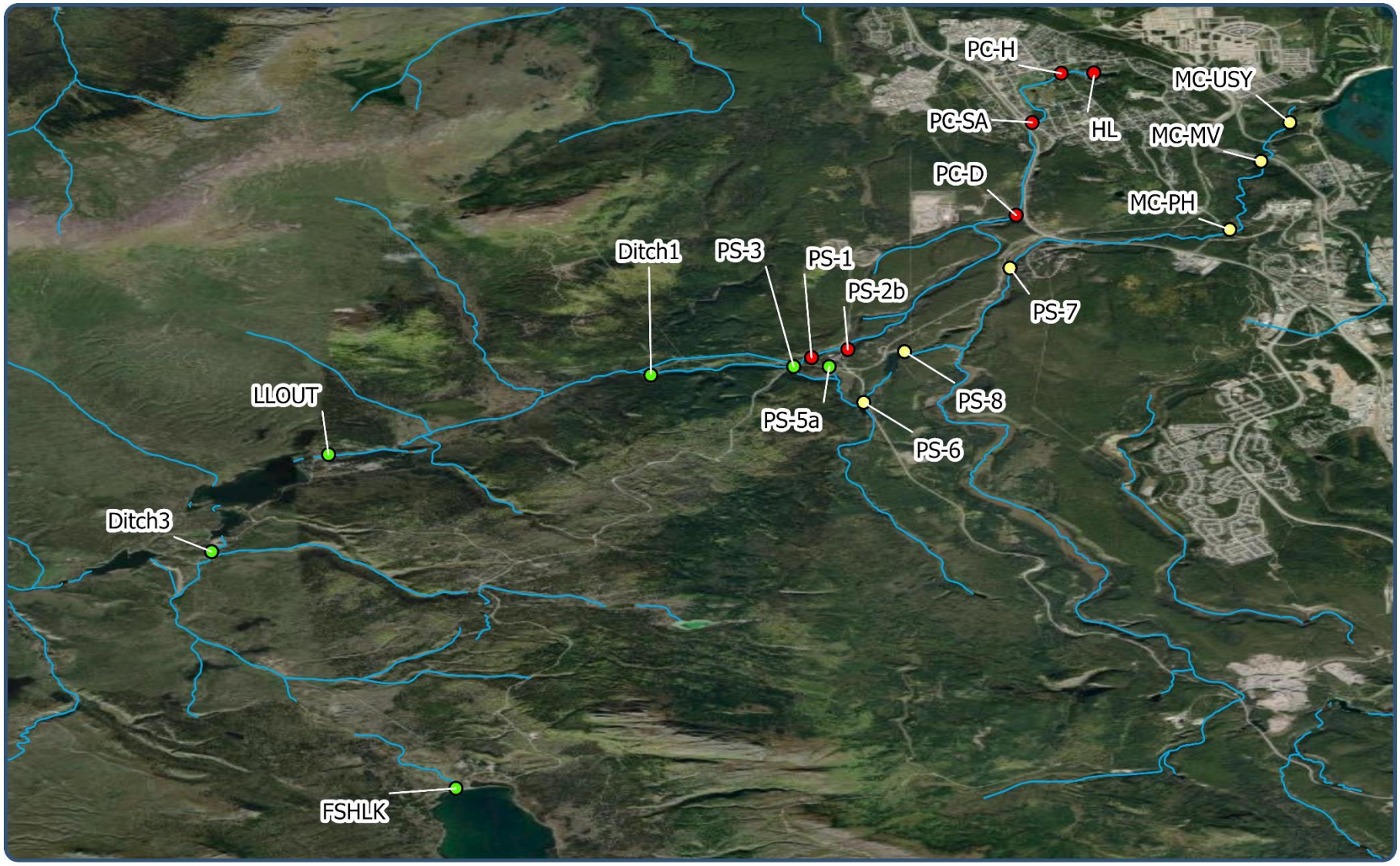
Sample collection was completed by WRB staff using best practices for water sampling (Government of Yukon 2021) and followed the requirements from the commercial lab conducting the analysis. The sampling procedures used during this study were done in accordance with the standard sampling methods defined by the guidance document produced by Environment and Climate Change Canada (ECCC) and by Government of Yukon Department of Environment. In-situ water quality field parameters were measured using YSI ProDSS Handheld Multimeter (Appendix A). The multimeter was calibrated before going in the field by WRB staff as per manufacturer specifications and best practices.

WRB staff collected eighteen surface water samples during the October 2021 audit, outlined in Table 1 below. The sampling locations are also presented in Map 1. These locations were selected in order to support audit objectives and existing sampling locations were sampled wherever possible. This included samples on Fish Creek, Porter Creek, Hidden Lake, McIntyre Creek and on the IWL site. Complete results from sample analysis can be found in Appendix A.

Table 1. Surface water samples collected during the October 2021 site audit.

Station Code	Location	Date & Time	Coordinates		Rationale
			Long	Lat	
FSHLK	Łu Zil Män (Fish Lake) at Outlet	29-Oct-21 16:00	-135.242	60.64941	Background water quality for Fish Creek.
DITCH3	Fish Creek upstream of Louise at Ditch 3	29-Oct-21 14:55	-135.287	60.68533	Fish Creek water quality upstream of Louise Lake – no water being diverted to Franklin Lake via Ditch 3 diversion at time of sampling.
LLOUT	Louise Lake Outlet at Ditch 2	29-Oct-21 14:15	-135.265	60.70719	Fish Creek water quality downstream of Louise Lake, capture potential impact from Jackson Lakes community.

Station Code	Location	Date & Time	Coordinates Long	Lat	Rationale
DITCH1	Ditch 1 downstream of spillway diversion	29-Oct-21 13:20	-135.207	60.72127	Fish Creek water quality prior to entering IWL site via tailrace of ATCO turbine #1 on Łu Zil Män (Fish Lake) Road.
PS-1	Fresh water impoundment for hatchery water supply	29-Oct-21 11:40	-135.182	60.72375	Water quality at headwater of Porter Creek prior to IWL influence.
PS-2b	Weir at upstream end of culvert on Haeckel Hill Road	29-Oct-21 10:20	-135.174	60.72548	License standard applies to effluent flowing under Haeckel Hill Road.
PS-3	Tailrace of ATCO power plant downstream side of culvert on Łu Zil Män (Fish Lake) road.	29-Oct-21 10:50	-135.182	60.7233	Water quality of flow from ATCO controlled Fish Creek flowing from Headpond 1 through Plant #1.
PS-5a	Upstream side of culvert under Łu Zil Män (Fish Lake) Road	29-Oct-21 12:25	-135.176	60.7225	Water quality of flow being returned to McIntyre Creek after IWL influence.
PS-6	Upstream side of McIntyre Creek culvert under Copper Haul Road	28-Oct-21 16:00	-135.17	60.71622	Background water quality on McIntyre Creek.
PS-7	McIntyre Creek at old copper mine access road	28-Oct-21 14:40	-135.146	60.73975	Water quality in McIntyre Creek upstream of Alaska Highway.
PS-8	North end of Headpond 2	28-Oct-21 15:20	-135.163	60.72535	Water quality in Headpond 2 which collects McIntyre Creek flow.
PC-D	Porter Creek upstream of dump access road	28-Oct-21 14:05	-135.144	60.74865	First monitoring location downstream of PS-2b discharge on Porter Creek from IWL.
PC-SA	Porter Creek downstream of Centennial Street	28-Oct-21 13:30	-135.142	60.76492	Station downstream of Alaska Highway and Centennial street, capture influence from roadway maintenance.
PC-H	Porter Creek upstream of Holly Street	28-Oct-21 12:50	-135.139	60.77621	Prior to channel flowing under Holly Street into Versulce Meadows.
HL	Hidden Lake Northwest Side	28-Oct-21 11:40	-135.133	60.77298	Water quality in Hidden Lake.
MC-PH	McIntyre Creek at pumphouse pond west of Yukon University	28-Oct-21 10:40	-135.107	60.74739	McIntyre Creek water quality downstream of IWL monitoring station PS-7
MC-MV	McIntyre Creek upstream of Mountainview Drive	28-Oct-21 10:05	-135.101	60.75897	Sampling location downstream of Yukon University
MC-USY	McIntyre Creek upstream of Yukon River	28-Oct-21 9:05	-135.096	60.76509	Downstream most sampling location on McIntyre Creek



Yukon

JANUARY 2023

Kilometers

0 1 2 4

Spatial Reference
Name: GCS WGS 1984
Map Units: Degree

Map 1.

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Water Quality Sampling Locations

- Fish Creek
- McIntyre Creek
- Porter Creek

Fish Creek, Porter Creek, McIntyre Creek October 2021 Sampling Locations Overview

3.2 Water quality analysis

Samples collected during the October 2021 site visit were analyzed for a suite of analytical parameters (Table 2). These parameters were selected to support site audit objectives and to allow for comparison with the effluent quality standards listed in IWL's water licence MS21-034 and with the Guidelines for Protection of Aquatic Life published by the Canadian Council of Ministers of the Environment (CCME-PAL). In addition, hydrocarbons were sampled and analysed at select stations, where there have been concerns due to past land use activities or water use.

Table 2. Analysis performed for samples collected during the October 2021 site audit. Hydrocarbon samples were collected at the Łu Zil Män (Fish Lake) outlet, all Porter Creek sites, all McIntyre Creek sites, and the IWL license sampling locations PS-2B and PS-7

Parameter			
- Alkalinity - Residual Chlorine - Low Level Chloride & Sulphate - Conductivity - Hardness - Total & Dissolved Metals - General Elemental Chemistry - Nitrogen, Nitrate, Nitrite, Ammonia - Phosphorus, Orthophosphate - Hydrocarbons, Volatile Organic Carbon, Benzene, Toluene, Ethylbenzene and Xylene (BTEX) - Total Suspended Solids - Water Isotopes (IWL Sites Only)			
Hydrocarbons Sampled			
Parameter	**Detection Limit (ug/L)**	**Parameter**	**Detection Limit (ug/L)**
Low Molecular Weight PAH	0.1	Chrysene	0.02
High Molecular Weight PAH	0.05	Benzo(b&j)fluoranthene	0.03
Total PAH	0.1	Benzo(k)fluoranthene	0.05
Quinoline	0.02	Benzo(a)pyrene	0.005
Naphthalene	0.1	Indeno(1,2,3-cd)pyrene	0.05
1-Methylnaphthalene	0.05	Dibenz(a,h)anthracene	0.003
2-Methylnaphthalene	0.1	Benzo(g,h,i)perylene	0.05
Acenaphthylene	0.05	LEPH (C10-C19 less PAH)	0.2

Parameter	Detection Limit (ug/L)	Parameter	Detection Limit (ug/L)
Acenaphthene	0.05	HEPH (C19-C32 less PAH)	0.2
Fluorene	0.05	EPH (C10-C19)	0.2
Phenanthrene	0.05	EPH (C19-C32)	0.2
Anthracene	0.01	Pyrene	0.02
Acridine	0.05	Benzo(a)anthracene	0.01
Fluoranthene	0.02		

3.3 QA/QC

In addition to standard samples collected from site, WRB completed four Quality Assurance/Quality Control (QA/QC) samples as described in Table 3.

Table 3. QA/QC samples completed during the July 2021 site audit.

QA/QC Sample Type Collected	Procedure	Purpose
Travel Blank	Lab that is providing sample bottle sets provides an additional set filled with lab grade deionized water and sealed. This sample is carried for the duration of the sampling event, returned to the lab and never opened until analysis.	Can help identify if any contaminants have been introduced into the sample during or as a result of the transportation process.
Field Blank	A sample bottle set is filled with lab grade deionized water in the field by sampling staff following all the standard protocols and procedures of a normal sample.	Can help identify if any contaminants have been introduced into the sample from the atmosphere at the sampling location or from sampling staff handling protocols and procedures.
Replicate (x2)	A regular sample is collected followed immediately by an identical replicate sample being collected adhering to all of the same standard protocols and procedures. One replicate is collected for every ten samples, rounded up to the nearest ten samples. Analytical results are compared and Relative Percent Difference (RPD) is calculated.	Can help identify precision of sampling technique and methods and provide an estimate of sampling error and analytical error.

3.4 Benthic invertebrate data analysis methods

Benthic invertebrates are a good indicator of water quality over time and benthic invertebrate monitoring is one of the requirements listed in the water licences authorising fish farming by Icy Water Ltd. Invertebrate sampling was conducted once a year between 2008 - 2011, and 2013 - 2015 and twice a year in 2020 by IWL staff.

WRB analysed the data to determine if long-term trends were evident in two measures of diversity, called the Simpson's index and the Shannon's index. The differences in species populations between two different sites was also quantified using the Bray-Curtis dissimilarity. Lastly, a trend analysis was performed on the results to determine the significance and magnitude of any trends.

All data was analysed using the RStudio program. R Studio was also used to standardise tabular data and calculate average invertebrate numbers in the case of triplicate samples. Only data for sites sampled during the nine field seasons was retained and these include sites PS-3, PS-6, and PS-7.

3.4.1 Measures of invertebrate diversity, richness, and density

Simpson's and Shannon's indices of diversity were calculated for each year and for each site using the R package Vegan. Mann-Kendall non-parametric trend tests were performed on the resultant time-series using the Kendall package, and the Sen's slope of potential trends was estimated using the Trend package in R.

3.4.2 Measures of site similarity

Site similarity was assessed for pairs of sites (i.e. site PS3 with PS6, PS3 with PS7, and PS6 with PS7) and for each year of available data by calculating the Bray-Curtis index of dissimilarity. A Mann-Kendall non-parametric trend test was performed on the resultant time-series to determine if any long-term trends existed in site similarity.

3.4.3 Benthic invertebrate assessment limitation

Species richness (number of species encountered) and invertebrate density (count/area) are also commonly calculated and compared to assess ecosystem productivity. These measures were not assessed because:

- Sampling methodology and surface area sampled were unknown, precluding year-to-year comparisons of invertebrate density or species richness.
- The dates of sampling events were unknown, precluding comparisons that heavily factored the number of individuals. Invertebrate populations in a particular environment rapidly increase or decrease as species moves through life cycle stages (i.e. eggs hatching, adults emerging from aquatic environment).
- Early sampling efforts consisted of a single sampling point, while later efforts consisted of triplicate samples (three sampling points) at each site. Invertebrate numbers and species assemblages are spatially heterogeneous, leading to unreliable conclusions when comparing single-point samples to other single-point samples or to triplicate samples. This is illustrated by triplicate samples varying by 2-10+ times in individual counts and 2-4 times in number of species for the same site, which could be indicative of inconsistent sampling or reporting methodology or site selection.

4. Results and Observations

4.1 Fish Creek

There is very little historical water quality data for Fish Creek available to WRB, and therefore difficult to determine if water quality has changed over time. Unlike McIntyre or Porter Creeks, Fish Creek does not have regular monthly monitoring on any of the upper reaches. As such, WRB had to rely on a small amount of data to assess water quality in the catchment.

Past sampling efforts as well as sampling conducted in October of 2021 included analysis of general water chemistry parameters, nutrients, metals as well as hydrocarbons assessment in some of the October 2021 samples and intends to detect

potential impacts from the known land uses in Fish Creek. The flow path of Fish Creek has been re-routed during the construction of the hydropower generation facility in the 1950's and later on the fish farm in 1985. Government of Yukon does not have data pre-development and therefore it is impossible to compare water quality today with water quality pre-development to identify the impact of hydro or fish farming in Fish Creek. Still, comparison of water quality upstream and downstream of a structure can help assess potential impact and comparing the data observed with water quality guideline can help assess the health of the creek today. It should be noted that both, ATCO Plant #1 and IWL are using water from Fish Creek and that IWL is required to return this water to McIntyre Creek, where Fish Creek would naturally flow if there was no development.

4.2 McIntyre Creek

McIntyre Creek receives effluent from IWL roughly halfway between its headwaters and its destination watercourse, the Yukon River. As a requirement of their license MS21-034, IWL is required to monitor water quality at a number of locations on McIntyre Creek. As a result, WRB has a long and detailed record of water quality in the area surrounding IWL's site. Focusing on licence EQS parameters, WRB assessed the record to determine if IWL had a significant impact on downstream water quality. Additionally, WRB assessed hydrocarbon sampling results from the October 2021 monitoring event to determine if hydrocarbons were present in surface water at a number of locations including the confluence of McIntyre Creek and the Yukon River due to the historic landfill in the area. No hydrocarbon were detected in the samples collected in October 2021 by WRB. Out of the parameters listed under water licence MS21-034, total phosphorus has exceeded license EQS most often. Other licenced parameters exhibited virtually no exceedances on the record for the McIntyre Creek monitoring locations. IWL has recently submitted a phosphorus management plan with their most recent licence renewal, which outlines the protocols they will use to mitigate impacts from phosphorus inputs required by their aquaculture processes. On-site analysis of total phosphorus will allow for rapid reaction to exceedances where fish feed inputs will be adjusted as quickly as possible to avoid prolonged discharge of effluent with high phosphorus concentrations.

While total phosphorus has exceeded the EQS defined in water licences in the past, downstream total phosphorus concentrations have remained stable. No change to aquatic ecology, benthic invertebrates or trophic status were observed. Similarly, TSS and ammonia, which are both parameters listed in the EQS, show a significant decrease between PS-5a and PS-8 sampling locations, at which point both are substantially reduced in concentration and stable. Interestingly, effluent from PS-5a has a concentration of nitrate that is low and stable, where downstream sample locations PS-8 and PS-7 tend to have more nitrate than IWL effluent. Additionally, PS-3 which is upstream of IWL has been measured in some cases (Figure 10) to have higher nitrate concentrations than IWL effluent at PS-5a, suggesting there are sources of nitrate in McIntyre Creek that are distinct from IWL.

4.3 Porter Creek

IWL is only required to monitor PS-2b as their downstream most monitoring location on Porter Creek as per their water license MS21-034. This license considers PS-1 to be background water quality on Porter Creek which is within the IWL site footprint, compared to McIntyre Creek where effluent is discharged into a watercourse that does not enter the site. As such, PS-2b accurately captures impact from IWL effluent on Porter Creek. Between May, 2009 and April, 2021 PS-2b has exceeded EQS 28 times, where 24 of these exceedances occurred between April and October on the given year (Figure 15), and 50% of the total exceedances on record during this period occur between May and August of the given year, indicating there is likely a seasonal factor influencing Total Phosphorus exceedances. Additionally, 96% of the Total Phosphorus EQS exceedances (27 out of 28) were during the period that licenses MS02-203, MS11-041 and MS21-034 were active and contained the lowest concentration EQS for Total Phosphorus. Aside from Total Phosphorus, PS-2b has only exhibited one other EQS exceedance between April, 2005 and present, which was one exceedance of TSS in September, 2010 (Figure 16).

Hidden Lake is the destination waterbody for surface water in Porter Creek until it goes to ground within Hidden Lake and is transported via groundwater to the Yukon River.

WRB found that based on historical lake area the perceived lower lake levels observed in Hidden Lake in late 2020 and throughout 2021 were actually representative of what past normal lake levels have been. The abnormally high lake levels exhibited in the lake 2010's were likely a result of either an increase in flow reaching the lake or a decrease in infiltration to the lake. The rapid decline in lake level in 2021 was primarily caused by upstream beaver activity that restricted inflow to the lake. Future hidden lake levels will likely be dynamic and strongly tied to inflow to the lake.

4.4 Isotopes data from Fish, McIntyre and Porter creeks

Water Resources Branch analyzed samples for stable water isotopes (δ^2H and $\delta^{18}O$) to support interpretations of site water movement across IWL. All natural waters contain variable ratios of elemental isotopes of different masses. The principal element ratios of interest for isotope tracing are Oxygen ($^{18}O/^{16}O$, also referred to as $\delta^{18}O$) and Hydrogen ($^{2}H/^{1}H$, also referred to as $\delta^{2}H$), although isotopes of other elements are sometimes used. The ratio of the lighter isotopes to heavier isotopes provides information about the environment of formation or source of the containing waters. Water molecules enriched in heavier ^{18}O isotopes do not evaporate as readily from surface water bodies, causing surface waters that have stagnated for long periods of time to gradually become enriched in ^{18}O. Precipitation that condenses in warmer temperatures (rain) is generally more enriched in ^{18}O than lighter precipitation that condenses in colder temperatures (snow).

Figure 2 shows δ^2H and $\delta^{18}O$ ratios for surface water samples (solid circles) collected during the October 2021 monitoring event and precipitation (hollow circles) collected in Whitehorse from 1960-1990 via the Global Network of Isotopes in Precipitation (GNIP; IAEA 2021). Precipitation that fell between May and September is inferred to be rain (red hollow circles) whereas precipitation that fell between October and April is inferred to be snow (blue hollow circles). A local meteoric water line (LMWL) was generated based on the stable water isotope ratios for precipitation samples collected from the Whitehorse GNIP station. The LMWL is a line of best fit ($R^2 = 0.93$) that represents the site-specific long-term covariation of hydrogen and oxygen stable isotope ratios.

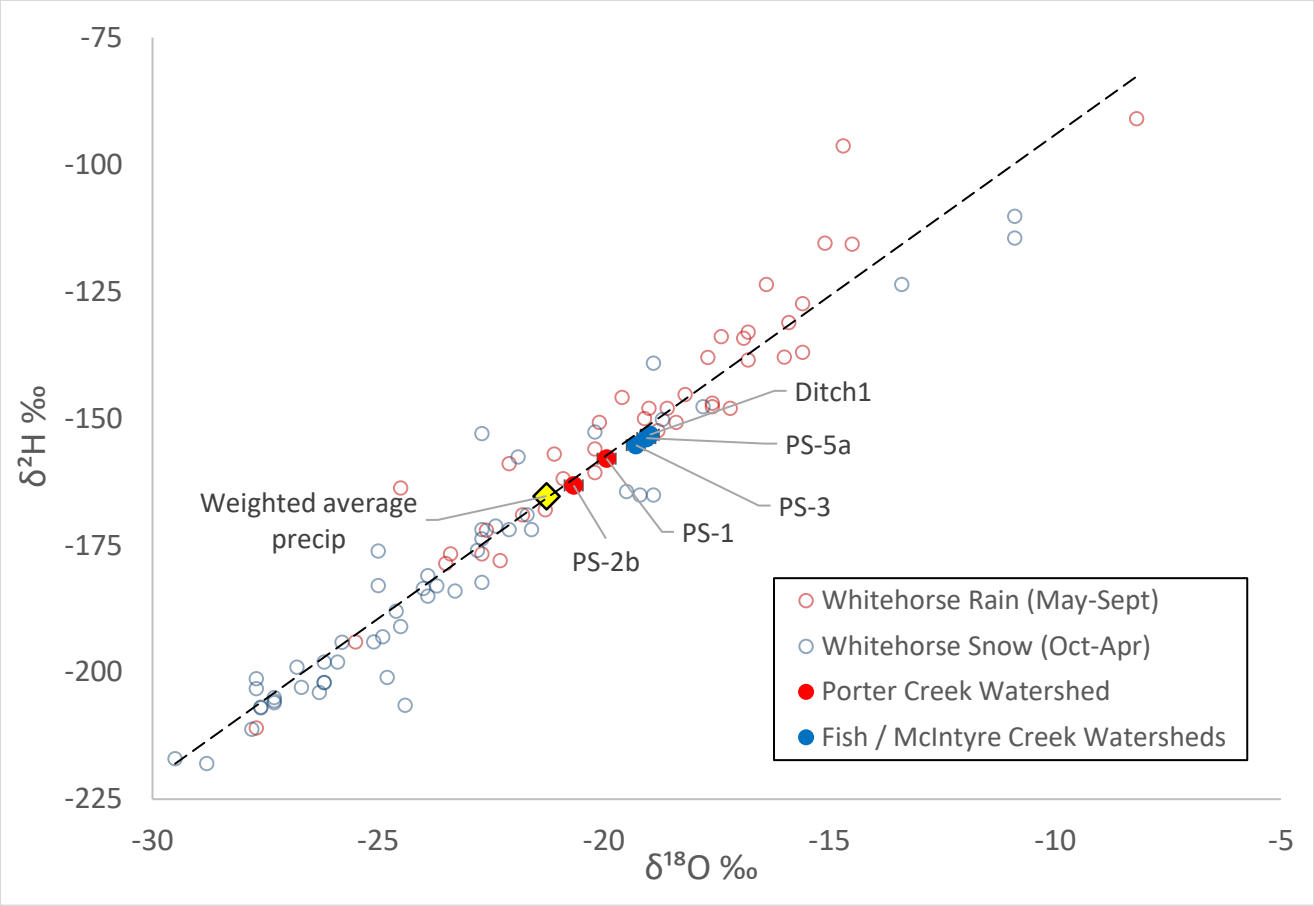

Figure 2. Stable water isotope compositions for samples collected on the IWL site.

As evident in Figure 2, there is a distinct cluster of points in the upper right of the plot, consisting of water originating from Fish Creek and discharged into McIntyre Creek. Given the close clustering of points and what would be expected, it is apparent that there is little to no change in the isotopic composition of the water as it moves from Fish Creek through the IWL facility and back into McIntyre Creek.

Comparatively, PS-1 and PS-2b appear more towards the lower left of the plot which would indicate that water sourced from the headwater of Porter Creek (PS-1) is isotopically distinct from water sourced from Fish Creek (Ditch 1). Additionally, water discharged from PS-2b is distinct from PS-1. The difference in isotopic composition between PS-1 and PS-2B cannot be explained by mixing between Porter Creek (PS-1) and Fish Creek (Ditch 1), nor can it be explained by evaporation of water in the hatchery. Rather, the difference in isotopic composition between PS-1 and PS-2B suggests that

PS-2B represents a mixture of water from Porter Creek (PS-1) and another source of water that is relatively depleted in ^{18}O (i.e. plots further to the lower left in Figure 2). Typically, groundwater samples plot approximately along the LMWL and have stable water isotope compositions similar to that of amount-weighted average precipitation (Kendall & Doctor, 2005), which is plotted as a yellow diamond in Figure 2. A mixture of groundwater, likely from seeps identified in the area and Porter Creek water (represented by PS-1) could yield the isotopic composition observed at PS-2b.

5. Fish Creek

5.1 Land & water uses

WRB reviewed Government of Yukon's current map data via GeoYukon (https://mapservices.gov.yk.ca/GeoYukon/) in order to get an overview of land and water uses in the region of Fish Creek that could potentially impact water quality in the area. This data is publicly available online and includes the Government of Yukon's authoritative and current map data. Of note, Government of Yukon is currently working with Kwanlin Dun First Nation government to develop a local area plan for the area encompassing Łu Zil Män (Fish Lake), Fish Creek, Louise Lake and Franklin Lake. More information can be found at https://yukon.ca/en/fish-lake-local-area-planning.

Of the creeks studied, Fish Creek is unique in that compared to Porter and McIntyre Creeks it is far less urbanized. It also has headwaters outside of Whitehorse city limits, where Fish Creek begins at the outlet of Łu Zil Män (Fish Lake) and flows into McIntyre Creek. For these reasons, the land and water uses present in the catchment are significantly different from those found within the more urbanized Porter Creek and McIntyre Creek catchments. Table 4 below lists the major or significant land and water uses that were identified using this tool and help to provide some insight into the expected impacts these uses may or may not have on water quality.

Table 4. Land and water uses in the Fish Creek catchment.

Land or Water Use Type	Details
Kwanlin Dün Settlement Land	Several categories of settlement land encompassing large swaths of Bonneville Lakes, Łu Zil Män (Fish Lake), Franklin Lake, Louise Lake and Fish Creek
Ta'an Kwach'an Council Settlement Land	Category B settlement land on the southeast side of Łu Zil Män (Fish Lake)
Agriculture	Two agricultural areas designated for grazing purposes, both between Łu Zil Män (Fish Lake) and Louise Lake. One area of 287.9 hectares, one 232 hectares.
Mineral exploration	Mineral exploration claims can be found in different areas along Fish Creek and in the Franklin and Louise Lakes area. Additionally, there are historic gravel or aggregate pits that are no longer in use.
Hydroelectric Generation	Yukon Electrical Company Ltd. holds a water licence (HY12-06) authorizing them to alter flows and water levels for the purpose of hydro power generation. This includes Łu Zil Män (Fish Lake), Fish Creek, Louise Lake, Porter Creek, and McIntyre Creek and requires that they maintain a particular range of flows and water levels at specific locations in the watershed.
Residential	Small communities exist in the Louise Lake and Łu Zil Män (Fish Lake) area, with approximately 50 residents.
Drinking Water Wells	There are a number of private domestic drinking water wells at residences along Łu Zil Män (Fish Lake) Road and the Louise Lake area.
Recreation	There are a large number of trails around Fish Creek which are used relatively commonly. This use includes recreation such as hiking, dog mushing, horseback riding, ATV and off-roading and snowmobiling. Additionally, the area is a popular fishing and boating destination.

Of the land and water uses on Fish Creek, the most noteworthy in terms of potential impact on water quality would be the hydroelectric generation and the IWL aquaculture facility. Hydroelectric generation is generally considered as having a potential impact on physical parameters such as turbidity and TSS but not so much on water chemistry. Physical parameters can still have an impact on aquatic ecosystems and organisms. Aquaculture is expected to impact nutrients levels. The water flows from Fish Creek and into the hydropower generation facility and the fish farm is complex to describe.

Figure 3 attempts to present the flow path for Fish Creek and for the head water of Porter Creek through IWL.

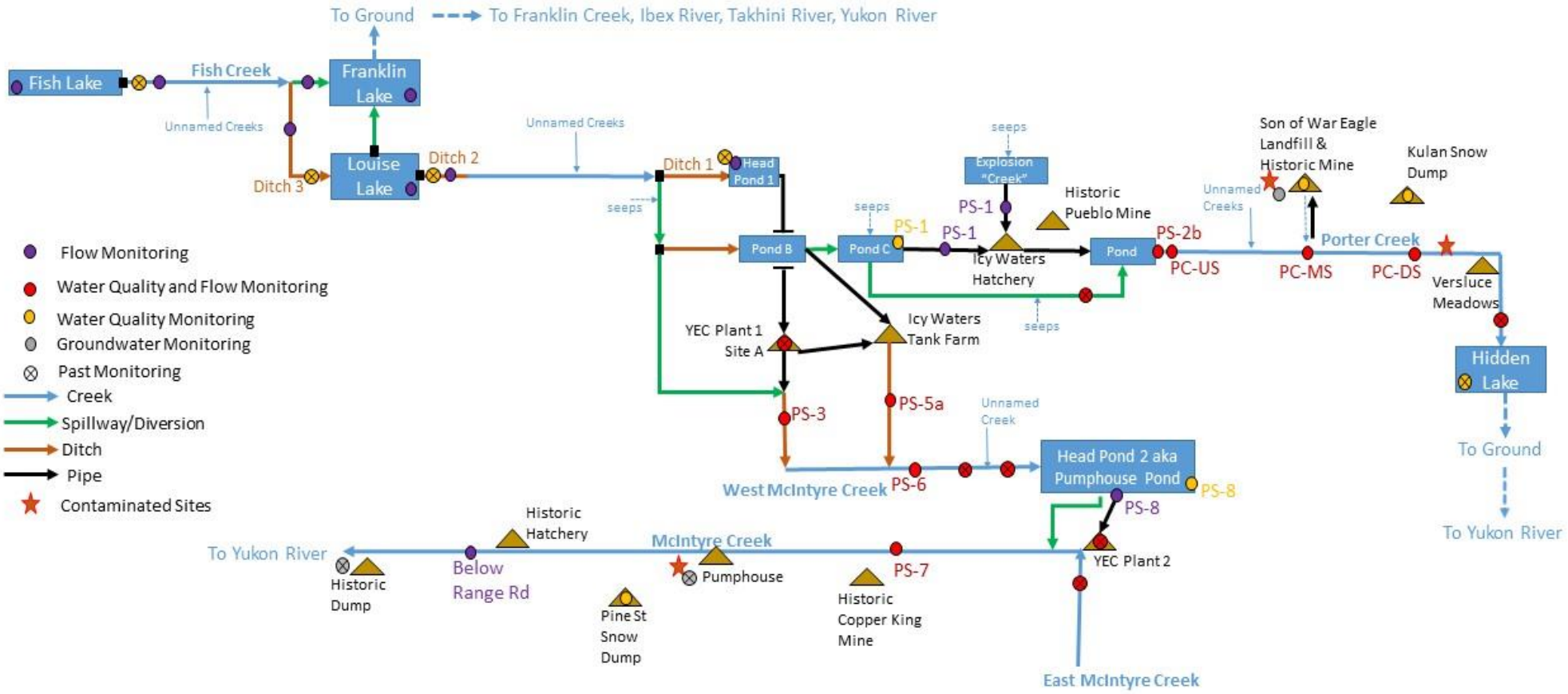

Figure 3. Flow diagram of Fish Creek, Porter Creek and McIntyre Creek as they are understood to interact with various facilities, infrastructure and each other.

5.2 Water quality

Although there have been several studies conducted on Fish Creek, there is very little detailed water quality data available to WRB for Fish Creek. In June 2005, a single sample was collected at the outlet of Louise Lake, which was analysed for total metals, total dissolved and suspended solids, phosphorus, nitrate, nitrite and sulfate. Of these parameters, there were no exceedances of CCME guidelines, and the majority of parameters were below laboratory detection limits. Additionally, in September, 2018 Fish Creek was sampled in five locations, spanning from the outlet of Łu Zil Män (Fish Lake) to the outlet of Louise Lake. These sampling events primarily collected in-situ field parameters including pH, temperature, dissolved oxygen, oxidative reduction potential and specific conductance. All parameters were relatively stable upstream to downstream, with the most notable changes exhibited in a slight increase of specific conductance moving upstream to downstream (173.3 µS/cm to 209.3 µS/cm), until Louise Lake where specific conductance is lowest at the outlet (111.5 µS/cm). pH also drops from 8.32 to 7.83 across the span of the five sampling locations.

WRB received some concerns expressed by members of the public regarding the potential for hydrocarbons in Łu Zil Män (Fish Lake) or Fish Creek due to the frequency of recreational boating in the open water season and snowmobile use on the lake during periods of ice cover. WRB is also aware of several historical contaminated sites or dumping areas in Porter Creek and McIntyre Creek catchments, thus WRB also collected hydrocarbon samples for relevant locations across all of the creeks during the October 2021 sampling event. Of these samples collected Fish Creek, there were no exceedances of any CCME guidelines, and there were no hydrocarbons detected.

WRB also received concerns from members of the public surrounding the potential for water quality on Fish Creek to be impacted by hydro generation. Though there is substantial hydro generation infrastructure between Łu Zil Män (Fish Lake) and the Alaska Highway, WRB currently has no data suggesting this infrastructure has a significant impact on water quality in Fish Creek or McIntyre Creek. It should be noted that since Fish Creek water quality is not monitored on a regular basis, there is insufficient

data for determining any trends or changes to water quality throughout the watercourse or over time.

ATCO is the operator of the Fish Creek hydro generation and is authorized under their water license HY12-06. Total Suspended Solids (TSS) is one of the water quality parameters that is the most likely to be impacted by hydro generation. In the October 2021 samples on Fish Creek, TSS was below the detection limit of 1mg/L, thus indicating hydro generation did not have a significant impact on water quality at the time of sampling. Aside from HY12-06, there are no water licenses related to Fish Creek.

6. McIntyre Creek

IWL and ATCO have an agreement in place to articulate the conditions for water use and sharing amongst the two companies. Water flows from ATCO's tailrace of Plant #1 toward IWL's Tank Farm before returning it to McIntyre Creek flowing into Headpond #2. Licence MS21-034 was recently renewed until 2032 and includes a description of water use and deposit of waste that states IWL is authorized to use water from Porter Creek and Fish Creek, as well as from the tailrace of ATCO Plant #1 at a combined rate not to exceed 38,880 cubic meters per day as measured at PS-5a in McIntyre Creek.

6.1 Land & water uses

WRB reviewed Government of Yukon's current map data via GeoYukon to review land and water uses in the region of McIntyre Creek that could potentially impact water quality in the area. This data is publicly available online and includes the Government of Yukon's authoritative and current map data. McIntyre Creek begins as a collection of tributaries on the north slopes of Mount Sima and Mount McIntyre. This water flows through historic mining areas then flows through town and crosses the Alaska Highway. While there is more anthropogenic impact on McIntyre creek than Fish Creek, it is still relatively unimpacted in its upper reaches and has headwaters outside of city limits. The lower section of McIntyre Creek is recognised as the McIntyre Creek Regional Park (Figure 4) and a large amount of research has been done to document changes in land uses in the

lower section of the McIntyre Creek watershed from before the Gold Rush to now (Walton 2021) and the historic, social and ecological value of this area (McCaw 2020).

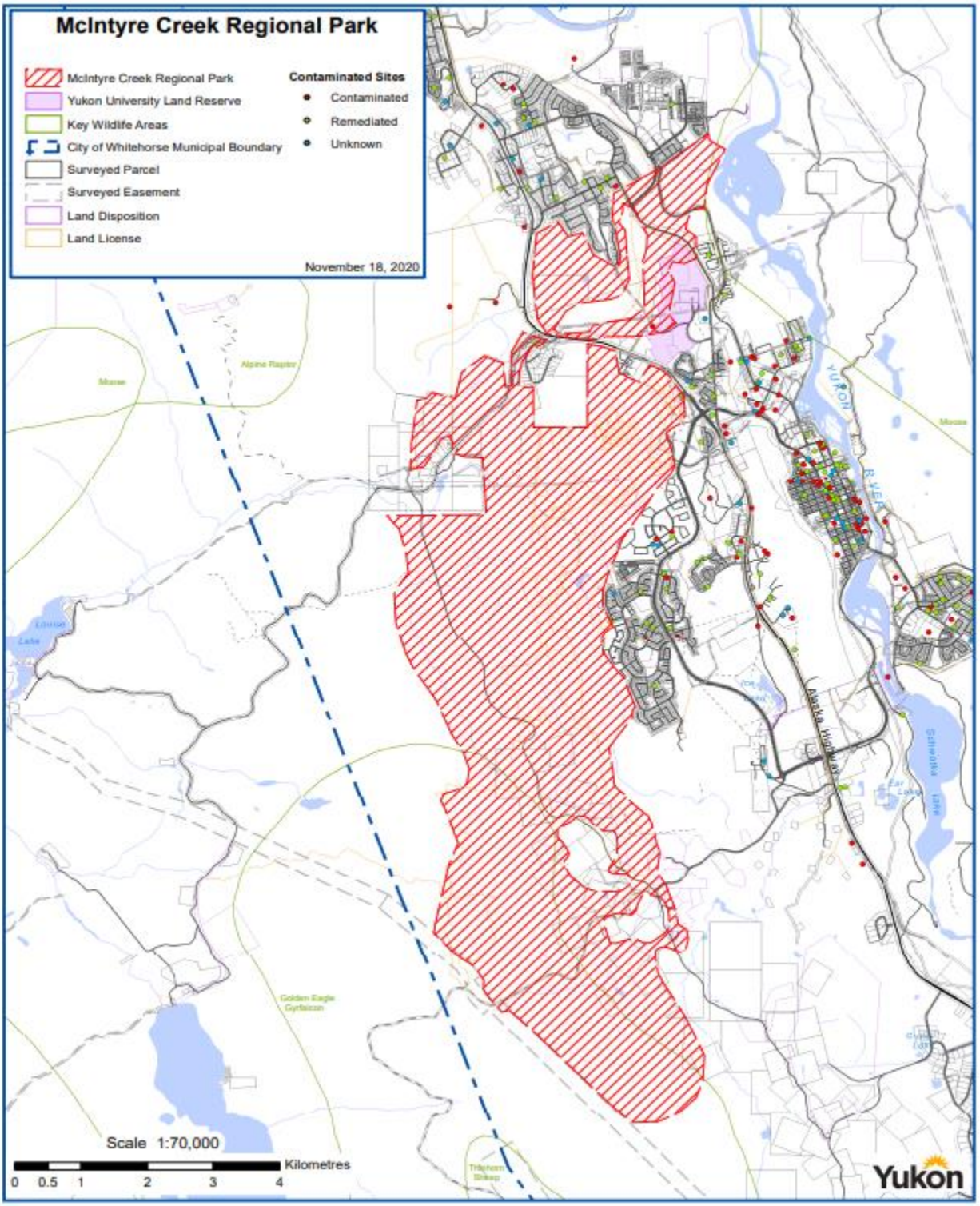

Figure 4 McIntyre Creek Regional Park map, from Walton (2021)

Table 5 below lists the major or significant land and water uses that were identified using GeoYukon to provide some insight into the expected impacts these uses may or may not have on water quality.

Table 5. Land and water uses in the McIntyre Creek catchment.

Land or Water Use Type	Details
Historical Land Uses	Historic mineral exploration was conducted in different areas along upper reaches of McIntyre Creek and its tributaries. This includes the historic Copper King mine which has some remaining waste rock piles in the vicinity of McIntyre Creek. There are also historic gravel or aggregate pits that are no longer in use in the area. Additionally, a historic dump site known as "The Point" dump site originated at the confluence of McIntyre Creek and the Yukon River during the WWII and was closed in 1945 after US Army left. The dump was re-opened by the city as a municipal landfill in 1950's. After a large debris slide in 1968 into the creek, a berm was developed to reroute it, however the landfill was closed in 1975 after an order from Water Board.
Residential	Raven's ridge is a small neighbourhood on the south side of McIntyre Creek off of the Alaska Highway adjacent to the creek. Yukon University and the Takhini neighbourhood are also within the catchment.
Drinking Water Wells	There are a number of private domestic drinking water wells at residences in the Raven's Ridge subdivision.
Aquaculture	There was a salmon incubation facility on McIntyre Creek on the upstream side of Mountainview Road producing fry for salmon restoration efforts. We understand that this was closed in 2018 after a fire inside the facility.
Recreation	There is a substantial trail network across the entire reach of McIntyre Creek that extends from the Alaska Highway to the Yukon River, including extensive trails in the area surrounding Yukon University and the confluence of McIntyre Creek and Yukon River.
Contaminated Sites	There are an assortment of contaminated sites in various stages of remediation. Contamination incidents and remediation dates are dating from 2008 to present. The nature of these contaminated sites include but are not limited to diesel spills, heating fuel leaks, and hydraulic fluids. More information on contaminated sites can be found at https://yukon.ca/en/waste-and-recycling/contaminated-sites/find-contaminated-sites-information

Of the land and water uses on McIntyre Creek, the most noteworthy in terms of potential impact on water quality would be IWL aquaculture facility as well as the historic dumping at the confluence with the Yukon River. WRB performed a detailed analysis of historic data available from IWL's license monitoring as well as conducted field sampling in and around the site to allow for watershed scale analysis. Additionally, WRB sampled for hydrocarbons at a number of locations to understand if historic dumping activities may have contributed to hydrocarbon contamination in surface water.

6.2 Water quality

IWL has a water licence authorizing them to use water from the tailrace of ATCO electric's Plant #1 (which is water from Fish Creek) up to a specific volume, as well as consolidate this "used" water, or effluent, into McIntyre Creek with the rest of Fish Creek flow. This effluent has specific quality requirements as outlined in the current water license MS21-034. These requirements are known as Effluent Quality Standards (EQS) which in the case of McIntyre Creek are applied to the water sampling location known as PS-5a. The complete EQS have been outlined in Table 6. It should be noted that the phosphorus EQS listed in Table 6 only apply from June 30th, 2017 until present, however WRB possesses records prior to this date when EQS were different. Past EQS and their associated timelines are listed in Table 7. It is worth noting that the EQS for Total Phosphorus has become increasingly more stringent from the early years (0.18 mg/L above background in 2005) to now (0.065 mg/L if background TSS < 25 mg/L or 0.065 mg/L above background if TSS > 25 mg/L).

Table 6. Current EQS under IWL water use licence.

Parameter	MS21-034 EQS
Total Phosphorus	0.065 mg/L at station PS-5a. This standard applies only when TSS measured at station PS-3 is equal to or below 25 mg/L.
	0.065 mg/L at station PS-2b. This standard applies only when TSS measured at station PS-1 is equal to or below 25 mg/L.
	0.065 mg/L at station PS-5a, above background (background measured at PS-3). This standard applies only when background TSS measured at station PS-3 is greater than 25 mg/L.
	0.065 mg/L at station PS-2b, above background (background measured at PS-1). This standard applies only when background TSS measured at station PS-1 is greater than 25 mg/L.
Total Nitrate (as N)	0.5 mg/L
Total Ammonia (as N)	1.0 mg/L
Total Suspended Solids (TSS)	10 mg/L above background as measured at stations PS-1 and PS-3, respectively
pH	No less than 6.5
Oil & Grease	None visible

Table 7. Historic EQS for total phosphorus across different iterations of water use licences as both PS-2b and PS-5a.

License	Active dates	Total phosphorus
MS02-203	April 25th, 2005 – April 30th, 2009	0.18 mg/L above background
MS02-203	May 1st, 2009 – April 20th, 2010	0.065 mg/L
MS08-275	April 21st, 2010 – June 29th, 2012	0.12 mg/L above background
MS11-041	June 30th, 2012 – 29th June, 2017	0.12 mg/L if background TSS < 25 mg/L 0.12 mg/L above background if TSS > 25 mg/L
MS11-041	June 30th, 2017 – June 29th, 2022	0.065 mg/L if background TSS < 25 mg/L 0.065 mg/L above background if TSS > 25 mg/L
MS21-034	June 30th, 2022 - Present	0.065 mg/L if background TSS < 25 mg/L 0.065 mg/L above background if TSS > 25 mg/L

Unlike Fish Creek, there is a substantial historical water quality record for the upper reaches of McIntyre Creek and this data is collected as a requirement of IWL's water licences since 2005. For this reason, it is possible to do more long-term visualization of data to view potential trends or changes over time as shown in Figure 5. This figure presents both the Total Phosphorus data collected as well as the Total Phosphorus EQS,

which is evolving and defined under the various water licence amendments (Table 7). There has been 26 exceedances of the Total Phosphorus EQS during the period displayed with most of them occurring when the EQS was 0.065 mg/L and 8 of these exceedances occurred across an 11 month span between May 1st, 2009 and April 20th, 2010 under licence MS-02-203, when the EQS was 0.065 mg/L and not varying with the phosphorus concentrations in the background water flowing into the IWL facility. It should also be noted that generally speaking, total phosphorus concentration in the effluent is decreasing, likely due to efforts from IWL to reduce the production of phosphorus in the aquaculture process.

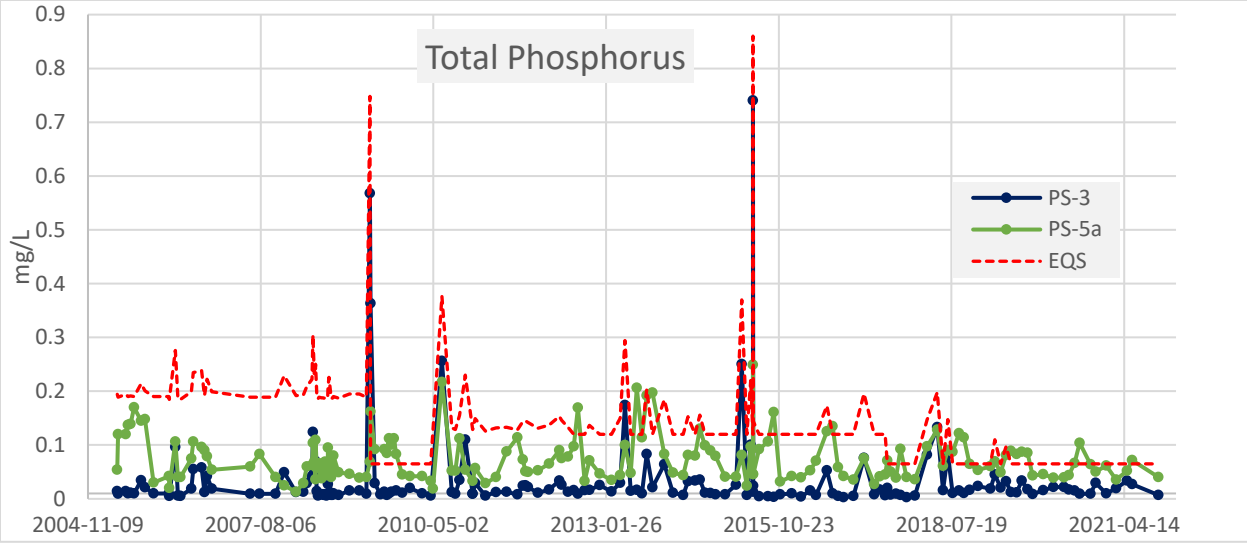

Figure 5. Total phosphorus data from 2005 to the most recent point in the WRB record, with EQS adjusted for licence changes over time.

As depicted above, total phosphorus at PS-5a generally tends to fluctuate between 0.01 and 0.2 mg/L while the EQS varies notably due to instances of elevated TSS in the background. In these instances, the Total Phosphorus EQS is adjusted to account for potential elevated phosphorus coming from upstream of the IWL facility. To do so, water at PS-3, the tail race from ATCO, is considered background water quality for PS-5a. When TSS at PS-3 increases above the 25 mg/L threshold, the EQS for Total Phosphorus increases and is defined as “0.065 mg/L above background”.

Table 8. Mann-Kendall test results by site and timespan assessed.

Site	Date Range	Trend	P Value
PS-3	2005-04-27 to Present	Positive, not significant	0.7439
	2005-04-27 to 2012-06-29	None, not significant	0.7082
	2012-06-30 to Present	Negative, not significant	0.9169
PS-5a	2005-04-27 to Present	Negative, not significant	0.5499
	2005-04-27 to 2012-06-29	Negative, not significant	0.3331
	2012-06-30 to Present	Negative, not significant	0.1159
PS-8	Entire Record* 2010-06-21 to Present	Positive, not significant	0.8399
PS-7	2005-04-27 to Present	Negative, significant	0.0097
	2005-04-27 to 2012-06-29	Negative, significant	0.0047
	2012-06-30 to Present	Positive, not significant	0.4868

Starting from PS-5a and moving downstream, total phosphorus concentrations were examined to determine how water quality downstream of PS-5a may have changed over time due to total phosphorus input from IWL operations. CCME has a Canadian Guidance Framework for Phosphorus which defines trophic levels based on the total phosphorus concentrations, as outlined in Table 9.

Table 9. CCME Guidance Framework for long term concentration of total phosphorus and the corresponding trophic thresholds.

Trophic Level	Total Phosphorus Threshold (mg/L)
Ultra-oligotrophic	<0.004
Oligotrophic	0.004 – 0.01
Mesotrophic	0.01 – 0.02
Meso-eutrophic	0.02 – 0.035
Eutrophic	0.035 – 0.1
Hyper-eutrophic	>0.1

As displayed in Table 9, the change between the lowest four ranges requires only a small change in total phosphorus concentrations, however it should be pointed that actual shifts between trophic statuses requires sustained concentrations over time.

Relevant to trophic status, WRB also completed a benthic invertebrate investigation using data available from IWL required benthic monitoring, which is discussed in section 3.4. Figure 6 displays the total phosphorus concentrations monitored at PS-5a, as well as two other stations downstream of this, PS-8 and PS-7 with the thresholds for total phosphorus trophic levels. It should be noted that the naming convention may be misleading, and that PS-8 is upstream of PS-7. Thus, the flow path travels from PS- 3 to, PS-5a, PS-8, finally to PS-7 where PS-3 is the upstream-most location and is considered to be background.

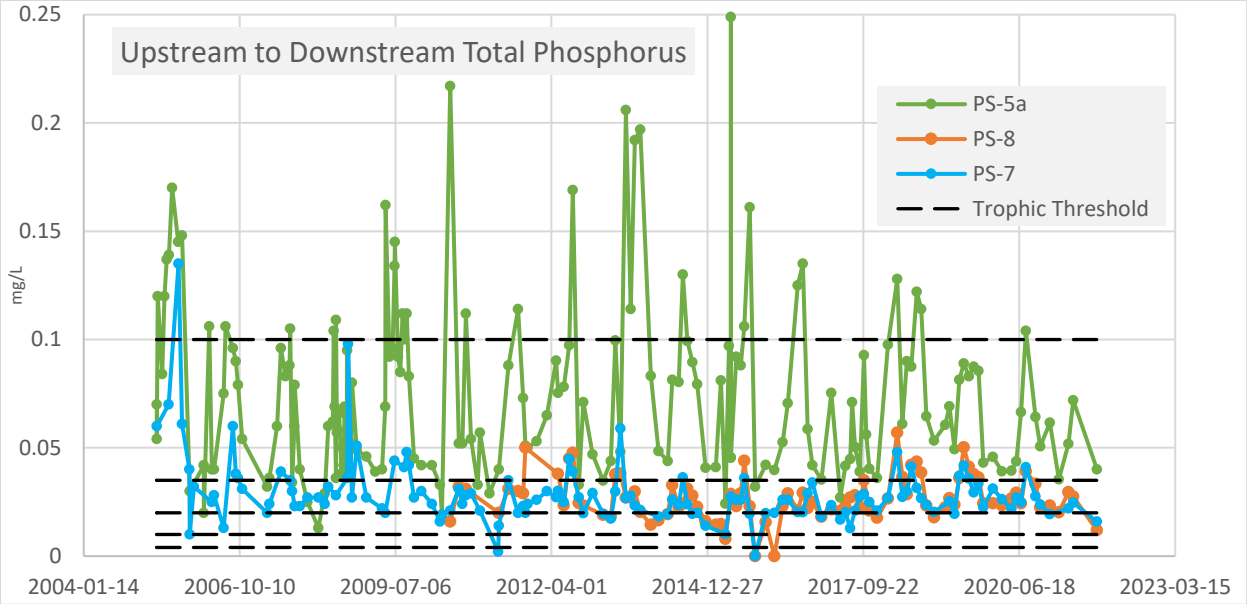

Figure 6. Long term total phosphorus for PS-5a and the two sampling locations next in the flowpath. Data is displayed against CCME Guideline Framework thresholds.

Figure 6 displays that PS-5a total phosphorus concentrations are the most variable of all parameters at all stations and exhibit eutrophic conditions most of the time with some concentrations in the hyper-eutrophic range. Comparatively, PS-8 and PS-7 tend to have total phosphorus concentrations fairly similar to one another that exhibit relatively stable meso-eutrophic conditions. PS-8 and PS-7 total phosphorus data seems to vary seasonally with higher values in April or May, when it hits eutrophic conditions and then returning below the 0.035 mg/L threshold back to meso-eutrophic conditions in the summer. There are also isolated instances where concentrations reached mesotrophic, oligotrophic and ultra-oligotrophic conditions, however these conditions are rarely sustained for more than one sampling event. At this time, WRB is not concerned that PS5a is impacting downstream phosphorus trophic status.

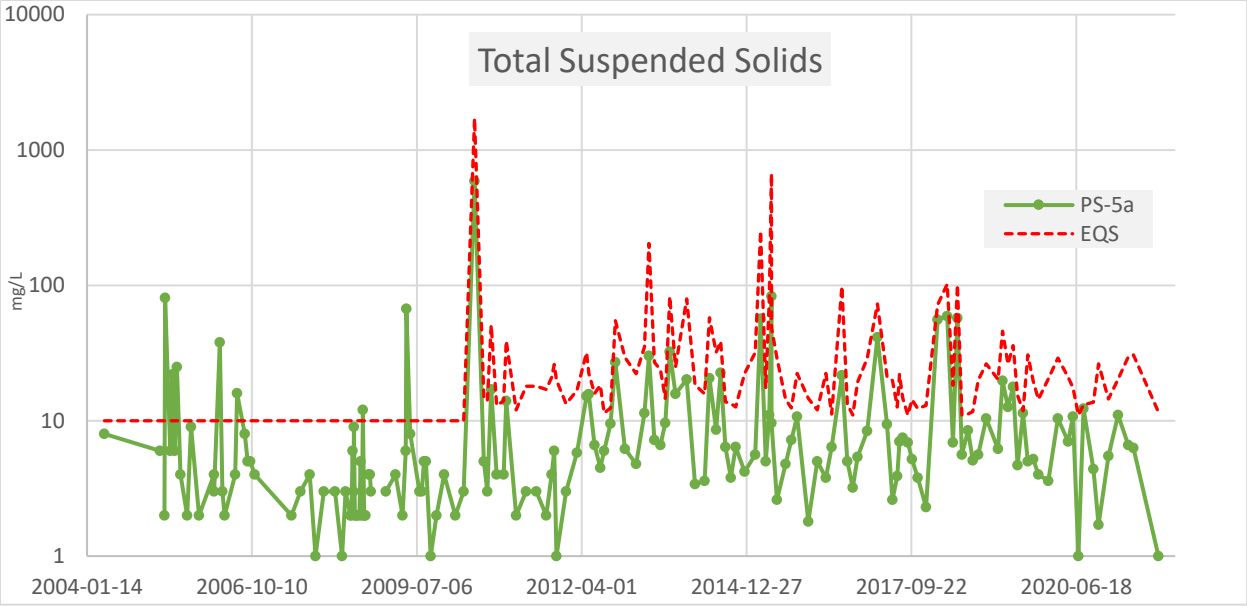

Figure 7. Long term concentrations of TSS at the McIntyre Creek compliance monitoring location PS-5a. Displayed on log-10 scale so that low concentration variation is visible.

Up until April 2010 the licence EQS for TSS was a static 10 mg/L, after which point the licence EQS was changed to a variable value to account for background TSS concentrations. The EQS is now defined as "10 mg/L above background", where background for PS-5a background is considered to be PS-3. This is displayed above in Figure 7 where the EQS become highly variable after April 2010. Pictured below in Figure 8 is the long term TSS data for the background location PS-3, which displays the impact of the variability of the TSS at PS-3 on the TSS EQS at PS-5a. TSS is often elevated at PS-3 and much more variable than the downstream PS-5a. This may be due to PS-3 being the tail race of the ATCO generating station and being in close proximity to Łu Zil Män (Fish Lake) Road. Turbidity and TSS vary naturally with precipitation and wind conditions, but hydro generation would also be expected to potentially elevate TSS. Additionally, year-round traffic on Łu Zil Män (Fish Lake) Road, the addition of sand in winter months and other general maintenance of the roadway and ditches are also factors likely to cause an increase in TSS in nearby creeks and create variability. In contrast, the settling pond located on the IWL facility is likely reducing TSS in effluent by allowing particles to settle out and concentrations to become more stable by the time effluent is discharged at PS-5a.

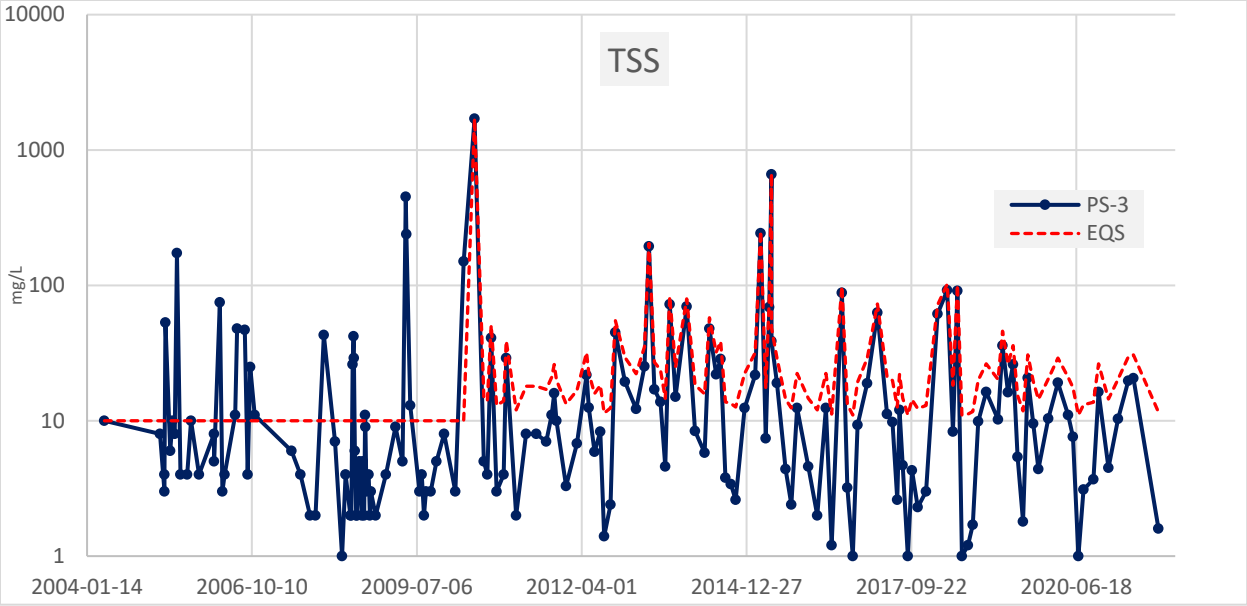

Figure 8. Long term concentrations of TSS at PS-3, which is the background sampling location for corresponding PS-5a. Displayed on log-10 scale so that low concentration variation is visible.

TSS is gradually decreasing along the flowpath in Fish Creek (PS-3 and PS5a) and McIntyre Creek (PS-8 and PS-7) as pictured in Figure 9. Water at PS-5a releases effluent with concentrations of TSS generally between 1 and 85 mg/L, and by the next sampling location TSS is generally below 10 mg/L. This decrease can be explained by the wetlands areas downstream of IWL where water moves slowly and where suspended particles settle out of the water. This includes the large wetland and pond beside the Copper Haul Road and Headpond 2 adjacent to Łu Zil Män (Fish Lake) Road, as well as more wetlands further down the flow path both before and after crossing the Alaska Highway. Water at PS-7 also tends to be below 10 mg/L TSS, with less variability than at the upstream station PS-8. There are instances of spikes in TSS at PS-8 and PS-7, but these are expected to be temporally and geographically isolated sources. One example would be the spike in TSS at PS-8 in September of 2018, which may have been due to a precipitation event or the construction work associated with the replacement of the Headpond #2 outlet control structure. Similarly, in June 2010 a TSS concentration of 590 mg/L was measured at PS-5a, however the next highest concentration measured was 83.2 mg/L, indicating that the 590 mg/L is likely an outlier that was similarly impacted by some temporally and geographically isolated source.

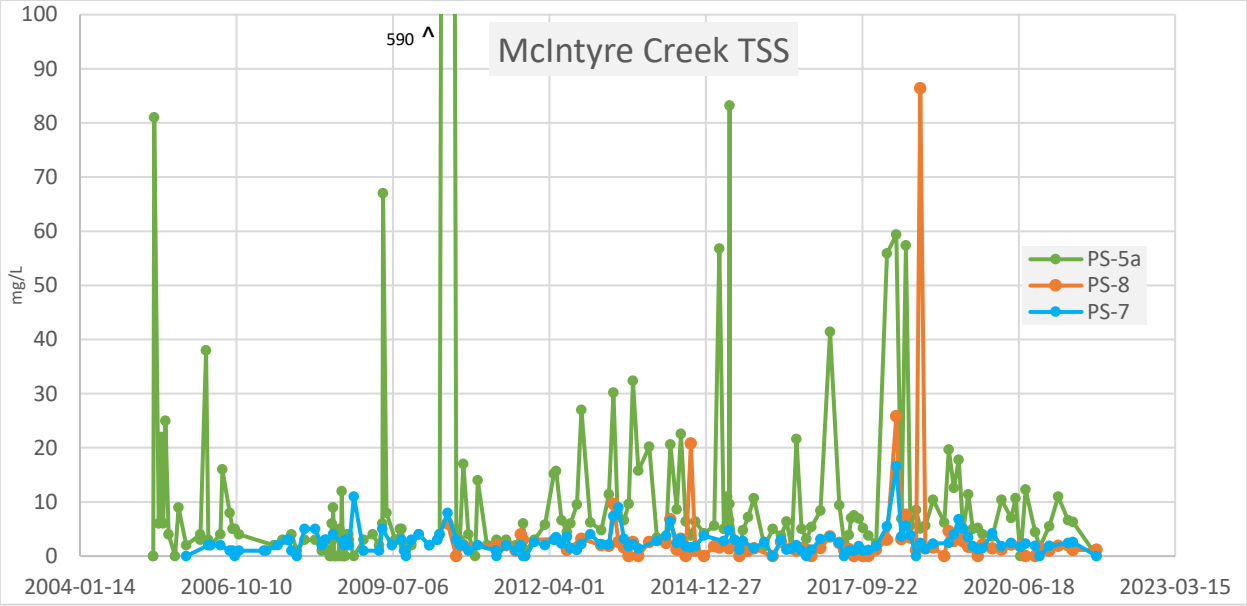

Figure 9. TSS concentrations moving from upstream compliance location PS-5a to Headpond #2 location PS-8 and finally to the downstream most location PS-7.

Nitrate is a licence parameter that has no EQS exceedances on record in the WRB database. It is to be expected on McIntyre Creek that PS-3 would have the lowest nitrate concentrations, and as displayed in Figure 10, from approximately June 2013 to present it does generally tend to have the lowest nitrate concentrations, though there are a number of steep spikes across the records. Interestingly, McIntyre Creek appears to gain nitrate as it moves downstream towards PS-8 and PS-7. This is evident by the fact that, especially in recent years, PS-5a and PS-3 have similar concentrations of nitrate, whereas PS-8 and PS-7 generally average anywhere from 2 to 3 times the nitrate of PS-5a, suggesting that there are nitrate inputs in McIntyre Creek that are not related to IWL. Because PS-8 and PS-7 appear to have very similar nitrate concentrations, it is likely that the source of nitrate input occurs downstream of PS-5a and upstream of PS-8. There is also a seasonal variation indicated by long term nitrate data where concentrations tend to increase to their highest in September and October then decrease into May and June each year. These seasonal trends indicate that nitrate likely comes from runoff in the watershed during rain season, where in winter when the runoff is almost non-existent nitrate concentrations are shown to be decreasing.

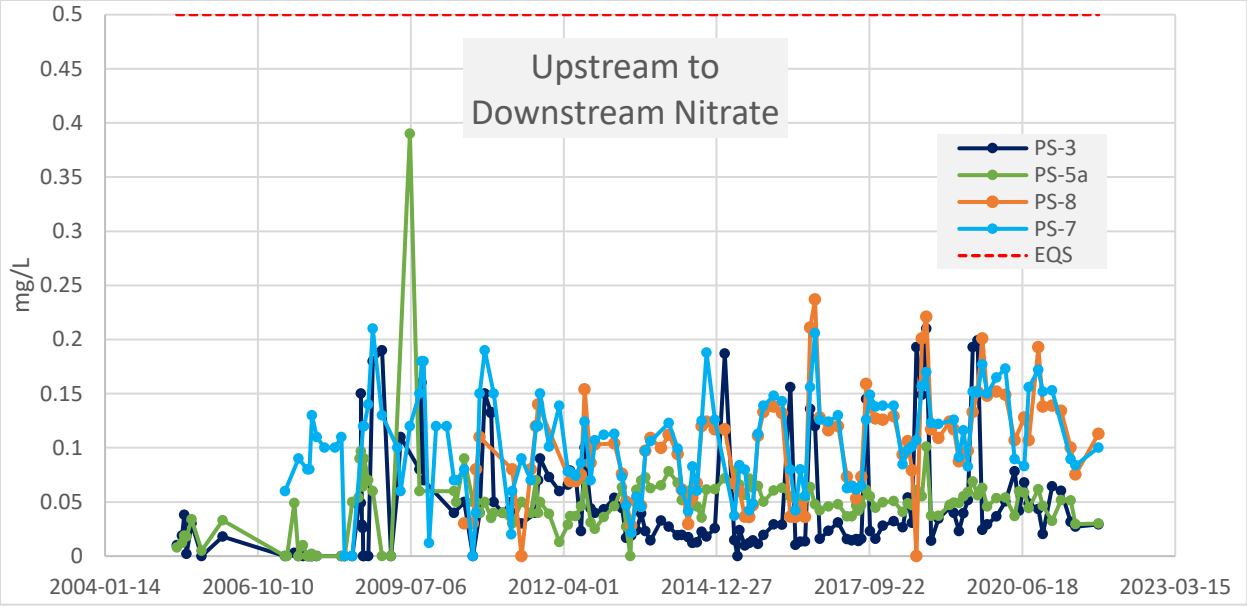

Figure 10. Long term nitrate concentrations at IWL monitoring locations on McIntyre Creek.

Similar to nitrate, ammonia has virtually no exceedances of EQS on record except for one exceedance in December of 2018 (Figure 11). Ammonia is seasonally variable at PS-5a and is generally anywhere from 4 to 30 times the ammonia of the next downstream station PS-8, however background ammonia concentrations at PS-3 are generally at or below detection limit, and PS-8 and PS-7 also have concentrations at or very close to detection limits. While IWL does contribute ammonia to McIntyre Creek, within the authorized range of concentrations, we are not seeing indications that the effluent from IWL is impacting downstream ammonia concentrations at PS8 and PS7. It is worth noting that although there are peaks in ammonia concentrations at PS7, the concentration upstream at PS8 is often lower than that observed at PS7, and therefore we do not believe that these peaks were caused by effluent release from IWL. As with other parameters, there also appears to be much less seasonal variability at the downstream sites.

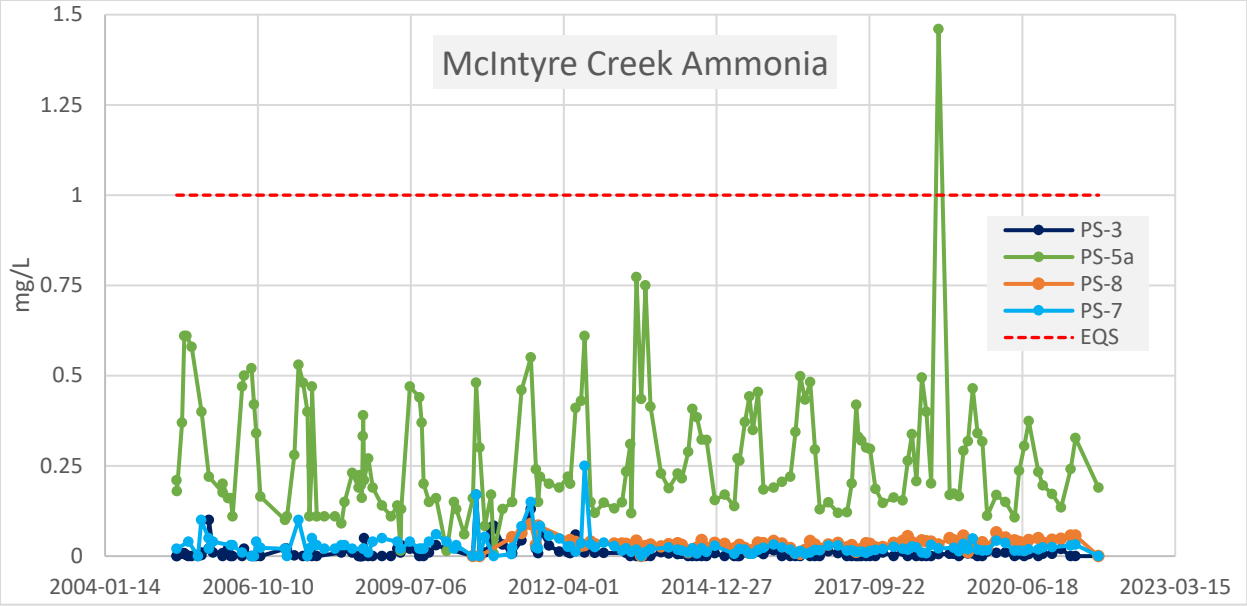

Figure 11. Long term ammonia concentrations at IWL monitoring locations on McIntyre Creek.

Figure 12 displays MS21-034 licence EQS from the October 2021 sampling in order from upstream to downstream moving left to right. As evident below and from Figure 10 there appears to be some source of nitrate in the McIntyre Creek reach that is contributing to nitrate concentrations, however nitrate from IWL is not impacting the downstream environment. Some ammonia was detected upstream of IWL impact at PS-6, however after mixing with effluent from PS-5a ammonia was not detected again in the flowpath all the way to the Yukon River. Phosphorus is highest at PS-5a in the McIntyre flowpath, though it decreases to at or near detection limit all the way to the Yukon River with only minor variability. TSS was variable throughout McIntyre Creek with no TSS detected at PS-5a and the highest TSS measured at McIntyre Creek upstream of Mountainview Drive, though relatively low at 6.8 mg/L.

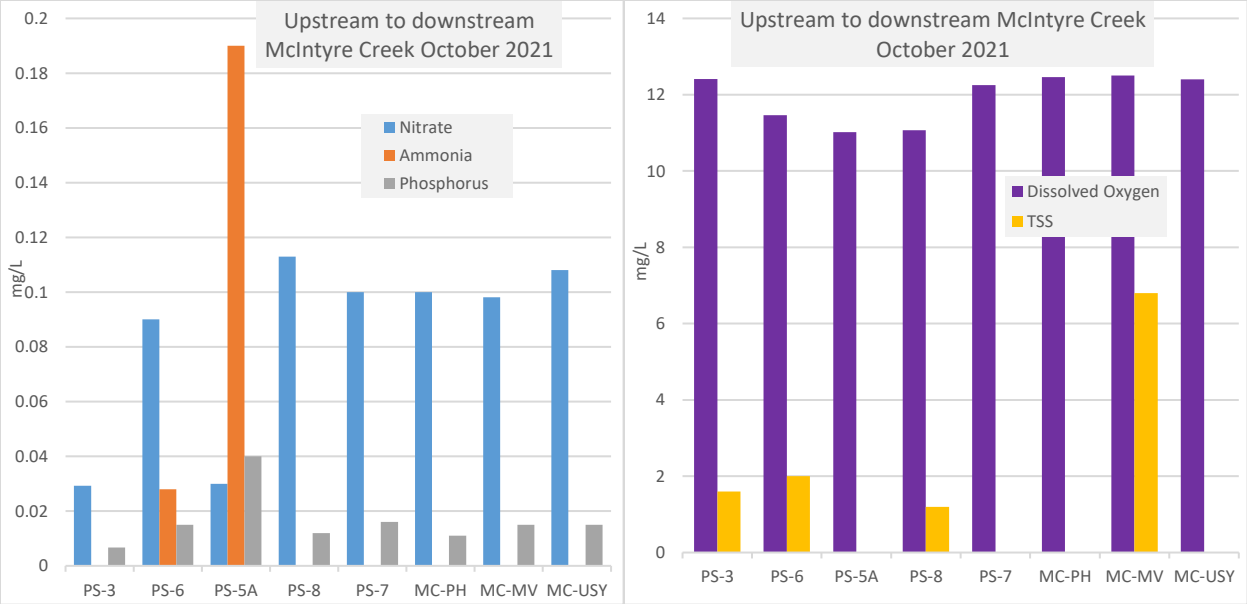

Figure 12. MS21-034 EQS parameters from October 2021 samples plotted moving upstream to downstream from left to right. Concentrations not displayed were below detection limits.

6.3 Benthic invertebrate investigation in McIntyre Creek

6.3.1 Measures of diversity

The Shannon diversity at all sites ranged from 1.23 to 2.87 (unitless and unbounded, greater number meaning greater diversity), while Simpson's diversity ranged from 0.52 to 0.92 (unitless and bounded between 0 and 1; greater number meaning greater diversity). Both measures were largely comparable, with changes in one reflected in the other.

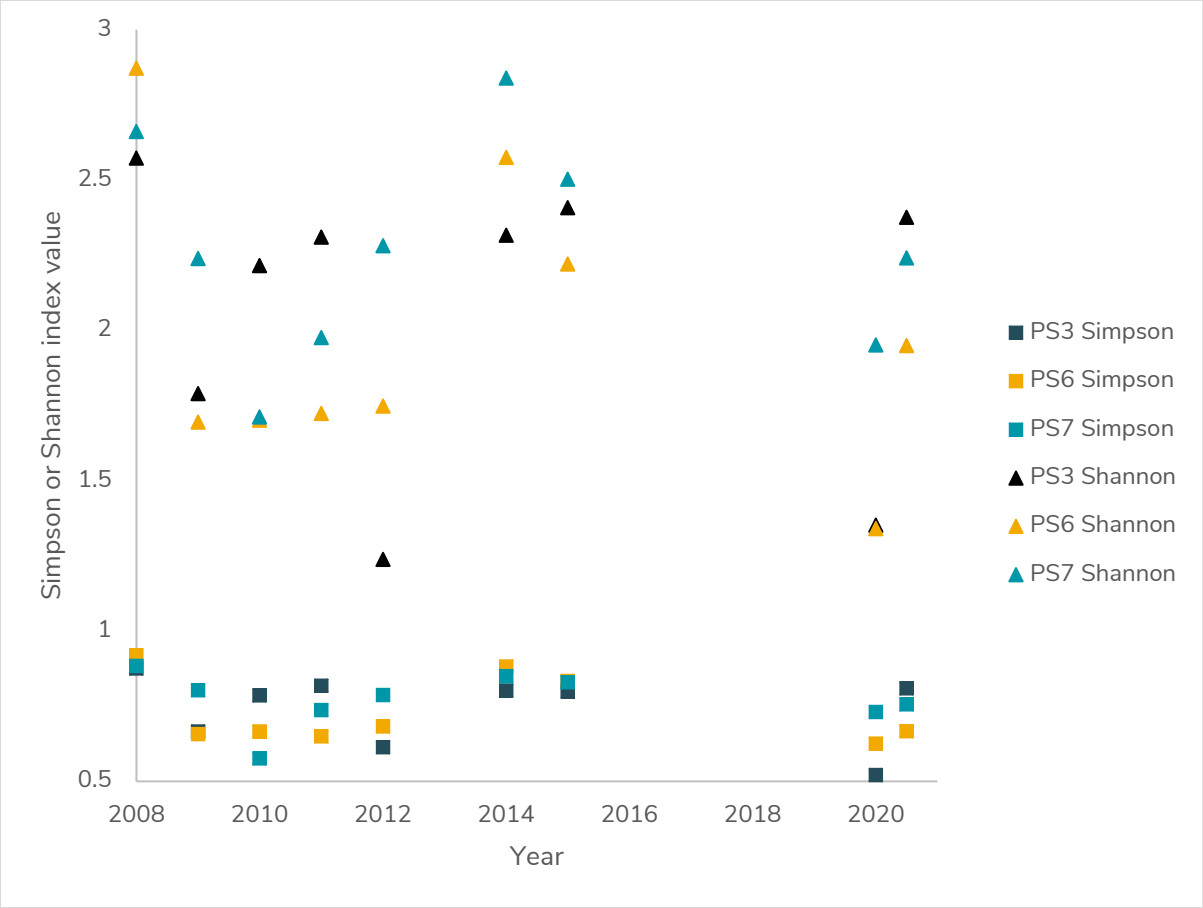

Figure 13: Simpson's and Shannon indices for each site between 2008 and 2020. The two indices respond similarly to changes in species/count. Y-axis is truncated; Simpson's index values range from 0 to 1, Shannon index values are unbounded.

Based on available information there appears to be no statistically significant increase or decrease in diversity at sites PS3, PS6, and PS7 and it does not seem that McIntyre Creek benthic diversity is impacted by IWL effluents. In all cases, Mann-Kendall p-values ranged from 0.90 to 1; Sen's slope 95% confidence intervals encompassed 0, with central estimates near 0 in all cases. However, these findings should be qualified with several caveats:

- Data is missing from years 2013 and 2016-2019. The resultant truncated time-series is likely too short to infer statistical significance of trends with any precision or confidence.
- Data prior to 2012 are from single samples, while later years are averages of three discrete samples. The high spatial heterogeneity of invertebrate populations

means that single samples are much more likely to result in drastic over or under-representations of average individual counts at any one site.

6.3.2 Measures of site similarity

Site similarity was assessed as a means of determining if the species assemblage and distribution of individuals between species differed between sites, and if this difference increased or decreased throughout the study period. Owing to the computations involved in diversity calculations these do not necessarily account for such changes: an ecological community could be changing, but with no change in diversity indices if the *number* of species and *distribution of individuals* remains identical. Therefore, measures of diversity cannot by themselves rule out impacts on ecological communities: the receiving environment may be *different*, but still *equally diverse* from a statistical perspective.

Baseline conditions may also be changing with time, especially in northern environments where climate change may be accelerated: this could affect measures of diversity and their underlying parameters (species and individual distribution) as well as species assemblages without any influence from industry or land use changes. Comparing the similarity/dissimilarity between sites and across time is therefore an indirect way of assessing whether a site downstream of a potential impact is changing in species assemblage and distribution of individuals, while inherently taking into consideration changing baseline conditions.

Of the three sites considered for analysis (refer to Methods for rationale), no significant trend in changing similarity (as measured by performing a Mann Kendall test on the Bray-Curtis dissimilarity) were found between sites PS3 and PS6 ($p=0.466$), or between sites PS6 and PS7 ($p=0.602$). However, sites PS3 and PS7 appear to be getting more similar with time ($p=0.0476$) (Figure 14).

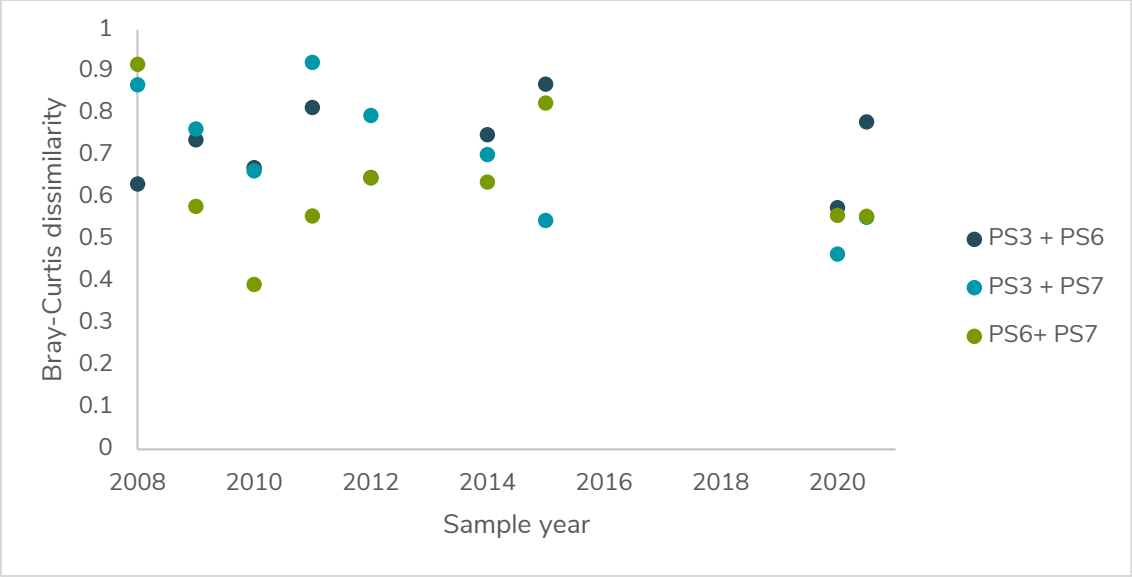

Figure 14: Calculated Bray-Curtis dissimilarity for pairs of sites from 2008 to 2020.

7. Porter Creek & Hidden Lake

Porter Creek is a unique case in this watershed in that all surface water flow ends at Hidden Lake. Hidden Lake is located in the Porter Creek neighbourhood between Porter Creek Secondary School, Holly Street, Boxwood Crescent and Hickory Street. Hidden Lake has exhibited significant fluctuations in water level in the past twenty years, where previously water levels appeared to be relatively stable. The lake has no surface outflow and aside from precipitation events the vast majority of incoming water arrives via Porter Creek, with minimal other surface inputs. Given that there was public interest, and the potential connection with IWL operations, WRB expanded the scope of the audit to include an assessment of historic Hidden Lake water levels, Porter Creek flows and a Hidden Lake water balance in order to explore the relationship between Porter Creek, IWL and Hidden Lake water levels. Figure 28 provides an artistic rendering of the Porter Creek and Hidden Lake system and the factors impacting hydrology in the area.

7.1 Land & water uses

WRB reviewed Government of Yukon's current map data via GeoYukon to get a general overview of land and water uses in the region of Porter Creek and Hidden Lake that could potentially impact water quality in the area. This data is publicly available online via

GeoYukon and includes the Government of Yukon's authoritative and current map data. Table 10 below lists the major or significant land and water uses that were identified using this tool and help to provide some insight into the expected impacts these uses may or may not have on water quality.

Table 10. Land and water uses in the Porter Creek catchment.

Land or Water Use Type	Details
Historical Land Uses	Historic mining land use can be found in different areas along Porter Creek west of the Alaska Highway, including historic Pueblo Mine near IWL. Historic soil stripping also occurred at Versluece Meadows.
Municipal Landfill	Historic Whitehorse Municipal Landfill (War Eagle) located on the west side of the Alaska Highway at the former site of the Pueblo Mine.
Contaminated Sites	Sites currently considered contaminated along the west side of the Alaska Highway including a waste oil pit at the currently operating Whitehorse Municipal Landfill, as well as a residence on Lodgepole Lane deemed contaminated in 2020 due to petroleum hydrocarbons found in soil.
Remediated Sites	A number of remediated contaminated sites in the Porter Creek neighbourhood, mostly residential fuel and heating oil spills.
Drinking Water Wells	There are a handful of private domestic drinking water wells at residences in the Porter Creek area.
Residential	The Porter Creek neighbourhood is a dense residential area that encompasses Hidden Lake and a large portion of Porter Creek between the Alaska Highway and Hidden Lake.
Recreation	Numerous footpaths exist in the area surrounding Hidden Lake, and Hidden Lake is utilized for recreational fishing.

7.2 Water quality

IWL has a water licence authorizing them to use water from the headwater of Porter Creek for the purpose of aquaculture and discharging "used" water, or effluent, back into Porter Creek. All of the water from Porter Creek PS-2b flows through the IWL facility. It should be noted however that the water licence MS21-034 specifies a maximum volume of water from Porter Creek that IWL can use, and the effluent discharged from IWL also has specific quality requirements as outlined in the current

water license. These requirements are known as Effluent Quality Standards (EQS) which are applied to specific discharge points downstream of the facility. In the case of Porter Creek, the EQS are applied at the site PS-2b, beside Haeckel Hill Road. The complete EQS have been outlined in Table 6. It should be noted that the EQS listed in Table 6 only apply from June 30th, 2017, and Table 7 above outlines historic Total Phosphorus EQS from previous water licences.

As outlined in Table 6 the EQS for Total Phosphorus and TSS are dependant on respective concentration upstream at station PS1. In other words, PS1 is being considered as background. The EQS varies with what is observed in background water quality. WRB possesses sampling records for IWL as far back as 1988, however early records are sparse and are not useful for long term trend analysis, in part because sampling locations have changed slightly over time. These old records are not presented in this report. Additionally, the EQS for phosphorus have varied across the different iterations of IWL's water license over the years, and these changes have been displayed in Table 7.

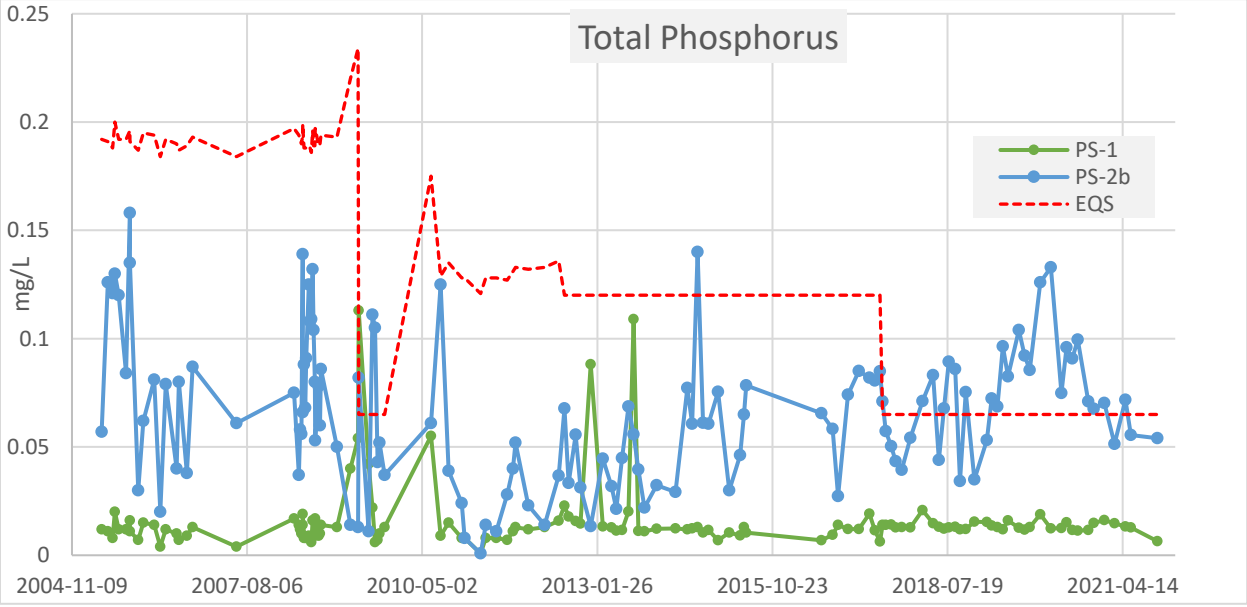

Figure 15. Total phosphorus data from 2005 to the most recent point in the WRB record, with EQS adjusted for licence changes over time.

With respect to EQS parameters, management of phosphorus has proven the most difficult. Figure 15 displays phosphorus values from April 2005 until the most recent

record in the WRB database. During this timeframe the various iterations of phosphorus EQS throughout the licenses have been exceeded a total of 28 times at PS-2b, and Total Phosphorus concentrations at PS-2b have generally increased since 2011. Due to the recurring exceedances since the lower EQS applied, IWL submitted a phosphorus management plan in September 2022 that outlines what actions they will take in the event of a phosphorus exceedance in Porter Creek. IWL now has the capacity to analyse phosphorus samples on site, which will support timely implementation of mitigating actions. The phosphorus management plan submitted by IWL indicates that the rates of fish feed is the largest contributor of phosphorus in the effluent, thus mitigations are largely focused on active sampling and on-site monitoring of phosphorus and adjusting feed levels accordingly.

Total suspended solids (TSS) concentrations have been relatively stable and report only one known exceedance in September of 2010. The elevated TSS EQS in June 2010 that is exhibited in Figure 16 is caused by a TSS spike in the background, in this case at PS-1, and was potentially due to a precipitation event, bank erosion or some other process upstream of the IWL facility.

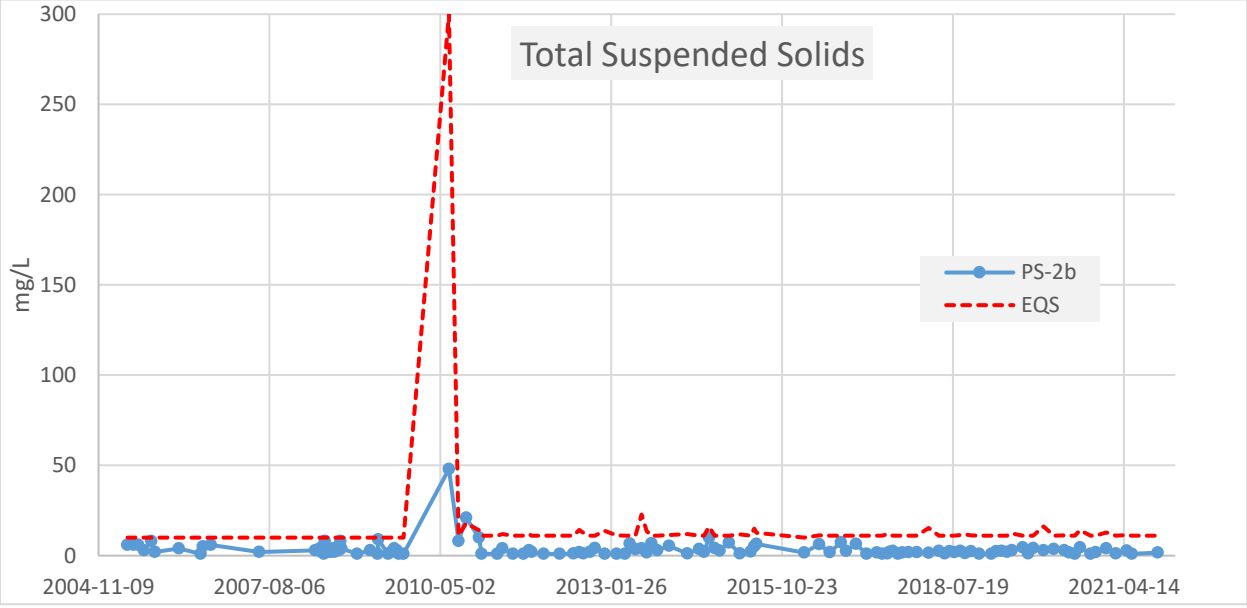

Figure 16. Concentrations of TSS at the Porter Creek compliance monitoring location PS-2b and associated EQS.

Total nitrate (Figure 17) and total ammonia (Figure 18) concentrations in effluent discharged to Porter Creek have also remained under the EQS threshold for the period WRB has on record with no exceedances. Similarly, pH and Oil & Grease EQS have never been exceeded. It should be noted however that nitrate and ammonia were very variable in early years and have since become more stable. Similar to Total Phosphorus, it seems that nitrate and ammonia are also trending upward from 2013 to now. It is unclear why that trend is observed but it is likely related to the IWL operation. However, these trends in nitrate and ammonia are not causing exceedance of the EQS and meet all license requirements.

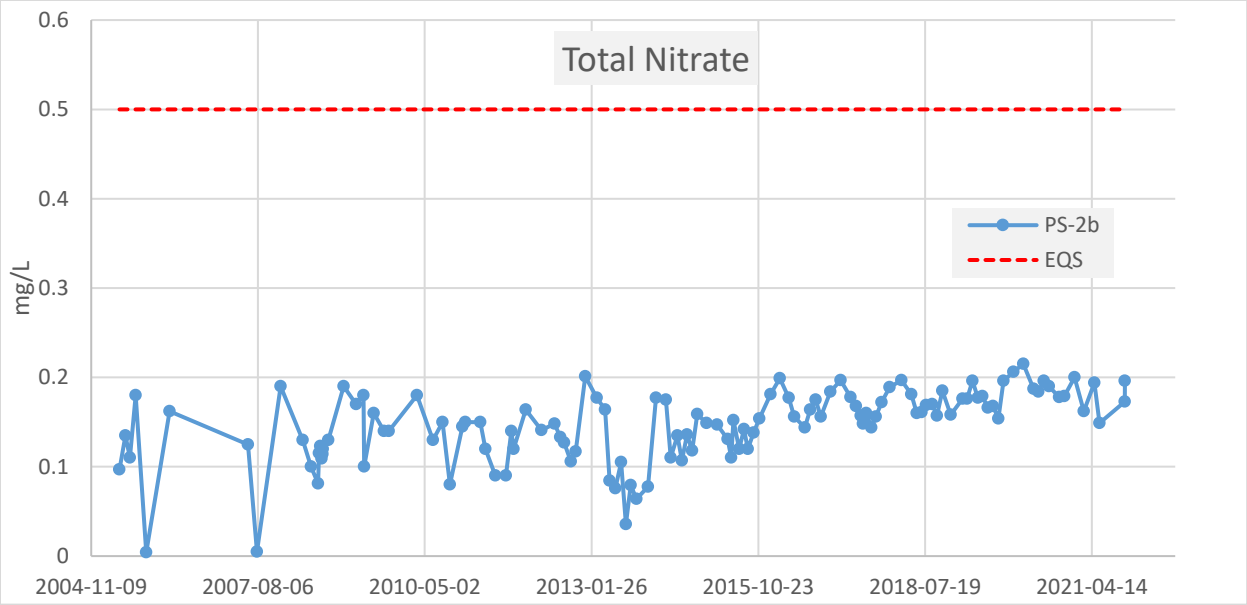

Figure 17. Concentrations of Total Nitrate at the Porter Creek compliance monitoring location PS-2b and associated EQS.

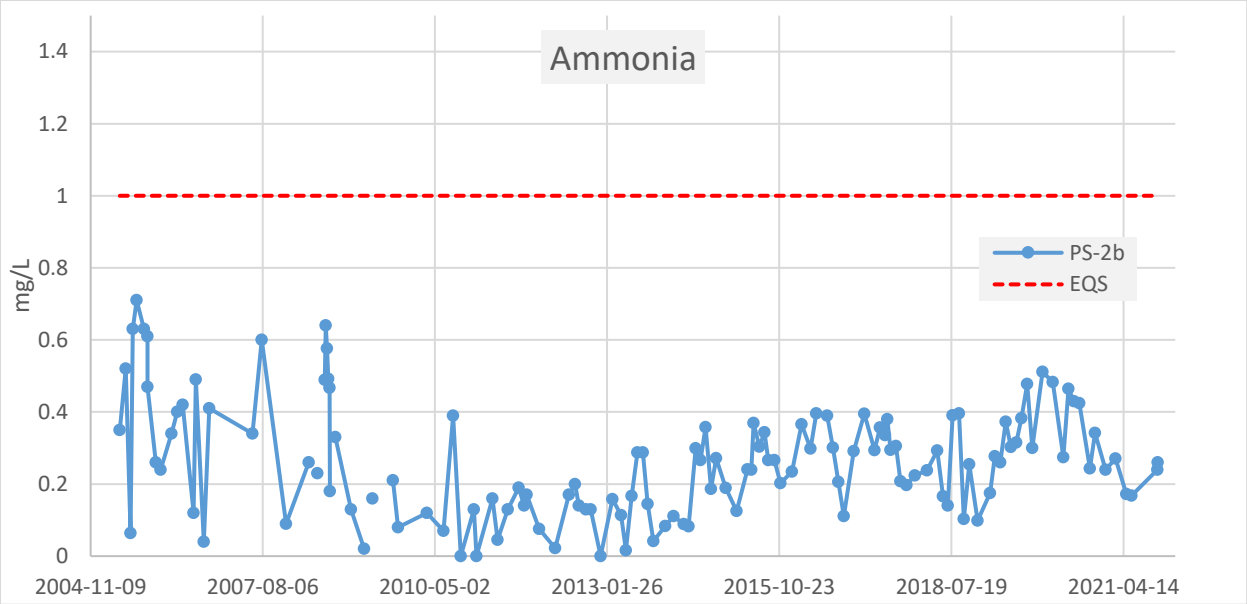

Figure 18. Concentrations of Ammonia at the Porter Creek compliance monitoring location PS-2b and associated EQS.

Figure 19 displays nutrients, TSS and dissolved oxygen concentrations in the samples collected by WRB in October 2021. Sampling locations are displayed from upstream to downstream in Porter Creek at the IWL compliance location, Whitehorse municipal landfill access road, downstream of the Centennial Street crossing, upstream of Holly Street crossing and in Hidden Lake. The October 2021 was the only time all five locations have been sampled during the same monitoring event and it is meant to provide a snapshot of water quality as water flows down Porter Creek. On that day, Ammonia and TSS were below detection limit by the time Porter Creek reached the landfill access road and remained below detection limit except for a detection of TSS at the Holly Street location, likely due to some localized source such as roadway crossings or natural bank erosion in a specific location. Nitrate increases slightly then decreases again proceeding downstream while phosphorus decreases significantly (almost by half) in the section between IWL and the landfill access road and continues to decrease more gradually to Hidden Lake.

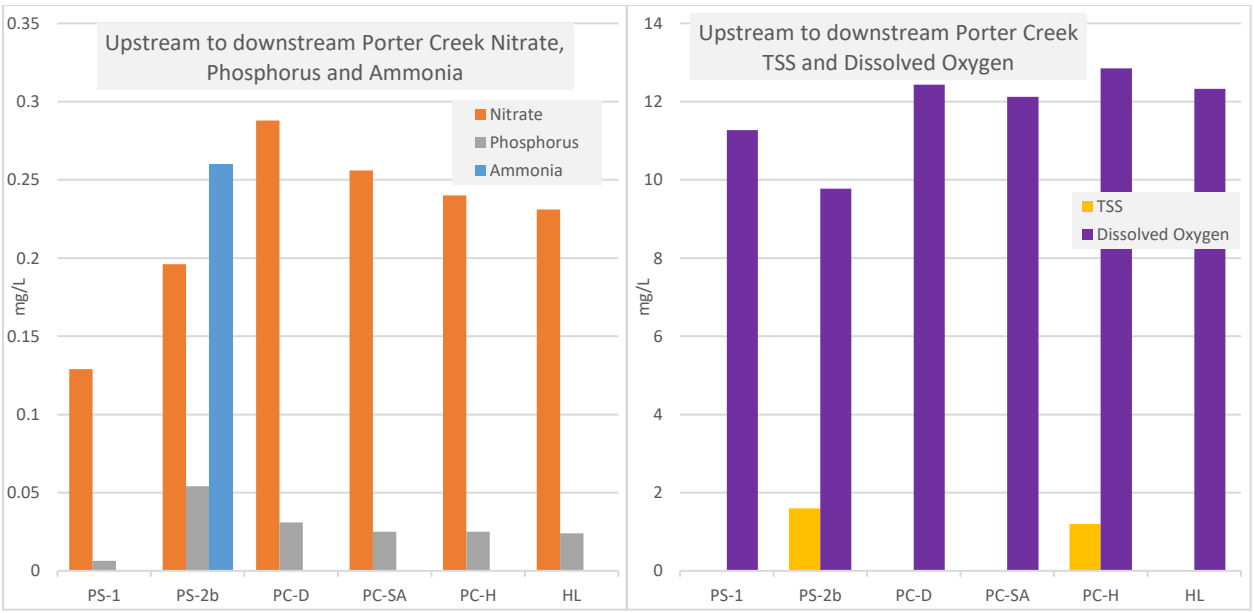

Figure 19. MS21-034 EQS parameters from October 2021 samples plotted moving upstream to downstream from left to right. Values not displayed were at or below detection limit for analysis.

The CCME guideline for nitrate is 13 mg/L for the protection of aquatic life over the long-term and the observed nitrate concentrations in Porter Creek are well below this guideline. The guideline for Total Ammonia, (based on a pH of 7.5 and a temperature of 10°C) is 32.4mg/L ammonia as N. Even the highest concentration observed at PS-2b is approximately an order of magnitude below the CCME guideline. Therefore, the data observed during the October 2021 sampling event indicates that nitrate and ammonia from IWL are unlikely to cause a significant impact on the aquatic ecosystem. CCME does not have a guideline associated to TSS, however the fact that TSS concentrations from PS-2b decrease very significantly and become undetectable at the next downstream PC-D (by the landfill access road) indicates that the release of TSS from IWL is likely not a concern as suspended solids appear to settle quite rapidly. Phosphorus is a nutrient and is not toxic, however phosphorus and phosphate drive the eutrophic level of a water body. As such, CCME has published a Canadian Guidance Framework for Phosphorus which includes trigger ranges for total phosphorus but not a single guideline. These trigger ranges were presented above in Table 9. During the October 2021 sampling event, PS1 had total phosphorus measured at 0.0065 mg/L, then the water flows through the IWL facility and is discharged at PS-2b with a concentration of 0.056 mg/L then it comes down at 0.031, 0.025, 0.025 and 0.024 mg/L respectively at PC-D, PC-SA,

PC-H and in Hidden Lake. A fish farm is expected to release total phosphorus in the water, as is the case with IWL, where phosphorus concentration jumps up 3 levels of eutrophication as it is being used in the fish farm. Yet, it is difficult to conclude if this is a detrimental impact to the creek as phosphorus is not toxic at these concentrations. Phosphorus, along with nitrogen and temperature support the development of algae, which in turn consumes oxygen. As such, Dissolved Oxygen (DO) is a useful indicator of eutrophication. As expected, DO is decreasing as the water goes through IWL, going from 11.27 mg/L upstream at PS1 to 9.77 mg/L at PS2b, which corresponds to 72.1% of oxygen saturation, (i.e. oxygen is still available to benthic invertebrates and fish). As the water moves downstream, DO increases to levels above PS1, as presented in Figure 19. As indicated by the October 2021 sampling results, the load of phosphorus from IWL does not seem to create lasting effects on DO in Porter Creek.

7.3 Hydrology

7.3.1 Porter Creek

7.3.1.1 Existing hydrological record

The modern Porter Creek emerges from several seeps at the IWL facility, and so the flows entering and leaving IWL can be reasonably defined as representative of the headwater of Porter Creek. Flows at the PS-2b location are measured monthly using a weir, immediately downstream of the IWL facility where the creek crosses Haeckel Hill Rd. Flow monitoring also occurs typically two to three times a year during the open water season as part of monitoring of the Whitehorse Landfill. Landfill monitoring stations PC-US PC-MS, and PC-DS have the longest records, whereas other sites have periodic data. Additionally, in the downstream portion of the creek (stations PC-D and PC-H), flow was monitored from 2004-2007 by WRB. All known Porter Creek monitoring comprises discrete 'point in time' measurements taken by flow meter, salt dilution, or in the case of PS-2b, weir measurement.

Flow data from these stations is summarized in Figure 20. Caution should be used when making direct comparisons between sites because of the varying sampling periods and frequencies. However, it is worth noting that the uppermost landfill monitoring station

(PC-US) is located at essentially the same location (other side of the road) as PS-2b. Flows at these locations should be the same, but there is higher flow being reported from PC-US, indicating that there is some notable degree of error associated with measurements at one or both stations.

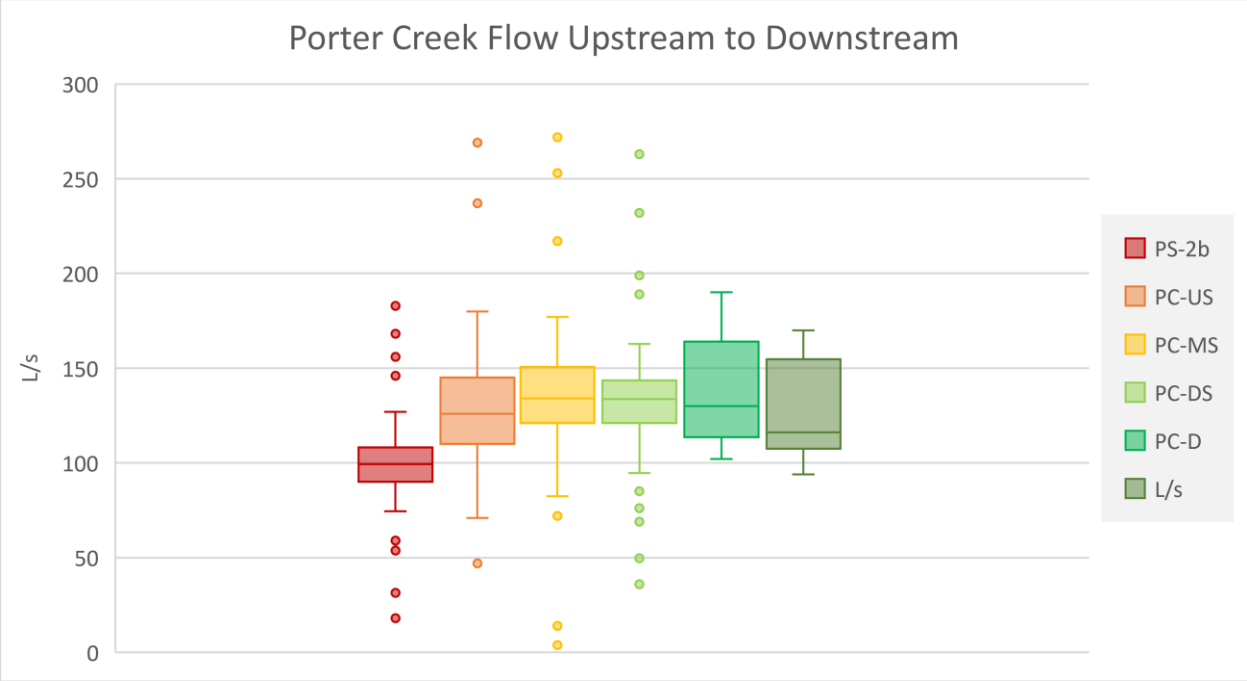

Figure 20. Summary of all flow data available to WRB from upstream to downstream (left to right) on Porter Creek.

Despite the uncertainty with these measurements, there are notable conclusions that can be drawn from this data:

1. Flows in Porter Creek are generally not seasonally variable. Groundwater discharge to Porter Creek at IWL provides a steady supply of flow that does not change significantly from summer to winter (as indicated by PS-2b flows).
2. The rate of flow in Porter Creek does not appear to substantially increase or decrease from upstream to downstream. There may be short-term exceptions to this (e.g. due to heavy rain events and snow melt); however, the landfill monitoring in particular appears to indicate relatively steady flows along that section of the creek.
3. Finally, flows in Porter Creek appear to be consistently greater than 100 L/s, the relevance of which to Hidden Lake is discussed more in section 7.3.2.

Understanding how flows may have changed over time in Porter Creek is challenging. The longest record of flow monitoring for the creek comes from the weir measurements performed by IWL as a condition of their water licence. PS-2b data goes back to 2003, and during that time there has been no notable change in flows reported over time (Figure 21). Prior to that, IWL reported flow from station PS-2.

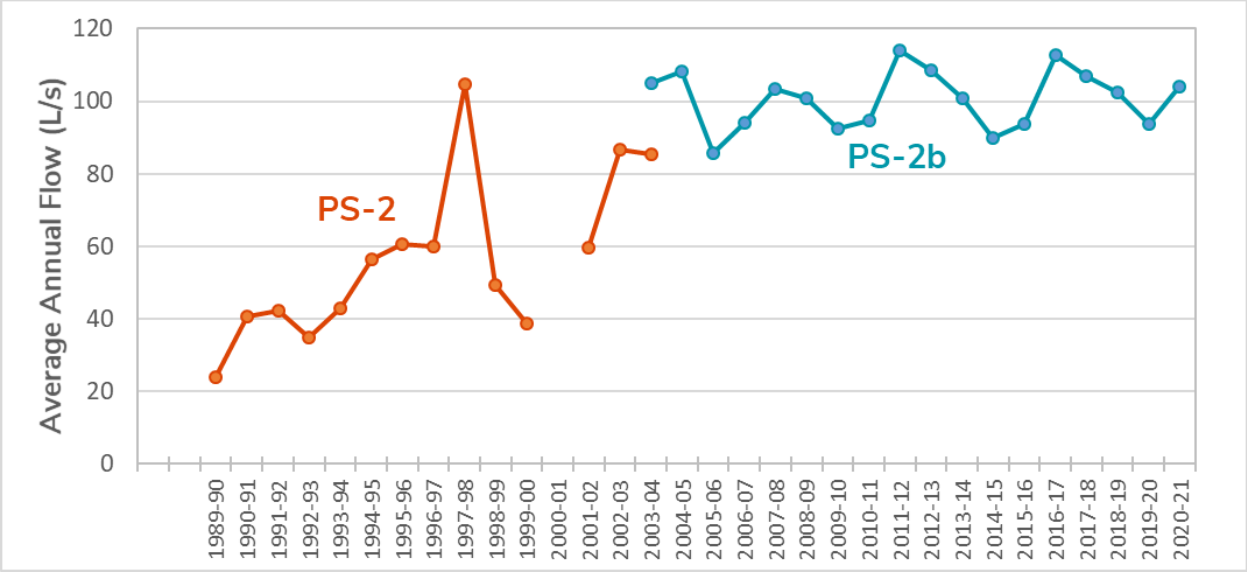

Figure 21. Average annual flows reported from Icy Water's at stations PS-2 and PS-2b expressed over water year (October-September). The number of reported flows for each year varies between 2 and 14.

Previous water licences (e.g. IN95-001) defined PS-2 as "Outflow from lower settling pond". While it is apparent from the MS02-203 water board hearing transcripts that PS-2 did not capture all of the flow exiting the facility, it is not clear to the authors of this report what flow wasn't captured at PS-2 and why flows recorded at PS-2 may have varied so much from year to year (Figure 21).

When the flow monitoring station was switched from PS-2 to PS-2b there were discussions around discrepancies between flows reported by IWL and those measured during past WRB audits (MS02-203 Environmental Screening Report, 2004). Additionally, it was noted at the time that flows at PS-2 were operating above authorized limits and these authorized volumes were increased with the issuance of water licence MS02-203 (MS02-203 Environmental Screening Report, 2004).

If flows had increased at the outlet of IWL (measurements of which are significantly uncertain), it is highly unlikely that the IWL operation influenced these flows in any significant manner. IWL is a flow-through operation with very minimal storage capacity: what goes into the facility largely goes out of the facility at the same rate of flow. The one possible mechanism to increase flows to Porter Creek would be if the facility was using Fish/McIntyre Creek water and discharging it onto the Porter Creek side. This was a topic of discussion in 2004 and, in fact, was a recommendation of the screening report that Porter Creek and Fish/McIntyre Creek waters be kept separate; however, the Yukon Water Board determined that "based on evidence presented by IWL at the hearing that the two water supply system are not connected, the board is satisfied that no further requirement is warranted" (MS02-203 Reasons for Decision).

During the WRB site visit in 2021, there was overflow occurring at the time between out of Pond B, which we understand to report to a ditch that eventually runs into Pond C; as such, this would represent water switching catchments to Porter Creek. Regardless, the overflow was small at the time of the visit and, presuming that larger overflows are not typical, this wouldn't be expected to be a significant contribution.

7.3.1.2 Porter Creek in 2021

The lower portion of Porter Creek experienced unusually low flows in the summer of 2021 despite normal flows being reported for the upper portion of the creek. IWL monthly reporting of flows from the PS-2b weir between May and September 2021 averaged 103 L/s (2003-2020 average for that period is 105 L/s). Additionally, the winter snowpack in the region was above normal (Government of Yukon, 2021). Despite this, WRB received several calls from Porter Creek residents from June to August who observed unusually low flow (or no flow) in portions of the creek from Dogwood Street to Hidden Lake. Some of these residents observed fish stranding and deaths.

In response to the first resident call, WRB staff walked large portions of the creek on June 8th (Appendix B). At this time, the Porter Creek culvert under the Alaska Highway and all portions of the creek further downstream to Hidden Lake contained very minimal flow. Conversely, flow in the creek further upstream at the culvert of the landfill access road was greater, and in the range of what would be expected. The portion of the creek

that parallels the Alaska Highway between the landfill access road and the highway culvert was largely flooded as a result of numerous beaver dams.

WRB continued to visually observe the creek throughout the summer and collected water level data from the creek upstream of Holly Street from late-May to mid-October. The location of the logger turned out to be strongly influenced by backwater effects caused by a barrier upstream of the culvert; however, the data do provide a general sense of periods of higher and lower flow. Two additional beaver dams were also observed downstream of Holly Street such that, even during periods when flow was observed in the Holly Street culvert, there was often no surface water connection to the lake.

Based on these observations and the logger data, WRB has a high degree of confidence that there was no flow entering Hidden Lake from July 7th through August 2nd, with the exception of a two-day period on July 27-28 where there was a brief rainfall response. By late September, flows appeared to be more steadily increasing in the lower portions of the creek. On September 30th, water was observed to be overtopping the channel between Holly Street and the edge of Hidden Lake as a result of a beaver dam, causing water to flood portions of the 'overflow' section of the lake which is typically only underwater at very high lake levels. This formed an alternate channel in which flow was reaching the lake. From October 4th until the water level logger was removed from the creek on October 14th, creek levels were at their highest level of the season.

7.3.2 Hidden Lake

7.3.2.1 Historic lake levels

Air photo and satellite image analysis of the lake area over the past 75 years shows that Hidden Lake has historically been much smaller than it has been over the past decade. Prior to 2010, all available images of the lake show an area less than 18,000 m^2, including occurrences in 1946 and 1985 where the lake had dropped enough to create two separate pools (Figure 23). Conversely, images between 2014 and May 2020 show lake areas between 33,000-45,000 m^2. A lake area of 33,000 m^2 also roughly corresponds to a level above which the lake begins to flood the area northwest of the basin typically

occupied by the lake. Above this level, relatively small increases in lake level cause relatively large increases in lake area.

The air photos and imagery analysis only cover a point in time during open water, and while at least one image is available in every decade back to the 1940's, this does not capture any variation, that may have occurred between observations.

The air photo analysis supports findings of the Porter Creek Experimental Science Program (PCES), a science program based out of Porter Creek Secondary School, which reported an observed rise in Hidden Lake of 3m from 1994-2012 (PCES, 2012), and concluded the lake area had not been so high in at least 130-140 years based on the age of trees that were dying off from rising water levels (PCES, 2012).

The PCES program also documented in 1994 that the lake had completely dried up under the ice in winter and resulted in mass fish die-off (PCES, 2022). This was said to occur over several winters and was attributed to a lack of inflow to the lake caused by icing effect overflow into Versleuce Meadows, ultimately a result of soil stripping in the meadows, according to PCES (PCES, 2022).

The recent high water levels in Hidden Lake were measured as part of a 2019 study by Morrison Hershfield, which included surveys of the lake (Morrison Hershfield, 2019). The Challenger Geomatic survey in June 2019 reported the lake level at 706.0 masl (Morrison Hershfield, 2019). In 2020, residents in the area started to report declining water levels in the lake, and WRB monitored these levels through the 2021 open water season.

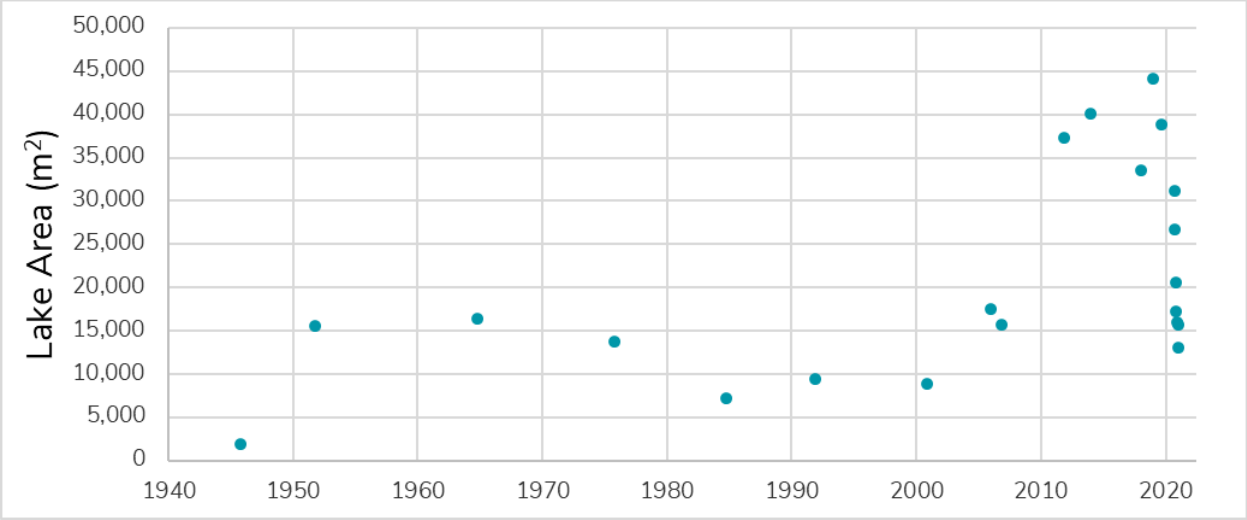

Figure 22. Lake areas measured from air photograph and satellite image analysis. Sources of images included: Government of Yukon air photos (GeoYukon and EMR Library), Government of Yukon satellite images (GeoYukon), ESRI World Imagery Wayback, Google Earth, and Sentinel Hub.

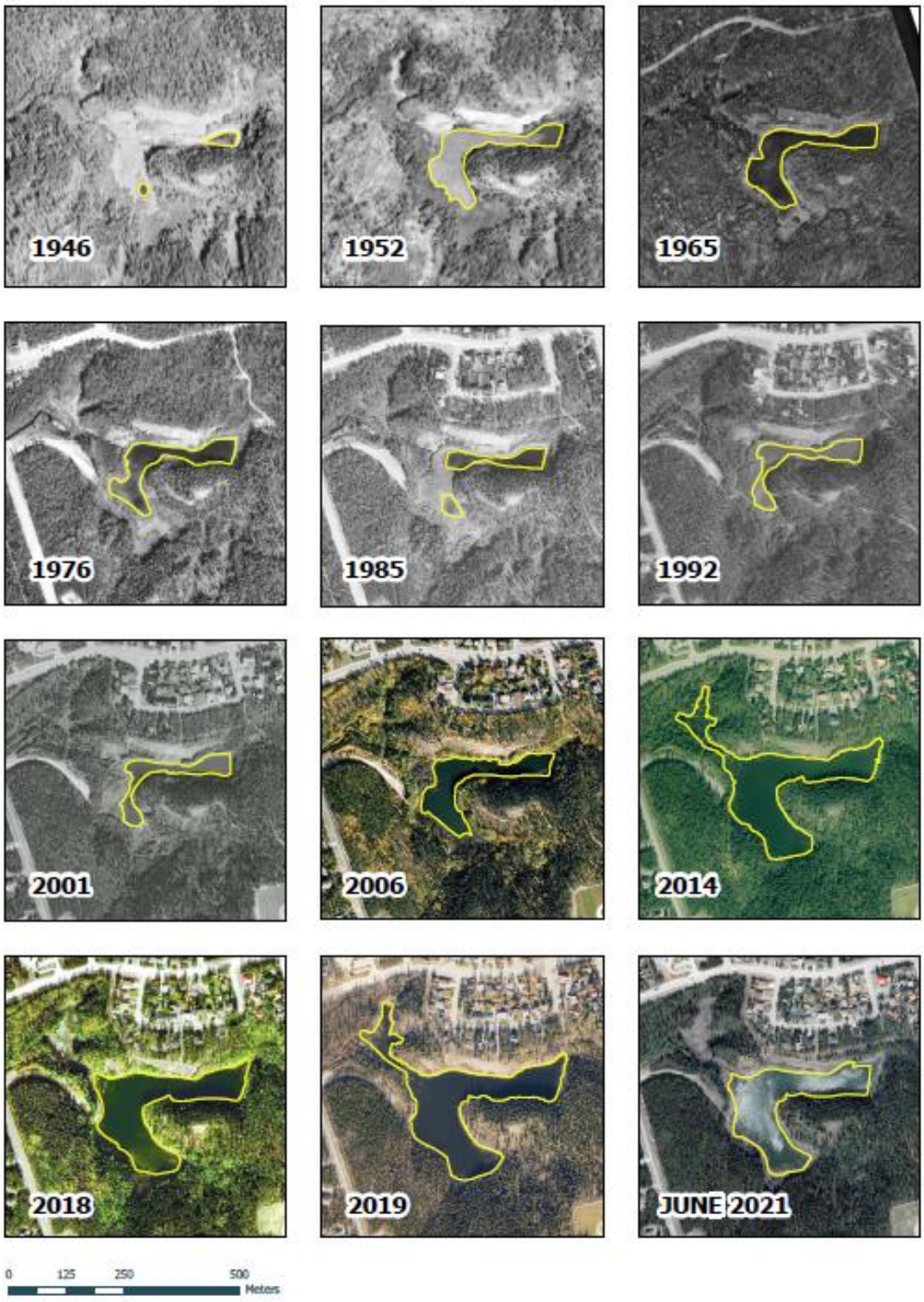

Figure 23. Air photograph and satellite images of Hidden Lake in the Porter Creek neighborhood. The outline of the lake was delineated manually in each case to calculate a lake area. A total of 20 images were analyzed.

7.3.2.2 Hidden Lake in 2021

WRB installed a Solinst water level logger and barometric logger on the north side of Hidden Lake on May 28, 2021. The data were converted to geodetic elevations based on a stage elevation survey conducted on September 8, 2021 utilizing the benchmarks available from the 2019 Challenger survey. Unfortunately, a month-long gap in the data occurred from water levels that fell below the elevation of the logger. To account for this dewatering as precisely as possible, WRB found the logger dry, re-surveyed the water level and de-wetted logger as accurately as possible and re-deployed the logger in the lake.

Water levels dropped rapidly in early June, decreasing by 1 m within the first 15 days of monitoring. A steady decline continued through most of the summer with a total drop of approximately 3.3 m from the start of monitoring to the lowest level at the end of September. Water levels then began to increase, corresponding to an increase in observed inflow in early October, rising by 85 cm within a four day period prior to the loggers being removed.

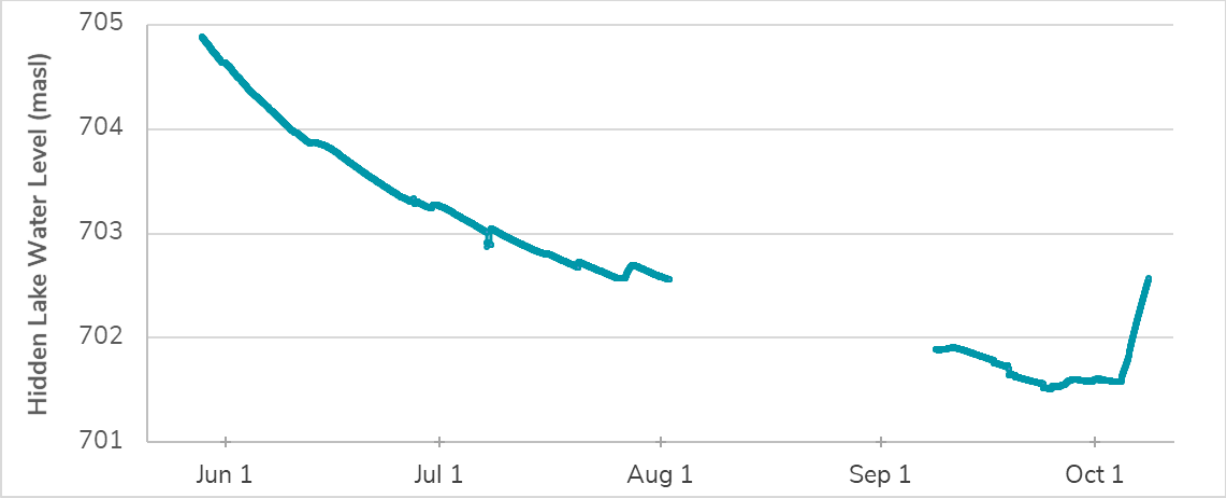

Figure 24. Water level measured by WRB in Hidden Lake from June 2021 to October 2021.

7.3.2.3 Hidden Lake Water Balance

With no surface water output from Hidden Lake, an open water balance can be expressed as:

$$\Delta S = P + Q_{IN} - E - G$$

in which;

- ΔS is the change in storage of the lake,
- P is precipitation,
- Q_{IN} is the surface inflow to the lake,
- E is the total evaporation, and
- G is the groundwater component, which in the case of Hidden Lake is thought to be net infiltration into the ground.

The water balance has been calculated over a daily time step for the period of May 28th to October 7th, 2021.

Change in storage (ΔS)

The change in storage can be calculated based on the change in lake water level as measured from the data logger. To express this as a volume, a lake area to water level relationship was developed. This relationship was based on lake areas calculated from available clear sky satellite images (Sentinel Hub and Google Earth images) during 2021. In total, six images were analysed during the period with logger data available, over a range of lake levels from 701.7 to 704.5 masl.

Precipitation (P)

Daily precipitation data was taken as the average of two nearby weather stations: Whitehorse Airport (located 5km to south, operated by Environment and Climate Change Canada) and Nursery (located 10km to the northwest, operated by Yukon Wildland Fire). Total precipitation of the period was reported as 154 mm (Whitehorse Airport) and 190 mm (Nursery).

Evaporation (E)

Daily evaporation was calculated using the Meyer's formula (1915):

$$E = K_M(e_s - e_a) * \left(1 + \frac{u_9}{16}\right)$$

in which

- E is the daily evaporation in mm,
- K_M is a constant (0.5 for small, shallow lakes),
- e_s is the saturated vapour pressure in mm Hg,
- e_a is the actual vapour pressure in mm Hg, and
- u_9 is the wind speed in km/h at 9m height.

Vapour pressures were calculated from standard relationships to air temperature and relative humidity, which along with wind speed were obtained from the Nursery weather station.

Total calculated evaporation over the period was 429 mm. Based on experience, this may be a bit of an overestimation of evaporation but is certainly reasonable for the purposes of this water balance, which is predominately driven by inflow and infiltration.

Inflow (Q_{IN}) and groundwater (G)

The two remaining and unknown terms of the water balance are the surface inflow via Porter Creek and the rate of infiltration to ground. As discussed in section 7.3.1.1, there is a rough understanding that flow in Porter Creek is typically >100 L/s (see Figure 21).

Figure 25 shows the relationship between inflow and infiltration that would be required to maintain steady lake levels for four different lake areas. This is based on an annual precipitation – evaporation net loss assumption of 200 mm/yr, which is roughly what has been reported from past data around Whitehorse (Morrison Hershfield, 2019). The figure shows that at 100 L/s inflow and a 40,000 m^2 lake area, there would need to be around 200 mm/day infiltration to maintain steady water levels; whereas, the same inflow for a 10,000 m^2 lake area would require around 800 mm/day infiltration. These numbers suggest that the Hidden Lake water balance is dominated by inflow and infiltration as opposed to direct precipitation and evaporation and that the lake has a relatively low residence time on the order of days to weeks.

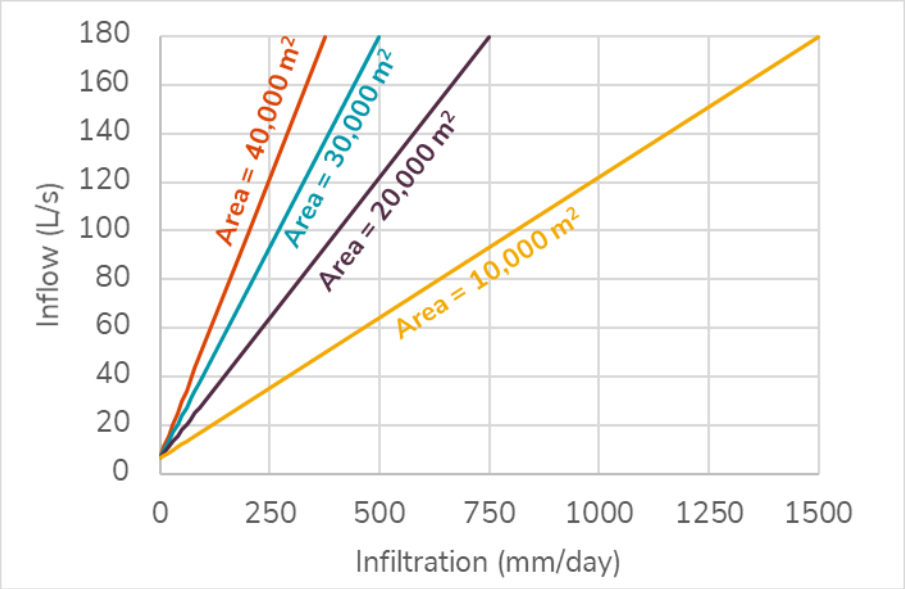

Figure 25. Calculated relationship between surface inflow and groundwater infiltration that would be required to maintain steady lake levels dependent on the size of the lake. This relationship assumes an annual evaporation that is 200 mm greater than precipitation.

WRB measured infiltration on two dates in September 2021 using seepage meters. Four seepage meters were constructed by WRB using a half barrel technique, where a 55 gallon drum was cut in half to create two cylinders closed on one end and open on the other. The half barrels were fitted with a valve on the closed end to allow air to escape and a barb on the side of the half barrel to allow a hose to be attached. Handles were welded on top for easy handling and installation. The half barrel is placed open-side first into the substrate of a water body with the top air purge value open, and slowly inserted into the bed with a twisting motion and applied pressure avoiding large rocks or woody debris that prevents deep penetration. Once the air has fully escaped the submerged barrel the purge valve on the top is shut creating a closed hydraulic environment within the half barrel. A polybag fitted with a petcock valve is then filled with a known volume of water and attached to the barb on the side with a rubber tube. This bag is housed within a modified Tupperware container to prevent pressure forces from impacting the bag. The valve on the fluid bag is opened for a known duration and closed after said duration is elapsed, and the change of volume of water over time within the bag is measured to determine the rate of water leaving or entering the system.

WRB installed two of the above described seepage meters at two different locations in the lake on September 8th and 16th, 2021. Seepage was measured at locations on the east and west sides of the lake, in an attempt to evaluate heterogeneity of the hydraulic conductivity of the lake substrate. Meters could only be installed in relatively shallow, near-shore locations. Two meters were used at each location in an attempt to evaluate the precision of the meters, and measurements were collected on two different days in an attempt to evaluate changing conditions as the lake level continued to decrease. The seepage flux is a function of the lake level because the lake level effectively controls the hydraulic gradient between the lake and the underlying aquifer. The hydraulic gradient also depends on the hydraulic head in the underlying aquifer, but it can be assumed that the underlying hydraulic head does not change as rapidly or significantly as the lake level. Thus it is assumed that the seepage flux would be greater on the September 8th measurement date than the September 16th measurement date and that the seepage flux was significantly greater earlier in the season when the lake level was significantly higher.

The results from the seepage meter measurements returned averages of 5.3 mm/day into the ground for the September 8th measurement and 0.2 mm/day into the ground for the September 16th measurement. These measurements appear to underestimate the actual infiltration of the lake, given that that the average rate of water level decline in the lake over the 8 days between infiltration measurements was around 30 mm/day. This underestimation may be due to error associated with the seepage measurement method but could also be because of heterogeneity of the hydraulic conductivity of the lake substrate. As mentioned above, meters could only be installed in relatively shallow, near-shore locations. It is possible that the infiltration rate was significantly higher at other potentially deeper, inaccessible locations in the lake at the same time as the seep meter measurements were conducted.

Infiltration rates in the range of centimetres per day are not unreasonable. Reported rates of exchange between groundwater and lakes span more than five orders of magnitude. Rosenberry, et al. 2015 reviewed rates of exchange between lakes and groundwater reported in the literature and found that median exfiltration (flow from groundwater to a

lake) was 7.4 mm/day, and median infiltration (flow from a lake to groundwater) was 6.0 mm/day. Exfiltration ranged from near 0% to 94% of input terms in lake-water budgets, and infiltration ranged from near 0% to 91% of loss terms (Rosenberry, et al. 2015). Infiltration rates on the order of tens of centimetres per day are common in near-shore environments and infiltration rates on the order of hundreds of centimetres per day are less common but have been observed (Rosenberry, personal communication).

Sept. 8, 2021			Sept. 16, 2021		
Seepage Meter	**Time hh:mm**	**Flux mm/day**	**Seepage Meter**	**Time hh:mm**	**Flux mm/day**
1	6:28	-1.7	1	5:49	0.2
2	6:27	-5.3	2	5:54	0
3	4:40	-6.3	3	5:41	-0.5
4	4:43	-7.8	4	5:39	-0.3
Average		-5.3	Average		-0.2
Lake Level		701.88 masl	Lake Level		701.65 masl
Lake Area		14,289 m^2	Lake Area		12,475 m^2
Lake Infiltration		0.9 L/s	Lake Infiltration		0.02 L/s

Daily water balance results

Figure 26 presents the results of the daily water balance for the lake expressed in terms of the two unknowns (surface inflow and groundwater infiltration). The values in the figure are derived from the water balance equation:

$$Q_{IN} - G = \Delta S + E - P$$

Thus, positive values represent when there is surface inflow exceeds infiltration, and negative values represent when infiltration exceeds surface inflow.

Values ($Q_{IN} - G$) were primarily negative throughout the summer, which is expected given observed beaver damming of Porter Creek and the resulting declining lake levels. Negative values in Figure 26 can be interpreted as the minimum infiltration that was occurring out of the lake during a given day. The most negative values are found on the

first days after the logger was installed. These numbers indicate that when the logger was first installed on May 28, infiltration out of the lake was greater than 85 mm/day, and likely significantly greater given there was surface inflow occurring. For the period when there was no surface inflow to the lake during most of July 7th through August 2nd, the values in Figure 26 represent the groundwater component only comprising generally between 20-30 mm/day over that period.

Considering the inflow pattern observed in Porter Creek (section 7.3.1.1) and the pattern in Figure 26 this suggests that there was a strong seasonality to infiltration rates that were highest early in the season, and rapidly declined to lower rates later in the summer. This behaviour is as expected, given that the seepage flux is a function of the lake level because the lake level effectively controls the hydraulic gradient between the lake and the underlying aquifer, as mentioned above.

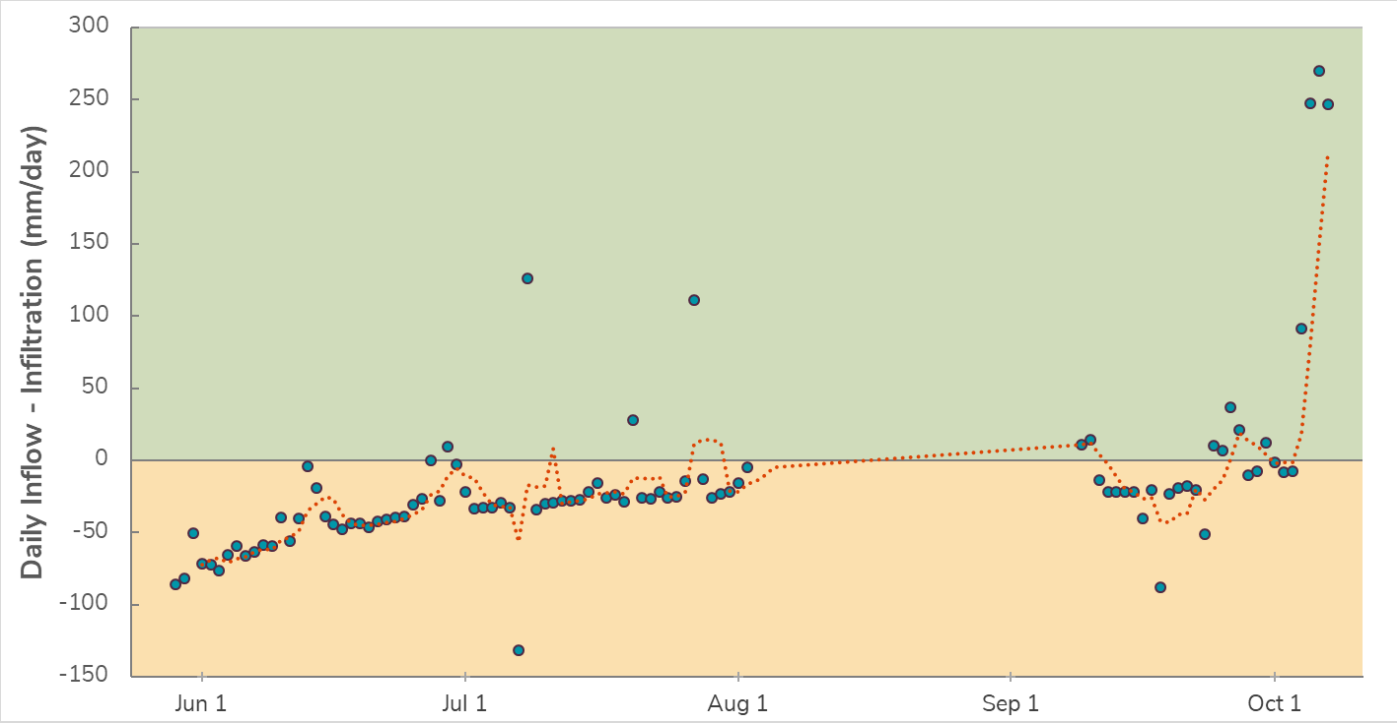

Figure 26. Results of the daily water balance calculation. Values represent the change in storage plus evaporation minus precipitation for any given day. Negative values indicate that infiltration into the ground exceeds surface inflow, whereas positive values indicate surface inflows exceeding groundwater infiltration or a net groundwater component into the lake.

7.3.3 Hidden Lake level interpretation

Why did Hidden Lake appear so low in 2021?

Lake levels were low in 2021 relative to the past decade, but not in the context of the preceding seven decades. Even the lowest levels in 2021 were still well within the typical range observed from the 1940's through the 1990's. Yet, several local residents remarked on what they saw as dramatically low lake levels in 2020 and 2021. Previously higher water levels for many years have now significantly altered the look and aesthetic appeal of the lake. Flooded areas around the lake resulted in dead trees, and the subsequent lowering water level has now exposed the woody debris that covers the shoreline and makes the lake look much different than it would have decades ago with similar water levels.

Regardless, the lake level did drop suddenly in 2020 and 2021. This was caused by significant beaver activity in Porter Creek, mainly along the stretch where the creek parallels the Alaska Highway. Porter Creek, typically has a steady year-round flow given its groundwater seep origins; however, during most of the summer, flow downstream of the Alaska Highway culvert was very limited or non existent. No flow via Porter Creek was observed to reach Hidden Lake throughout most of the month of July.

Hidden Lake is a small body of water that is very sensitive to changes in inflow. Similar effects have been noted in the past with respect to winter icing effects around Versleuce Meadows that cut off the flow to the lake and resulted in the lake completely drying up and freezing to bottom in the winter (PCES, 2022).

Why did Hidden Lake rise in the 2000's / 2010's?

The Porter Creek Experimental Science (PCES) interpretations have previously attributed the increased water levels in Hidden Lake to an increased algae presence that has reduced the infiltration rates in the lake (PCES, 2012). They attribute the increase in algae to an increase in nutrient supply that has resulted from the operation of IWL.

It's the view of this study that there is no conclusive answer as to why water levels in the lake rose so substantially over this period. Water quality data presented in previous section do not show a significant increase in nutrient discharge from IWL in 2001-2010 compared to 2005-2000 and total phosphorus seems to be generally lower in the 2001-2010 period. However, we believe the more probable explanation is that it was a result of changes in creek inflows to the lake.

The longest flow record available for Porter Creek comes from IWL at the start of modern Porter Creek (station PS-2b). The data record for this site starts roughly around the same time lake levels started to rise, so it is difficult to say whether changes in these flows could have contributed. There are some hints that flows could have been increasing in Porter Creek during the early years of IWL operations based on the need for increased flow authorizations and the data from station PS-2; however, these are far from definitive.

It is not clear if discharge at the headwaters of Porter Creek has increased or, if it has, the mechanism by which this has occurred. Porter Creek originates from several groundwater seeps, but the nature of these seeps, for instance whether they are fed by relatively shallow and responsive or deep and slow-responding groundwater, is not known. Stable water isotope data (section 4.4) suggest the headwaters of the creek comprise multiple, isotopically-distinct sources.

Janowicz (2004) noted that the pre-hydro development watershed area for Porter Creek was 35.7 km^2, whereas the present-day drainage area is at 19.5 km^2 as depicted in Figure 27. Janowicz thus calculated that pre-hydro flows for Porter Creek would have been significantly higher and seasonally variable. However, it's not clear to the authors of this report the exact nature of stream course changes that occurred with hydro construction, nor what changes may have occurred from Pueblo mine development in the 1910's. It is not clear from the 1946 air photograph of the future IWL location how Fish Creek, Porter Creek, McIntyre Creek confluence was connected prior to hydro development.

Based on the significant volume of groundwater inputs that form modern day Porter Creek, it's clear that the 'effective watershed area' extends well beyond the 'topographic watershed area'. It is also conceivable that Fish Creek downstream of Louise Lake is a loosing stream (i.e. contributes to groundwater) and that increased flows to this area resulting from hydro development has resulted in a greater contribution to groundwater seeps that daylight near IWL.

Climate change factors could also be a possible explanation for changes to flows at the start of Porter Creek, such as if there is thawing permafrost in the area that could alter the groundwater flow paths in the area.

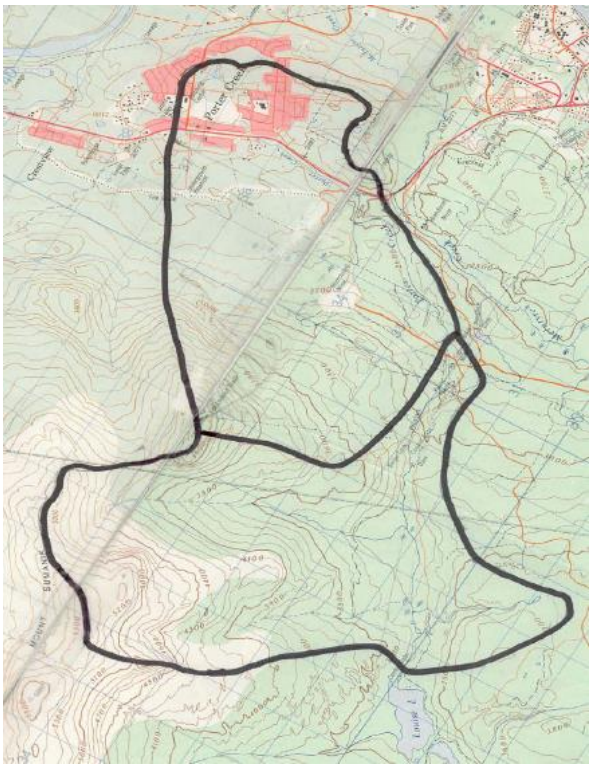

Figure 27. Porter Creek watershed based on topography drawn by Janowicz (2004) for the modern (upper area) and pre-hydro (upper and lower area) catchments.

The inflow into Hidden Lake could also be affected by impacts along the length of the creek. The creek was rerouted around Versluce Meadows (starting sometime between

1965-1976 based on air photos), and as the soil stripping continued into the 1990's (Morrison Hershfield, 2019) the rerouted creek is now perched above the surrounding meadows. The current routing has been prone to ice related overflows from the creek to the meadows. Whereas older air photos prior to the rerouting show multiple channels flowing through the middle of the meadows.

Changes in Porter Creek flow along the creek driven by climatic variables (rain and snow) are not likely to be a significant factor. The actual drainage area of the creek is relatively small (~10 km^2; Morrison Hershfield, 2019), and inputs along the length of the creek appear to comprise a small portion of the total creek flow.

If Porter Creek flows prior to the rise in Hidden Lake were similar to what has recently been observed (>100 L/s), substantial rates of infiltration would have been required to explain past lake levels. The image analysis of lake area between 1946-2002 included four occurrences where lake areas were <10,000 m^2, and all images had lake area <17,000 m^2. At those inflows and lake areas, infiltration would have had to average somewhere in the neighbourhood of >750 mm/day, which seems unlikely.

While both an increase in flow and decrease in infiltration are possible mechanisms to trigger an increase in lake level, it is difficult to quantify how much of an increase would be required to replicate the observed changes in lake level. This is primarily because infiltration is highly dynamic. Not only is there a seasonal pattern to infiltration as discussed, but it also varies based on lake level and this relationship is likely to be complex both because rapid changes in lake level would induce changes to the hydraulic gradient , and as water levels rise and flood new areas of land it may encounter soils with different hydraulic conductivities.

What is the future Hidden Lake likely to look like?

As long as beavers remains active and reduce flows in Porter Creek, the lake is likely to remain low. We don't think that there is a 'lower limit' to lake levels under current conditions. If inflows remain low enough, there is the potential that the lake could become

very small or even completely dry up. In the past, this has been observed to occur in the winter, but without sufficient inflow there is no obvious reason this could not occur during the open water season.

Presuming the beaver activity will eventually cease, or flows around the beaver activity reach an equilibrium, and inflows to Hidden Lake increase, the lake level is likely to return to a high water level like that observed in the late 2010's. Regardless of whether changes in inflows or changes in infiltration were the cause of previous lake level rises, future lake levels are more likely to be driven by inflows.

There is also the potential that while beaver activity remains active, there could be significant fluctuation of water levels from a pattern of beaver dams blocking flow, water level building up and eventually breaking through dams, and then the beavers repairing their dams and blocking off flow again. Figure 28 is an artistic rendering of the above-mentioned factors influencing Hidden Lake water levels as WRB currently understands them.

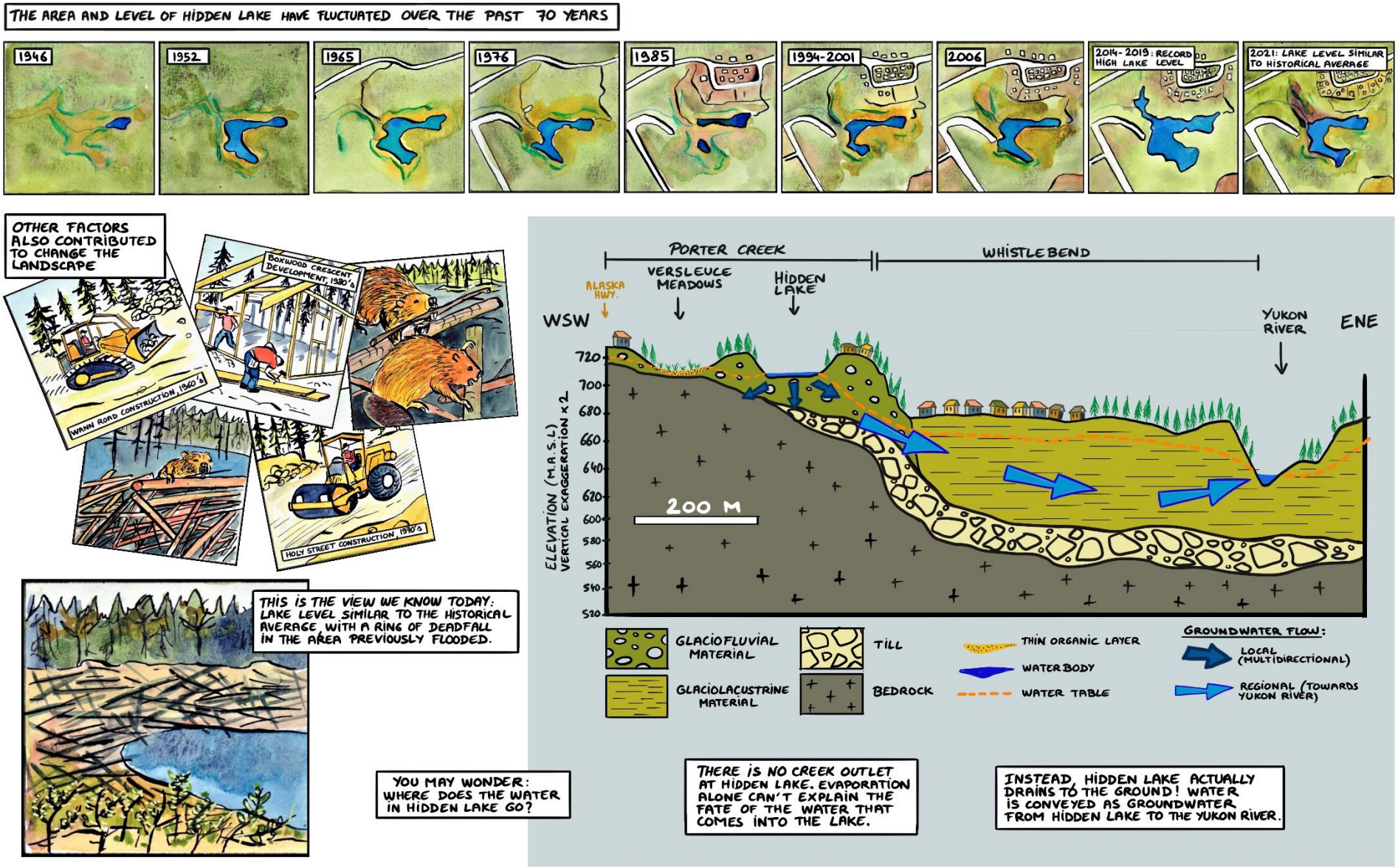

Figure 28. Illustration produced by Esther Bordet at Yukon Graphic Recording, 2022.

8. Conclusion and recommendations

Improve benthic monitoring protocol to support species richness (number of species encountered) and invertebrate density (count/area) assessments

IWL should provide more detailed benthic invertebrate methodology information and reporting including the outlining of sampling methods, maintaining precise and consistent site locations, providing the name of lab performing analysis, sampling at a consistent time of year, outlining number of replicates, as well as including field notes and site photos. Additionally, IWL should provide information regarding the qualifications of the sampler and training they have received. Finally, it is recommended that IWL contract a firm with specific benthic invertebrate experience to analyze and report on collected benthic invertebrate data every 5-6 years.

Implement and maintain the Phosphorus Management Plan at the IWL facility

This plan was drafted and submitted by IWL to the YWBS in 2022. The authors of this report believe that this plan can help control the discharge of phosphorus in both, McIntyre and Porter Creek.

Confirm the accuracy of the weir for measuring flows at PS-2b

Flows reported at the start of Porter Creek are substantially different between those reported by IWL (using the PS-2b weir) and those reported by the City of Whitehorse Landfill monitoring program (station PC-US). The logical starting point for further investigating this difference would be to confirm whether the weir level-flow relationship is accurate by conducting simultaneous flow measurements with weir readings.

Investigate the difference in isotopic composition between PS-1 and PS-2b

Isotopic signature of the water at PS-1 and PS-2b appeared to be somewhat different, and that difference cannot be explained by the flow of water through the IWL fish hatchery.

9. References

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Appendices

A – October 2021 Water Quality Sampling Results

B – Photo Log

Your Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

Attention: Devon O'Connor

Government of Yukon
Box 2703
Whitehorse, AB
Canada Y1A 2C6

Your C.O.C. #: 650479-01-01, 650479-02-01, 650479-03-01

Report Date: 2021/11/11
Report #: R3098077
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C183638
Received: 2021/10/30, 14:47

Sample Matrix: Water
Samples Received: 22

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	22	N/A	2021/11/02	BBY6SOP-00026	SM 23 2320 B m
Residual Chlorine, Free (3)	22	N/A	2021/10/30	BBY6SOP-00046	SM 23 4500-Cl G m
Low level chloride/sulphate by AC	2	N/A	2021/11/03	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC	18	N/A	2021/11/04	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Low level chloride/sulphate by AC	2	N/A	2021/11/08	BBY6SOP-00011 / BBY6SOP-00017	SM23-4500-Cl/SO4-E m
Conductivity @25C	22	N/A	2021/11/02	BBY6SOP-00026	SM 23 2510 B m
Hardness Total (calculated as CaCO3) (4)	18	N/A	2021/11/03	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO3) (4)	4	N/A	2021/11/05	BBY WI-00033	Auto Calc
Hardness (calculated as CaCO3)	22	N/A	2021/11/04	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV (5)	13	2021/11/01	2021/11/02	AB SOP-00084	BCMOE BCLM Oct2013 m
Mercury (Dissolved) by CV (5)	5	2021/11/01	2021/11/04	AB SOP-00084	BCMOE BCLM Oct2013 m
Mercury (Dissolved) by CV (5)	4	2021/11/04	2021/11/04	AB SOP-00084	BCMOE BCLM Oct2013 m
Mercury (Total) by CV	21	2021/11/01	2021/11/02	AB SOP-00084	BCMOE BCLM Oct2013 m
Mercury (Total) by CV	1	2021/11/04	2021/11/04	AB SOP-00084	BCMOE BCLM Oct2013 m
Ion Balance	21	N/A	2021/11/04	BBY WI-00033	Auto Calc
Ion Balance	1	N/A	2021/11/05	BBY WI-00033	Auto Calc
EPH in Water when PAH required	12	2021/11/04	2021/11/04	BBY8SOP-00029	BCMOE BCLM Sep2017 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	22	N/A	2021/11/04	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (5)	3	N/A	2021/11/02	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Low Level (dissolved) (5)	19	N/A	2021/11/04	BBY7SOP-00002	EPA 6020b R2 m
Elements by ICPMS Digested LL (total)	4	2021/11/03	2021/11/04	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	18	N/A	2021/11/03	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total)	4	N/A	2021/11/05	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (total)	18	N/A	2021/11/02	BBY7SOP-00002	EPA 6020b R2 m
Nitrogen (Tot. Diss) - FF/FP (6)	15	N/A	2021/11/03	BBY6SOP-00016	SM 23 4500-N C m
Nitrogen (Tot. Diss) - FF/FP (6)	7	N/A	2021/11/05	BBY6SOP-00016	SM 23 4500-N C m

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Your Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

Attention: Devon O'Connor

Government of Yukon
Box 2703
Whitehorse, AB
Canada Y1A 2C6

Your C.O.C. #: 650479-01-01, 650479-02-01, 650479-03-01

Report Date: 2021/11/11
Report #: R3098077
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C183638
Received: 2021/10/30, 14:47

Sample Matrix: Water
Samples Received: 22

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Nitrogen (Total)	22	N/A	2021/11/03	BBY6SOP-00016	SM 23 4500-N C m
Un-ionized Ammonia as N @ 15 C	22	N/A	2021/11/05	BBY WI-00033	Auto Calc
Ammonia-N (Total)	22	N/A	2021/11/04	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate+Nitrite (N) (low level)	22	N/A	2021/11/02	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrite (N) (low level)	22	N/A	2021/11/02	BBY6SOP-00010	SM 23 4500-NO3- I m
Nitrogen - Nitrate (as N) Low Level Calc	22	N/A	2021/11/02	BBY WI-00033	Auto Calc
PAH in Water by GC/MS (SIM)	12	2021/11/04	2021/11/04	BBY8SOP-00021	BCMOE BCLM Jul2017m
Total LMW, HMW, Total PAH Calc (7)	12	N/A	2021/11/05	BBY WI-00033	Auto Calc
Filter and HNO3 Preserve for Metals	21	N/A	2021/10/30	BBY7 WI-00004	SM 23 3030B m
pH measured @ 15 C (1, 8)	17	N/A	2021/11/02	EENVSOP-00159	SM 23 4500 H+ B m
pH measured @ 15 C (1, 8)	5	N/A	2021/11/03	EENVSOP-00159	SM 23 4500 H+ B m
Orthophosphate by Konelab (low level) (9)	22	N/A	2021/11/02	BBY6SOP-00013	SM 23 4500-P E m
EPH less PAH in Water by GC/FID (10)	12	N/A	2021/11/05	BBY WI-00033	Auto Calc
Carbon (Total Organic) (2, 11)	17	N/A	2021/11/03	AB SOP-00087	MMCW 119 1996 m
Carbon (Total Organic) (2, 11)	5	N/A	2021/11/04	AB SOP-00087	MMCW 119 1996 m
Total Phosphorus Low Level Dissolved (2, 12)	21	2021/11/03	2021/11/04	AB SOP-00024	SM 23 4500-P A,B,F m
Total Phosphorus Low Level Dissolved (2, 12)	1	2021/11/04	2021/11/04	AB SOP-00024	SM 23 4500-P A,B,F m
Total Phosphorus Low Level Total (2)	15	2021/11/03	2021/11/03	AB SOP-00024	SM 23 4500-P A,B,F m
Total Phosphorus Low Level Total (2)	7	2021/11/03	2021/11/04	AB SOP-00024	SM 23 4500-P A,B,F m
Total Suspended Solids (NFR)	1	2021/11/01	2021/11/02	BBY6SOP-00034	SM 23 2540 D m
Total Suspended Solids (NFR)	11	2021/11/03	2021/11/04	BBY6SOP-00034	SM 23 2540 D m
Total Suspended Solids (NFR)	10	2021/11/04	2021/11/05	BBY6SOP-00034	SM 23 2540 D m
VOCs, VH, F1, LH in Water by HS GC/MS	1	N/A	2021/11/02	BBY8SOP-00009 / BBY8SOP-00011 / BBY8SOP-00012	BCMOE BCLM Jul2017 m
VOCs, VH, F1, LH in Water by HS GC/MS	11	N/A	2021/11/03	BBY8SOP-00009 / BBY8SOP-00011 / BBY8SOP-00012	BCMOE BCLM Jul2017 m
Volatile HC-BTEX (13)	6	N/A	2021/11/03	BBY WI-00033	Auto Calc
Volatile HC-BTEX (13)	6	N/A	2021/11/04	BBY WI-00033	Auto Calc

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CERTIFICATE OF ANALYSIS

BV LABS JOB #: C183638
Received: 2021/10/30, 14:47

Sample Matrix: Water
Samples Received: 22

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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) This test was performed by Bureau Veritas Edmonton Environmental, 9331 - 48 St. , Edmonton, AB, T6B 2R4
(2) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(3) The BC-MOE and APHA Standard Method require Chlorine to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory Chlorine analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.
(4) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(5) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(6) Dissolved Nitrogen > Total Nitrogen Imbalance: When applicable, Dissolved Phosphorus and Total Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
(7) Total PAHs in Water include: Quinoline, Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Acridine, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b&j)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene,

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and Benzo(g,h,i)perylene.
(8) The CCME method requires 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 CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.
(9) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
(10) LEPH = EPH (C10 to C19) - (Acenaphthene + Acridine + Anthracene + Fluorene + Naphthalene + Phenanthrene)
HEPH = EPH (C19 to C32) - (Benzo(a)anthracene + Benzo(a)pyrene + Fluoranthene + Pyrene)
(11) TOC present in the sample should be considered as non-purgeable TOC.
(12) Dissolved Phosphorus > Total Phosphorus Imbalance: When applicable, Dissolved Phosphorus and Total Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
(13) VPH = VH - (Benzene + Toluene + Ethylbenzene + m & p-Xylene + o-Xylene + Styrene)

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (604) 734 7276

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL788			AJL788			AJL789		
Sampling Date		2021/10/29 16:00			2021/10/29 16:00			2021/10/29 14:55		
COC Number		650479-01-01			650479-01-01			650479-01-01		
	UNITS	FSHLK	RDL	QC Batch	FSHLK Lab-Dup	RDL	QC Batch	USFRLO	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD		ONSITE				FIELD		ONSITE
Ion Balance (% Difference)	%	3.8	N/A	A407898				3.1	N/A	A407898
Nitrate (N)	mg/L	<0.0020	0.0020	A407906				0.0042	0.0020	A407906
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	0.00050	A407803				<0.00050	0.00050	A407803
Misc. Inorganics										
Conductivity	uS/cm	180	2.0	A412545				190	2.0	A412545
Free Residual Chlorine	mg/L	0.030	0.020	A408256	0.020	0.020	A408256	<0.020	0.020	A408256
Total Organic Carbon (C)	mg/L	2.2	0.20	A410473				2.3	0.20	A410473
Total Suspended Solids	mg/L	<1.0	1.0	A413783				<1.0	1.0	A413783
Anions										
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Alkalinity (Total as CaCO3)	mg/L	75	1.0	A412537				80	1.0	A412537
Bicarbonate (HCO3)	mg/L	91	1.0	A412537				98	1.0	A412537
Carbonate (CO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Hydroxide (OH)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Orthophosphate (P)	mg/L	<0.0010	0.0010	A410951				<0.0010	0.0010	A410951
Dissolved Chloride (Cl)	mg/L	0.66	0.50	A413642				<0.50	0.50	A413642
Dissolved Sulphate (SO4)	mg/L	17	0.50	A413642				17	0.50	A413642
Nutrients										
Total Ammonia (N)	mg/L	<0.015	0.015	A414023				<0.015	0.015	A414023
Dissolved Phosphorus (P)	mg/L	<0.0010	0.0010	A412090				0.0016	0.0010	A412090
Total Phosphorus (P)	mg/L	0.0021	0.0010	A412080				0.0027	0.0010	A412080
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	A410901				0.0042	0.0020	A410901
Nitrite (N)	mg/L	<0.0020	0.0020	A410903				<0.0020	0.0020	A410903
Dissolved Nitrogen (N)	mg/L	0.136	0.020	A410765				0.171	0.020	A410765
Total Nitrogen (N)	mg/L	0.136	0.020	A410776				0.168	0.020	A410776
Physical Properties										
pH (15 C)	pH	7.66		A411102				7.69		A412654

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL789		AJL790		AJL791		
Sampling Date		2021/10/29 14:55		2021/10/29 14:15		2021/10/29 13:20		
COC Number		650479-01-01		650479-01-01		650479-01-01		
	UNITS	USFRLO Lab-Dup	QC Batch	LLOUT	QC Batch	DITCH 1	RDL	QC Batch
Calculated Parameters								
Filter and HNO3 Preservation	N/A			FIELD	ONSITE	FIELD		ONSITE
Ion Balance (% Difference)	%			2.9	A407898	1.9	N/A	A407898
Nitrate (N)	mg/L			<0.0020	A407906	<0.0020	0.0020	A407906
Un-Ionized Ammonia @ 15 °C	mg/L			<0.00050	A407803	<0.00050	0.00050	A407803
Misc. Inorganics								
Conductivity	uS/cm			200	A412545	210	2.0	A412545
Free Residual Chlorine	mg/L			<0.020	A408256	<0.020	0.020	A408256
Total Organic Carbon (C)	mg/L			2.5	A410473	2.6	0.20	A410473
Total Suspended Solids	mg/L			<1.0	A413783	<1.0	1.0	A413783
Anions								
Alkalinity (PP as CaCO3)	mg/L			<1.0	A412537	<1.0	1.0	A412537
Alkalinity (Total as CaCO3)	mg/L			77	A412537	92	1.0	A412537
Bicarbonate (HCO3)	mg/L			94	A412537	110	1.0	A412537
Carbonate (CO3)	mg/L			<1.0	A412537	<1.0	1.0	A412537
Hydroxide (OH)	mg/L			<1.0	A412537	<1.0	1.0	A412537
Orthophosphate (P)	mg/L			<0.0010	A410951	<0.0010	0.0010	A410951
Dissolved Chloride (Cl)	mg/L			<0.50	A413642	<0.50	0.50	A413642
Dissolved Sulphate (SO4)	mg/L			17	A413642	16	0.50	A413642
Nutrients								
Total Ammonia (N)	mg/L			<0.015	A414023	<0.015	0.015	A414023
Dissolved Phosphorus (P)	mg/L			0.0022	A412029	0.0014	0.0010	A412090
Total Phosphorus (P)	mg/L			0.0053	A412080	0.0047	0.0010	A412080
Nitrate plus Nitrite (N)	mg/L			<0.0020	A410901	<0.0020	0.0020	A410901
Nitrite (N)	mg/L			<0.0020	A410903	<0.0020	0.0020	A410903
Dissolved Nitrogen (N)	mg/L			0.160	A410765	0.145	0.020	A410765
Total Nitrogen (N)	mg/L			0.131	A410776	0.159	0.020	A410776
Physical Properties								
pH (15 C)	pH	7.72	A412654	7.77	A412654	7.72		A411102

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL792		AJL793			AJL793		
Sampling Date		2021/10/29 11:40		2021/10/29 10:20			2021/10/29 10:20		
COC Number		650479-01-01		650479-01-01			650479-01-01		
	UNITS	PS-1	QC Batch	PS-2B	RDL	QC Batch	PS-2B Lab-Dup	RDL	QC Batch
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE			
Ion Balance (% Difference)	%	2.0	A407898	2.7	N/A	A407898			
Nitrate (N)	mg/L	0.129	A407906	0.196	0.0020	A407906			
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	A407803	0.0026	0.00050	A407803			
Misc. Inorganics									
Conductivity	uS/cm	280	A412545	330	2.0	A412545			
Free Residual Chlorine	mg/L	<0.020	A408256	<0.020	0.020	A408256			
Total Organic Carbon (C)	mg/L	1.2	A410473	0.74	0.20	A412675			
Total Suspended Solids	mg/L	<1.0	A413783	1.6	1.0	A412422			
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	A412537	<1.0	1.0	A412537			
Alkalinity (Total as CaCO3)	mg/L	130	A412537	160	1.0	A412537			
Bicarbonate (HCO3)	mg/L	160	A412537	200	1.0	A412537			
Carbonate (CO3)	mg/L	<1.0	A412537	<1.0	1.0	A412537			
Hydroxide (OH)	mg/L	<1.0	A412537	<1.0	1.0	A412537			
Orthophosphate (P)	mg/L	0.0042	A410951	0.038	0.0010	A410965	0.038	0.0010	A410965
Dissolved Chloride (Cl)	mg/L	0.51	A413642	1.2	0.50	A413643	1.2	0.50	A413643
Dissolved Sulphate (SO4)	mg/L	13	A413642	15	0.50	A413643	13	0.50	A413643
Nutrients									
Total Ammonia (N)	mg/L	<0.015	A414023	0.26	0.015	A414023			
Dissolved Phosphorus (P)	mg/L	0.0050	A412090	0.043	0.0010	A412090	0.050	0.0010	A412090
Total Phosphorus (P)	mg/L	0.0065	A412080	0.054	0.0010	A412080			
Nitrate plus Nitrite (N)	mg/L	0.129	A410901	0.198	0.0020	A410904	0.202	0.0020	A410904
Nitrite (N)	mg/L	<0.0020	A410903	0.0029	0.0020	A410905	0.0025	0.0020	A410905
Dissolved Nitrogen (N)	mg/L	0.210	A410765	0.516	0.020	A414670	0.515	0.020	A414670
Total Nitrogen (N)	mg/L	0.211	A410796	0.569	0.020	A410796			
Physical Properties									
pH (15 C)	pH	7.76	A412654	7.56		A411102			

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL794		AJL795			AJL795		
Sampling Date		2021/10/29 10:50		2021/10/29 12:25			2021/10/29 12:25		
COC Number		650479-01-01		650479-01-01			650479-01-01		
	UNITS	PS-3	QC Batch	PS-5A	RDL	QC Batch	PS-5A Lab-Dup	RDL	QC Batch
Calculated Parameters									
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE			
Ion Balance (% Difference)	%	1.6	A407898	0.35	N/A	A407898			
Nitrate (N)	mg/L	0.0293	A407906	0.0300	0.0020	A407906			
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	A407803	0.0018	0.00050	A407803			
Misc. Inorganics									
Conductivity	uS/cm	220	A412545	220	2.0	A412545			
Free Residual Chlorine	mg/L	0.030	A408256	<0.020	0.020	A408256			
Total Organic Carbon (C)	mg/L	2.4	A410473	2.7	0.20	A410473			
Total Suspended Solids	mg/L	1.6	A413783	<1.0	1.0	A412422			
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	A412537	<1.0	1.0	A412537			
Alkalinity (Total as CaCO3)	mg/L	100	A412537	93	1.0	A412537			
Bicarbonate (HCO3)	mg/L	120	A412537	110	1.0	A412537			
Carbonate (CO3)	mg/L	<1.0	A412537	<1.0	1.0	A412537			
Hydroxide (OH)	mg/L	<1.0	A412537	<1.0	1.0	A412537			
Orthophosphate (P)	mg/L	0.0010	A410951	0.022	0.0010	A410951			
Dissolved Chloride (Cl)	mg/L	<0.50	A413643	0.52	0.50	A413643			
Dissolved Sulphate (SO4)	mg/L	15	A413643	16	0.50	A413643			
Nutrients									
Total Ammonia (N)	mg/L	<0.015	A414023	0.19	0.015	A414023			
Dissolved Phosphorus (P)	mg/L	0.0024	A412090	0.032	0.0010	A412090			
Total Phosphorus (P)	mg/L	0.0067	A412097	0.040	0.0010	A412080			
Nitrate plus Nitrite (N)	mg/L	0.0293	A410904	0.0300	0.0020	A410901			
Nitrite (N)	mg/L	<0.0020	A410905	<0.0020	0.0020	A410903			
Dissolved Nitrogen (N)	mg/L	0.190	A414670	0.427	0.020	A414670			
Total Nitrogen (N)	mg/L	0.175	A410796	0.457	0.020	A410796	0.451	0.020	A410796
Physical Properties									
pH (15 C)	pH	7.76	A412654	7.55		A411102			

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Bureau Veritas Job #: C183638
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Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL796			AJL796			AJL797		
Sampling Date		2021/10/29 16:00			2021/10/29 16:00			2021/10/28 14:40		
COC Number		650479-01-01			650479-01-01			650479-02-01		
	UNITS	PS-6	RDL	QC Batch	PS-6 Lab-Dup	RDL	QC Batch	PS-7	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD		ONSITE				FIELD		ONSITE
Ion Balance (% Difference)	%	0.60	N/A	A407898				0.98	N/A	A407898
Nitrate (N)	mg/L	0.0901	0.0020	A407906				0.100	0.0020	A407906
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	0.00050	A407803				<0.00050	0.00050	A407803
Misc. Inorganics										
Conductivity	uS/cm	240	2.0	A412545				280	2.0	A412545
Free Residual Chlorine	mg/L	<0.020	0.020	A408256				0.020	0.020	A408256
Total Organic Carbon (C)	mg/L	2.0	0.20	A412675	2.0	0.20	A412675	1.8	0.20	A412675
Total Suspended Solids	mg/L	2.0	1.0	A412169				<1.0	1.0	A412422
Anions										
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Alkalinity (Total as CaCO3)	mg/L	110	1.0	A412537				130	1.0	A412537
Bicarbonate (HCO3)	mg/L	130	1.0	A412537				160	1.0	A412537
Carbonate (CO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Hydroxide (OH)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Orthophosphate (P)	mg/L	0.0098	0.0010	A410951				0.0065	0.0010	A410951
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	A413643				<0.50	0.50	A418336
Dissolved Sulphate (SO4)	mg/L	15	0.50	A413643				16	0.50	A418336
Nutrients										
Total Ammonia (N)	mg/L	0.028	0.015	A414023				<0.015	0.015	A414023
Dissolved Phosphorus (P)	mg/L	0.014	0.0010	A412090				0.0084	0.0010	A412090
Total Phosphorus (P)	mg/L	0.015	0.0010	A412070				0.016	0.0010	A412080
Nitrate plus Nitrite (N)	mg/L	0.0945	0.0020	A410904				0.100	0.0020	A410901
Nitrite (N)	mg/L	0.0044	0.0020	A410905				<0.0020	0.0020	A410903
Dissolved Nitrogen (N)	mg/L	0.258	0.020	A414670				0.234	0.020	A410765
Total Nitrogen (N)	mg/L	0.269	0.020	A410796				0.246	0.020	A410796
Physical Properties										
pH (15 C)	pH	7.78		A411102				7.87		A411102

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL798			AJL798			AJL799		
Sampling Date		2021/10/28 15:20			2021/10/28 15:20			2021/10/28 14:05		
COC Number		650479-02-01			650479-02-01			650479-02-01		
	UNITS	PS-8	RDL	QC Batch	PS-8 Lab-Dup	RDL	QC Batch	PC-D	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD		ONSITE				FIELD		ONSITE
Ion Balance (% Difference)	%	3.5	N/A	A407898				1.6	N/A	A407898
Nitrate (N)	mg/L	0.113	0.0020	A407906				0.288	0.0020	A407906
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	0.00050	A407803				<0.00050	0.00050	A407803
Misc. Inorganics										
Conductivity	uS/cm	250	2.0	A412545				370	2.0	A412527
Free Residual Chlorine	mg/L	<0.020	0.020	A408256				<0.020	0.020	A408256
Total Organic Carbon (C)	mg/L	2.1	0.20	A410473				1.5	0.20	A410473
Total Suspended Solids	mg/L	1.2	1.0	A412169				<1.0	1.0	A413783
Anions										
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412526
Alkalinity (Total as CaCO3)	mg/L	120	1.0	A412537				170	1.0	A412526
Bicarbonate (HCO3)	mg/L	150	1.0	A412537				210	1.0	A412526
Carbonate (CO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412526
Hydroxide (OH)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412526
Orthophosphate (P)	mg/L	0.015	0.0010	A410951				0.026	0.0010	A410951
Dissolved Chloride (Cl)	mg/L	0.65	0.50	A413642				4.0	0.50	A413642
Dissolved Sulphate (SO4)	mg/L	14	0.50	A413642				20	0.50	A413642
Nutrients										
Total Ammonia (N)	mg/L	<0.015	0.015	A414023	<0.015	0.015	A414023	<0.015	0.015	A414023
Dissolved Phosphorus (P)	mg/L	0.0096	0.0010	A412090				0.026	0.0010	A412029
Total Phosphorus (P)	mg/L	0.012	0.0010	A412097				0.031	0.0010	A412080
Nitrate plus Nitrite (N)	mg/L	0.113	0.0020	A410901				0.291	0.0020	A410901
Nitrite (N)	mg/L	<0.0020	0.0020	A410903				0.0028	0.0020	A410903
Dissolved Nitrogen (N)	mg/L	0.269	0.020	A410765				0.385	0.020	A410765
Total Nitrogen (N)	mg/L	0.257	0.020	A410796				0.495	0.020	A410796
Physical Properties										
pH (15 C)	pH	7.74		A411102				7.87		A411102

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL800			AJL800			AJL801		
Sampling Date		2021/10/28 13:30			2021/10/28 13:30			2021/10/28 12:50		
COC Number		650479-02-01			650479-02-01			650479-02-01		
	UNITS	PC-SA	RDL	QC Batch	PC-SA Lab-Dup	RDL	QC Batch	PC-H	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD		ONSITE				FIELD		ONSITE
Ion Balance (% Difference)	%	1.8	N/A	A407898				1.6	N/A	A407898
Nitrate (N)	mg/L	0.256	0.0020	A407906				0.240	0.0020	A407906
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	0.00050	A407803				<0.00050	0.00050	A407803
Misc. Inorganics										
Conductivity	uS/cm	370	2.0	A412545				370	2.0	A412545
Free Residual Chlorine	mg/L	<0.020	0.020	A408256				0.020	0.020	A408256
Total Organic Carbon (C)	mg/L	1.7	0.20	A410473				1.8	0.20	A410473
Total Suspended Solids	mg/L	<1.0	1.0	A412422				1.2	1.0	A412422
Anions										
Alkalinity (PP as CaCO3)	mg/L	1.4	1.0	A412537				1.7	1.0	A412537
Alkalinity (Total as CaCO3)	mg/L	170	1.0	A412537				170	1.0	A412537
Bicarbonate (HCO3)	mg/L	210	1.0	A412537				200	1.0	A412537
Carbonate (CO3)	mg/L	1.6	1.0	A412537				2.1	1.0	A412537
Hydroxide (OH)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Orthophosphate (P)	mg/L	0.023	0.0010	A410951				0.019	0.0010	A410951
Dissolved Chloride (Cl)	mg/L	5.6	0.50	A413643				5.5	0.50	A413643
Dissolved Sulphate (SO4)	mg/L	20	0.50	A413643				20	0.50	A413643
Nutrients										
Total Ammonia (N)	mg/L	<0.015	0.015	A414023				<0.015	0.015	A414023
Dissolved Phosphorus (P)	mg/L	0.023	0.0010	A412090				0.020	0.0010	A412029
Total Phosphorus (P)	mg/L	0.025	0.0010	A412097	0.026	0.0010	A412097	0.025	0.0010	A412097
Nitrate plus Nitrite (N)	mg/L	0.256	0.0020	A410901				0.240	0.0020	A410901
Nitrite (N)	mg/L	<0.0020	0.0020	A410903				<0.0020	0.0020	A410903
Dissolved Nitrogen (N)	mg/L	0.346	0.020	A410765				0.341	0.020	A410765
Total Nitrogen (N)	mg/L	0.358	0.020	A410796				0.342	0.020	A410796
Physical Properties										
pH (15 C)	pH	7.80		A411102				7.94		A411102

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL802		AJL803		AJL804		
Sampling Date		2021/10/28 11:40		2021/10/28 10:40		2021/10/28 10:04		
COC Number		650479-02-01		650479-02-01		650479-02-01		
	UNITS	HL	QC Batch	MC-PH	QC Batch	MC-MV	RDL	QC Batch
Calculated Parameters								
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD	ONSITE	FIELD		ONSITE
Ion Balance (% Difference)	%	4.4	A407898	1.9	A407898	0.75	N/A	A407898
Nitrate (N)	mg/L	0.231	A407906	0.100	A407906	0.0981	0.0020	A407906
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	A407803	<0.00050	A407803	<0.00050	0.00050	A407803
Misc. Inorganics								
Conductivity	uS/cm	380	A412545	280	A412545	280	2.0	A412527
Free Residual Chlorine	mg/L	<0.020	A408256	<0.020	A408256	<0.020	0.020	A408256
Total Organic Carbon (C)	mg/L	1.9	A410473	2.1	A412675	2.2	0.20	A410473
Total Suspended Solids	mg/L	<1.0	A413783	<1.0	A413783	6.8	1.0	A412422
Anions								
Alkalinity (PP as CaCO3)	mg/L	<1.0	A412537	<1.0	A412537	<1.0	1.0	A412526
Alkalinity (Total as CaCO3)	mg/L	180	A412537	140	A412537	130	1.0	A412526
Bicarbonate (HCO3)	mg/L	220	A412537	170	A412537	160	1.0	A412526
Carbonate (CO3)	mg/L	<1.0	A412537	<1.0	A412537	<1.0	1.0	A412526
Hydroxide (OH)	mg/L	<1.0	A412537	<1.0	A412537	<1.0	1.0	A412526
Orthophosphate (P)	mg/L	0.015	A410951	0.0063	A410951	0.0048	0.0010	A410951
Dissolved Chloride (Cl)	mg/L	5.6	A413642	0.62	A413642	0.53	0.50	A418336
Dissolved Sulphate (SO4)	mg/L	20	A413642	14	A413642	16	0.50	A418336
Nutrients								
Total Ammonia (N)	mg/L	<0.015	A414026	<0.015	A414026	<0.015	0.015	A414026
Dissolved Phosphorus (P)	mg/L	0.020	A412090	0.0079	A412029	0.0072	0.0010	A412090
Total Phosphorus (P)	mg/L	0.024	A412097	0.011	A412080	0.015	0.0010	A412080
Nitrate plus Nitrite (N)	mg/L	0.231	A410901	0.100	A410901	0.0981	0.0020	A410901
Nitrite (N)	mg/L	<0.0020	A410903	<0.0020	A410903	<0.0020	0.0020	A410903
Dissolved Nitrogen (N)	mg/L	0.352	A410765	0.245	A410765	0.216	0.020	A410765
Total Nitrogen (N)	mg/L	0.376	A410796	0.243	A410796	0.254	0.020	A410796
Physical Properties								
pH (15 C)	pH	7.80	A412654	7.86	A411102	7.97		A411102

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL804			AJL805			AJL805		
Sampling Date		2021/10/28 10:04			2021/10/28 09:05			2021/10/28 09:05		
COC Number		650479-02-01			650479-02-01			650479-02-01		
	UNITS	MC-MV Lab-Dup	RDL	QC Batch	MC-USY	RDL	QC Batch	MC-USY Lab-Dup	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A				FIELD		ONSITE			
Ion Balance (% Difference)	%				2.5	N/A	A407898			
Nitrate (N)	mg/L				0.108	0.0020	A407906			
Un-Ionized Ammonia @ 15 °C	mg/L				<0.00050	0.00050	A407803			
Misc. Inorganics										
Conductivity	uS/cm				290	2.0	A412527			
Free Residual Chlorine	mg/L				0.020	0.020	A408256			
Total Organic Carbon (C)	mg/L				1.5	0.20	A412675			
Total Suspended Solids	mg/L				<1.0	1.0	A412169			
Anions										
Alkalinity (PP as CaCO3)	mg/L				<1.0	1.0	A412526			
Alkalinity (Total as CaCO3)	mg/L				140	1.0	A412526			
Bicarbonate (HCO3)	mg/L				170	1.0	A412526			
Carbonate (CO3)	mg/L				<1.0	1.0	A412526			
Hydroxide (OH)	mg/L				<1.0	1.0	A412526			
Orthophosphate (P)	mg/L	0.0059	0.0010	A410951	0.0047	0.0010	A410951			
Dissolved Chloride (Cl)	mg/L				0.73	0.50	A413642			
Dissolved Sulphate (SO4)	mg/L				14	0.50	A413642			
Nutrients										
Total Ammonia (N)	mg/L				<0.015	0.015	A414026			
Dissolved Phosphorus (P)	mg/L				0.010	0.0010	A413413	0.011	0.0010	A413413
Total Phosphorus (P)	mg/L				0.015	0.0010	A412070			
Nitrate plus Nitrite (N)	mg/L	0.0999	0.0020	A410901	0.108	0.0020	A410901			
Nitrite (N)	mg/L	<0.0020	0.0020	A410903	<0.0020	0.0020	A410903			
Dissolved Nitrogen (N)	mg/L				0.240	0.020	A410765			
Total Nitrogen (N)	mg/L				0.266	0.020	A410796			
Physical Properties										
pH (15 C)	pH				7.92		A411102			

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL806		AJL807			AJL807	
Sampling Date		2021/10/28 09:15		2021/10/28 10:25			2021/10/28 10:25	
COC Number		650479-02-01		650479-03-01			650479-03-01	
	UNITS	REP-1	QC Batch	REP-2	RDL	QC Batch	REP-2 Lab-Dup	QC Batch
Calculated Parameters								
Filter and HNO3 Preservation	N/A	FIELD	ONSITE	FIELD		ONSITE		
Ion Balance (% Difference)	%	1.2	A407898	2.4	N/A	A407898		
Nitrate (N)	mg/L	0.101	A407906	0.173	0.0020	A407906		
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	A407803	0.0020	0.00050	A407803		
Misc. Inorganics								
Conductivity	uS/cm	280	A412527	330	2.0	A412552		
Free Residual Chlorine	mg/L	0.020	A408256	<0.020	0.020	A408256		
Total Organic Carbon (C)	mg/L	2.0	A410473	0.98	0.20	A410473		
Total Suspended Solids	mg/L	2.0	A412169	<1.0	1.0	A413783		
Anions								
Alkalinity (PP as CaCO3)	mg/L	<1.0	A412526	<1.0	1.0	A412550		
Alkalinity (Total as CaCO3)	mg/L	130	A412526	160	1.0	A412550		
Bicarbonate (HCO3)	mg/L	160	A412526	200	1.0	A412550		
Carbonate (CO3)	mg/L	<1.0	A412526	<1.0	1.0	A412550		
Hydroxide (OH)	mg/L	<1.0	A412526	<1.0	1.0	A412550		
Orthophosphate (P)	mg/L	0.0049	A410951	0.039	0.0010	A410965		
Dissolved Chloride (Cl)	mg/L	0.79	A413642	1.1	0.50	A413643		
Dissolved Sulphate (SO4)	mg/L	15	A413642	13	0.50	A413643		
Nutrients								
Total Ammonia (N)	mg/L	<0.015	A414026	0.24	0.015	A414026		
Dissolved Phosphorus (P)	mg/L	0.0068	A412029	0.045	0.0010	A412090		
Total Phosphorus (P)	mg/L	0.015	A412080	0.056	0.0010	A412097		
Nitrate plus Nitrite (N)	mg/L	0.101	A410901	0.176	0.0020	A410904		
Nitrite (N)	mg/L	<0.0020	A410903	0.0027	0.0020	A410905		
Dissolved Nitrogen (N)	mg/L	0.216	A410765	0.501	0.020	A414670		
Total Nitrogen (N)	mg/L	0.231	A410796	0.545	0.020	A410796		
Physical Properties								
pH (15 C)	pH	7.95	A411102	7.49		A411122	7.56	A411122

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL808			AJL808			AJL809		
Sampling Date		2021/10/28 16:15			2021/10/28 16:15			2021/10/28 00:00		
COC Number		650479-03-01			650479-03-01			650479-03-01		
	UNITS	FIELD BLANK	RDL	QC Batch	FIELD BLANK Lab-Dup	RDL	QC Batch	TRIP BLANK	RDL	QC Batch
Calculated Parameters										
Filter and HNO3 Preservation	N/A	FIELD		ONSITE						
Ion Balance (% Difference)	%	NC	N/A	A407898				NC	N/A	A407898
Nitrate (N)	mg/L	<0.0020	0.0020	A407906				<0.0020	0.0020	A407906
Un-Ionized Ammonia @ 15 °C	mg/L	<0.00050	0.00050	A407803				<0.00050	0.00050	A407803
Misc. Inorganics										
Conductivity	uS/cm	<2.0	2.0	A412545				<2.0	2.0	A412545
Free Residual Chlorine	mg/L	<0.020	0.020	A408261	<0.020	0.020	A408261	<0.020	0.020	A408261
Total Organic Carbon (C)	mg/L	<0.20	0.20	A410473				<0.20	0.20	A410473
Total Suspended Solids	mg/L	<1.0	1.0	A412422				<1.0	1.0	A409325
Anions										
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Alkalinity (Total as CaCO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Bicarbonate (HCO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Carbonate (CO3)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Hydroxide (OH)	mg/L	<1.0	1.0	A412537				<1.0	1.0	A412537
Orthophosphate (P)	mg/L	<0.0010	0.0010	A410951				<0.0010	0.0010	A410951
Dissolved Chloride (Cl)	mg/L	<0.50	0.50	A412717				<0.50	0.50	A412717
Dissolved Sulphate (SO4)	mg/L	<0.50	0.50	A412717				0.62	0.50	A412717
Nutrients										
Total Ammonia (N)	mg/L	<0.015	0.015	A414023				<0.015	0.015	A414023
Dissolved Phosphorus (P)	mg/L	<0.0010	0.0010	A412090				<0.0010	0.0010	A412090
Total Phosphorus (P)	mg/L	<0.0010	0.0010	A412097				<0.0010	0.0010	A412080
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0020	A410901				<0.0020	0.0020	A410901
Nitrite (N)	mg/L	<0.0020	0.0020	A410903				<0.0020	0.0020	A410903
Dissolved Nitrogen (N)	mg/L	<0.020	0.020	A414670				<0.020	0.020	A414670
Total Nitrogen (N)	mg/L	<0.020	0.020	A410796				<0.020	0.020	A410796
Physical Properties										
pH (15 C)	pH	5.93		A411122				5.79		A411122

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AJL809		
Sampling Date		2021/10/28 00:00		
COC Number		650479-03-01		
	UNITS	**TRIP BLANK Lab-Dup**	**RDL**	**QC Batch**
Misc. Inorganics				
Total Suspended Solids	mg/L	<1.0	1.0	A409325

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

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

Bureau Veritas ID		AJL788	AJL793	AJL797	AJL799	AJL800		
Sampling Date		2021/10/29 16:00	2021/10/29 10:20	2021/10/28 14:40	2021/10/28 14:05	2021/10/28 13:30		
COC Number		650479-01-01	650479-01-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	FSHLK	PS-2B	PS-7	PC-D	PC-SA	RDL	QC Batch
Calculated Parameters								
Low Molecular Weight PAH`s	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A407907
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A407907
Total PAH	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A407907
Polycyclic Aromatics								
Quinoline	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A413099
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A413099
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A413099
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A413099
Chrysene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	<0.030	<0.030	<0.030	0.030	A413099
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A413099
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	A413099
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Calculated Parameters								
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A407908
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A407908
Ext. Pet. Hydrocarbon								
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A413506
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A413506
Surrogate Recovery (%)								
O-TERPHENYL (sur.)	%	97	96	100	85	84		A413506
RDL = Reportable Detection Limit								

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

Bureau Veritas ID		AJL788	AJL793	AJL797	AJL799	AJL800		
Sampling Date		2021/10/29 16:00	2021/10/29 10:20	2021/10/28 14:40	2021/10/28 14:05	2021/10/28 13:30		
COC Number		650479-01-01	650479-01-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	FSHLK	PS-2B	PS-7	PC-D	PC-SA	RDL	QC Batch
D10-ANTHRACENE (sur.)	%	92	86	92	87	86		A413099
D8-ACENAPHTHYLENE (sur.)	%	85	85	87	86	86		A413099
D8-NAPHTHALENE (sur.)	%	73	82	78	78	77		A413099
TERPHENYL-D14 (sur.)	%	104	92	99	93	89		A413099
RDL = Reportable Detection Limit								

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

Bureau Veritas ID		AJL800			AJL801	AJL802	AJL803		
Sampling Date		2021/10/28 13:30			2021/10/28 12:50	2021/10/28 11:40	2021/10/28 10:40		
COC Number		650479-02-01			650479-02-01	650479-02-01	650479-02-01		
	UNITS	PC-SA Lab-Dup	RDL	QC Batch	PC-H	HL	MC-PH	RDL	QC Batch
Calculated Parameters									
Low Molecular Weight PAH`s	ug/L				<0.10	<0.10	<0.10	0.10	A407907
High Molecular Weight PAH`s	ug/L				<0.050	<0.050	<0.050	0.050	A407907
Total PAH	ug/L				<0.10	<0.10	<0.10	0.10	A407907
Polycyclic Aromatics									
Quinoline	ug/L	<0.020	0.020	A413099	<0.020	<0.020	<0.020	0.020	A413099
Naphthalene	ug/L	<0.10	0.10	A413099	<0.10	<0.10	<0.10	0.10	A413099
1-Methylnaphthalene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
2-Methylnaphthalene	ug/L	<0.10	0.10	A413099	<0.10	<0.10	<0.10	0.10	A413099
Acenaphthylene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Acenaphthene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Fluorene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Phenanthrene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Anthracene	ug/L	<0.010	0.010	A413099	<0.010	<0.010	<0.010	0.010	A413099
Acridine	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Fluoranthene	ug/L	<0.020	0.020	A413099	<0.020	<0.020	<0.020	0.020	A413099
Pyrene	ug/L	<0.020	0.020	A413099	<0.020	<0.020	<0.020	0.020	A413099
Benzo(a)anthracene	ug/L	<0.010	0.010	A413099	<0.010	<0.010	<0.010	0.010	A413099
Chrysene	ug/L	<0.020	0.020	A413099	<0.020	<0.020	<0.020	0.020	A413099
Benzo(b&j)fluoranthene	ug/L	<0.030	0.030	A413099	<0.030	<0.030	<0.030	0.030	A413099
Benzo(k)fluoranthene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Benzo(a)pyrene	ug/L	<0.0050	0.0050	A413099	<0.0050	<0.0050	<0.0050	0.0050	A413099
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Dibenz(a,h)anthracene	ug/L	<0.0030	0.0030	A413099	<0.0030	<0.0030	<0.0030	0.0030	A413099
Benzo(g,h,i)perylene	ug/L	<0.050	0.050	A413099	<0.050	<0.050	<0.050	0.050	A413099
Calculated Parameters									
LEPH (C10-C19 less PAH)	mg/L				<0.20	<0.20	<0.20	0.20	A407908
HEPH (C19-C32 less PAH)	mg/L				<0.20	<0.20	<0.20	0.20	A407908
Ext. Pet. Hydrocarbon									
EPH (C10-C19)	mg/L	<0.20	0.20	A413506	<0.20	<0.20	<0.20	0.20	A413506
EPH (C19-C32)	mg/L	<0.20	0.20	A413506	<0.20	<0.20	<0.20	0.20	A413506

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

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

Bureau Veritas ID		AJL800			AJL801	AJL802	AJL803		
Sampling Date		2021/10/28 13:30			2021/10/28 12:50	2021/10/28 11:40	2021/10/28 10:40		
COC Number		650479-02-01			650479-02-01	650479-02-01	650479-02-01		
	UNITS	PC-SA Lab-Dup	RDL	QC Batch	PC-H	HL	MC-PH	RDL	QC Batch
Surrogate Recovery (%)									
O-TERPHENYL (sur.)	%	85		A413506	85	85	87		A413506
D10-ANTHRACENE (sur.)	%	87		A413099	87	88	90		A413099
D8-ACENAPHTHYLENE (sur.)	%	85		A413099	85	85	89		A413099
D8-NAPHTHALENE (sur.)	%	77		A413099	78	77	85		A413099
TERPHENYL-D14 (sur.)	%	95		A413099	93	95	97		A413099

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

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

Bureau Veritas ID		AJL804	AJL805	AJL808	AJL809		
Sampling Date		2021/10/28 10:04	2021/10/28 09:05	2021/10/28 16:15	2021/10/28 00:00		
COC Number		650479-02-01	650479-02-01	650479-03-01	650479-03-01		
	UNITS	MC-MV	MC-USY	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Calculated Parameters							
Low Molecular Weight PAH`s	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A407907
High Molecular Weight PAH`s	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A407907
Total PAH	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A407907
Polycyclic Aromatics							
Quinoline	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A413099
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A413099
Acenaphthylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Acenaphthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A413099
Acridine	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A413099
Chrysene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A413099
Benzo(b&j)fluoranthene	ug/L	<0.030	<0.030	<0.030	<0.030	0.030	A413099
Benzo(k)fluoranthene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Benzo(a)pyrene	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A413099
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Dibenz(a,h)anthracene	ug/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	A413099
Benzo(g,h,i)perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A413099
Calculated Parameters							
LEPH (C10-C19 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A407908
HEPH (C19-C32 less PAH)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A407908
Ext. Pet. Hydrocarbon							
EPH (C10-C19)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A413506
EPH (C19-C32)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A413506
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	88	90	91	92		A413506
RDL = Reportable Detection Limit							

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

Bureau Veritas ID		AJL804	AJL805	AJL808	AJL809		
Sampling Date		2021/10/28 10:04	2021/10/28 09:05	2021/10/28 16:15	2021/10/28 00:00		
COC Number		650479-02-01	650479-02-01	650479-03-01	650479-03-01		
	UNITS	MC-MV	MC-USY	FIELD BLANK	TRIP BLANK	RDL	QC Batch
D10-ANTHRACENE (sur.)	%	87	88	91	90		A413099
D8-ACENAPHTHYLENE (sur.)	%	86	86	87	86		A413099
D8-NAPHTHALENE (sur.)	%	79	81	82	81		A413099
TERPHENYL-D14 (sur.)	%	94	96	100	99		A413099
RDL = Reportable Detection Limit							

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL788	AJL789		AJL790		AJL791		
Sampling Date		2021/10/29 16:00	2021/10/29 14:55		2021/10/29 14:15		2021/10/29 13:20		
COC Number		650479-01-01	650479-01-01		650479-01-01		650479-01-01		
	UNITS	FSHLK	USFRLO	QC Batch	LLOUT	QC Batch	DITCH 1	RDL	QC Batch
Calculated Parameters									
Dissolved Hardness (CaCO3)	mg/L	79.4	84.2	A407752	91.9	A407752	96.4	0.50	A407752
Elements									
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	A410029	<0.0019	A410029	<0.0019	0.0019	A410029
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	0.99	1.50	A409697	1.52	A409697	2.19	0.50	A410622
Dissolved Antimony (Sb)	ug/L	0.035	0.040	A409697	0.059	A409697	0.045	0.020	A410622
Dissolved Arsenic (As)	ug/L	1.17	1.14	A409697	1.17	A409697	1.02	0.020	A410622
Dissolved Barium (Ba)	ug/L	33.6	33.9	A409697	36.3	A409697	32.5	0.020	A410622
Dissolved Beryllium (Be)	ug/L	<0.010	<0.010	A409697	<0.010	A409697	<0.010	0.010	A410622
Dissolved Bismuth (Bi)	ug/L	<0.0050	<0.0050	A409697	<0.0050	A409697	<0.0050	0.0050	A410622
Dissolved Boron (B)	ug/L	<10	<10	A409697	<10	A409697	<10	10	A410622
Dissolved Cadmium (Cd)	ug/L	<0.0050	<0.0050	A409697	<0.0050	A409697	<0.0050	0.0050	A410622
Dissolved Chromium (Cr)	ug/L	<0.10	<0.10	A409697	<0.10	A409697	0.11	0.10	A410622
Dissolved Cobalt (Co)	ug/L	0.0096	0.0121	A409697	0.0140	A409697	0.0227	0.0050	A410622
Dissolved Copper (Cu)	ug/L	0.289	0.319	A409697	0.327	A409697	0.349	0.050	A410622
Dissolved Iron (Fe)	ug/L	3.9	23.5	A409697	8.7	A409697	25.3	1.0	A410622
Dissolved Lead (Pb)	ug/L	<0.0050	<0.0050	A409697	<0.0050	A409697	<0.0050	0.0050	A410622
Dissolved Lithium (Li)	ug/L	0.88	0.88	A409697	0.94	A409697	0.70	0.50	A410622
Dissolved Manganese (Mn)	ug/L	1.06	4.73	A409697	1.09	A409697	5.17	0.050	A410622
Dissolved Molybdenum (Mo)	ug/L	0.666	0.682	A409697	0.671	A409697	0.682	0.050	A410622
Dissolved Nickel (Ni)	ug/L	0.133	0.139	A409697	0.155	A409697	0.209	0.020	A410622
Dissolved Phosphorus (P)	ug/L	3.5	3.3	A409697	<2.0	A409697	3.6	2.0	A410622
Dissolved Selenium (Se)	ug/L	0.090	0.099	A409697	0.098	A409697	0.090	0.040	A410622
Dissolved Silicon (Si)	ug/L	4440	4450	A409697	5130	A409697	4870	50	A410622
Dissolved Silver (Ag)	ug/L	<0.0050	<0.0050	A409697	<0.0050	A409697	<0.0050	0.0050	A410622
Dissolved Strontium (Sr)	ug/L	156	161	A409697	175	A409697	173	0.050	A410622
Dissolved Thallium (Tl)	ug/L	<0.0020	<0.0020	A409697	<0.0020	A409697	<0.0020	0.0020	A410622
Dissolved Tin (Sn)	ug/L	<0.20	<0.20	A409697	<0.20	A409697	<0.20	0.20	A410622
Dissolved Titanium (Ti)	ug/L	<0.50	<0.50	A409697	<0.50	A409697	<0.50	0.50	A410622
Dissolved Uranium (U)	ug/L	0.257	0.306	A409697	0.366	A409697	0.787	0.0020	A410622
Dissolved Vanadium (V)	ug/L	0.23	0.22	A409697	<0.20	A409697	0.25	0.20	A410622

RDL = Reportable Detection Limit

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL788	AJL789		AJL790		AJL791		
Sampling Date		2021/10/29 16:00	2021/10/29 14:55		2021/10/29 14:15		2021/10/29 13:20		
COC Number		650479-01-01	650479-01-01		650479-01-01		650479-01-01		
	UNITS	**FSHLK**	**USFRLO**	**QC Batch**	**LLOUT**	**QC Batch**	**DITCH 1**	**RDL**	**QC Batch**
Dissolved Zinc (Zn)	ug/L	0.10	<0.10	A409697	0.13	A418483	0.36	0.10	A410622
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	A409697	<0.10	A409697	<0.10	0.10	A410622
Dissolved Calcium (Ca)	mg/L	23.2	24.6	A407901	27.1	A407901	29.6	0.050	A407901
Dissolved Magnesium (Mg)	mg/L	5.19	5.51	A407901	5.90	A407901	5.43	0.050	A407901
Dissolved Potassium (K)	mg/L	0.753	0.771	A407901	0.819	A407901	0.771	0.050	A407901
Dissolved Sodium (Na)	mg/L	3.02	3.12	A407901	3.29	A407901	3.00	0.050	A407901
Dissolved Sulphur (S)	mg/L	5.3	5.2	A407901	5.7	A407901	4.5	3.0	A407901
RDL = Reportable Detection Limit									

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL792	AJL793	AJL794	AJL795	AJL796	AJL797		
Sampling Date		2021/10/29 11:40	2021/10/29 10:20	2021/10/29 10:50	2021/10/29 12:25	2021/10/29 16:00	2021/10/28 14:40		
COC Number		650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-02-01		
	UNITS	PS-1	PS-2B	PS-3	PS-5A	PS-6	PS-7	RDL	QC Batch
Calculated Parameters									
Dissolved Hardness (CaCO3)	mg/L	136	161	107	103	115	136	0.50	A407752
Elements									
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	A410029
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	1.27	1.37	2.61	2.09	3.67	1.46	0.50	A410622
Dissolved Antimony (Sb)	ug/L	0.053	0.059	0.047	0.049	0.051	0.044	0.020	A410622
Dissolved Arsenic (As)	ug/L	0.978	0.928	1.04	0.960	0.982	0.895	0.020	A410622
Dissolved Barium (Ba)	ug/L	26.2	27.2	30.7	30.6	29.4	30.6	0.020	A410622
Dissolved Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A410622
Dissolved Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A410622
Dissolved Boron (B)	ug/L	<10	<10	<10	<10	<10	<10	10	A410622
Dissolved Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A410622
Dissolved Chromium (Cr)	ug/L	0.61	0.64	0.23	0.36	0.30	0.25	0.10	A410622
Dissolved Cobalt (Co)	ug/L	0.0150	0.0375	0.0226	0.0261	0.0255	0.0229	0.0050	A410622
Dissolved Copper (Cu)	ug/L	0.193	0.357	0.309	0.379	0.307	0.701	0.050	A410622
Dissolved Iron (Fe)	ug/L	6.9	43.7	18.8	35.5	25.5	20.7	1.0	A410622
Dissolved Lead (Pb)	ug/L	<0.0050	<0.0050	<0.0050	0.0063	0.0055	<0.0050	0.0050	A410622
Dissolved Lithium (Li)	ug/L	0.74	0.80	0.73	0.76	0.75	0.92	0.50	A410622
Dissolved Manganese (Mn)	ug/L	1.21	9.58	4.21	5.61	5.20	6.22	0.050	A410622
Dissolved Molybdenum (Mo)	ug/L	1.38	2.03	0.831	0.786	0.934	0.991	0.050	A410622
Dissolved Nickel (Ni)	ug/L	0.110	0.085	0.144	0.287	0.156	0.164	0.020	A410622
Dissolved Phosphorus (P)	ug/L	8.2	47.7	5.3	37.1	16.3	13.0	2.0	A410622
Dissolved Selenium (Se)	ug/L	0.186	0.234	0.117	0.096	0.131	0.115	0.040	A410622
Dissolved Silicon (Si)	ug/L	5570	5900	5040	5030	5180	5520	50	A410622
Dissolved Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A410622
Dissolved Strontium (Sr)	ug/L	225	267	181	176	192	218	0.050	A410622
Dissolved Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	A410622
Dissolved Tin (Sn)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A410622
Dissolved Titanium (Ti)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A410622
Dissolved Uranium (U)	ug/L	1.54	1.94	0.984	0.903	1.09	1.12	0.0020	A410622
Dissolved Vanadium (V)	ug/L	0.69	0.85	0.42	0.33	0.48	0.45	0.20	A410622

RDL = Reportable Detection Limit

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL792	AJL793	AJL794	AJL795	AJL796	AJL797		
Sampling Date		2021/10/29 11:40	2021/10/29 10:20	2021/10/29 10:50	2021/10/29 12:25	2021/10/29 16:00	2021/10/28 14:40		
COC Number		650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-02-01		
	UNITS	**PS-1**	**PS-2B**	**PS-3**	**PS-5A**	**PS-6**	**PS-7**	**RDL**	**QC Batch**
Dissolved Zinc (Zn)	ug/L	0.14	0.56	0.30	0.32	0.22	0.11	0.10	A410622
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A410622
Dissolved Calcium (Ca)	mg/L	40.3	47.6	32.1	31.1	34.6	40.2	0.050	A407901
Dissolved Magnesium (Mg)	mg/L	8.56	10.2	6.44	6.07	7.05	8.59	0.050	A407901
Dissolved Potassium (K)	mg/L	0.922	1.15	0.814	0.821	0.865	0.926	0.050	A407901
Dissolved Sodium (Na)	mg/L	3.20	3.58	3.06	3.03	3.10	3.28	0.050	A407901
Dissolved Sulphur (S)	mg/L	3.5	3.5	4.3	4.6	4.0	3.3	3.0	A407901
RDL = Reportable Detection Limit									

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL798	AJL799	AJL800		AJL801		
Sampling Date		2021/10/28 15:20	2021/10/28 14:05	2021/10/28 13:30		2021/10/28 12:50		
COC Number		650479-02-01	650479-02-01	650479-02-01		650479-02-01		
	UNITS	PS-8	PC-D	PC-SA	QC Batch	PC-H	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO3)	mg/L	118	181	182	A407752	180	0.50	A407752
Elements								
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	A410029	<0.0019	0.0019	A413592
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	ug/L	1.51	2.70	1.30	A410622	1.18	0.50	A410622
Dissolved Antimony (Sb)	ug/L	0.047	0.069	0.070	A410622	0.071	0.020	A410622
Dissolved Arsenic (As)	ug/L	0.977	0.894	0.876	A410622	0.876	0.020	A410622
Dissolved Barium (Ba)	ug/L	28.0	28.1	28.2	A410622	27.1	0.020	A410622
Dissolved Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	A410622	<0.010	0.010	A410622
Dissolved Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	A410622	<0.0050	0.0050	A410622
Dissolved Boron (B)	ug/L	<10	<10	<10	A410622	<10	10	A410622
Dissolved Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	A410622	<0.0050	0.0050	A410622
Dissolved Chromium (Cr)	ug/L	0.34	0.27	0.37	A410622	0.18	0.10	A410622
Dissolved Cobalt (Co)	ug/L	0.0264	0.0399	0.0361	A410622	0.0371	0.0050	A410622
Dissolved Copper (Cu)	ug/L	0.300	0.777	0.724	A410622	0.727	0.050	A410622
Dissolved Iron (Fe)	ug/L	23.3	92.3	79.6	A410622	61.0	1.0	A410622
Dissolved Lead (Pb)	ug/L	<0.0050	<0.0050	0.0098	A410622	0.0103	0.0050	A410622
Dissolved Lithium (Li)	ug/L	0.75	0.97	1.00	A410622	0.99	0.50	A410622
Dissolved Manganese (Mn)	ug/L	4.76	17.0	9.58	A410622	5.13	0.050	A410622
Dissolved Molybdenum (Mo)	ug/L	0.994	6.64	6.57	A410622	6.68	0.050	A410622
Dissolved Nickel (Ni)	ug/L	0.155	0.219	0.201	A410622	0.229	0.020	A410622
Dissolved Phosphorus (P)	ug/L	14.5	31.6	27.8	A410622	22.9	2.0	A410622
Dissolved Selenium (Se)	ug/L	0.118	0.216	0.191	A410622	0.190	0.040	A410622
Dissolved Silicon (Si)	ug/L	5230	6110	5950	A410622	5950	50	A410622
Dissolved Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	A410622	<0.0050	0.0050	A410622
Dissolved Strontium (Sr)	ug/L	197	293	290	A410622	288	0.050	A410622
Dissolved Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	A410622	<0.0020	0.0020	A410622
Dissolved Tin (Sn)	ug/L	<0.20	<0.20	<0.20	A410622	<0.20	0.20	A410622
Dissolved Titanium (Ti)	ug/L	<0.50	<0.50	<0.50	A410622	<0.50	0.50	A410622
Dissolved Uranium (U)	ug/L	1.11	2.29	2.26	A410622	2.26	0.0020	A410622
Dissolved Vanadium (V)	ug/L	0.41	0.65	0.64	A410622	0.56	0.20	A410622

RDL = Reportable Detection Limit

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL798	AJL799	AJL800		AJL801		
Sampling Date		2021/10/28 15:20	2021/10/28 14:05	2021/10/28 13:30		2021/10/28 12:50		
COC Number		650479-02-01	650479-02-01	650479-02-01		650479-02-01		
	UNITS	**PS-8**	**PC-D**	**PC-SA**	**QC Batch**	**PC-H**	**RDL**	**QC Batch**
Dissolved Zinc (Zn)	ug/L	0.15	0.14	0.42	A410622	0.40	0.10	A410622
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	A410622	<0.10	0.10	A410622
Dissolved Calcium (Ca)	mg/L	34.9	54.2	54.7	A407901	54.2	0.050	A407901
Dissolved Magnesium (Mg)	mg/L	7.50	11.1	11.1	A407901	10.9	0.050	A407901
Dissolved Potassium (K)	mg/L	0.847	1.37	1.38	A407901	1.37	0.050	A407901
Dissolved Sodium (Na)	mg/L	3.15	4.46	4.72	A407901	4.76	0.050	A407901
Dissolved Sulphur (S)	mg/L	3.8	5.3	5.7	A407901	5.3	3.0	A407901
RDL = Reportable Detection Limit								

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL802	AJL803	AJL804		AJL805		
Sampling Date		2021/10/28 11:40	2021/10/28 10:40	2021/10/28 10:04		2021/10/28 09:05		
COC Number		650479-02-01	650479-02-01	650479-02-01		650479-02-01		
	UNITS	HL	MC-PH	MC-MV	QC Batch	MC-USY	RDL	QC Batch
Calculated Parameters								
Dissolved Hardness (CaCO3)	mg/L	182	138	137	A407752	139	0.50	A407752
Dissolved Metals by ICPMS								
Dissolved Aluminum (Al)	ug/L	1.42	2.12	1.46	A410622	1.40	0.50	A412157
Dissolved Antimony (Sb)	ug/L	0.068	0.051	0.048	A410622	0.061	0.020	A412157
Dissolved Arsenic (As)	ug/L	0.858	0.904	0.886	A410622	0.882	0.020	A412157
Dissolved Barium (Ba)	ug/L	27.5	30.1	30.6	A410622	30.5	0.020	A412157
Dissolved Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	A410622	<0.010	0.010	A412157
Dissolved Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	A410622	<0.0050	0.0050	A412157
Dissolved Boron (B)	ug/L	<10	<10	<10	A410622	<10	10	A412157
Dissolved Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	A410622	<0.0050	0.0050	A412157
Dissolved Chromium (Cr)	ug/L	0.21	0.21	0.29	A410622	0.22	0.10	A412157
Dissolved Cobalt (Co)	ug/L	0.0430	0.0246	0.0205	A410622	0.0219	0.0050	A412157
Dissolved Copper (Cu)	ug/L	0.717	0.426	0.408	A410622	0.410	0.050	A412157
Dissolved Iron (Fe)	ug/L	52.1	16.8	16.8	A410622	15.4	1.0	A412157
Dissolved Lead (Pb)	ug/L	0.0114	<0.0050	<0.0050	A410622	0.0057	0.0050	A412157
Dissolved Lithium (Li)	ug/L	0.96	0.93	0.92	A410622	0.95	0.50	A412157
Dissolved Manganese (Mn)	ug/L	5.17	4.99	3.25	A410622	3.45	0.050	A412157
Dissolved Molybdenum (Mo)	ug/L	6.87	1.09	1.06	A410622	1.14	0.050	A412157
Dissolved Nickel (Ni)	ug/L	0.220	0.152	0.152	A410622	0.165	0.020	A412157
Dissolved Phosphorus (P)	ug/L	23.4	11.0	11.4	A410622	10.8	2.0	A412157
Dissolved Selenium (Se)	ug/L	0.200	0.118	0.107	A410622	0.106	0.040	A412157
Dissolved Silicon (Si)	ug/L	6140	5680	5560	A410622	5600	50	A412157
Dissolved Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	A410622	<0.0050	0.0050	A412157
Dissolved Strontium (Sr)	ug/L	299	219	220	A410622	223	0.050	A412157
Dissolved Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	A410622	<0.0020	0.0020	A412157
Dissolved Tin (Sn)	ug/L	<0.20	<0.20	<0.20	A410622	<0.20	0.20	A412157
Dissolved Titanium (Ti)	ug/L	<0.50	<0.50	<0.50	A410622	<0.50	0.50	A412157
Dissolved Uranium (U)	ug/L	2.29	1.12	1.12	A410622	1.12	0.0020	A412157
Dissolved Vanadium (V)	ug/L	0.55	0.38	0.35	A410622	0.35	0.20	A412157
Dissolved Zinc (Zn)	ug/L	0.48	<0.10	0.13	A410622	0.31	0.10	A412157

RDL = Reportable Detection Limit

LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL802	AJL803	AJL804		AJL805		
Sampling Date		2021/10/28 11:40	2021/10/28 10:40	2021/10/28 10:04		2021/10/28 09:05		
COC Number		650479-02-01	650479-02-01	650479-02-01		650479-02-01		
	UNITS	HL	MC-PH	MC-MV	QC Batch	MC-USY	RDL	QC Batch
Dissolved Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	A410622	<0.10	0.10	A412157
Dissolved Calcium (Ca)	mg/L	54.7	40.7	40.7	A407901	41.0	0.050	A407901
Dissolved Magnesium (Mg)	mg/L	11.0	8.69	8.55	A407901	8.86	0.050	A407901
Dissolved Potassium (K)	mg/L	1.39	0.919	0.926	A407901	0.918	0.050	A407901
Dissolved Sodium (Na)	mg/L	4.77	3.31	3.26	A407901	3.39	0.050	A407901
Dissolved Sulphur (S)	mg/L	5.6	3.8	3.3	A407901	3.8	3.0	A407901
RDL = Reportable Detection Limit								

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL805			AJL806	AJL807	AJL808		
Sampling Date		2021/10/28 09:05			2021/10/28 09:15	2021/10/28 10:25	2021/10/28 16:15		
COC Number		650479-02-01			650479-02-01	650479-03-01	650479-03-01		
	UNITS	MC-USY Lab-Dup	RDL	QC Batch	REP-1	REP-2	FIELD BLANK	RDL	QC Batch
Calculated Parameters									
Dissolved Hardness (CaCO3)	mg/L				139	162	<0.50	0.50	A407752
Elements									
Dissolved Mercury (Hg)	ug/L				<0.0019	<0.0019	<0.0019	0.0019	A413592
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	1.38	0.50	A412157	1.59	1.53	0.82	0.50	A412157
Dissolved Antimony (Sb)	ug/L	0.044	0.020	A412157	0.055	0.067	<0.020	0.020	A412157
Dissolved Arsenic (As)	ug/L	0.909	0.020	A412157	0.922	0.911	<0.020	0.020	A412157
Dissolved Barium (Ba)	ug/L	30.5	0.020	A412157	30.9	28.0	1.66	0.020	A412157
Dissolved Beryllium (Be)	ug/L	<0.010	0.010	A412157	<0.010	<0.010	<0.010	0.010	A412157
Dissolved Bismuth (Bi)	ug/L	<0.0050	0.0050	A412157	<0.0050	<0.0050	<0.0050	0.0050	A412157
Dissolved Boron (B)	ug/L	<10	10	A412157	<10	<10	<10	10	A412157
Dissolved Cadmium (Cd)	ug/L	<0.0050	0.0050	A412157	<0.0050	<0.0050	<0.0050	0.0050	A412157
Dissolved Chromium (Cr)	ug/L	0.22	0.10	A412157	0.36	0.71	<0.10	0.10	A412157
Dissolved Cobalt (Co)	ug/L	0.0214	0.0050	A412157	0.0232	0.0387	<0.0050	0.0050	A412157
Dissolved Copper (Cu)	ug/L	0.413	0.050	A412157	0.417	0.334	<0.050	0.050	A412157
Dissolved Iron (Fe)	ug/L	15.7	1.0	A412157	26.2	45.2	20.6	1.0	A412157
Dissolved Lead (Pb)	ug/L	<0.0050	0.0050	A412157	0.0076	<0.0050	<0.0050	0.0050	A412157
Dissolved Lithium (Li)	ug/L	0.96	0.50	A412157	0.95	0.80	<0.50	0.50	A412157
Dissolved Manganese (Mn)	ug/L	3.38	0.050	A412157	3.42	9.67	0.115	0.050	A412157
Dissolved Molybdenum (Mo)	ug/L	1.14	0.050	A412157	1.18	1.97	<0.050	0.050	A412157
Dissolved Nickel (Ni)	ug/L	0.172	0.020	A412157	0.179	0.095	0.079	0.020	A412157
Dissolved Phosphorus (P)	ug/L	11.5	2.0	A412157	11.8	50.1	<2.0	2.0	A412157
Dissolved Selenium (Se)	ug/L	0.126	0.040	A412157	0.112	0.257	<0.040	0.040	A412157
Dissolved Silicon (Si)	ug/L	5680	50	A412157	5680	6230	<50	50	A412157
Dissolved Silver (Ag)	ug/L	<0.0050	0.0050	A412157	<0.0050	<0.0050	<0.0050	0.0050	A412157
Dissolved Strontium (Sr)	ug/L	223	0.050	A412157	222	260	0.094	0.050	A412157
Dissolved Thallium (Tl)	ug/L	<0.0020	0.0020	A412157	<0.0020	<0.0020	<0.0020	0.0020	A412157
Dissolved Tin (Sn)	ug/L	<0.20	0.20	A412157	<0.20	<0.20	<0.20	0.20	A412157
Dissolved Titanium (Ti)	ug/L	<0.50	0.50	A412157	<0.50	<0.50	<0.50	0.50	A412157
Dissolved Uranium (U)	ug/L	1.11	0.0020	A412157	1.13	1.91	<0.0020	0.0020	A412157

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

LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL805			AJL806	AJL807	AJL808		
Sampling Date		2021/10/28 09:05			2021/10/28 09:15	2021/10/28 10:25	2021/10/28 16:15		
COC Number		650479-02-01			650479-02-01	650479-03-01	650479-03-01		
	UNITS	**MC-USY Lab-Dup**	**RDL**	**QC Batch**	**REP-1**	**REP-2**	**FIELD BLANK**	**RDL**	**QC Batch**
Dissolved Vanadium (V)	ug/L	0.38	0.20	A412157	0.44	0.72	<0.20	0.20	A412157
Dissolved Zinc (Zn)	ug/L	0.26	0.10	A412157	0.27	0.69	0.19	0.10	A412157
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	A412157	<0.10	<0.10	<0.10	0.10	A412157
Dissolved Calcium (Ca)	mg/L				41.2	47.8	0.192	0.050	A407901
Dissolved Magnesium (Mg)	mg/L				8.85	10.3	<0.050	0.050	A407901
Dissolved Potassium (K)	mg/L				0.928	1.16	<0.050	0.050	A407901
Dissolved Sodium (Na)	mg/L				3.38	3.58	<0.050	0.050	A407901
Dissolved Sulphur (S)	mg/L				4.3	3.8	<3.0	3.0	A407901

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

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LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL808			AJL809		
Sampling Date		2021/10/28 16:15			2021/10/28 00:00		
COC Number		650479-03-01			650479-03-01		
	UNITS	FIELD BLANK Lab-Dup	RDL	QC Batch	TRIP BLANK	RDL	QC Batch
Calculated Parameters							
Dissolved Hardness (CaCO3)	mg/L				<0.50	0.50	A407752
Elements							
Dissolved Mercury (Hg)	ug/L				<0.0019	0.0019	A413592
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	ug/L	0.75	0.50	A412157	<0.50	0.50	A412157
Dissolved Antimony (Sb)	ug/L	<0.020	0.020	A412157	<0.020	0.020	A412157
Dissolved Arsenic (As)	ug/L	<0.020	0.020	A412157	<0.020	0.020	A412157
Dissolved Barium (Ba)	ug/L	1.75	0.020	A412157	<0.020	0.020	A412157
Dissolved Beryllium (Be)	ug/L	<0.010	0.010	A412157	<0.010	0.010	A412157
Dissolved Bismuth (Bi)	ug/L	<0.0050	0.0050	A412157	<0.0050	0.0050	A412157
Dissolved Boron (B)	ug/L	<10	10	A412157	<10	10	A412157
Dissolved Cadmium (Cd)	ug/L	<0.0050	0.0050	A412157	<0.0050	0.0050	A412157
Dissolved Chromium (Cr)	ug/L	<0.10	0.10	A412157	<0.10	0.10	A412157
Dissolved Cobalt (Co)	ug/L	<0.0050	0.0050	A412157	<0.0050	0.0050	A412157
Dissolved Copper (Cu)	ug/L	<0.050	0.050	A412157	<0.050	0.050	A412157
Dissolved Iron (Fe)	ug/L	20.9	1.0	A412157	<1.0	1.0	A412157
Dissolved Lead (Pb)	ug/L	<0.0050	0.0050	A412157	<0.0050	0.0050	A412157
Dissolved Lithium (Li)	ug/L	<0.50	0.50	A412157	<0.50	0.50	A412157
Dissolved Manganese (Mn)	ug/L	0.085	0.050	A412157	<0.050	0.050	A412157
Dissolved Molybdenum (Mo)	ug/L	<0.050	0.050	A412157	<0.050	0.050	A412157
Dissolved Nickel (Ni)	ug/L	0.090	0.020	A412157	<0.020	0.020	A412157
Dissolved Phosphorus (P)	ug/L	<2.0	2.0	A412157	<2.0	2.0	A412157
Dissolved Selenium (Se)	ug/L	<0.040	0.040	A412157	<0.040	0.040	A412157
Dissolved Silicon (Si)	ug/L	<50	50	A412157	<50	50	A412157
Dissolved Silver (Ag)	ug/L	<0.0050	0.0050	A412157	<0.0050	0.0050	A412157
Dissolved Strontium (Sr)	ug/L	0.099	0.050	A412157	<0.050	0.050	A412157
Dissolved Thallium (Tl)	ug/L	<0.0020	0.0020	A412157	<0.0020	0.0020	A412157
Dissolved Tin (Sn)	ug/L	<0.20	0.20	A412157	<0.20	0.20	A412157
Dissolved Titanium (Ti)	ug/L	<0.50	0.50	A412157	<0.50	0.50	A412157
Dissolved Uranium (U)	ug/L	<0.0020	0.0020	A412157	0.0023	0.0020	A412157

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

LOW LEVEL DISSOLVED METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL808			AJL809		
Sampling Date		2021/10/28 16:15			2021/10/28 00:00		
COC Number		650479-03-01			650479-03-01		
	UNITS	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Dissolved Vanadium (V)	ug/L	<0.20	0.20	A412157	<0.20	0.20	A412157
Dissolved Zinc (Zn)	ug/L	0.20	0.10	A412157	<0.10	0.10	A412157
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	A412157	<0.10	0.10	A412157
Dissolved Calcium (Ca)	mg/L				<0.050	0.050	A407901
Dissolved Magnesium (Mg)	mg/L				<0.050	0.050	A407901
Dissolved Potassium (K)	mg/L				<0.050	0.050	A407901
Dissolved Sodium (Na)	mg/L				<0.050	0.050	A407901
Dissolved Sulphur (S)	mg/L				<3.0	3.0	A407901

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

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL788			AJL788			AJL789		
Sampling Date		2021/10/29 16:00			2021/10/29 16:00			2021/10/29 14:55		
COC Number		650479-01-01			650479-01-01			650479-01-01		
	UNITS	FSHLK	RDL	QC Batch	FSHLK Lab-Dup	RDL	QC Batch	USFRLO	RDL	QC Batch
Calculated Parameters										
Total Hardness (CaCO3)	mg/L	78.5	0.50	A407751				83.2	0.50	A407751
Elements										
Total Mercury (Hg)	ug/L	<0.0019	0.0019	A410024				<0.0019	0.0019	A410024
Total Metals by ICPMS										
Total Aluminum (Al)	ug/L	2.71	0.50	A409677	2.69	0.50	A409677	4.29	0.50	A409677
Total Antimony (Sb)	ug/L	0.036	0.020	A409677	0.039	0.020	A409677	0.045	0.020	A409677
Total Arsenic (As)	ug/L	1.21	0.020	A409677	1.21	0.020	A409677	1.13	0.020	A409677
Total Barium (Ba)	ug/L	33.7	0.020	A409677	33.8	0.020	A409677	33.5	0.020	A409677
Total Beryllium (Be)	ug/L	<0.010	0.010	A409677	<0.010	0.010	A409677	<0.010	0.010	A409677
Total Bismuth (Bi)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Boron (B)	ug/L	<10	10	A409677	<10	10	A409677	<10	10	A409677
Total Cadmium (Cd)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Chromium (Cr)	ug/L	<0.10	0.10	A409677	<0.10	0.10	A409677	<0.10	0.10	A409677
Total Cobalt (Co)	ug/L	0.0121	0.0050	A409677	0.0108	0.0050	A409677	0.0135	0.0050	A409677
Total Copper (Cu)	ug/L	0.307	0.050	A409677	0.307	0.050	A409677	0.327	0.050	A409677
Total Iron (Fe)	ug/L	11.5	1.0	A409677	11.5	1.0	A409677	42.5	1.0	A409677
Total Lead (Pb)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Lithium (Li)	ug/L	0.79	0.50	A409677	0.81	0.50	A409677	0.82	0.50	A409677
Total Manganese (Mn)	ug/L	3.31	0.050	A409677	3.20	0.050	A409677	6.02	0.050	A409677
Total Molybdenum (Mo)	ug/L	0.831	0.050	A409677	0.829	0.050	A409677	0.696	0.050	A409677
Total Nickel (Ni)	ug/L	0.144	0.020	A409677	0.145	0.020	A409677	0.156	0.020	A409677
Total Phosphorus (P)	ug/L	5.9	2.0	A409677	5.2	2.0	A409677	6.4	2.0	A409677
Total Selenium (Se)	ug/L	0.101	0.040	A409677	0.089	0.040	A409677	0.091	0.040	A409677
Total Silicon (Si)	ug/L	4460	50	A409677	4410	50	A409677	4300	50	A409677
Total Silver (Ag)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Strontium (Sr)	ug/L	153	0.050	A409677	156	0.050	A409677	160	0.050	A409677
Total Thallium (Tl)	ug/L	<0.0020	0.0020	A409677	<0.0020	0.0020	A409677	<0.0020	0.0020	A409677
Total Tin (Sn)	ug/L	<0.20	0.20	A409677	<0.20	0.20	A409677	<0.20	0.20	A409677
Total Titanium (Ti)	ug/L	<0.50	0.50	A409677	<0.50	0.50	A409677	<0.50	0.50	A409677
Total Uranium (U)	ug/L	0.250	0.0020	A409677	0.246	0.0020	A409677	0.295	0.0020	A409677

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

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LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL788			AJL788			AJL789		
Sampling Date		2021/10/29 16:00			2021/10/29 16:00			2021/10/29 14:55		
COC Number		650479-01-01			650479-01-01			650479-01-01		
	UNITS	**FSHLK**	**RDL**	**QC Batch**	**FSHLK Lab-Dup**	**RDL**	**QC Batch**	**USFRLO**	**RDL**	**QC Batch**
Total Vanadium (V)	ug/L	0.21	0.20	A409677	<0.20	0.20	A409677	0.29	0.20	A409677
Total Zinc (Zn)	ug/L	0.11	0.10	A409677	<0.10	0.10	A409677	0.16	0.10	A409677
Total Zirconium (Zr)	ug/L	<0.10	0.10	A409677	<0.10	0.10	A409677	<0.10	0.10	A409677
Total Calcium (Ca)	mg/L	22.9	0.050	A407834				24.2	0.050	A407834
Total Magnesium (Mg)	mg/L	5.15	0.050	A407834				5.53	0.050	A407834
Total Potassium (K)	mg/L	0.739	0.050	A407834				0.788	0.050	A407834
Total Sodium (Na)	mg/L	2.97	0.050	A407834				3.13	0.050	A407834
Total Sulphur (S)	mg/L	5.0	3.0	A407834				4.9	3.0	A407834

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

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL790	AJL791	AJL792	AJL793	AJL794	AJL795		
Sampling Date		2021/10/29 14:15	2021/10/29 13:20	2021/10/29 11:40	2021/10/29 10:20	2021/10/29 10:50	2021/10/29 12:25		
COC Number		650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-01-01		
	UNITS	LLOUT	DITCH 1	PS-1	PS-2B	PS-3	PS-5A	RDL	QC Batch
Calculated Parameters									
Total Hardness (CaCO3)	mg/L	85.9	93.3	130	153	99.4	96.4	0.50	A407751
Elements									
Total Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	A410024
Total Metals by ICPMS									
Total Aluminum (Al)	ug/L	2.88	42.9	20.5	7.02	35.8	29.9	0.50	A409677
Total Antimony (Sb)	ug/L	0.040	0.040	0.060	0.072	0.051	0.042	0.020	A409677
Total Arsenic (As)	ug/L	1.10	1.10	0.995	0.946	1.05	1.08	0.020	A409677
Total Barium (Ba)	ug/L	33.9	32.3	26.9	26.5	31.2	31.1	0.020	A409677
Total Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A409677
Total Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A409677
Total Boron (B)	ug/L	<10	<10	<10	<10	<10	<10	10	A409677
Total Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A409677
Total Chromium (Cr)	ug/L	0.11	0.21	0.74	0.76	0.32	0.23	0.10	A409677
Total Cobalt (Co)	ug/L	0.0141	0.0462	0.0318	0.0434	0.0425	0.0428	0.0050	A409677
Total Copper (Cu)	ug/L	0.330	0.433	0.237	1.11	0.393	0.469	0.050	A409677
Total Iron (Fe)	ug/L	18.3	98.3	44.6	71.5	80.0	77.3	1.0	A409677
Total Lead (Pb)	ug/L	<0.0050	0.0357	0.0152	0.0061	0.0322	0.0261	0.0050	A409677
Total Lithium (Li)	ug/L	0.81	0.88	0.92	0.98	0.89	0.88	0.50	A409677
Total Manganese (Mn)	ug/L	2.97	7.36	2.35	9.44	5.80	6.44	0.050	A409677
Total Molybdenum (Mo)	ug/L	0.642	0.709	1.34	1.99	0.832	0.812	0.050	A409677
Total Nickel (Ni)	ug/L	0.143	0.217	0.135	0.092	0.221	0.189	0.020	A409677
Total Phosphorus (P)	ug/L	5.9	8.7	9.3	63.2	8.5	43.4	2.0	A409677
Total Selenium (Se)	ug/L	0.090	0.090	0.199	0.242	0.110	0.102	0.040	A409677
Total Silicon (Si)	ug/L	4370	4580	5090	5540	4610	4600	50	A409677
Total Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A409677
Total Strontium (Sr)	ug/L	162	155	205	241	167	161	0.050	A409677
Total Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	A409677
Total Tin (Sn)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A409677
Total Titanium (Ti)	ug/L	<0.50	2.09	1.18	0.66	2.10	2.04	0.50	A409677
Total Uranium (U)	ug/L	0.343	0.667	1.34	1.68	0.833	0.768	0.0020	A409677
Total Vanadium (V)	ug/L	0.32	0.44	0.82	0.89	0.54	0.45	0.20	A409677

RDL = Reportable Detection Limit

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Bureau Veritas Job #: C183638
Report Date: 2021/11/11

Government of Yukon
Client Project #: Icy Waters
Site Location: Porter McIntyre Fish Creeks

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL790	AJL791	AJL792	AJL793	AJL794	AJL795		
Sampling Date		2021/10/29 14:15	2021/10/29 13:20	2021/10/29 11:40	2021/10/29 10:20	2021/10/29 10:50	2021/10/29 12:25		
COC Number		650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-01-01	650479-01-01		
	UNITS	**LLOUT**	**DITCH 1**	**PS-1**	**PS-2B**	**PS-3**	**PS-5A**	**RDL**	**QC Batch**
Total Zinc (Zn)	ug/L	<0.10	0.28	0.35	2.41	0.29	0.70	0.10	A409677
Total Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A409677
Total Calcium (Ca)	mg/L	25.4	28.4	38.4	44.5	29.9	29.0	0.050	A407834
Total Magnesium (Mg)	mg/L	5.47	5.44	8.32	10.1	5.98	5.81	0.050	A407834
Total Potassium (K)	mg/L	0.751	0.756	0.929	1.17	0.777	0.816	0.050	A407834
Total Sodium (Na)	mg/L	3.03	2.89	3.10	3.59	2.88	2.92	0.050	A407834
Total Sulphur (S)	mg/L	4.3	4.2	3.6	3.5	4.1	3.7	3.0	A407834
RDL = Reportable Detection Limit									

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL796	AJL797	AJL798	AJL799	AJL800	AJL801		
Sampling Date		2021/10/29 16:00	2021/10/28 14:40	2021/10/28 15:20	2021/10/28 14:05	2021/10/28 13:30	2021/10/28 12:50		
COC Number		650479-01-01	650479-02-01	650479-02-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	PS-6	PS-7	PS-8	PC-D	PC-SA	PC-H	RDL	QC Batch
Calculated Parameters									
Total Hardness (CaCO3)	mg/L	109	128	113	172	171	170	0.50	A407751
Elements									
Total Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	A410024
Total Metals by ICPMS									
Total Aluminum (Al)	ug/L	29.1	15.0	10.9	26.2	7.14	6.61	0.50	A409677
Total Antimony (Sb)	ug/L	0.050	0.048	0.047	0.060	0.068	0.061	0.020	A409677
Total Arsenic (As)	ug/L	0.983	0.924	1.01	0.973	0.940	0.886	0.020	A409677
Total Barium (Ba)	ug/L	29.1	29.8	28.3	28.5	27.1	26.9	0.020	A409677
Total Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A409677
Total Bismuth (Bi)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A409677
Total Boron (B)	ug/L	<10	<10	<10	<10	<10	<10	10	A409677
Total Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A409677
Total Chromium (Cr)	ug/L	0.33	0.33	0.29	0.35	0.26	0.29	0.10	A409677
Total Cobalt (Co)	ug/L	0.0405	0.0328	0.0255	0.0607	0.0454	0.0374	0.0050	A409677
Total Copper (Cu)	ug/L	0.369	0.536	0.315	0.941	0.802	0.776	0.050	A409677
Total Iron (Fe)	ug/L	72.2	54.7	47.1	188	126	114	1.0	A409677
Total Lead (Pb)	ug/L	0.0218	0.0104	0.0097	0.0206	0.0235	0.0228	0.0050	A409677
Total Lithium (Li)	ug/L	0.91	1.05	0.89	1.17	1.17	1.20	0.50	A409677
Total Manganese (Mn)	ug/L	6.12	7.48	4.96	22.8	9.95	5.38	0.050	A409677
Total Molybdenum (Mo)	ug/L	1.48	1.09	0.966	6.47	6.46	6.44	0.050	A409677
Total Nickel (Ni)	ug/L	0.168	0.171	0.172	0.251	0.229	0.228	0.020	A409677
Total Phosphorus (P)	ug/L	20.9	16.9	17.3	39.4	31.3	29.7	2.0	A409677
Total Selenium (Se)	ug/L	0.118	0.115	0.112	0.211	0.184	0.188	0.040	A409677
Total Silicon (Si)	ug/L	4810	5060	4800	5730	5570	5450	50	A409677
Total Silver (Ag)	ug/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A409677
Total Strontium (Sr)	ug/L	178	200	183	266	260	258	0.050	A409677
Total Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	A409677
Total Tin (Sn)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A409677
Total Titanium (Ti)	ug/L	1.26	0.98	<0.50	3.36	0.67	0.67	0.50	A409677
Total Uranium (U)	ug/L	0.947	0.927	0.944	2.00	1.93	1.95	0.0020	A409677
Total Vanadium (V)	ug/L	0.55	0.56	0.40	0.78	0.63	0.66	0.20	A409677

RDL = Reportable Detection Limit

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LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL796	AJL797	AJL798	AJL799	AJL800	AJL801		
Sampling Date		2021/10/29 16:00	2021/10/28 14:40	2021/10/28 15:20	2021/10/28 14:05	2021/10/28 13:30	2021/10/28 12:50		
COC Number		650479-01-01	650479-02-01	650479-02-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	PS-6	PS-7	PS-8	PC-D	PC-SA	PC-H	RDL	QC Batch
Total Zinc (Zn)	ug/L	0.33	0.18	0.27	1.02	0.62	0.50	0.10	A409677
Total Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A409677
Total Calcium (Ca)	mg/L	32.7	37.5	33.4	51.2	51.1	50.8	0.050	A407834
Total Magnesium (Mg)	mg/L	6.73	8.37	7.26	10.8	10.6	10.5	0.050	A407834
Total Potassium (K)	mg/L	0.827	0.934	0.856	1.29	1.25	1.29	0.050	A407834
Total Sodium (Na)	mg/L	3.00	3.27	3.14	4.36	4.62	4.71	0.050	A407834
Total Sulphur (S)	mg/L	4.0	3.5	3.8	5.0	5.1	5.3	3.0	A407834

RDL = Reportable Detection Limit

Bureau Veritas ID		AJL802	AJL803	AJL804	AJL805	AJL805		
Sampling Date		2021/10/28 11:40	2021/10/28 10:40	2021/10/28 10:04	2021/10/28 09:05	2021/10/28 09:05		
COC Number		650479-02-01	650479-02-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	HL	MC-PH	MC-MV	MC-USY	MC-USY Lab-Dup	RDL	QC Batch
Elements								
Total Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	A410024

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

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LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL806			AJL807			AJL808		
Sampling Date		2021/10/28 09:15			2021/10/28 10:25			2021/10/28 16:15		
COC Number		650479-02-01			650479-03-01			650479-03-01		
	UNITS	REP-1	RDL	QC Batch	REP-2	RDL	QC Batch	FIELD BLANK	RDL	QC Batch
Calculated Parameters										
Total Hardness (CaCO3)	mg/L	134	0.50	A407751	154	0.50	A407751	<0.50	0.50	A407751
Elements										
Total Mercury (Hg)	ug/L	<0.0019 (1)	0.0019	A410024	<0.0019 (2)	0.0019	A409977	<0.0019	0.0019	A410024
Total Metals by ICPMS										
Total Aluminum (Al)	ug/L	73.3	0.50	A409677	4.81	0.50	A409677	1.05	0.50	A409677
Total Antimony (Sb)	ug/L	0.051	0.020	A409677	0.060	0.020	A409677	<0.020	0.020	A409677
Total Arsenic (As)	ug/L	0.975	0.020	A409677	0.920	0.020	A409677	<0.020	0.020	A409677
Total Barium (Ba)	ug/L	32.3	0.020	A409677	27.0	0.020	A409677	<0.020	0.020	A409677
Total Beryllium (Be)	ug/L	<0.010	0.010	A409677	<0.010	0.010	A409677	<0.010	0.010	A409677
Total Bismuth (Bi)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Boron (B)	ug/L	<10	10	A409677	<10	10	A409677	<10	10	A409677
Total Cadmium (Cd)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Chromium (Cr)	ug/L	0.57	0.10	A409677	0.87	0.10	A409677	<0.10	0.10	A409677
Total Cobalt (Co)	ug/L	0.0738	0.0050	A409677	0.0428	0.0050	A409677	<0.0050	0.0050	A409677
Total Copper (Cu)	ug/L	0.793	0.050	A409677	0.503	0.050	A409677	<0.050	0.050	A409677
Total Iron (Fe)	ug/L	145	1.0	A409677	78.8	1.0	A409677	<1.0	1.0	A409677
Total Lead (Pb)	ug/L	0.0653	0.0050	A409677	0.0055	0.0050	A409677	<0.0050	0.0050	A409677
Total Lithium (Li)	ug/L	1.21	0.50	A409677	1.00	0.50	A409677	<0.50	0.50	A409677
Total Manganese (Mn)	ug/L	8.74	0.050	A409677	9.28	0.050	A409677	<0.050	0.050	A409677
Total Molybdenum (Mo)	ug/L	2.64	0.050	A409677	2.03	0.050	A409677	<0.050	0.050	A409677
Total Nickel (Ni)	ug/L	0.332	0.020	A409677	0.092	0.020	A409677	<0.020	0.020	A409677
Total Phosphorus (P)	ug/L	19.8	2.0	A409677				2.7	2.0	A409677
Total Selenium (Se)	ug/L	0.114	0.040	A409677	0.241	0.040	A409677	<0.040	0.040	A409677
Total Silicon (Si)	ug/L	5190	50	A409677	5630	50	A409677	<50	50	A409677
Total Silver (Ag)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Strontium (Sr)	ug/L	216	0.050	A409677	239	0.050	A409677	<0.050	0.050	A409677
Total Thallium (Tl)	ug/L	<0.0020	0.0020	A409677	<0.0020	0.0020	A409677	<0.0020	0.0020	A409677
Total Tin (Sn)	ug/L	<0.20	0.20	A409677	<0.20	0.20	A409677	<0.20	0.20	A409677

RDL = Reportable Detection Limit

(1) Matrix spike exceeds acceptance limits due to probable matrix interference.

(2) Matrix spike exceeds acceptance limits due to probable matrix interference.

Mercury sample analyzed using the HDPE container and nitric acid preservative, these non-conformances can cause stability and high or low biases, results for this test are qualified

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LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL806			AJL807			AJL808		
Sampling Date		2021/10/28 09:15			2021/10/28 10:25			2021/10/28 16:15		
COC Number		650479-02-01			650479-03-01			650479-03-01		
	UNITS	**REP-1**	**RDL**	**QC Batch**	**REP-2**	**RDL**	**QC Batch**	**FIELD BLANK**	**RDL**	**QC Batch**
Total Titanium (Ti)	ug/L	4.25	0.50	A409677	0.69	0.50	A409677	<0.50	0.50	A409677
Total Uranium (U)	ug/L	0.995	0.0020	A409677	1.65	0.0020	A409677	<0.0020	0.0020	A409677
Total Vanadium (V)	ug/L	0.78	0.20	A409677	0.94	0.20	A409677	<0.20	0.20	A409677
Total Zinc (Zn)	ug/L	0.72	0.10	A409677	0.65	0.10	A409677	<0.10	0.10	A409677
Total Zirconium (Zr)	ug/L	<0.10	0.10	A409677	<0.10	0.10	A409677	<0.10	0.10	A409677
Total Calcium (Ca)	mg/L	39.1	0.050	A407834	45.3	0.050	A407834	<0.050	0.050	A407834
Total Magnesium (Mg)	mg/L	8.87	0.050	A407834	9.96	0.050	A407834	<0.050	0.050	A407834
Total Potassium (K)	mg/L	0.975	0.050	A407834	1.08	0.050	A407834	<0.050	0.050	A407834
Total Sodium (Na)	mg/L	3.39	0.050	A407834	3.55	0.050	A407834	<0.050	0.050	A407834
Total Sulphur (S)	mg/L	3.7	3.0	A407834	3.4	3.0	A407834	<3.0	3.0	A407834
RDL = Reportable Detection Limit										

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LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL808			AJL809		
Sampling Date		2021/10/28 16:15			2021/10/28 00:00		
COC Number		650479-03-01			650479-03-01		
	UNITS	FIELD BLANK Lab-Dup	RDL	QC Batch	TRIP BLANK	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO3)	mg/L				<0.50	0.50	A407751
Elements							
Total Mercury (Hg)	ug/L				<0.0019	0.0019	A413611
Total Metals by ICPMS							
Total Aluminum (Al)	ug/L	1.09	0.50	A409677	<0.50	0.50	A409677
Total Antimony (Sb)	ug/L	<0.020	0.020	A409677	<0.020	0.020	A409677
Total Arsenic (As)	ug/L	<0.020	0.020	A409677	<0.020	0.020	A409677
Total Barium (Ba)	ug/L	<0.020	0.020	A409677	<0.020	0.020	A409677
Total Beryllium (Be)	ug/L	<0.010	0.010	A409677	<0.010	0.010	A409677
Total Bismuth (Bi)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Boron (B)	ug/L	<10	10	A409677	<10	10	A409677
Total Cadmium (Cd)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Chromium (Cr)	ug/L	<0.10	0.10	A409677	<0.10	0.10	A409677
Total Cobalt (Co)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Copper (Cu)	ug/L	<0.050	0.050	A409677	<0.050	0.050	A409677
Total Iron (Fe)	ug/L	<1.0	1.0	A409677	<1.0	1.0	A409677
Total Lead (Pb)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Lithium (Li)	ug/L	<0.50	0.50	A409677	<0.50	0.50	A409677
Total Manganese (Mn)	ug/L	<0.050	0.050	A409677	<0.050	0.050	A409677
Total Molybdenum (Mo)	ug/L	<0.050	0.050	A409677	<0.050	0.050	A409677
Total Nickel (Ni)	ug/L	<0.020	0.020	A409677	<0.020	0.020	A409677
Total Phosphorus (P)	ug/L	2.7	2.0	A409677	<2.0	2.0	A409677
Total Selenium (Se)	ug/L	<0.040	0.040	A409677	<0.040	0.040	A409677
Total Silicon (Si)	ug/L	<50	50	A409677	<50	50	A409677
Total Silver (Ag)	ug/L	<0.0050	0.0050	A409677	<0.0050	0.0050	A409677
Total Strontium (Sr)	ug/L	<0.050	0.050	A409677	<0.050	0.050	A409677
Total Thallium (Tl)	ug/L	<0.0020	0.0020	A409677	<0.0020	0.0020	A409677
Total Tin (Sn)	ug/L	<0.20	0.20	A409677	<0.20	0.20	A409677
Total Titanium (Ti)	ug/L	<0.50	0.50	A409677	<0.50	0.50	A409677
Total Uranium (U)	ug/L	<0.0020	0.0020	A409677	<0.0020	0.0020	A409677

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

LOW LEVEL TOTAL METALS WITH CV HG (WATER)

Bureau Veritas ID		AJL808			AJL809		
Sampling Date		2021/10/28 16:15			2021/10/28 00:00		
COC Number		650479-03-01			650479-03-01		
	UNITS	**FIELD BLANK Lab-Dup**	**RDL**	**QC Batch**	**TRIP BLANK**	**RDL**	**QC Batch**
Total Vanadium (V)	ug/L	<0.20	0.20	A409677	<0.20	0.20	A409677
Total Zinc (Zn)	ug/L	<0.10	0.10	A409677	<0.10	0.10	A409677
Total Zirconium (Zr)	ug/L	<0.10	0.10	A409677	<0.10	0.10	A409677
Total Calcium (Ca)	mg/L				<0.050	0.050	A407834
Total Magnesium (Mg)	mg/L				<0.050	0.050	A407834
Total Potassium (K)	mg/L				<0.050	0.050	A407834
Total Sodium (Na)	mg/L				<0.050	0.050	A407834
Total Sulphur (S)	mg/L				<3.0	3.0	A407834

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

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LL TOTAL METALS (DIGESTED) WITH CV HG

Bureau Veritas ID		AJL802	AJL803	AJL804	AJL805		
Sampling Date		2021/10/28 11:40	2021/10/28 10:40	2021/10/28 10:04	2021/10/28 09:05		
COC Number		650479-02-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	HL	MC-PH	MC-MV	MC-USY	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	179	136	140	140	0.50	A407751
Elements							
Dissolved Mercury (Hg)	ug/L	<0.0019	<0.0019	<0.0019	<0.0019	0.0019	A413592
Total Metals by ICPMS							
Total Aluminum (Al)	ug/L	24.3	26.2	67.3	86.8	3.0	A411813
Total Antimony (Sb)	ug/L	0.076	0.058	0.052	0.063	0.020	A411813
Total Arsenic (As)	ug/L	0.969	0.947	1.00	1.06	0.020	A411813
Total Barium (Ba)	ug/L	30.6	33.0	35.2	35.7	0.050	A411813
Total Beryllium (Be)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A411813
Total Bismuth (Bi)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A411813
Total Boron (B)	ug/L	10	<10	<10	<10	10	A411813
Total Cadmium (Cd)	ug/L	<0.0050	<0.0050	<0.0050	0.0075	0.0050	A411813
Total Chromium (Cr)	ug/L	0.21	0.22	0.38	0.49	0.10	A411813
Total Cobalt (Co)	ug/L	0.049	0.033	0.073	0.085	0.010	A411813
Total Copper (Cu)	ug/L	0.87	0.61	0.88	0.87	0.10	A411813
Total Iron (Fe)	ug/L	137	60.4	133	158	5.0	A411813
Total Lead (Pb)	ug/L	0.061	0.035	0.071	0.116	0.020	A411813
Total Lithium (Li)	ug/L	1.09	0.98	1.04	1.07	0.50	A411813
Total Manganese (Mn)	ug/L	5.96	7.57	9.51	10.2	0.10	A411813
Total Molybdenum (Mo)	ug/L	7.17	1.15	1.18	1.26	0.050	A411813
Total Nickel (Ni)	ug/L	0.26	0.18	0.29	0.35	0.10	A411813
Total Selenium (Se)	ug/L	0.221	0.126	0.128	0.120	0.040	A411813
Total Silicon (Si)	ug/L	5610	5150	5270	5300	50	A411813
Total Silver (Ag)	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A411813
Total Strontium (Sr)	ug/L	317	236	258	248	0.050	A411813
Total Tellurium (Te)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A411813
Total Thallium (Tl)	ug/L	<0.0020	<0.0020	<0.0020	0.0023	0.0020	A411813
Total Thorium (Th)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A411813
Total Tin (Sn)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	A411813
Total Titanium (Ti)	ug/L	<2.0	<2.0	3.6	4.5	2.0	A411813
Total Tungsten (W)	ug/L	0.030	<0.010	<0.010	0.010	0.010	A411813
Total Uranium (U)	ug/L	2.21	1.07	1.10	1.13	0.0050	A411813

RDL = Reportable Detection Limit

LL TOTAL METALS (DIGESTED) WITH CV HG

Bureau Veritas ID		AJL802	AJL803	AJL804	AJL805		
Sampling Date		2021/10/28 11:40	2021/10/28 10:40	2021/10/28 10:04	2021/10/28 09:05		
COC Number		650479-02-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	HL	MC-PH	MC-MV	MC-USY	RDL	QC Batch
Total Vanadium (V)	ug/L	0.25	<0.20	0.23	0.28	0.20	A411813
Total Zinc (Zn)	ug/L	<1.0	<1.0	1.2	1.2	1.0	A411813
Total Zirconium (Zr)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A411813
Total Calcium (Ca)	mg/L	53.6	40.3	41.7	41.3	0.25	A407834
Total Magnesium (Mg)	mg/L	10.9	8.59	8.81	8.87	0.25	A407834
Total Potassium (K)	mg/L	1.29	0.91	0.95	0.96	0.25	A407834
Total Sodium (Na)	mg/L	4.86	3.40	3.53	3.53	0.25	A407834
Total Sulphur (S)	mg/L	5.8	4.0	4.0	4.4	3.0	A407834
RDL = Reportable Detection Limit							

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CSR VOC + VPH IN WATER (WATER)

Bureau Veritas ID		AJL788		AJL793	AJL797			AJL797		
Sampling Date		2021/10/29 16:00		2021/10/29 10:20	2021/10/28 14:40			2021/10/28 14:40		
COC Number		650479-01-01		650479-01-01	650479-02-01			650479-02-01		
	UNITS	FSHLK	QC Batch	PS-2B	PS-7	RDL	QC Batch	PS-7 Lab-Dup	RDL	QC Batch
Calculated Parameters										
VPH (VH6 to 10 - BTEX)	ug/L	<300	A407910	<300	<300	300	A407910			
Volatiles										
VH C6-C10	ug/L	<300	A409150	<300	<300	300	A409359	<300	300	A409359
1,1,1,2-tetrachloroethane	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,1,1-trichloroethane	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,1,2,2-tetrachloroethane	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,1,2Trichloro-1,2,2Trifluoroethane	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
1,1,2-trichloroethane	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,1-dichloroethane	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,1-dichloroethene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,2,3-trichlorobenzene	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
1,2,4-trichlorobenzene	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
1,2-dibromoethane	ug/L	<0.20	A409150	<0.20	<0.20	0.20	A409359	<0.20	0.20	A409359
1,2-dichlorobenzene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,2-dichloroethane	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,2-dichloropropane	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,3,5-trimethylbenzene	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
1,3-Butadiene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,3-dichlorobenzene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
1,3-dichloropropane	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
1,4-dichlorobenzene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
Benzene	ug/L	<0.40	A409150	<0.40	<0.40	0.40	A409359	<0.40	0.40	A409359
Bromobenzene	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
Bromodichloromethane	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
Bromoform	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
Bromomethane	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
Carbon tetrachloride	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
Chlorobenzene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
Dibromochloromethane	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
Chloroethane	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
Chloroform	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359

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

CSR VOC + VPH IN WATER (WATER)

Bureau Veritas ID		AJL788		AJL793	AJL797			AJL797		
Sampling Date		2021/10/29 16:00		2021/10/29 10:20	2021/10/28 14:40			2021/10/28 14:40		
COC Number		650479-01-01		650479-01-01	650479-02-01			650479-02-01		
	UNITS	**FSHLK**	**QC Batch**	**PS-2B**	**PS-7**	**RDL**	**QC Batch**	**PS-7 Lab-Dup**	**RDL**	**QC Batch**
Chloromethane	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
cis-1,2-dichloroethene	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
cis-1,3-dichloropropene	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
Dichlorodifluoromethane	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
Dichloromethane	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
Ethylbenzene	ug/L	<0.40	A409150	<0.40	<0.40	0.40	A409359	<0.40	0.40	A409359
Hexachlorobutadiene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
Isopropylbenzene	ug/L	<2.0	A409150	<2.0	<2.0	2.0	A409359	<2.0	2.0	A409359
Methyl-tert-butylether (MTBE)	ug/L	<4.0	A409150	<4.0	<4.0	4.0	A409359	<4.0	4.0	A409359
Styrene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
Tetrachloroethene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
Toluene	ug/L	<0.40	A409150	0.41	<0.40	0.40	A409359	<0.40	0.40	A409359
trans-1,2-dichloroethene	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
trans-1,3-dichloropropene	ug/L	<1.0	A409150	<1.0	<1.0	1.0	A409359	<1.0	1.0	A409359
Trichloroethene	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
Trichlorofluoromethane	ug/L	<4.0	A409150	<4.0	<4.0	4.0	A409359	<4.0	4.0	A409359
Vinyl chloride	ug/L	<0.50	A409150	<0.50	<0.50	0.50	A409359	<0.50	0.50	A409359
m & p-Xylene	ug/L	<0.40	A409150	<0.40	<0.40	0.40	A409359	<0.40	0.40	A409359
o-Xylene	ug/L	<0.40	A409150	<0.40	<0.40	0.40	A409359	<0.40	0.40	A409359
Xylenes (Total)	ug/L	<0.40	A409150	<0.40	<0.40	0.40	A409359	<0.40	0.40	A409359
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	106	A409150	101	104		A409359	104		A409359
4-Bromofluorobenzene (sur.)	%	86	A409150	84	88		A409359	87		A409359
D4-1,2-Dichloroethane (sur.)	%	106	A409150	105	106		A409359	108		A409359

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

CSR VOC + VPH IN WATER (WATER)

Bureau Veritas ID		AJL799	AJL800	AJL801	AJL802	AJL803		
Sampling Date		2021/10/28 14:05	2021/10/28 13:30	2021/10/28 12:50	2021/10/28 11:40	2021/10/28 10:40		
COC Number		650479-02-01	650479-02-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	PC-D	PC-SA	PC-H	HL	MC-PH	RDL	QC Batch
Calculated Parameters								
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	<300	300	A407910
Volatiles								
VH C6-C10	ug/L	<300	<300	<300	<300	<300	300	A409359
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1,1-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1,2Trichloro-1,2,2Trifluoroethane	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,1,2-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1-dichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,2,3-trichlorobenzene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,2,4-trichlorobenzene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,2-dibromoethane	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A409359
1,2-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,2-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,2-dichloropropane	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,3,5-trimethylbenzene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,3-Butadiene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,3-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,3-dichloropropane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
1,4-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Bromobenzene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Bromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Carbon tetrachloride	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Chlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Dibromochloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Chloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Chloroform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Chloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359

RDL = Reportable Detection Limit

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CSR VOC + VPH IN WATER (WATER)

Bureau Veritas ID		AJL799	AJL800	AJL801	AJL802	AJL803		
Sampling Date		2021/10/28 14:05	2021/10/28 13:30	2021/10/28 12:50	2021/10/28 11:40	2021/10/28 10:40		
COC Number		650479-02-01	650479-02-01	650479-02-01	650479-02-01	650479-02-01		
	UNITS	PC-D	PC-SA	PC-H	HL	MC-PH	RDL	QC Batch
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Dichlorodifluoromethane	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Dichloromethane	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Hexachlorobutadiene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Isopropylbenzene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	A409359
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Tetrachloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A409359
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Trichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Trichlorofluoromethane	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	4.0	A409359
Vinyl chloride	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A409359
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A409359
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	105	105	106	102	103		A409359
4-Bromofluorobenzene (sur.)	%	87	85	87	80	79		A409359
D4-1,2-Dichloroethane (sur.)	%	105	105	108	93	92		A409359
RDL = Reportable Detection Limit								

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CSR VOC + VPH IN WATER (WATER)

Bureau Veritas ID		AJL804	AJL805	AJL808	AJL809		
Sampling Date		2021/10/28 10:04	2021/10/28 09:05	2021/10/28 16:15	2021/10/28 00:00		
COC Number		650479-02-01	650479-02-01	650479-03-01	650479-03-01		
	UNITS	MC-MV	MC-USY	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Calculated Parameters							
VPH (VH6 to 10 - BTEX)	ug/L	<300	<300	<300	<300	300	A407910
Volatiles							
VH C6-C10	ug/L	<300	<300	<300	<300	300	A409359
1,1,1,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1,1-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1,2,2-tetrachloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1,2Trichloro-1,2,2Trifluoroethane	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,1,2-trichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,1-dichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,2,3-trichlorobenzene	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,2,4-trichlorobenzene	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,2-dibromoethane	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	A409359
1,2-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,2-dichloroethane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,2-dichloropropane	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,3,5-trimethylbenzene	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
1,3-Butadiene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,3-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
1,3-dichloropropane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
1,4-dichlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Bromobenzene	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Bromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Carbon tetrachloride	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Chlorobenzene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Dibromochloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Chloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Chloroform	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Chloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359

RDL = Reportable Detection Limit

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CSR VOC + VPH IN WATER (WATER)

Bureau Veritas ID		AJL804	AJL805	AJL808	AJL809		
Sampling Date		2021/10/28 10:04	2021/10/28 09:05	2021/10/28 16:15	2021/10/28 00:00		
COC Number		650479-02-01	650479-02-01	650479-03-01	650479-03-01		
	UNITS	MC-MV	MC-USY	FIELD BLANK	TRIP BLANK	RDL	QC Batch
cis-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
cis-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Dichlorodifluoromethane	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Dichloromethane	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Hexachlorobutadiene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Isopropylbenzene	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	A409359
Methyl-tert-butylether (MTBE)	ug/L	<4.0	<4.0	<4.0	<4.0	4.0	A409359
Styrene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Tetrachloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A409359
trans-1,2-dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
trans-1,3-dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	A409359
Trichloroethene	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
Trichlorofluoromethane	ug/L	<4.0	<4.0	<4.0	<4.0	4.0	A409359
Vinyl chloride	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	A409359
m & p-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A409359
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Xylenes (Total)	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A409359
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	104	104	104	104		A409359
4-Bromofluorobenzene (sur.)	%	78	79	77	76		A409359
D4-1,2-Dichloroethane (sur.)	%	95	96	92	94		A409359
RDL = Reportable Detection Limit							

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.3°C
Package 2	5.7°C
Package 3	5.7°C
Package 4	4.3°C
Package 5	4.7°C

Sample AJL788 [FSHLK] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL789 [USFRLO] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL790 [LLOUT] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL791 [DITCH 1] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL792 [PS-1] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL793 [PS-2B] : Sample received with excess headspace (>1mL) for VOC/VH analysis on batch: A409359. Results may have a potential for low bias. Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL794 [PS-3] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL795 [PS-5A] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL796 [PS-6] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL797 [PS-7] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL798 [PS-8] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL799 [PC-D] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases

the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL800 [PC-SA] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL801 [PC-H] : Sample received with excess headspace (>1mL) for VOC/VH analysis on batch: A409359. Results may have a potential for low bias. Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL802 [HL] : Sample received with excess headspace (>1mL) for VOC/VH analysis on batch: A409359. Results may have a potential for low bias. Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL803 [MC-PH] : Sample received with excess headspace (>1mL) for VOC/VH analysis on batch: A409359. Results may have a potential for low bias. Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL804 [MC-MV] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL805 [MC-USY] : Sample received with excess headspace (>1mL) for VOC/VH analysis on batch: A409359. Results may have a potential for low bias. Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL806 [REP-1] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL807 [REP-2] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL808 [FIELD BLANK] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL809 [TRIP BLANK] : Sample was analyzed past method specified hold time for Nitrate+Nitrite (N) (low level). Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrite (N) (low level). Sample was analyzed past method specified hold time for Orthophosphate by Konelab (low level).

Sample AJL790, Elements by ICPMS Low Level (dissolved): Test repeated.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A408256	RLE	Spiked Blank	Free Residual Chlorine	2021/10/30		84	%	80 - 120
A408256	RLE	Method Blank	Free Residual Chlorine	2021/10/30	<0.020		mg/L	
A408256	RLE	RPD [AJL788-12]	Free Residual Chlorine	2021/10/30	NC		%	25
A408261	RLE	Spiked Blank	Free Residual Chlorine	2021/10/30		84	%	80 - 120
A408261	RLE	Method Blank	Free Residual Chlorine	2021/10/30	<0.020		mg/L	
A408261	RLE	RPD [AJL808-12]	Free Residual Chlorine	2021/10/30	NC		%	25
A409150	KPA	Matrix Spike	1,4-Difluorobenzene (sur.)	2021/11/02		103	%	50 - 140
			4-Bromofluorobenzene (sur.)	2021/11/02		116	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2021/11/02		111	%	50 - 140
			1,1,1,2-tetrachloroethane	2021/11/02		102	%	50 - 140
			1,1,1-trichloroethane	2021/11/02		100	%	50 - 140
			1,1,2,2-tetrachloroethane	2021/11/02		104	%	50 - 140
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/02		94	%	50 - 140
			1,1,2-trichloroethane	2021/11/02		109	%	50 - 140
			1,1-dichloroethane	2021/11/02		104	%	50 - 140
			1,1-dichloroethene	2021/11/02		99	%	50 - 140
			1,2,3-trichlorobenzene	2021/11/02		133	%	50 - 140
			1,2,4-trichlorobenzene	2021/11/02		130	%	50 - 140
			1,2-dibromoethane	2021/11/02		102	%	50 - 140
			1,2-dichlorobenzene	2021/11/02		116	%	50 - 140
			1,2-dichloroethane	2021/11/02		96	%	50 - 140
			1,2-dichloropropane	2021/11/02		103	%	50 - 140
			1,3,5-trimethylbenzene	2021/11/02		114	%	50 - 140
			1,3-Butadiene	2021/11/02		121	%	50 - 140
			1,3-dichlorobenzene	2021/11/02		114	%	50 - 140
			1,3-dichloropropane	2021/11/02		105	%	50 - 140
			1,4-dichlorobenzene	2021/11/02		109	%	50 - 140
			Benzene	2021/11/02		103	%	50 - 140
			Bromobenzene	2021/11/02		103	%	50 - 140
			Bromodichloromethane	2021/11/02		101	%	50 - 140
			Bromoform	2021/11/02		99	%	50 - 140
			Bromomethane	2021/11/02		61	%	50 - 140
			Carbon tetrachloride	2021/11/02		103	%	50 - 140
			Chlorobenzene	2021/11/02		103	%	50 - 140
			Dibromochloromethane	2021/11/02		101	%	50 - 140
			Chloroethane	2021/11/02		96	%	50 - 140
			Chloroform	2021/11/02		101	%	50 - 140
			Chloromethane	2021/11/02		84	%	50 - 140
			cis-1,2-dichloroethene	2021/11/02		104	%	50 - 140
			cis-1,3-dichloropropene	2021/11/02		54	%	50 - 140
			Dichlorodifluoromethane	2021/11/02		57	%	50 - 140
			Dichloromethane	2021/11/02		107	%	50 - 140
			Ethylbenzene	2021/11/02		125	%	50 - 140
			Hexachlorobutadiene	2021/11/02		111	%	50 - 140
			Isopropylbenzene	2021/11/02		101	%	50 - 140
			Methyl-tert-butylether (MTBE)	2021/11/02		100	%	50 - 140
			Styrene	2021/11/02		107	%	50 - 140
			Tetrachloroethene	2021/11/02		104	%	50 - 140
			Toluene	2021/11/02		NC	%	50 - 140
			trans-1,2-dichloroethene	2021/11/02		100	%	50 - 140
			trans-1,3-dichloropropene	2021/11/02		41 (1)	%	50 - 140
			Trichloroethene	2021/11/02		98	%	50 - 140
			Trichlorofluoromethane	2021/11/02		93	%	50 - 140
			Vinyl chloride	2021/11/02		82	%	50 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			m & p-Xylene	2021/11/02		120	%	50 - 140
			o-Xylene	2021/11/02		111	%	50 - 140
A409150	KPA	Spiked Blank	1,4-Difluorobenzene (sur.)	2021/11/02		100	%	50 - 140
			4-Bromofluorobenzene (sur.)	2021/11/02		107	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2021/11/02		103	%	50 - 140
			VH C6-C10	2021/11/02		92	%	70 - 130
			1,1,1,2-tetrachloroethane	2021/11/02		91	%	60 - 130
			1,1,1-trichloroethane	2021/11/02		91	%	60 - 130
			1,1,2,2-tetrachloroethane	2021/11/02		96	%	60 - 130
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/02		81	%	60 - 130
			1,1,2-trichloroethane	2021/11/02		95	%	60 - 130
			1,1-dichloroethane	2021/11/02		92	%	60 - 130
			1,1-dichloroethene	2021/11/02		86	%	60 - 130
			1,2,3-trichlorobenzene	2021/11/02		112	%	60 - 130
			1,2,4-trichlorobenzene	2021/11/02		103	%	60 - 130
			1,2-dibromoethane	2021/11/02		91	%	60 - 130
			1,2-dichlorobenzene	2021/11/02		108	%	60 - 130
			1,2-dichloroethane	2021/11/02		85	%	60 - 130
			1,2-dichloropropane	2021/11/02		92	%	60 - 130
			1,3,5-trimethylbenzene	2021/11/02		103	%	60 - 130
			1,3-Butadiene	2021/11/02		112	%	50 - 140
			1,3-dichlorobenzene	2021/11/02		108	%	60 - 130
			1,3-dichloropropane	2021/11/02		93	%	60 - 130
			1,4-dichlorobenzene	2021/11/02		103	%	60 - 130
			Benzene	2021/11/02		91	%	60 - 130
			Bromobenzene	2021/11/02		95	%	60 - 130
			Bromodichloromethane	2021/11/02		90	%	60 - 130
			Bromoform	2021/11/02		92	%	60 - 130
			Bromomethane	2021/11/02		79	%	50 - 140
			Carbon tetrachloride	2021/11/02		91	%	60 - 130
			Chlorobenzene	2021/11/02		91	%	60 - 130
			Dibromochloromethane	2021/11/02		90	%	60 - 130
			Chloroethane	2021/11/02		88	%	50 - 140
			Chloroform	2021/11/02		90	%	60 - 130
			Chloromethane	2021/11/02		79	%	50 - 140
			cis-1,2-dichloroethene	2021/11/02		91	%	60 - 130
			cis-1,3-dichloropropene	2021/11/02		79	%	50 - 140
			Dichlorodifluoromethane	2021/11/02		63	%	50 - 140
			Dichloromethane	2021/11/02		94	%	60 - 130
			Ethylbenzene	2021/11/02		99	%	60 - 130
			Hexachlorobutadiene	2021/11/02		98	%	60 - 130
			Isopropylbenzene	2021/11/02		90	%	60 - 130
			Methyl-tert-butylether (MTBE)	2021/11/02		92	%	60 - 130
			Styrene	2021/11/02		90	%	60 - 130
			Tetrachloroethene	2021/11/02		91	%	60 - 130
			Toluene	2021/11/02		91	%	60 - 130
			trans-1,2-dichloroethene	2021/11/02		89	%	60 - 130
			trans-1,3-dichloropropene	2021/11/02		72	%	50 - 140
			Trichloroethene	2021/11/02		89	%	60 - 130
			Trichlorofluoromethane	2021/11/02		81	%	60 - 130
			Vinyl chloride	2021/11/02		75	%	50 - 140
			m & p-Xylene	2021/11/02		98	%	60 - 130
			o-Xylene	2021/11/02		85	%	60 - 130
A409150	KPA	Method Blank	1,4-Difluorobenzene (sur.)	2021/11/02		103	%	50 - 140

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			4-Bromofluorobenzene (sur.)	2021/11/02		82	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2021/11/02		102	%	50 - 140
			VH C6-C10	2021/11/02	<300		ug/L	
			1,1,1,2-tetrachloroethane	2021/11/02	<0.50		ug/L	
			1,1,1-trichloroethane	2021/11/02	<0.50		ug/L	
			1,1,2,2-tetrachloroethane	2021/11/02	<0.50		ug/L	
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/02	<2.0		ug/L	
			1,1,2-trichloroethane	2021/11/02	<0.50		ug/L	
			1,1-dichloroethane	2021/11/02	<0.50		ug/L	
			1,1-dichloroethene	2021/11/02	<0.50		ug/L	
			1,2,3-trichlorobenzene	2021/11/02	<2.0		ug/L	
			1,2,4-trichlorobenzene	2021/11/02	<2.0		ug/L	
			1,2-dibromoethane	2021/11/02	<0.20		ug/L	
			1,2-dichlorobenzene	2021/11/02	<0.50		ug/L	
			1,2-dichloroethane	2021/11/02	<0.50		ug/L	
			1,2-dichloropropane	2021/11/02	<0.50		ug/L	
			1,3,5-trimethylbenzene	2021/11/02	<2.0		ug/L	
			1,3-Butadiene	2021/11/02	<0.50		ug/L	
			1,3-dichlorobenzene	2021/11/02	<0.50		ug/L	
			1,3-dichloropropane	2021/11/02	<1.0		ug/L	
			1,4-dichlorobenzene	2021/11/02	<0.50		ug/L	
			Benzene	2021/11/02	<0.40		ug/L	
			Bromobenzene	2021/11/02	<2.0		ug/L	
			Bromodichloromethane	2021/11/02	<1.0		ug/L	
			Bromoform	2021/11/02	<1.0		ug/L	
			Bromomethane	2021/11/02	<1.0		ug/L	
			Carbon tetrachloride	2021/11/02	<0.50		ug/L	
			Chlorobenzene	2021/11/02	<0.50		ug/L	
			Dibromochloromethane	2021/11/02	<1.0		ug/L	
			Chloroethane	2021/11/02	<1.0		ug/L	
			Chloroform	2021/11/02	<1.0		ug/L	
			Chloromethane	2021/11/02	<1.0		ug/L	
			cis-1,2-dichloroethene	2021/11/02	<1.0		ug/L	
			cis-1,3-dichloropropene	2021/11/02	<1.0		ug/L	
			Dichlorodifluoromethane	2021/11/02	<2.0		ug/L	
			Dichloromethane	2021/11/02	<2.0		ug/L	
			Ethylbenzene	2021/11/02	<0.40		ug/L	
			Hexachlorobutadiene	2021/11/02	<0.50		ug/L	
			Isopropylbenzene	2021/11/02	<2.0		ug/L	
			Methyl-tert-butylether (MTBE)	2021/11/02	<4.0		ug/L	
			Styrene	2021/11/02	<0.50		ug/L	
			Tetrachloroethene	2021/11/02	<0.50		ug/L	
			Toluene	2021/11/02	<0.40		ug/L	
			trans-1,2-dichloroethene	2021/11/02	<1.0		ug/L	
			trans-1,3-dichloropropene	2021/11/02	<1.0		ug/L	
			Trichloroethene	2021/11/02	<0.50		ug/L	
			Trichlorofluoromethane	2021/11/02	<4.0		ug/L	
			Vinyl chloride	2021/11/02	<0.50		ug/L	
			m & p-Xylene	2021/11/02	<0.40		ug/L	
			o-Xylene	2021/11/02	<0.40		ug/L	
			Xylenes (Total)	2021/11/02	<0.40		ug/L	
A409150	KPA	RPD	VH C6-C10	2021/11/02	8.5		%	30
			1,1,1,2-tetrachloroethane	2021/11/02	NC		%	30
			1,1,1-trichloroethane	2021/11/02	NC		%	30

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2,2-tetrachloroethane	2021/11/02	NC		%	30
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/02	NC		%	30
			1,1,2-trichloroethane	2021/11/02	NC		%	30
			1,1-dichloroethane	2021/11/02	NC		%	30
			1,1-dichloroethene	2021/11/02	NC		%	30
			1,2,3-trichlorobenzene	2021/11/02	NC		%	30
			1,2,4-trichlorobenzene	2021/11/02	NC		%	30
			1,2-dibromoethane	2021/11/02	NC		%	30
			1,2-dichlorobenzene	2021/11/02	NC		%	30
			1,2-dichloroethane	2021/11/02	NC		%	30
			1,2-dichloropropane	2021/11/02	NC		%	30
			1,3,5-trimethylbenzene	2021/11/02	1.9		%	30
			1,3-Butadiene	2021/11/02	NC		%	30
			1,3-dichlorobenzene	2021/11/02	NC		%	30
			1,3-dichloropropane	2021/11/02	NC		%	30
			1,4-dichlorobenzene	2021/11/02	2.3		%	30
			Benzene	2021/11/02	0		%	30
			Bromobenzene	2021/11/02	NC		%	30
			Bromodichloromethane	2021/11/02	NC		%	30
			Bromoform	2021/11/02	NC		%	30
			Bromomethane	2021/11/02	NC		%	30
			Carbon tetrachloride	2021/11/02	NC		%	30
			Chlorobenzene	2021/11/02	1.4		%	30
			Dibromochloromethane	2021/11/02	NC		%	30
			Chloroethane	2021/11/02	NC		%	30
			Chloroform	2021/11/02	NC		%	30
			Chloromethane	2021/11/02	NC		%	30
			cis-1,2-dichloroethene	2021/11/02	NC		%	30
			cis-1,3-dichloropropene	2021/11/02	NC		%	30
			Dichlorodifluoromethane	2021/11/02	NC		%	30
			Dichloromethane	2021/11/02	NC		%	30
			Ethylbenzene	2021/11/02	2.2		%	30
			Hexachlorobutadiene	2021/11/02	NC		%	30
			Isopropylbenzene	2021/11/02	6.3		%	30
			Methyl-tert-butylether (MTBE)	2021/11/02	NC		%	30
			Styrene	2021/11/02	NC		%	30
			Tetrachloroethene	2021/11/02	NC		%	30
			Toluene	2021/11/02	1.2		%	30
			trans-1,2-dichloroethene	2021/11/02	NC		%	30
			trans-1,3-dichloropropene	2021/11/02	NC		%	30
			Trichloroethene	2021/11/02	NC		%	30
			Trichlorofluoromethane	2021/11/02	NC		%	30
			Vinyl chloride	2021/11/02	NC		%	30
			m & p-Xylene	2021/11/02	0.83		%	30
			o-Xylene	2021/11/02	1.1		%	30
			Xylenes (Total)	2021/11/02	0.23		%	30
A409325	BTM	Matrix Spike	Total Suspended Solids	2021/11/02		104	%	80 - 120
A409325	BTM	Spiked Blank	Total Suspended Solids	2021/11/02		103	%	80 - 120
A409325	BTM	Method Blank	Total Suspended Solids	2021/11/02	<1.0		mg/L	
A409325	BTM	RPD [AJL809-01]	Total Suspended Solids	2021/11/02	NC		%	20
A409359	AC2	Matrix Spike [AJL797-14]	1,4-Difluorobenzene (sur.)	2021/11/03		103	%	50 - 140
			4-Bromofluorobenzene (sur.)	2021/11/03		120	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2021/11/03		107	%	50 - 140
			1,1,1,2-tetrachloroethane	2021/11/03		91	%	50 - 140

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,1-trichloroethane	2021/11/03		88	%	50 - 140
			1,1,2,2-tetrachloroethane	2021/11/03		98	%	50 - 140
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/03		80	%	50 - 140
			1,1,2-trichloroethane	2021/11/03		95	%	50 - 140
			1,1-dichloroethane	2021/11/03		89	%	50 - 140
			1,1-dichloroethene	2021/11/03		83	%	50 - 140
			1,2,3-trichlorobenzene	2021/11/03		117	%	50 - 140
			1,2,4-trichlorobenzene	2021/11/03		126	%	50 - 140
			1,2-dibromoethane	2021/11/03		95	%	50 - 140
			1,2-dichlorobenzene	2021/11/03		102	%	50 - 140
			1,2-dichloroethane	2021/11/03		89	%	50 - 140
			1,2-dichloropropane	2021/11/03		92	%	50 - 140
			1,3,5-trimethylbenzene	2021/11/03		95	%	50 - 140
			1,3-Butadiene	2021/11/03		94	%	50 - 140
			1,3-dichlorobenzene	2021/11/03		100	%	50 - 140
			1,3-dichloropropane	2021/11/03		97	%	50 - 140
			1,4-dichlorobenzene	2021/11/03		97	%	50 - 140
			Benzene	2021/11/03		89	%	50 - 140
			Bromobenzene	2021/11/03		92	%	50 - 140
			Bromodichloromethane	2021/11/03		90	%	50 - 140
			Bromoform	2021/11/03		90	%	50 - 140
			Bromomethane	2021/11/03		74	%	50 - 140
			Carbon tetrachloride	2021/11/03		87	%	50 - 140
			Chlorobenzene	2021/11/03		91	%	50 - 140
			Dibromochloromethane	2021/11/03		90	%	50 - 140
			Chloroethane	2021/11/03		78	%	50 - 140
			Chloroform	2021/11/03		89	%	50 - 140
			Chloromethane	2021/11/03		65	%	50 - 140
			cis-1,2-dichloroethene	2021/11/03		90	%	50 - 140
			cis-1,3-dichloropropene	2021/11/03		88	%	50 - 140
			Dichlorodifluoromethane	2021/11/03		42 (1)	%	50 - 140
			Dichloromethane	2021/11/03		89	%	50 - 140
			Ethylbenzene	2021/11/03		100	%	50 - 140
			Hexachlorobutadiene	2021/11/03		95	%	50 - 140
			Isopropylbenzene	2021/11/03		93	%	50 - 140
			Methyl-tert-butylether (MTBE)	2021/11/03		96	%	50 - 140
			Styrene	2021/11/03		90	%	50 - 140
			Tetrachloroethene	2021/11/03		84	%	50 - 140
			Toluene	2021/11/03		93	%	50 - 140
			trans-1,2-dichloroethene	2021/11/03		83	%	50 - 140
			trans-1,3-dichloropropene	2021/11/03		85	%	50 - 140
			Trichloroethene	2021/11/03		84	%	50 - 140
			Trichlorofluoromethane	2021/11/03		70	%	50 - 140
			Vinyl chloride	2021/11/03		63	%	50 - 140
			m & p-Xylene	2021/11/03		98	%	50 - 140
			o-Xylene	2021/11/03		87	%	50 - 140
A409359	AC2	Spiked Blank	1,4-Difluorobenzene (sur.)	2021/11/03		107	%	50 - 140
			4-Bromofluorobenzene (sur.)	2021/11/03		112	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2021/11/03		109	%	50 - 140
			VH C6-C10	2021/11/03		79	%	70 - 130
			1,1,1,2-tetrachloroethane	2021/11/03		93	%	60 - 130
			1,1,1-trichloroethane	2021/11/03		93	%	60 - 130
			1,1,2,2-tetrachloroethane	2021/11/03		91	%	60 - 130
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/03		88	%	60 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,1,2-trichloroethane	2021/11/03		88	%	60 - 130
			1,1-dichloroethane	2021/11/03		93	%	60 - 130
			1,1-dichloroethene	2021/11/03		85	%	60 - 130
			1,2,3-trichlorobenzene	2021/11/03		106	%	60 - 130
			1,2,4-trichlorobenzene	2021/11/03		98	%	60 - 130
			1,2-dibromoethane	2021/11/03		97	%	60 - 130
			1,2-dichlorobenzene	2021/11/03		99	%	60 - 130
			1,2-dichloroethane	2021/11/03		91	%	60 - 130
			1,2-dichloropropane	2021/11/03		95	%	60 - 130
			1,3,5-trimethylbenzene	2021/11/03		97	%	60 - 130
			1,3-Butadiene	2021/11/03		103	%	50 - 140
			1,3-dichlorobenzene	2021/11/03		99	%	60 - 130
			1,3-dichloropropane	2021/11/03		100	%	60 - 130
			1,4-dichlorobenzene	2021/11/03		94	%	60 - 130
			Benzene	2021/11/03		94	%	60 - 130
			Bromobenzene	2021/11/03		91	%	60 - 130
			Bromodichloromethane	2021/11/03		94	%	60 - 130
			Bromoform	2021/11/03		87	%	60 - 130
			Bromomethane	2021/11/03		71	%	50 - 140
			Carbon tetrachloride	2021/11/03		92	%	60 - 130
			Chlorobenzene	2021/11/03		94	%	60 - 130
			Dibromochloromethane	2021/11/03		92	%	60 - 130
			Chloroethane	2021/11/03		80	%	50 - 140
			Chloroform	2021/11/03		94	%	60 - 130
			Chloromethane	2021/11/03		71	%	50 - 140
			cis-1,2-dichloroethene	2021/11/03		93	%	60 - 130
			cis-1,3-dichloropropene	2021/11/03		85	%	50 - 140
			Dichlorodifluoromethane	2021/11/03		45 (1)	%	50 - 140
			Dichloromethane	2021/11/03		92	%	60 - 130
			Ethylbenzene	2021/11/03		105	%	60 - 130
			Hexachlorobutadiene	2021/11/03		90	%	60 - 130
			Isopropylbenzene	2021/11/03		87	%	60 - 130
			Methyl-tert-butylether (MTBE)	2021/11/03		99	%	60 - 130
			Styrene	2021/11/03		92	%	60 - 130
			Tetrachloroethene	2021/11/03		90	%	60 - 130
			Toluene	2021/11/03		97	%	60 - 130
			trans-1,2-dichloroethene	2021/11/03		85	%	60 - 130
			trans-1,3-dichloropropene	2021/11/03		79	%	50 - 140
			Trichloroethene	2021/11/03		88	%	60 - 130
			Trichlorofluoromethane	2021/11/03		80	%	60 - 130
			Vinyl chloride	2021/11/03		69	%	50 - 140
			m & p-Xylene	2021/11/03		103	%	60 - 130
			o-Xylene	2021/11/03		91	%	60 - 130
A409359	AC2	Method Blank	1,4-Difluorobenzene (sur.)	2021/11/03		103	%	50 - 140
			4-Bromofluorobenzene (sur.)	2021/11/03		86	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2021/11/03		99	%	50 - 140
			VH C6-C10	2021/11/03	<300		ug/L	
			1,1,1,2-tetrachloroethane	2021/11/03	<0.50		ug/L	
			1,1,1-trichloroethane	2021/11/03	<0.50		ug/L	
			1,1,2,2-tetrachloroethane	2021/11/03	<0.50		ug/L	
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/03	<2.0		ug/L	
			1,1,2-trichloroethane	2021/11/03	<0.50		ug/L	
			1,1-dichloroethane	2021/11/03	<0.50		ug/L	
			1,1-dichloroethene	2021/11/03	<0.50		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3-trichlorobenzene	2021/11/03	<2.0		ug/L	
			1,2,4-trichlorobenzene	2021/11/03	<2.0		ug/L	
			1,2-dibromoethane	2021/11/03	<0.20		ug/L	
			1,2-dichlorobenzene	2021/11/03	<0.50		ug/L	
			1,2-dichloroethane	2021/11/03	<0.50		ug/L	
			1,2-dichloropropane	2021/11/03	<0.50		ug/L	
			1,3,5-trimethylbenzene	2021/11/03	<2.0		ug/L	
			1,3-Butadiene	2021/11/03	<0.50		ug/L	
			1,3-dichlorobenzene	2021/11/03	<0.50		ug/L	
			1,3-dichloropropane	2021/11/03	<1.0		ug/L	
			1,4-dichlorobenzene	2021/11/03	<0.50		ug/L	
			Benzene	2021/11/03	<0.40		ug/L	
			Bromobenzene	2021/11/03	<2.0		ug/L	
			Bromodichloromethane	2021/11/03	<1.0		ug/L	
			Bromoform	2021/11/03	<1.0		ug/L	
			Bromomethane	2021/11/03	<1.0		ug/L	
			Carbon tetrachloride	2021/11/03	<0.50		ug/L	
			Chlorobenzene	2021/11/03	<0.50		ug/L	
			Dibromochloromethane	2021/11/03	<1.0		ug/L	
			Chloroethane	2021/11/03	<1.0		ug/L	
			Chloroform	2021/11/03	<1.0		ug/L	
			Chloromethane	2021/11/03	<1.0		ug/L	
			cis-1,2-dichloroethene	2021/11/03	<1.0		ug/L	
			cis-1,3-dichloropropene	2021/11/03	<1.0		ug/L	
			Dichlorodifluoromethane	2021/11/03	<2.0		ug/L	
			Dichloromethane	2021/11/03	<2.0		ug/L	
			Ethylbenzene	2021/11/03	<0.40		ug/L	
			Hexachlorobutadiene	2021/11/03	<0.50		ug/L	
			Isopropylbenzene	2021/11/03	<2.0		ug/L	
			Methyl-tert-butylether (MTBE)	2021/11/03	<4.0		ug/L	
			Styrene	2021/11/03	<0.50		ug/L	
			Tetrachloroethene	2021/11/03	<0.50		ug/L	
			Toluene	2021/11/03	<0.40		ug/L	
			trans-1,2-dichloroethene	2021/11/03	<1.0		ug/L	
			trans-1,3-dichloropropene	2021/11/03	<1.0		ug/L	
			Trichloroethene	2021/11/03	<0.50		ug/L	
			Trichlorofluoromethane	2021/11/03	<4.0		ug/L	
			Vinyl chloride	2021/11/03	<0.50		ug/L	
			m & p-Xylene	2021/11/03	<0.40		ug/L	
			o-Xylene	2021/11/03	<0.40		ug/L	
			Xylenes (Total)	2021/11/03	<0.40		ug/L	
A409359	AC2	RPD [AJL797-14]	VH C6-C10	2021/11/03	NC		%	30
			1,1,1,2-tetrachloroethane	2021/11/03	NC		%	30
			1,1,1-trichloroethane	2021/11/03	NC		%	30
			1,1,2,2-tetrachloroethane	2021/11/03	NC		%	30
			1,1,2Trichloro-1,2,2Trifluoroethane	2021/11/03	NC		%	30
			1,1,2-trichloroethane	2021/11/03	NC		%	30
			1,1-dichloroethane	2021/11/03	NC		%	30
			1,1-dichloroethene	2021/11/03	NC		%	30
			1,2,3-trichlorobenzene	2021/11/03	NC		%	30
			1,2,4-trichlorobenzene	2021/11/03	NC		%	30
			1,2-dibromoethane	2021/11/03	NC		%	30
			1,2-dichlorobenzene	2021/11/03	NC		%	30
			1,2-dichloroethane	2021/11/03	NC		%	30

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-dichloropropane	2021/11/03	NC		%	30
			1,3,5-trimethylbenzene	2021/11/03	NC		%	30
			1,3-Butadiene	2021/11/03	NC		%	30
			1,3-dichlorobenzene	2021/11/03	NC		%	30
			1,3-dichloropropane	2021/11/03	NC		%	30
			1,4-dichlorobenzene	2021/11/03	NC		%	30
			Benzene	2021/11/03	NC		%	30
			Bromobenzene	2021/11/03	NC		%	30
			Bromodichloromethane	2021/11/03	NC		%	30
			Bromoform	2021/11/03	NC		%	30
			Bromomethane	2021/11/03	NC		%	30
			Carbon tetrachloride	2021/11/03	NC		%	30
			Chlorobenzene	2021/11/03	NC		%	30
			Dibromochloromethane	2021/11/03	NC		%	30
			Chloroethane	2021/11/03	NC		%	30
			Chloroform	2021/11/03	NC		%	30
			Chloromethane	2021/11/03	NC		%	30
			cis-1,2-dichloroethene	2021/11/03	NC		%	30
			cis-1,3-dichloropropene	2021/11/03	NC		%	30
			Dichlorodifluoromethane	2021/11/03	NC		%	30
			Dichloromethane	2021/11/03	NC		%	30
			Ethylbenzene	2021/11/03	NC		%	30
			Hexachlorobutadiene	2021/11/03	NC		%	30
			Isopropylbenzene	2021/11/03	NC		%	30
			Methyl-tert-butylether (MTBE)	2021/11/03	NC		%	30
			Styrene	2021/11/03	NC		%	30
			Tetrachloroethene	2021/11/03	NC		%	30
			Toluene	2021/11/03	NC		%	30
			trans-1,2-dichloroethene	2021/11/03	NC		%	30
			trans-1,3-dichloropropene	2021/11/03	NC		%	30
			Trichloroethene	2021/11/03	NC		%	30
			Trichlorofluoromethane	2021/11/03	NC		%	30
			Vinyl chloride	2021/11/03	NC		%	30
			m & p-Xylene	2021/11/03	NC		%	30
			o-Xylene	2021/11/03	NC		%	30
			Xylenes (Total)	2021/11/03	NC		%	30
A409677	AA1	Matrix Spike [AJL788-05]	Total Aluminum (Al)	2021/11/02		92	%	80 - 120
			Total Antimony (Sb)	2021/11/02		99	%	80 - 120
			Total Arsenic (As)	2021/11/02		101	%	80 - 120
			Total Barium (Ba)	2021/11/02		97	%	80 - 120
			Total Beryllium (Be)	2021/11/02		101	%	80 - 120
			Total Bismuth (Bi)	2021/11/02		93	%	80 - 120
			Total Boron (B)	2021/11/02		95	%	80 - 120
			Total Cadmium (Cd)	2021/11/02		98	%	80 - 120
			Total Chromium (Cr)	2021/11/02		94	%	80 - 120
			Total Cobalt (Co)	2021/11/02		97	%	80 - 120
			Total Copper (Cu)	2021/11/02		91	%	80 - 120
			Total Iron (Fe)	2021/11/02		99	%	80 - 120
			Total Lead (Pb)	2021/11/02		98	%	80 - 120
			Total Lithium (Li)	2021/11/02		102	%	80 - 120
			Total Manganese (Mn)	2021/11/02		91	%	80 - 120
			Total Molybdenum (Mo)	2021/11/02		104	%	80 - 120
			Total Nickel (Ni)	2021/11/02		93	%	80 - 120
			Total Phosphorus (P)	2021/11/02		99	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2021/11/02		100	%	80 - 120
			Total Silicon (Si)	2021/11/02		101	%	80 - 120
			Total Silver (Ag)	2021/11/02		97	%	80 - 120
			Total Strontium (Sr)	2021/11/02		NC	%	80 - 120
			Total Thallium (Tl)	2021/11/02		101	%	80 - 120
			Total Tin (Sn)	2021/11/02		97	%	80 - 120
			Total Titanium (Ti)	2021/11/02		99	%	80 - 120
			Total Uranium (U)	2021/11/02		94	%	80 - 120
			Total Vanadium (V)	2021/11/02		94	%	80 - 120
			Total Zinc (Zn)	2021/11/02		98	%	80 - 120
			Total Zirconium (Zr)	2021/11/02		101	%	80 - 120
A409677	AA1	Spiked Blank	Total Aluminum (Al)	2021/11/02		96	%	80 - 120
			Total Antimony (Sb)	2021/11/02		103	%	80 - 120
			Total Arsenic (As)	2021/11/02		101	%	80 - 120
			Total Barium (Ba)	2021/11/02		99	%	80 - 120
			Total Beryllium (Be)	2021/11/02		106	%	80 - 120
			Total Bismuth (Bi)	2021/11/02		97	%	80 - 120
			Total Boron (B)	2021/11/02		101	%	80 - 120
			Total Cadmium (Cd)	2021/11/02		102	%	80 - 120
			Total Chromium (Cr)	2021/11/02		99	%	80 - 120
			Total Cobalt (Co)	2021/11/02		104	%	80 - 120
			Total Copper (Cu)	2021/11/02		98	%	80 - 120
			Total Iron (Fe)	2021/11/02		102	%	80 - 120
			Total Lead (Pb)	2021/11/02		100	%	80 - 120
			Total Lithium (Li)	2021/11/02		104	%	80 - 120
			Total Manganese (Mn)	2021/11/02		96	%	80 - 120
			Total Molybdenum (Mo)	2021/11/02		101	%	80 - 120
			Total Nickel (Ni)	2021/11/02		100	%	80 - 120
			Total Phosphorus (P)	2021/11/02		98	%	80 - 120
			Total Selenium (Se)	2021/11/02		103	%	80 - 120
			Total Silicon (Si)	2021/11/02		101	%	80 - 120
			Total Silver (Ag)	2021/11/02		97	%	80 - 120
			Total Strontium (Sr)	2021/11/02		95	%	80 - 120
			Total Thallium (Tl)	2021/11/02		100	%	80 - 120
			Total Tin (Sn)	2021/11/02		98	%	80 - 120
			Total Titanium (Ti)	2021/11/02		103	%	80 - 120
			Total Uranium (U)	2021/11/02		98	%	80 - 120
			Total Vanadium (V)	2021/11/02		97	%	80 - 120
			Total Zinc (Zn)	2021/11/02		109	%	80 - 120
			Total Zirconium (Zr)	2021/11/02		99	%	80 - 120
A409677	AA1	Method Blank	Total Aluminum (Al)	2021/11/02	<0.50		ug/L	
			Total Antimony (Sb)	2021/11/02	<0.020		ug/L	
			Total Arsenic (As)	2021/11/02	<0.020		ug/L	
			Total Barium (Ba)	2021/11/02	<0.020		ug/L	
			Total Beryllium (Be)	2021/11/02	<0.010		ug/L	
			Total Bismuth (Bi)	2021/11/02	<0.0050		ug/L	
			Total Boron (B)	2021/11/02	<10		ug/L	
			Total Cadmium (Cd)	2021/11/02	<0.0050		ug/L	
			Total Chromium (Cr)	2021/11/02	<0.10		ug/L	
			Total Cobalt (Co)	2021/11/02	<0.0050		ug/L	
			Total Copper (Cu)	2021/11/02	<0.050		ug/L	
			Total Iron (Fe)	2021/11/02	<1.0		ug/L	
			Total Lead (Pb)	2021/11/02	<0.0050		ug/L	
			Total Lithium (Li)	2021/11/02	<0.50		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2021/11/02	<0.050		ug/L	
			Total Molybdenum (Mo)	2021/11/02	<0.050		ug/L	
			Total Nickel (Ni)	2021/11/02	<0.020		ug/L	
			Total Phosphorus (P)	2021/11/02	<2.0		ug/L	
			Total Selenium (Se)	2021/11/02	<0.040		ug/L	
			Total Silicon (Si)	2021/11/02	<50		ug/L	
			Total Silver (Ag)	2021/11/02	<0.0050		ug/L	
			Total Strontium (Sr)	2021/11/02	<0.050		ug/L	
			Total Thallium (Tl)	2021/11/02	<0.0020		ug/L	
			Total Tin (Sn)	2021/11/02	<0.20		ug/L	
			Total Titanium (Ti)	2021/11/02	<0.50		ug/L	
			Total Uranium (U)	2021/11/02	<0.0020		ug/L	
			Total Vanadium (V)	2021/11/02	<0.20		ug/L	
			Total Zinc (Zn)	2021/11/02	<0.10		ug/L	
			Total Zirconium (Zr)	2021/11/02	<0.10		ug/L	
A409677	AA1	RPD [AJL788-05]	Total Aluminum (Al)	2021/11/02	0.53		%	20
			Total Antimony (Sb)	2021/11/02	6.7		%	20
			Total Arsenic (As)	2021/11/02	0.17		%	20
			Total Barium (Ba)	2021/11/02	0.20		%	20
			Total Beryllium (Be)	2021/11/02	NC		%	20
			Total Bismuth (Bi)	2021/11/02	NC		%	20
			Total Boron (B)	2021/11/02	NC		%	20
			Total Cadmium (Cd)	2021/11/02	NC		%	20
			Total Chromium (Cr)	2021/11/02	NC		%	20
			Total Cobalt (Co)	2021/11/02	11		%	20
			Total Copper (Cu)	2021/11/02	0.088		%	20
			Total Iron (Fe)	2021/11/02	0.62		%	20
			Total Lead (Pb)	2021/11/02	NC		%	20
			Total Lithium (Li)	2021/11/02	2.3		%	20
			Total Manganese (Mn)	2021/11/02	3.3		%	20
			Total Molybdenum (Mo)	2021/11/02	0.13		%	20
			Total Nickel (Ni)	2021/11/02	0.13		%	20
			Total Phosphorus (P)	2021/11/02	13		%	20
			Total Selenium (Se)	2021/11/02	12		%	20
			Total Silicon (Si)	2021/11/02	1.1		%	20
			Total Silver (Ag)	2021/11/02	NC		%	20
			Total Strontium (Sr)	2021/11/02	1.9		%	20
			Total Thallium (Tl)	2021/11/02	NC		%	20
			Total Tin (Sn)	2021/11/02	NC		%	20
			Total Titanium (Ti)	2021/11/02	NC		%	20
			Total Uranium (U)	2021/11/02	1.5		%	20
			Total Vanadium (V)	2021/11/02	6.6		%	20
			Total Zinc (Zn)	2021/11/02	7.9		%	20
			Total Zirconium (Zr)	2021/11/02	NC		%	20
A409677	AA1	RPD [AJL808-05]	Total Aluminum (Al)	2021/11/02	3.8		%	20
			Total Antimony (Sb)	2021/11/02	NC		%	20
			Total Arsenic (As)	2021/11/02	NC		%	20
			Total Barium (Ba)	2021/11/02	NC		%	20
			Total Beryllium (Be)	2021/11/02	NC		%	20
			Total Bismuth (Bi)	2021/11/02	NC		%	20
			Total Boron (B)	2021/11/02	NC		%	20
			Total Cadmium (Cd)	2021/11/02	NC		%	20
			Total Chromium (Cr)	2021/11/02	NC		%	20
			Total Cobalt (Co)	2021/11/02	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Copper (Cu)	2021/11/02	NC		%	20
			Total Iron (Fe)	2021/11/02	NC		%	20
			Total Lead (Pb)	2021/11/02	NC		%	20
			Total Lithium (Li)	2021/11/02	NC		%	20
			Total Manganese (Mn)	2021/11/02	NC		%	20
			Total Molybdenum (Mo)	2021/11/02	NC		%	20
			Total Nickel (Ni)	2021/11/02	NC		%	20
			Total Phosphorus (P)	2021/11/02	1.4		%	20
			Total Selenium (Se)	2021/11/02	NC		%	20
			Total Silicon (Si)	2021/11/02	NC		%	20
			Total Silver (Ag)	2021/11/02	NC		%	20
			Total Strontium (Sr)	2021/11/02	NC		%	20
			Total Thallium (Tl)	2021/11/02	NC		%	20
			Total Tin (Sn)	2021/11/02	NC		%	20
			Total Titanium (Ti)	2021/11/02	NC		%	20
			Total Uranium (U)	2021/11/02	NC		%	20
			Total Vanadium (V)	2021/11/02	NC		%	20
			Total Zinc (Zn)	2021/11/02	NC		%	20
			Total Zirconium (Zr)	2021/11/02	NC		%	20
A409697	AA1	Matrix Spike	Dissolved Aluminum (Al)	2021/11/02		94	%	80 - 120
			Dissolved Antimony (Sb)	2021/11/02		101	%	80 - 120
			Dissolved Arsenic (As)	2021/11/02		103	%	80 - 120
			Dissolved Barium (Ba)	2021/11/02		NC	%	80 - 120
			Dissolved Beryllium (Be)	2021/11/02		93	%	80 - 120
			Dissolved Bismuth (Bi)	2021/11/02		92	%	80 - 120
			Dissolved Boron (B)	2021/11/02		93	%	80 - 120
			Dissolved Cadmium (Cd)	2021/11/02		97	%	80 - 120
			Dissolved Chromium (Cr)	2021/11/02		92	%	80 - 120
			Dissolved Cobalt (Co)	2021/11/02		91	%	80 - 120
			Dissolved Copper (Cu)	2021/11/02		84	%	80 - 120
			Dissolved Iron (Fe)	2021/11/02		98	%	80 - 120
			Dissolved Lead (Pb)	2021/11/02		97	%	80 - 120
			Dissolved Lithium (Li)	2021/11/02		105	%	80 - 120
			Dissolved Manganese (Mn)	2021/11/02		89	%	80 - 120
			Dissolved Molybdenum (Mo)	2021/11/02		108	%	80 - 120
			Dissolved Nickel (Ni)	2021/11/02		86	%	80 - 120
			Dissolved Phosphorus (P)	2021/11/02		100	%	80 - 120
			Dissolved Selenium (Se)	2021/11/02		100	%	80 - 120
			Dissolved Silicon (Si)	2021/11/02		102	%	80 - 120
			Dissolved Silver (Ag)	2021/11/02		95	%	80 - 120
			Dissolved Strontium (Sr)	2021/11/02		NC	%	80 - 120
			Dissolved Thallium (Tl)	2021/11/02		102	%	80 - 120
			Dissolved Tin (Sn)	2021/11/02		97	%	80 - 120
			Dissolved Titanium (Ti)	2021/11/02		99	%	80 - 120
			Dissolved Uranium (U)	2021/11/02		100	%	80 - 120
			Dissolved Vanadium (V)	2021/11/02		92	%	80 - 120
			Dissolved Zinc (Zn)	2021/11/02		90	%	80 - 120
			Dissolved Zirconium (Zr)	2021/11/02		107	%	80 - 120
A409697	AA1	Spiked Blank	Dissolved Aluminum (Al)	2021/11/02		99	%	80 - 120
			Dissolved Antimony (Sb)	2021/11/02		105	%	80 - 120
			Dissolved Arsenic (As)	2021/11/02		103	%	80 - 120
			Dissolved Barium (Ba)	2021/11/02		101	%	80 - 120
			Dissolved Beryllium (Be)	2021/11/02		104	%	80 - 120
			Dissolved Bismuth (Bi)	2021/11/02		97	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Boron (B)	2021/11/02		98	%	80 - 120
			Dissolved Cadmium (Cd)	2021/11/02		105	%	80 - 120
			Dissolved Chromium (Cr)	2021/11/02		97	%	80 - 120
			Dissolved Cobalt (Co)	2021/11/02		100	%	80 - 120
			Dissolved Copper (Cu)	2021/11/02		95	%	80 - 120
			Dissolved Iron (Fe)	2021/11/02		100	%	80 - 120
			Dissolved Lead (Pb)	2021/11/02		102	%	80 - 120
			Dissolved Lithium (Li)	2021/11/02		103	%	80 - 120
			Dissolved Manganese (Mn)	2021/11/02		97	%	80 - 120
			Dissolved Molybdenum (Mo)	2021/11/02		105	%	80 - 120
			Dissolved Nickel (Ni)	2021/11/02		98	%	80 - 120
			Dissolved Phosphorus (P)	2021/11/02		100	%	80 - 120
			Dissolved Selenium (Se)	2021/11/02		104	%	80 - 120
			Dissolved Silicon (Si)	2021/11/02		102	%	80 - 120
			Dissolved Silver (Ag)	2021/11/02		100	%	80 - 120
			Dissolved Strontium (Sr)	2021/11/02		100	%	80 - 120
			Dissolved Thallium (Tl)	2021/11/02		98	%	80 - 120
			Dissolved Tin (Sn)	2021/11/02		103	%	80 - 120
			Dissolved Titanium (Ti)	2021/11/02		105	%	80 - 120
			Dissolved Uranium (U)	2021/11/02		102	%	80 - 120
			Dissolved Vanadium (V)	2021/11/02		96	%	80 - 120
			Dissolved Zinc (Zn)	2021/11/02		107	%	80 - 120
			Dissolved Zirconium (Zr)	2021/11/02		102	%	80 - 120
A409697	AA1	Method Blank	Dissolved Aluminum (Al)	2021/11/02	<0.50		ug/L	
			Dissolved Antimony (Sb)	2021/11/02	<0.020		ug/L	
			Dissolved Arsenic (As)	2021/11/02	<0.020		ug/L	
			Dissolved Barium (Ba)	2021/11/02	<0.020		ug/L	
			Dissolved Beryllium (Be)	2021/11/02	<0.010		ug/L	
			Dissolved Bismuth (Bi)	2021/11/02	<0.0050		ug/L	
			Dissolved Boron (B)	2021/11/02	<10		ug/L	
			Dissolved Cadmium (Cd)	2021/11/02	<0.0050		ug/L	
			Dissolved Chromium (Cr)	2021/11/02	<0.10		ug/L	
			Dissolved Cobalt (Co)	2021/11/02	<0.0050		ug/L	
			Dissolved Copper (Cu)	2021/11/02	<0.050		ug/L	
			Dissolved Iron (Fe)	2021/11/02	<1.0		ug/L	
			Dissolved Lead (Pb)	2021/11/02	<0.0050		ug/L	
			Dissolved Lithium (Li)	2021/11/02	<0.50		ug/L	
			Dissolved Manganese (Mn)	2021/11/02	<0.050		ug/L	
			Dissolved Molybdenum (Mo)	2021/11/02	<0.050		ug/L	
			Dissolved Nickel (Ni)	2021/11/02	<0.020		ug/L	
			Dissolved Phosphorus (P)	2021/11/02	<2.0		ug/L	
			Dissolved Selenium (Se)	2021/11/02	<0.040		ug/L	
			Dissolved Silicon (Si)	2021/11/02	<50		ug/L	
			Dissolved Silver (Ag)	2021/11/02	<0.0050		ug/L	
			Dissolved Strontium (Sr)	2021/11/02	<0.050		ug/L	
			Dissolved Thallium (Tl)	2021/11/02	<0.0020		ug/L	
			Dissolved Tin (Sn)	2021/11/02	<0.20		ug/L	
			Dissolved Titanium (Ti)	2021/11/02	<0.50		ug/L	
			Dissolved Uranium (U)	2021/11/02	<0.0020		ug/L	
			Dissolved Vanadium (V)	2021/11/02	<0.20		ug/L	
			Dissolved Zinc (Zn)	2021/11/02	<0.10		ug/L	
			Dissolved Zirconium (Zr)	2021/11/02	<0.10		ug/L	
A409697	AA1	RPD	Dissolved Aluminum (Al)	2021/11/02	8.1		%	20
			Dissolved Antimony (Sb)	2021/11/02	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Arsenic (As)	2021/11/02	1.2		%	20
			Dissolved Barium (Ba)	2021/11/02	0.072		%	20
			Dissolved Beryllium (Be)	2021/11/02	NC		%	20
			Dissolved Bismuth (Bi)	2021/11/02	NC		%	20
			Dissolved Boron (B)	2021/11/02	0.31		%	20
			Dissolved Cadmium (Cd)	2021/11/02	NC		%	20
			Dissolved Chromium (Cr)	2021/11/02	NC		%	20
			Dissolved Cobalt (Co)	2021/11/02	5.5		%	20
			Dissolved Copper (Cu)	2021/11/02	3.2		%	20
			Dissolved Iron (Fe)	2021/11/02	1.2		%	20
			Dissolved Lead (Pb)	2021/11/02	NC		%	20
			Dissolved Lithium (Li)	2021/11/02	0.091		%	20
			Dissolved Manganese (Mn)	2021/11/02	1.2		%	20
			Dissolved Molybdenum (Mo)	2021/11/02	5.0		%	20
			Dissolved Nickel (Ni)	2021/11/02	13		%	20
			Dissolved Selenium (Se)	2021/11/02	NC		%	20
			Dissolved Silicon (Si)	2021/11/02	2.0		%	20
			Dissolved Silver (Ag)	2021/11/02	NC		%	20
			Dissolved Strontium (Sr)	2021/11/02	2.4		%	20
			Dissolved Thallium (Tl)	2021/11/02	NC		%	20
			Dissolved Tin (Sn)	2021/11/02	NC		%	20
			Dissolved Titanium (Ti)	2021/11/02	NC		%	20
			Dissolved Uranium (U)	2021/11/02	2.0		%	20
			Dissolved Vanadium (V)	2021/11/02	NC		%	20
			Dissolved Zinc (Zn)	2021/11/02	2.0		%	20
			Dissolved Zirconium (Zr)	2021/11/02	NC		%	20
			Dissolved Aluminum (Al)	2021/11/02	3.8		%	20
			Dissolved Antimony (Sb)	2021/11/02	NC		%	20
			Dissolved Arsenic (As)	2021/11/02	NC		%	20
			Dissolved Barium (Ba)	2021/11/02	NC		%	20
			Dissolved Beryllium (Be)	2021/11/02	NC		%	20
			Dissolved Bismuth (Bi)	2021/11/02	NC		%	20
			Dissolved Boron (B)	2021/11/02	NC		%	20
			Dissolved Cadmium (Cd)	2021/11/02	NC		%	20
			Dissolved Chromium (Cr)	2021/11/02	NC		%	20
			Dissolved Cobalt (Co)	2021/11/02	NC		%	20
			Dissolved Copper (Cu)	2021/11/02	NC		%	20
			Dissolved Iron (Fe)	2021/11/02	NC		%	20
			Dissolved Lead (Pb)	2021/11/02	NC		%	20
			Dissolved Lithium (Li)	2021/11/02	NC		%	20
			Dissolved Molybdenum (Mo)	2021/11/02	NC		%	20
			Dissolved Nickel (Ni)	2021/11/02	NC		%	20
			Dissolved Phosphorus (P)	2021/11/02	NC		%	20
			Dissolved Selenium (Se)	2021/11/02	NC		%	20
			Dissolved Silicon (Si)	2021/11/02	NC		%	20
			Dissolved Silver (Ag)	2021/11/02	NC		%	20
			Dissolved Strontium (Sr)	2021/11/02	NC		%	20
			Dissolved Thallium (Tl)	2021/11/02	NC		%	20
			Dissolved Tin (Sn)	2021/11/02	NC		%	20
			Dissolved Titanium (Ti)	2021/11/02	NC		%	20
			Dissolved Uranium (U)	2021/11/02	NC		%	20
			Dissolved Vanadium (V)	2021/11/02	NC		%	20
			Dissolved Zinc (Zn)	2021/11/02	0.80		%	20
			Dissolved Zirconium (Zr)	2021/11/02	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A409977	CJY	Matrix Spike [AJL807-01]	Total Mercury (Hg)	2021/11/02		72 (1)	%	80 - 120
A409977	CJY	Spiked Blank	Total Mercury (Hg)	2021/11/02		88	%	80 - 120
A409977	CJY	Method Blank	Total Mercury (Hg)	2021/11/02	<0.0019		ug/L	
A409977	CJY	RPD	Total Mercury (Hg)	2021/11/02	NC		%	20
A410024	CJY	Matrix Spike [AJL806-06]	Total Mercury (Hg)	2021/11/02		76 (1)	%	80 - 120
A410024	CJY	Spiked Blank	Total Mercury (Hg)	2021/11/02		85	%	80 - 120
A410024	CJY	Method Blank	Total Mercury (Hg)	2021/11/02	<0.0019		ug/L	
A410024	CJY	RPD [AJL805-06]	Total Mercury (Hg)	2021/11/02	NC		%	20
A410029	CJY	Matrix Spike [AJL800-08]	Dissolved Mercury (Hg)	2021/11/02		82	%	80 - 120
A410029	CJY	Spiked Blank	Dissolved Mercury (Hg)	2021/11/02		96	%	80 - 120
A410029	CJY	Method Blank	Dissolved Mercury (Hg)	2021/11/02	<0.0019		ug/L	
A410029	CJY	RPD	Dissolved Mercury (Hg)	2021/11/02	NC		%	20
A410473	MDO	Matrix Spike	Total Organic Carbon (C)	2021/11/03		99	%	80 - 120
A410473	MDO	Spiked Blank	Total Organic Carbon (C)	2021/11/03		100	%	80 - 120
A410473	MDO	Method Blank	Total Organic Carbon (C)	2021/11/03	<0.20		mg/L	
A410473	MDO	RPD	Total Organic Carbon (C)	2021/11/03	7.3		%	20
A410622	AA1	Matrix Spike	Dissolved Aluminum (Al)	2021/11/04		87	%	80 - 120
			Dissolved Antimony (Sb)	2021/11/04		99	%	80 - 120
			Dissolved Arsenic (As)	2021/11/04		98	%	80 - 120
			Dissolved Barium (Ba)	2021/11/04		98	%	80 - 120
			Dissolved Beryllium (Be)	2021/11/04		92	%	80 - 120
			Dissolved Bismuth (Bi)	2021/11/04		94	%	80 - 120
			Dissolved Boron (B)	2021/11/04		93	%	80 - 120
			Dissolved Cadmium (Cd)	2021/11/04		99	%	80 - 120
			Dissolved Chromium (Cr)	2021/11/04		95	%	80 - 120
			Dissolved Cobalt (Co)	2021/11/04		98	%	80 - 120
			Dissolved Copper (Cu)	2021/11/04		96	%	80 - 120
			Dissolved Iron (Fe)	2021/11/04		98	%	80 - 120
			Dissolved Lead (Pb)	2021/11/04		95	%	80 - 120
			Dissolved Lithium (Li)	2021/11/04		95	%	80 - 120
			Dissolved Manganese (Mn)	2021/11/04		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2021/11/04		101	%	80 - 120
			Dissolved Nickel (Ni)	2021/11/04		97	%	80 - 120
			Dissolved Phosphorus (P)	2021/11/04		86	%	80 - 120
			Dissolved Selenium (Se)	2021/11/04		99	%	80 - 120
			Dissolved Silicon (Si)	2021/11/04		75 (1)	%	80 - 120
			Dissolved Silver (Ag)	2021/11/04		97	%	80 - 120
			Dissolved Strontium (Sr)	2021/11/04		97	%	80 - 120
			Dissolved Thallium (Tl)	2021/11/04		97	%	80 - 120
			Dissolved Tin (Sn)	2021/11/04		99	%	80 - 120
			Dissolved Titanium (Ti)	2021/11/04		100	%	80 - 120
			Dissolved Uranium (U)	2021/11/04		97	%	80 - 120
			Dissolved Vanadium (V)	2021/11/04		99	%	80 - 120
			Dissolved Zinc (Zn)	2021/11/04		101	%	80 - 120
			Dissolved Zirconium (Zr)	2021/11/04		99	%	80 - 120
A410622	AA1	Spiked Blank	Dissolved Aluminum (Al)	2021/11/04		100	%	80 - 120
			Dissolved Antimony (Sb)	2021/11/04		100	%	80 - 120
			Dissolved Arsenic (As)	2021/11/04		99	%	80 - 120
			Dissolved Barium (Ba)	2021/11/04		98	%	80 - 120
			Dissolved Beryllium (Be)	2021/11/04		99	%	80 - 120
			Dissolved Bismuth (Bi)	2021/11/04		97	%	80 - 120
			Dissolved Boron (B)	2021/11/04		98	%	80 - 120
			Dissolved Cadmium (Cd)	2021/11/04		100	%	80 - 120
			Dissolved Chromium (Cr)	2021/11/04		96	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cobalt (Co)	2021/11/04		95	%	80 - 120
			Dissolved Copper (Cu)	2021/11/04		96	%	80 - 120
			Dissolved Iron (Fe)	2021/11/04		102	%	80 - 120
			Dissolved Lead (Pb)	2021/11/04		98	%	80 - 120
			Dissolved Lithium (Li)	2021/11/04		94	%	80 - 120
			Dissolved Manganese (Mn)	2021/11/04		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2021/11/04		100	%	80 - 120
			Dissolved Nickel (Ni)	2021/11/04		99	%	80 - 120
			Dissolved Phosphorus (P)	2021/11/04		100	%	80 - 120
			Dissolved Selenium (Se)	2021/11/04		101	%	80 - 120
			Dissolved Silicon (Si)	2021/11/04		107	%	80 - 120
			Dissolved Silver (Ag)	2021/11/04		96	%	80 - 120
			Dissolved Strontium (Sr)	2021/11/04		99	%	80 - 120
			Dissolved Thallium (Tl)	2021/11/04		98	%	80 - 120
			Dissolved Tin (Sn)	2021/11/04		100	%	80 - 120
			Dissolved Titanium (Ti)	2021/11/04		101	%	80 - 120
			Dissolved Uranium (U)	2021/11/04		107	%	80 - 120
			Dissolved Vanadium (V)	2021/11/04		98	%	80 - 120
			Dissolved Zinc (Zn)	2021/11/04		102	%	80 - 120
			Dissolved Zirconium (Zr)	2021/11/04		98	%	80 - 120
A410622	AA1	Method Blank	Dissolved Aluminum (Al)	2021/11/04	<0.50		ug/L	
			Dissolved Antimony (Sb)	2021/11/04	<0.020		ug/L	
			Dissolved Arsenic (As)	2021/11/04	<0.020		ug/L	
			Dissolved Barium (Ba)	2021/11/04	<0.020		ug/L	
			Dissolved Beryllium (Be)	2021/11/04	<0.010		ug/L	
			Dissolved Bismuth (Bi)	2021/11/04	<0.0050		ug/L	
			Dissolved Boron (B)	2021/11/04	<10		ug/L	
			Dissolved Cadmium (Cd)	2021/11/04	<0.0050		ug/L	
			Dissolved Chromium (Cr)	2021/11/04	<0.10		ug/L	
			Dissolved Cobalt (Co)	2021/11/04	<0.0050		ug/L	
			Dissolved Copper (Cu)	2021/11/04	<0.050		ug/L	
			Dissolved Iron (Fe)	2021/11/04	<1.0		ug/L	
			Dissolved Lead (Pb)	2021/11/04	<0.0050		ug/L	
			Dissolved Lithium (Li)	2021/11/04	<0.50		ug/L	
			Dissolved Manganese (Mn)	2021/11/04	<0.050		ug/L	
			Dissolved Molybdenum (Mo)	2021/11/04	<0.050		ug/L	
			Dissolved Nickel (Ni)	2021/11/04	<0.020		ug/L	
			Dissolved Phosphorus (P)	2021/11/04	<2.0		ug/L	
			Dissolved Selenium (Se)	2021/11/04	<0.040		ug/L	
			Dissolved Silicon (Si)	2021/11/04	<50		ug/L	
			Dissolved Silver (Ag)	2021/11/04	<0.0050		ug/L	
			Dissolved Strontium (Sr)	2021/11/04	<0.050		ug/L	
			Dissolved Thallium (Tl)	2021/11/04	<0.0020		ug/L	
			Dissolved Tin (Sn)	2021/11/04	<0.20		ug/L	
			Dissolved Titanium (Ti)	2021/11/04	<0.50		ug/L	
			Dissolved Uranium (U)	2021/11/04	<0.0020		ug/L	
			Dissolved Vanadium (V)	2021/11/04	<0.20		ug/L	
			Dissolved Zinc (Zn)	2021/11/04	<0.10		ug/L	
			Dissolved Zirconium (Zr)	2021/11/04	<0.10		ug/L	
A410622	AA1	RPD	Dissolved Aluminum (Al)	2021/11/04	0.90		%	20
			Dissolved Antimony (Sb)	2021/11/04	NC		%	20
			Dissolved Arsenic (As)	2021/11/04	5.0		%	20
			Dissolved Barium (Ba)	2021/11/04	0.13		%	20
			Dissolved Beryllium (Be)	2021/11/04	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Bismuth (Bi)	2021/11/04	NC		%	20
			Dissolved Boron (B)	2021/11/04	NC		%	20
			Dissolved Cadmium (Cd)	2021/11/04	NC		%	20
			Dissolved Chromium (Cr)	2021/11/04	4.8		%	20
			Dissolved Cobalt (Co)	2021/11/04	0.85		%	20
			Dissolved Copper (Cu)	2021/11/04	0.80		%	20
			Dissolved Iron (Fe)	2021/11/04	1.1		%	20
			Dissolved Lead (Pb)	2021/11/04	NC		%	20
			Dissolved Lithium (Li)	2021/11/04	NC		%	20
			Dissolved Manganese (Mn)	2021/11/04	6.9		%	20
			Dissolved Molybdenum (Mo)	2021/11/04	NC		%	20
			Dissolved Nickel (Ni)	2021/11/04	2.3		%	20
			Dissolved Selenium (Se)	2021/11/04	9.2		%	20
			Dissolved Silicon (Si)	2021/11/04	1.6		%	20
			Dissolved Silver (Ag)	2021/11/04	NC		%	20
			Dissolved Strontium (Sr)	2021/11/04	1.4		%	20
			Dissolved Thallium (Tl)	2021/11/04	NC		%	20
			Dissolved Tin (Sn)	2021/11/04	NC		%	20
			Dissolved Titanium (Ti)	2021/11/04	12		%	20
			Dissolved Uranium (U)	2021/11/04	NC		%	20
			Dissolved Vanadium (V)	2021/11/04	NC		%	20
			Dissolved Zinc (Zn)	2021/11/04	1.5		%	20
			Dissolved Zirconium (Zr)	2021/11/04	NC		%	20
A410765	IC4	Matrix Spike	Dissolved Nitrogen (N)	2021/11/03		108	%	80 - 120
A410765	IC4	Spiked Blank	Dissolved Nitrogen (N)	2021/11/03		99	%	80 - 120
A410765	IC4	Method Blank	Dissolved Nitrogen (N)	2021/11/03	<0.020		mg/L	
A410765	IC4	RPD	Dissolved Nitrogen (N)	2021/11/03	7.2		%	25
A410776	IC4	Matrix Spike	Total Nitrogen (N)	2021/11/03		111	%	80 - 120
A410776	IC4	Spiked Blank	Total Nitrogen (N)	2021/11/03		99	%	80 - 120
A410776	IC4	Method Blank	Total Nitrogen (N)	2021/11/03	<0.020		mg/L	
A410776	IC4	RPD	Total Nitrogen (N)	2021/11/03	14		%	20
A410796	IC4	Matrix Spike [AJL795-03]	Total Nitrogen (N)	2021/11/03		NC	%	80 - 120
A410796	IC4	Spiked Blank	Total Nitrogen (N)	2021/11/03		98	%	80 - 120
A410796	IC4	Method Blank	Total Nitrogen (N)	2021/11/03	<0.020		mg/L	
A410796	IC4	RPD [AJL795-03]	Total Nitrogen (N)	2021/11/03	1.4		%	20
A410901	TSO	Matrix Spike [AJL804-02]	Nitrate plus Nitrite (N)	2021/11/02		102	%	80 - 120
A410901	TSO	Spiked Blank	Nitrate plus Nitrite (N)	2021/11/02		104	%	80 - 120
A410901	TSO	Method Blank	Nitrate plus Nitrite (N)	2021/11/02	<0.0020		mg/L	
A410901	TSO	RPD [AJL804-02]	Nitrate plus Nitrite (N)	2021/11/02	1.8		%	25
A410903	TSO	Matrix Spike [AJL804-02]	Nitrite (N)	2021/11/02		101	%	80 - 120
A410903	TSO	Spiked Blank	Nitrite (N)	2021/11/02		101	%	80 - 120
A410903	TSO	Method Blank	Nitrite (N)	2021/11/02	<0.0020		mg/L	
A410903	TSO	RPD [AJL804-02]	Nitrite (N)	2021/11/02	NC		%	25
A410904	TSO	Matrix Spike [AJL793-02]	Nitrate plus Nitrite (N)	2021/11/02		103	%	80 - 120
A410904	TSO	Spiked Blank	Nitrate plus Nitrite (N)	2021/11/02		105	%	80 - 120
A410904	TSO	Method Blank	Nitrate plus Nitrite (N)	2021/11/02	<0.0020		mg/L	
A410904	TSO	RPD [AJL793-02]	Nitrate plus Nitrite (N)	2021/11/02	1.6		%	25
A410905	TSO	Matrix Spike [AJL793-02]	Nitrite (N)	2021/11/02		103	%	80 - 120
A410905	TSO	Spiked Blank	Nitrite (N)	2021/11/02		102	%	80 - 120
A410905	TSO	Method Blank	Nitrite (N)	2021/11/02	<0.0020		mg/L	
A410905	TSO	RPD [AJL793-02]	Nitrite (N)	2021/11/02	15		%	25
A410951	TMH	Matrix Spike [AJL804-02]	Orthophosphate (P)	2021/11/02		112	%	80 - 120
A410951	TMH	Spiked Blank	Orthophosphate (P)	2021/11/02		95	%	80 - 120
A410951	TMH	Method Blank	Orthophosphate (P)	2021/11/02	<0.0010		mg/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A410951	TMH	RPD [AJL804-02]	Orthophosphate (P)	2021/11/02	NC		%	20
A410965	TMH	Matrix Spike [AJL793-02]	Orthophosphate (P)	2021/11/02		106	%	80 - 120
A410965	TMH	Spiked Blank	Orthophosphate (P)	2021/11/02		95	%	80 - 120
A410965	TMH	Method Blank	Orthophosphate (P)	2021/11/02	<0.0010		mg/L	
A410965	TMH	RPD [AJL793-02]	Orthophosphate (P)	2021/11/02	0.11		%	20
A411102	KMG	Spiked Blank	pH (15 C)	2021/11/02		100	%	97 - 103
A411102	KMG	RPD	pH (15 C)	2021/11/02	1.1		%	N/A
A411122	KMG	Spiked Blank	pH (15 C)	2021/11/02		100	%	97 - 103
A411122	KMG	RPD [AJL807-01]	pH (15 C)	2021/11/02	0.93		%	N/A
A411813	AA1	Matrix Spike	Total Aluminum (Al)	2021/11/04		124 (1)	%	80 - 120
			Total Antimony (Sb)	2021/11/04		114	%	80 - 120
			Total Arsenic (As)	2021/11/04		112	%	80 - 120
			Total Barium (Ba)	2021/11/04		NC	%	80 - 120
			Total Beryllium (Be)	2021/11/04		102	%	80 - 120
			Total Bismuth (Bi)	2021/11/04		102	%	80 - 120
			Total Boron (B)	2021/11/04		NC	%	80 - 120
			Total Cadmium (Cd)	2021/11/04		106	%	80 - 120
			Total Chromium (Cr)	2021/11/04		105	%	80 - 120
			Total Cobalt (Co)	2021/11/04		104	%	80 - 120
			Total Copper (Cu)	2021/11/04		100	%	80 - 120
			Total Iron (Fe)	2021/11/04		117	%	80 - 120
			Total Lead (Pb)	2021/11/04		102	%	80 - 120
			Total Lithium (Li)	2021/11/04		NC	%	80 - 120
			Total Manganese (Mn)	2021/11/04		NC	%	80 - 120
			Total Molybdenum (Mo)	2021/11/04		NC	%	80 - 120
			Total Nickel (Ni)	2021/11/04		100	%	80 - 120
			Total Selenium (Se)	2021/11/04		113	%	80 - 120
			Total Silicon (Si)	2021/11/04		101	%	80 - 120
			Total Silver (Ag)	2021/11/04		102	%	80 - 120
			Total Strontium (Sr)	2021/11/04		NC	%	80 - 120
			Total Tellurium (Te)	2021/11/04		107	%	80 - 120
			Total Thallium (Tl)	2021/11/04		107	%	80 - 120
			Total Thorium (Th)	2021/11/04		103	%	80 - 120
			Total Tin (Sn)	2021/11/04		112	%	80 - 120
			Total Titanium (Ti)	2021/11/04		113	%	80 - 120
			Total Tungsten (W)	2021/11/04		120	%	80 - 120
			Total Uranium (U)	2021/11/04		113	%	80 - 120
			Total Vanadium (V)	2021/11/04		110	%	80 - 120
			Total Zinc (Zn)	2021/11/04		104	%	80 - 120
			Total Zirconium (Zr)	2021/11/04		113	%	80 - 120
A411813	AA1	Spiked Blank	Total Aluminum (Al)	2021/11/04		98	%	80 - 120
			Total Antimony (Sb)	2021/11/04		106	%	80 - 120
			Total Arsenic (As)	2021/11/04		103	%	80 - 120
			Total Barium (Ba)	2021/11/04		106	%	80 - 120
			Total Beryllium (Be)	2021/11/04		102	%	80 - 120
			Total Bismuth (Bi)	2021/11/04		103	%	80 - 120
			Total Boron (B)	2021/11/04		101	%	80 - 120
			Total Cadmium (Cd)	2021/11/04		105	%	80 - 120
			Total Chromium (Cr)	2021/11/04		106	%	80 - 120
			Total Cobalt (Co)	2021/11/04		106	%	80 - 120
			Total Copper (Cu)	2021/11/04		105	%	80 - 120
			Total Iron (Fe)	2021/11/04		108	%	80 - 120
			Total Lead (Pb)	2021/11/04		105	%	80 - 120
			Total Lithium (Li)	2021/11/04		103	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2021/11/04		106	%	80 - 120
			Total Molybdenum (Mo)	2021/11/04		109	%	80 - 120
			Total Nickel (Ni)	2021/11/04		105	%	80 - 120
			Total Selenium (Se)	2021/11/04		104	%	80 - 120
			Total Silicon (Si)	2021/11/04		93	%	80 - 120
			Total Silver (Ag)	2021/11/04		103	%	80 - 120
			Total Strontium (Sr)	2021/11/04		106	%	80 - 120
			Total Tellurium (Te)	2021/11/04		107	%	80 - 120
			Total Thallium (Tl)	2021/11/04		105	%	80 - 120
			Total Thorium (Th)	2021/11/04		104	%	80 - 120
			Total Tin (Sn)	2021/11/04		104	%	80 - 120
			Total Titanium (Ti)	2021/11/04		111	%	80 - 120
			Total Tungsten (W)	2021/11/04		116	%	80 - 120
			Total Uranium (U)	2021/11/04		108	%	80 - 120
			Total Vanadium (V)	2021/11/04		107	%	80 - 120
			Total Zinc (Zn)	2021/11/04		106	%	80 - 120
			Total Zirconium (Zr)	2021/11/04		105	%	80 - 120
A411813	AA1	Method Blank	Total Aluminum (Al)	2021/11/04	<3.0		ug/L	
			Total Antimony (Sb)	2021/11/04	<0.020		ug/L	
			Total Arsenic (As)	2021/11/04	<0.020		ug/L	
			Total Barium (Ba)	2021/11/04	<0.050		ug/L	
			Total Beryllium (Be)	2021/11/04	<0.010		ug/L	
			Total Bismuth (Bi)	2021/11/04	<0.010		ug/L	
			Total Boron (B)	2021/11/04	<10		ug/L	
			Total Cadmium (Cd)	2021/11/04	<0.0050		ug/L	
			Total Chromium (Cr)	2021/11/04	<0.10		ug/L	
			Total Cobalt (Co)	2021/11/04	<0.010		ug/L	
			Total Copper (Cu)	2021/11/04	<0.10		ug/L	
			Total Iron (Fe)	2021/11/04	<5.0		ug/L	
			Total Lead (Pb)	2021/11/04	<0.020		ug/L	
			Total Lithium (Li)	2021/11/04	<0.50		ug/L	
			Total Manganese (Mn)	2021/11/04	<0.10		ug/L	
			Total Molybdenum (Mo)	2021/11/04	<0.050		ug/L	
			Total Nickel (Ni)	2021/11/04	<0.10		ug/L	
			Total Selenium (Se)	2021/11/04	<0.040		ug/L	
			Total Silicon (Si)	2021/11/04	<50		ug/L	
			Total Silver (Ag)	2021/11/04	<0.010		ug/L	
			Total Strontium (Sr)	2021/11/04	<0.050		ug/L	
			Total Tellurium (Te)	2021/11/04	<0.020		ug/L	
			Total Thallium (Tl)	2021/11/04	<0.0020		ug/L	
			Total Thorium (Th)	2021/11/04	<0.020		ug/L	
			Total Tin (Sn)	2021/11/04	<0.20		ug/L	
			Total Titanium (Ti)	2021/11/04	<2.0		ug/L	
			Total Tungsten (W)	2021/11/04	<0.010		ug/L	
			Total Uranium (U)	2021/11/04	<0.0050		ug/L	
			Total Vanadium (V)	2021/11/04	<0.20		ug/L	
			Total Zinc (Zn)	2021/11/04	<1.0		ug/L	
			Total Zirconium (Zr)	2021/11/04	<0.10		ug/L	
A411813	AA1	RPD	Total Aluminum (Al)	2021/11/04	0.096		%	20
			Total Antimony (Sb)	2021/11/04	0.67		%	20
			Total Arsenic (As)	2021/11/04	0.68		%	20
			Total Barium (Ba)	2021/11/04	1.6		%	20
			Total Beryllium (Be)	2021/11/04	NC		%	20
			Total Bismuth (Bi)	2021/11/04	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Boron (B)	2021/11/04	7.6		%	20
			Total Cadmium (Cd)	2021/11/04	NC		%	20
			Total Chromium (Cr)	2021/11/04	NC		%	20
			Total Cobalt (Co)	2021/11/04	1.3		%	20
			Total Copper (Cu)	2021/11/04	1.7		%	20
			Total Iron (Fe)	2021/11/04	0.33		%	20
			Total Lead (Pb)	2021/11/04	10		%	20
			Total Lithium (Li)	2021/11/04	1.7		%	20
			Total Manganese (Mn)	2021/11/04	0.20		%	20
			Total Molybdenum (Mo)	2021/11/04	0.49		%	20
			Total Nickel (Ni)	2021/11/04	0.45		%	20
			Total Selenium (Se)	2021/11/04	1.2		%	20
			Total Silicon (Si)	2021/11/04	4.2		%	20
			Total Silver (Ag)	2021/11/04	NC		%	20
			Total Strontium (Sr)	2021/11/04	0.51		%	20
			Total Thallium (Tl)	2021/11/04	NC		%	20
			Total Tin (Sn)	2021/11/04	NC		%	20
			Total Titanium (Ti)	2021/11/04	NC		%	20
			Total Uranium (U)	2021/11/04	2.5		%	20
			Total Vanadium (V)	2021/11/04	0.27		%	20
			Total Zinc (Zn)	2021/11/04	3.2		%	20
			Total Zirconium (Zr)	2021/11/04	6.1		%	20
A412029	FM0	Matrix Spike	Dissolved Phosphorus (P)	2021/11/04		93	%	80 - 120
A412029	FM0	QC Standard	Dissolved Phosphorus (P)	2021/11/04		96	%	80 - 120
A412029	FM0	Spiked Blank	Dissolved Phosphorus (P)	2021/11/04		95	%	80 - 120
A412029	FM0	Method Blank	Dissolved Phosphorus (P)	2021/11/04	<0.0010		mg/L	
A412029	FM0	RPD	Dissolved Phosphorus (P)	2021/11/04	NC		%	20
A412070	FM0	Matrix Spike	Total Phosphorus (P)	2021/11/03		110	%	80 - 120
A412070	FM0	QC Standard	Total Phosphorus (P)	2021/11/03		85	%	80 - 120
A412070	FM0	Spiked Blank	Total Phosphorus (P)	2021/11/03		88	%	80 - 120
A412070	FM0	Method Blank	Total Phosphorus (P)	2021/11/03	<0.0010		mg/L	
A412070	FM0	RPD	Total Phosphorus (P)	2021/11/03	14		%	20
A412080	FM0	Matrix Spike	Total Phosphorus (P)	2021/11/03		98	%	80 - 120
A412080	FM0	QC Standard	Total Phosphorus (P)	2021/11/03		89	%	80 - 120
A412080	FM0	Spiked Blank	Total Phosphorus (P)	2021/11/03		94	%	80 - 120
A412080	FM0	Method Blank	Total Phosphorus (P)	2021/11/03	<0.0010		mg/L	
A412080	FM0	RPD	Total Phosphorus (P)	2021/11/03	4.9		%	20
A412090	FM0	Matrix Spike [AJL793-10]	Dissolved Phosphorus (P)	2021/11/04		110	%	80 - 120
A412090	FM0	QC Standard	Dissolved Phosphorus (P)	2021/11/04		95	%	80 - 120
A412090	FM0	Spiked Blank	Dissolved Phosphorus (P)	2021/11/04		95	%	80 - 120
A412090	FM0	Method Blank	Dissolved Phosphorus (P)	2021/11/04	<0.0010		mg/L	
A412090	FM0	RPD [AJL793-10]	Dissolved Phosphorus (P)	2021/11/04	16		%	20
A412097	FM0	Matrix Spike [AJL800-04]	Total Phosphorus (P)	2021/11/04		97	%	80 - 120
A412097	FM0	QC Standard	Total Phosphorus (P)	2021/11/04		96	%	80 - 120
A412097	FM0	Spiked Blank	Total Phosphorus (P)	2021/11/04		102	%	80 - 120
A412097	FM0	Method Blank	Total Phosphorus (P)	2021/11/04	<0.0010		mg/L	
A412097	FM0	RPD [AJL800-04]	Total Phosphorus (P)	2021/11/04	2.1		%	20
A412157	AA1	Matrix Spike [AJL805-07]	Dissolved Aluminum (Al)	2021/11/04		99	%	80 - 120
			Dissolved Antimony (Sb)	2021/11/04		101	%	80 - 120
			Dissolved Arsenic (As)	2021/11/04		102	%	80 - 120
			Dissolved Barium (Ba)	2021/11/04		96	%	80 - 120
			Dissolved Beryllium (Be)	2021/11/04		99	%	80 - 120
			Dissolved Bismuth (Bi)	2021/11/04		95	%	80 - 120
			Dissolved Boron (B)	2021/11/04		98	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cadmium (Cd)	2021/11/04		100	%	80 - 120
			Dissolved Chromium (Cr)	2021/11/04		94	%	80 - 120
			Dissolved Cobalt (Co)	2021/11/04		91	%	80 - 120
			Dissolved Copper (Cu)	2021/11/04		90	%	80 - 120
			Dissolved Iron (Fe)	2021/11/04		101	%	80 - 120
			Dissolved Lead (Pb)	2021/11/04		97	%	80 - 120
			Dissolved Lithium (Li)	2021/11/04		96	%	80 - 120
			Dissolved Manganese (Mn)	2021/11/04		96	%	80 - 120
			Dissolved Molybdenum (Mo)	2021/11/04		106	%	80 - 120
			Dissolved Nickel (Ni)	2021/11/04		93	%	80 - 120
			Dissolved Phosphorus (P)	2021/11/04		102	%	80 - 120
			Dissolved Selenium (Se)	2021/11/04		102	%	80 - 120
			Dissolved Silicon (Si)	2021/11/04		NC	%	80 - 120
			Dissolved Silver (Ag)	2021/11/04		98	%	80 - 120
			Dissolved Strontium (Sr)	2021/11/04		NC	%	80 - 120
			Dissolved Thallium (Tl)	2021/11/04		99	%	80 - 120
			Dissolved Tin (Sn)	2021/11/04		100	%	80 - 120
			Dissolved Titanium (Ti)	2021/11/04		101	%	80 - 120
			Dissolved Uranium (U)	2021/11/04		110	%	80 - 120
			Dissolved Vanadium (V)	2021/11/04		99	%	80 - 120
			Dissolved Zinc (Zn)	2021/11/04		96	%	80 - 120
			Dissolved Zirconium (Zr)	2021/11/04		106	%	80 - 120
A412157	AA1	Spiked Blank	Dissolved Aluminum (Al)	2021/11/04		100	%	80 - 120
			Dissolved Antimony (Sb)	2021/11/04		100	%	80 - 120
			Dissolved Arsenic (As)	2021/11/04		99	%	80 - 120
			Dissolved Barium (Ba)	2021/11/04		98	%	80 - 120
			Dissolved Beryllium (Be)	2021/11/04		100	%	80 - 120
			Dissolved Bismuth (Bi)	2021/11/04		96	%	80 - 120
			Dissolved Boron (B)	2021/11/04		99	%	80 - 120
			Dissolved Cadmium (Cd)	2021/11/04		101	%	80 - 120
			Dissolved Chromium (Cr)	2021/11/04		95	%	80 - 120
			Dissolved Cobalt (Co)	2021/11/04		94	%	80 - 120
			Dissolved Copper (Cu)	2021/11/04		96	%	80 - 120
			Dissolved Iron (Fe)	2021/11/04		100	%	80 - 120
			Dissolved Lead (Pb)	2021/11/04		98	%	80 - 120
			Dissolved Lithium (Li)	2021/11/04		95	%	80 - 120
			Dissolved Manganese (Mn)	2021/11/04		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2021/11/04		102	%	80 - 120
			Dissolved Nickel (Ni)	2021/11/04		98	%	80 - 120
			Dissolved Phosphorus (P)	2021/11/04		99	%	80 - 120
			Dissolved Selenium (Se)	2021/11/04		102	%	80 - 120
			Dissolved Silicon (Si)	2021/11/04		106	%	80 - 120
			Dissolved Silver (Ag)	2021/11/04		99	%	80 - 120
			Dissolved Strontium (Sr)	2021/11/04		100	%	80 - 120
			Dissolved Thallium (Tl)	2021/11/04		97	%	80 - 120
			Dissolved Tin (Sn)	2021/11/04		99	%	80 - 120
			Dissolved Titanium (Ti)	2021/11/04		101	%	80 - 120
			Dissolved Uranium (U)	2021/11/04		107	%	80 - 120
			Dissolved Vanadium (V)	2021/11/04		99	%	80 - 120
			Dissolved Zinc (Zn)	2021/11/04		102	%	80 - 120
			Dissolved Zirconium (Zr)	2021/11/04		103	%	80 - 120
A412157	AA1	Method Blank	Dissolved Aluminum (Al)	2021/11/04	<0.50		ug/L	
			Dissolved Antimony (Sb)	2021/11/04	<0.020		ug/L	
			Dissolved Arsenic (As)	2021/11/04	<0.020		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Barium (Ba)	2021/11/04	<0.020		ug/L	
			Dissolved Beryllium (Be)	2021/11/04	<0.010		ug/L	
			Dissolved Bismuth (Bi)	2021/11/04	<0.0050		ug/L	
			Dissolved Boron (B)	2021/11/04	<10		ug/L	
			Dissolved Cadmium (Cd)	2021/11/04	<0.0050		ug/L	
			Dissolved Chromium (Cr)	2021/11/04	<0.10		ug/L	
			Dissolved Cobalt (Co)	2021/11/04	<0.0050		ug/L	
			Dissolved Copper (Cu)	2021/11/04	<0.050		ug/L	
			Dissolved Iron (Fe)	2021/11/04	<1.0		ug/L	
			Dissolved Lead (Pb)	2021/11/04	<0.0050		ug/L	
			Dissolved Lithium (Li)	2021/11/04	<0.50		ug/L	
			Dissolved Manganese (Mn)	2021/11/04	<0.050		ug/L	
			Dissolved Molybdenum (Mo)	2021/11/04	<0.050		ug/L	
			Dissolved Nickel (Ni)	2021/11/04	<0.020		ug/L	
			Dissolved Phosphorus (P)	2021/11/04	<2.0		ug/L	
			Dissolved Selenium (Se)	2021/11/04	<0.040		ug/L	
			Dissolved Silicon (Si)	2021/11/04	<50		ug/L	
			Dissolved Silver (Ag)	2021/11/04	<0.0050		ug/L	
			Dissolved Strontium (Sr)	2021/11/04	<0.050		ug/L	
			Dissolved Thallium (Tl)	2021/11/04	<0.0020		ug/L	
			Dissolved Tin (Sn)	2021/11/04	<0.20		ug/L	
			Dissolved Titanium (Ti)	2021/11/04	<0.50		ug/L	
			Dissolved Uranium (U)	2021/11/04	0.0022, RDL=0.0020 (2)		ug/L	
			Dissolved Vanadium (V)	2021/11/04	<0.20		ug/L	
			Dissolved Zinc (Zn)	2021/11/04	<0.10		ug/L	
			Dissolved Zirconium (Zr)	2021/11/04	<0.10		ug/L	
A412157	AA1	RPD [AJL805-07]	Dissolved Aluminum (Al)	2021/11/04	2.1		%	20
			Dissolved Antimony (Sb)	2021/11/04	NC		%	20
			Dissolved Arsenic (As)	2021/11/04	3.0		%	20
			Dissolved Barium (Ba)	2021/11/04	0.22		%	20
			Dissolved Beryllium (Be)	2021/11/04	NC		%	20
			Dissolved Bismuth (Bi)	2021/11/04	NC		%	20
			Dissolved Boron (B)	2021/11/04	NC		%	20
			Dissolved Cadmium (Cd)	2021/11/04	NC		%	20
			Dissolved Chromium (Cr)	2021/11/04	0.57		%	20
			Dissolved Cobalt (Co)	2021/11/04	2.3		%	20
			Dissolved Copper (Cu)	2021/11/04	0.76		%	20
			Dissolved Iron (Fe)	2021/11/04	2.0		%	20
			Dissolved Lead (Pb)	2021/11/04	13		%	20
			Dissolved Lithium (Li)	2021/11/04	0.57		%	20
			Dissolved Manganese (Mn)	2021/11/04	1.9		%	20
			Dissolved Molybdenum (Mo)	2021/11/04	0.14		%	20
			Dissolved Nickel (Ni)	2021/11/04	4.1		%	20
			Dissolved Phosphorus (P)	2021/11/04	6.2		%	20
			Dissolved Selenium (Se)	2021/11/04	18		%	20
			Dissolved Silicon (Si)	2021/11/04	1.3		%	20
			Dissolved Silver (Ag)	2021/11/04	NC		%	20
			Dissolved Strontium (Sr)	2021/11/04	0.093		%	20
			Dissolved Thallium (Tl)	2021/11/04	NC		%	20
			Dissolved Tin (Sn)	2021/11/04	NC		%	20
			Dissolved Titanium (Ti)	2021/11/04	NC		%	20
			Dissolved Uranium (U)	2021/11/04	1.3		%	20
			Dissolved Vanadium (V)	2021/11/04	8.3		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Zinc (Zn)	2021/11/04	15		%	20
			Dissolved Zirconium (Zr)	2021/11/04	NC		%	20
A412157	AA1	RPD [AJL808-07]	Dissolved Aluminum (Al)	2021/11/04	8.2		%	20
			Dissolved Antimony (Sb)	2021/11/04	NC		%	20
			Dissolved Arsenic (As)	2021/11/04	NC		%	20
			Dissolved Barium (Ba)	2021/11/04	4.9		%	20
			Dissolved Beryllium (Be)	2021/11/04	NC		%	20
			Dissolved Bismuth (Bi)	2021/11/04	NC		%	20
			Dissolved Boron (B)	2021/11/04	NC		%	20
			Dissolved Cadmium (Cd)	2021/11/04	NC		%	20
			Dissolved Chromium (Cr)	2021/11/04	NC		%	20
			Dissolved Cobalt (Co)	2021/11/04	NC		%	20
			Dissolved Copper (Cu)	2021/11/04	NC		%	20
			Dissolved Iron (Fe)	2021/11/04	1.2		%	20
			Dissolved Lead (Pb)	2021/11/04	NC		%	20
			Dissolved Lithium (Li)	2021/11/04	NC		%	20
			Dissolved Manganese (Mn)	2021/11/04	NC		%	20
			Dissolved Molybdenum (Mo)	2021/11/04	NC		%	20
			Dissolved Nickel (Ni)	2021/11/04	13		%	20
			Dissolved Phosphorus (P)	2021/11/04	NC		%	20
			Dissolved Selenium (Se)	2021/11/04	NC		%	20
			Dissolved Silicon (Si)	2021/11/04	NC		%	20
			Dissolved Silver (Ag)	2021/11/04	NC		%	20
			Dissolved Strontium (Sr)	2021/11/04	4.4		%	20
			Dissolved Thallium (Tl)	2021/11/04	NC		%	20
			Dissolved Tin (Sn)	2021/11/04	NC		%	20
			Dissolved Titanium (Ti)	2021/11/04	NC		%	20
			Dissolved Uranium (U)	2021/11/04	NC		%	20
			Dissolved Vanadium (V)	2021/11/04	NC		%	20
			Dissolved Zinc (Zn)	2021/11/04	3.7		%	20
			Dissolved Zirconium (Zr)	2021/11/04	NC		%	20
A412169	BTM	Matrix Spike	Total Suspended Solids	2021/11/04		105	%	80 - 120
A412169	BTM	Spiked Blank	Total Suspended Solids	2021/11/04		103	%	80 - 120
A412169	BTM	Method Blank	Total Suspended Solids	2021/11/04	<1.0		mg/L	
A412169	BTM	RPD	Total Suspended Solids	2021/11/04	NC		%	20
A412422	BTM	Matrix Spike	Total Suspended Solids	2021/11/04		105	%	80 - 120
A412422	BTM	Spiked Blank	Total Suspended Solids	2021/11/04		104	%	80 - 120
A412422	BTM	Method Blank	Total Suspended Solids	2021/11/04	<1.0		mg/L	
A412422	BTM	RPD	Total Suspended Solids	2021/11/04	NC		%	20
A412526	BB3	Matrix Spike	Alkalinity (Total as CaCO3)	2021/11/02		102	%	80 - 120
A412526	BB3	Spiked Blank	Alkalinity (Total as CaCO3)	2021/11/02		87	%	80 - 120
A412526	BB3	Method Blank	Alkalinity (PP as CaCO3)	2021/11/02	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2021/11/02	<1.0		mg/L	
			Bicarbonate (HCO3)	2021/11/02	<1.0		mg/L	
			Carbonate (CO3)	2021/11/02	<1.0		mg/L	
			Hydroxide (OH)	2021/11/02	<1.0		mg/L	
A412526	BB3	RPD	Alkalinity (PP as CaCO3)	2021/11/02	NC		%	20
			Alkalinity (Total as CaCO3)	2021/11/02	9.9		%	20
			Bicarbonate (HCO3)	2021/11/02	9.9		%	20
			Carbonate (CO3)	2021/11/02	NC		%	20
			Hydroxide (OH)	2021/11/02	NC		%	20
A412527	BB3	Spiked Blank	Conductivity	2021/11/02		99	%	80 - 120
A412527	BB3	Method Blank	Conductivity	2021/11/02	<2.0		uS/cm	
A412537	BB3	Matrix Spike	Alkalinity (Total as CaCO3)	2021/11/02		NC	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A412537	BB3	Spiked Blank	Alkalinity (Total as CaCO3)	2021/11/02		92	%	80 - 120
A412537	BB3	Method Blank	Alkalinity (PP as CaCO3)	2021/11/02	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2021/11/02	<1.0		mg/L	
			Bicarbonate (HCO3)	2021/11/02	<1.0		mg/L	
			Carbonate (CO3)	2021/11/02	<1.0		mg/L	
			Hydroxide (OH)	2021/11/02	<1.0		mg/L	
A412545	BB3	Spiked Blank	Conductivity	2021/11/02		101	%	80 - 120
A412545	BB3	Method Blank	Conductivity	2021/11/02	<2.0		uS/cm	
A412550	BB3	Matrix Spike	Alkalinity (Total as CaCO3)	2021/11/02		NC	%	80 - 120
A412550	BB3	Spiked Blank	Alkalinity (Total as CaCO3)	2021/11/02		91	%	80 - 120
A412550	BB3	Method Blank	Alkalinity (PP as CaCO3)	2021/11/02	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2021/11/02	<1.0		mg/L	
			Bicarbonate (HCO3)	2021/11/02	<1.0		mg/L	
			Carbonate (CO3)	2021/11/02	<1.0		mg/L	
			Hydroxide (OH)	2021/11/02	<1.0		mg/L	
A412550	BB3	RPD	Alkalinity (PP as CaCO3)	2021/11/02	NC		%	20
			Alkalinity (Total as CaCO3)	2021/11/02	1.7		%	20
			Bicarbonate (HCO3)	2021/11/02	1.7		%	20
			Carbonate (CO3)	2021/11/02	NC		%	20
			Hydroxide (OH)	2021/11/02	NC		%	20
A412552	BB3	Spiked Blank	Conductivity	2021/11/02		100	%	80 - 120
A412552	BB3	Method Blank	Conductivity	2021/11/02	<2.0		uS/cm	
A412654	CSH	Spiked Blank	pH (15 C)	2021/11/03		99	%	97 - 103
A412654	CSH	RPD [AJL789-01]	pH (15 C)	2021/11/03	0.39		%	N/A
A412675	ZWU	Matrix Spike [AJL796-04]	Total Organic Carbon (C)	2021/11/04		104	%	80 - 120
A412675	ZWU	Spiked Blank	Total Organic Carbon (C)	2021/11/04		102	%	80 - 120
A412675	ZWU	Method Blank	Total Organic Carbon (C)	2021/11/04	<0.20		mg/L	
A412675	ZWU	RPD [AJL796-04]	Total Organic Carbon (C)	2021/11/04	2.1		%	20
A412717	MO5	Matrix Spike	Dissolved Chloride (Cl)	2021/11/03		117	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/03		NC	%	80 - 120
A412717	MO5	Spiked Blank	Dissolved Chloride (Cl)	2021/11/03		105	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/03		100	%	80 - 120
A412717	MO5	Method Blank	Dissolved Chloride (Cl)	2021/11/03	<0.50		mg/L	
			Dissolved Sulphate (SO4)	2021/11/03	0.56, RDL=0.50		mg/L	
A412717	MO5	RPD	Dissolved Chloride (Cl)	2021/11/03	1.4		%	20
			Dissolved Sulphate (SO4)	2021/11/03	1.1		%	20
A413099	JP1	Matrix Spike [AJL799-13]	D10-ANTHRACENE (sur.)	2021/11/04		88	%	50 - 140
			D8-ACENAPHTHYLENE (sur.)	2021/11/04		88	%	50 - 140
			D8-NAPHTHALENE (sur.)	2021/11/04		83	%	50 - 140
			TERPHENYL-D14 (sur.)	2021/11/04		98	%	50 - 140
			Quinoline	2021/11/04		115	%	50 - 140
			Naphthalene	2021/11/04		86	%	50 - 140
			1-Methylnaphthalene	2021/11/04		89	%	50 - 140
			2-Methylnaphthalene	2021/11/04		89	%	50 - 140
			Acenaphthylene	2021/11/04		89	%	50 - 140
			Acenaphthene	2021/11/04		91	%	50 - 140
			Fluorene	2021/11/04		94	%	50 - 140
			Phenanthrene	2021/11/04		90	%	50 - 140
			Anthracene	2021/11/04		91	%	50 - 140
			Acridine	2021/11/04		105	%	50 - 140
			Fluoranthene	2021/11/04		102	%	50 - 140
			Pyrene	2021/11/04		101	%	50 - 140
			Benzo(a)anthracene	2021/11/04		89	%	50 - 140

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chrysene	2021/11/04		84	%	50 - 140
			Benzo(b&j)fluoranthene	2021/11/04		83	%	50 - 140
			Benzo(k)fluoranthene	2021/11/04		94	%	50 - 140
			Benzo(a)pyrene	2021/11/04		80	%	50 - 140
			Indeno(1,2,3-cd)pyrene	2021/11/04		78	%	50 - 140
			Dibenz(a,h)anthracene	2021/11/04		76	%	50 - 140
			Benzo(g,h,i)perylene	2021/11/04		73	%	50 - 140
A413099	JP1	Spiked Blank	D10-ANTHRACENE (sur.)	2021/11/04		100	%	50 - 140
			D8-ACENAPHTHYLENE (sur.)	2021/11/04		98	%	50 - 140
			D8-NAPHTHALENE (sur.)	2021/11/04		91	%	50 - 140
			TERPHENYL-D14 (sur.)	2021/11/04		108	%	50 - 140
			Quinoline	2021/11/04		107	%	50 - 140
			Naphthalene	2021/11/04		88	%	50 - 140
			1-Methylnaphthalene	2021/11/04		92	%	50 - 140
			2-Methylnaphthalene	2021/11/04		91	%	50 - 140
			Acenaphthylene	2021/11/04		93	%	50 - 140
			Acenaphthene	2021/11/04		95	%	50 - 140
			Fluorene	2021/11/04		100	%	50 - 140
			Phenanthrene	2021/11/04		96	%	50 - 140
			Anthracene	2021/11/04		97	%	50 - 140
			Acridine	2021/11/04		100	%	50 - 140
			Fluoranthene	2021/11/04		109	%	50 - 140
			Pyrene	2021/11/04		107	%	50 - 140
			Benzo(a)anthracene	2021/11/04		95	%	50 - 140
			Chrysene	2021/11/04		93	%	50 - 140
			Benzo(b&j)fluoranthene	2021/11/04		92	%	50 - 140
			Benzo(k)fluoranthene	2021/11/04		104	%	50 - 140
			Benzo(a)pyrene	2021/11/04		89	%	50 - 140
			Indeno(1,2,3-cd)pyrene	2021/11/04		105	%	50 - 140
			Dibenz(a,h)anthracene	2021/11/04		102	%	50 - 140
			Benzo(g,h,i)perylene	2021/11/04		99	%	50 - 140
A413099	JP1	Method Blank	D10-ANTHRACENE (sur.)	2021/11/04		94	%	50 - 140
			D8-ACENAPHTHYLENE (sur.)	2021/11/04		90	%	50 - 140
			D8-NAPHTHALENE (sur.)	2021/11/04		82	%	50 - 140
			TERPHENYL-D14 (sur.)	2021/11/04		103	%	50 - 140
			Quinoline	2021/11/04	<0.020		ug/L	
			Naphthalene	2021/11/04	<0.10		ug/L	
			1-Methylnaphthalene	2021/11/04	<0.050		ug/L	
			2-Methylnaphthalene	2021/11/04	<0.10		ug/L	
			Acenaphthylene	2021/11/04	<0.050		ug/L	
			Acenaphthene	2021/11/04	<0.050		ug/L	
			Fluorene	2021/11/04	<0.050		ug/L	
			Phenanthrene	2021/11/04	<0.050		ug/L	
			Anthracene	2021/11/04	<0.010		ug/L	
			Acridine	2021/11/04	<0.050		ug/L	
			Fluoranthene	2021/11/04	<0.020		ug/L	
			Pyrene	2021/11/04	<0.020		ug/L	
			Benzo(a)anthracene	2021/11/04	<0.010		ug/L	
			Chrysene	2021/11/04	<0.020		ug/L	
			Benzo(b&j)fluoranthene	2021/11/04	<0.030		ug/L	
			Benzo(k)fluoranthene	2021/11/04	<0.050		ug/L	
			Benzo(a)pyrene	2021/11/04	<0.0050		ug/L	
			Indeno(1,2,3-cd)pyrene	2021/11/04	<0.050		ug/L	
			Dibenz(a,h)anthracene	2021/11/04	<0.0030		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(g,h,i)perylene	2021/11/04	<0.050		ug/L	
A413099	JP1	RPD [AJL800-13]	Quinoline	2021/11/04	NC		%	40
			Naphthalene	2021/11/04	NC		%	40
			1-Methylnaphthalene	2021/11/04	NC		%	40
			2-Methylnaphthalene	2021/11/04	NC		%	40
			Acenaphthylene	2021/11/04	NC		%	40
			Acenaphthene	2021/11/04	NC		%	40
			Fluorene	2021/11/04	NC		%	40
			Phenanthrene	2021/11/04	NC		%	40
			Anthracene	2021/11/04	NC		%	40
			Acridine	2021/11/04	NC		%	40
			Fluoranthene	2021/11/04	NC		%	40
			Pyrene	2021/11/04	NC		%	40
			Benzo(a)anthracene	2021/11/04	NC		%	40
			Chrysene	2021/11/04	NC		%	40
			Benzo(b&j)fluoranthene	2021/11/04	NC		%	40
			Benzo(k)fluoranthene	2021/11/04	NC		%	40
			Benzo(a)pyrene	2021/11/04	NC		%	40
			Indeno(1,2,3-cd)pyrene	2021/11/04	NC		%	40
			Dibenz(a,h)anthracene	2021/11/04	NC		%	40
			Benzo(g,h,i)perylene	2021/11/04	NC		%	40
A413413	FM0	Matrix Spike [AJL805-10]	Dissolved Phosphorus (P)	2021/11/04		94	%	80 - 120
A413413	FM0	QC Standard	Dissolved Phosphorus (P)	2021/11/04		89	%	80 - 120
A413413	FM0	Spiked Blank	Dissolved Phosphorus (P)	2021/11/04		94	%	80 - 120
A413413	FM0	Method Blank	Dissolved Phosphorus (P)	2021/11/04	<0.0010		mg/L	
A413413	FM0	RPD [AJL805-10]	Dissolved Phosphorus (P)	2021/11/04	5.4		%	20
A413506	MUT	Matrix Spike [AJL797-13]	O-TERPHENYL (sur.)	2021/11/04		90	%	60 - 140
			EPH (C10-C19)	2021/11/04		103	%	60 - 140
			EPH (C19-C32)	2021/11/04		99	%	60 - 140
A413506	MUT	Spiked Blank	O-TERPHENYL (sur.)	2021/11/04		100	%	60 - 140
			EPH (C10-C19)	2021/11/04		115	%	70 - 130
			EPH (C19-C32)	2021/11/04		105	%	70 - 130
A413506	MUT	Method Blank	O-TERPHENYL (sur.)	2021/11/04		97	%	60 - 140
			EPH (C10-C19)	2021/11/04	<0.20		mg/L	
			EPH (C19-C32)	2021/11/04	<0.20		mg/L	
A413506	MUT	RPD [AJL800-13]	EPH (C10-C19)	2021/11/04	NC		%	30
			EPH (C19-C32)	2021/11/04	NC		%	30
A413592	CJY	Matrix Spike [AJL801-08]	Dissolved Mercury (Hg)	2021/11/04		86	%	80 - 120
A413592	CJY	Spiked Blank	Dissolved Mercury (Hg)	2021/11/04		105	%	80 - 120
A413592	CJY	Method Blank	Dissolved Mercury (Hg)	2021/11/04	<0.0019		ug/L	
A413592	CJY	RPD	Dissolved Mercury (Hg)	2021/11/04	NC		%	20
A413611	CJY	Matrix Spike	Total Mercury (Hg)	2021/11/04		80	%	80 - 120
A413611	CJY	Spiked Blank	Total Mercury (Hg)	2021/11/04		107	%	80 - 120
A413611	CJY	Method Blank	Total Mercury (Hg)	2021/11/04	<0.0019		ug/L	
A413611	CJY	RPD	Total Mercury (Hg)	2021/11/04	NC		%	20
A413642	TL9	Matrix Spike	Dissolved Chloride (Cl)	2021/11/04		99	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/04		NC	%	80 - 120
A413642	TL9	Spiked Blank	Dissolved Chloride (Cl)	2021/11/04		101	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/04		98	%	80 - 120
A413642	TL9	Method Blank	Dissolved Chloride (Cl)	2021/11/04	<0.50		mg/L	
			Dissolved Sulphate (SO4)	2021/11/04	0.50, RDL=0.50		mg/L	
A413642	TL9	RPD	Dissolved Chloride (Cl)	2021/11/04	NC		%	20
			Dissolved Sulphate (SO4)	2021/11/04	0.64		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A413643	TL9	Matrix Spike [AJL793-02]	Dissolved Chloride (Cl)	2021/11/04		101	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/04		85	%	80 - 120
A413643	TL9	Spiked Blank	Dissolved Chloride (Cl)	2021/11/04		101	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/04		101	%	80 - 120
A413643	TL9	Method Blank	Dissolved Chloride (Cl)	2021/11/04	<0.50		mg/L	
			Dissolved Sulphate (SO4)	2021/11/04	<0.50		mg/L	
A413643	TL9	RPD [AJL793-02]	Dissolved Chloride (Cl)	2021/11/04	5.3		%	20
			Dissolved Sulphate (SO4)	2021/11/04	13		%	20
A413783	BTM	Matrix Spike	Total Suspended Solids	2021/11/05		107	%	80 - 120
A413783	BTM	Spiked Blank	Total Suspended Solids	2021/11/05		103	%	80 - 120
A413783	BTM	Method Blank	Total Suspended Solids	2021/11/05	<1.0		mg/L	
A413783	BTM	RPD	Total Suspended Solids	2021/11/05	0		%	20
A414023	IC4	Matrix Spike [AJL798-11]	Total Ammonia (N)	2021/11/04		102	%	80 - 120
A414023	IC4	Spiked Blank	Total Ammonia (N)	2021/11/04		99	%	80 - 120
A414023	IC4	Method Blank	Total Ammonia (N)	2021/11/04	<0.015		mg/L	
A414023	IC4	RPD [AJL798-11]	Total Ammonia (N)	2021/11/04	NC		%	20
A414026	IC4	Matrix Spike	Total Ammonia (N)	2021/11/04		NC	%	80 - 120
A414026	IC4	Spiked Blank	Total Ammonia (N)	2021/11/04		99	%	80 - 120
A414026	IC4	Method Blank	Total Ammonia (N)	2021/11/04	<0.015		mg/L	
A414026	IC4	RPD	Total Ammonia (N)	2021/11/04	2.0		%	20
A414670	IC4	Matrix Spike [AJL793-09]	Dissolved Nitrogen (N)	2021/11/05		NC	%	80 - 120
A414670	IC4	Spiked Blank	Dissolved Nitrogen (N)	2021/11/05		98	%	80 - 120
A414670	IC4	Method Blank	Dissolved Nitrogen (N)	2021/11/05	<0.020		mg/L	
A414670	IC4	RPD [AJL793-09]	Dissolved Nitrogen (N)	2021/11/05	0.039		%	25
A418336	MO5	Matrix Spike	Dissolved Chloride (Cl)	2021/11/08		101	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/08		NC	%	80 - 120
A418336	MO5	Spiked Blank	Dissolved Chloride (Cl)	2021/11/08		100	%	80 - 120
			Dissolved Sulphate (SO4)	2021/11/08		101	%	80 - 120
A418336	MO5	Method Blank	Dissolved Chloride (Cl)	2021/11/08	<0.50		mg/L	
			Dissolved Sulphate (SO4)	2021/11/08	0.63, RDL=0.50		mg/L	
A418336	MO5	RPD	Dissolved Chloride (Cl)	2021/11/08	11		%	20
			Dissolved Sulphate (SO4)	2021/11/08	3.7		%	20
A418483	AA1	Matrix Spike	Dissolved Zinc (Zn)	2021/11/08		NC	%	80 - 120
A418483	AA1	Spiked Blank	Dissolved Zinc (Zn)	2021/11/08		98	%	80 - 120
A418483	AA1	Method Blank	Dissolved Zinc (Zn)	2021/11/08	<0.10		ug/L	
A418483	AA1	RPD	Dissolved Zinc (Zn)	2021/11/08	0.93		%	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.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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 spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

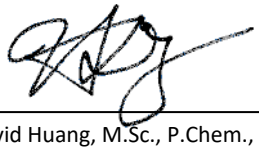
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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

(2) Method blank exceeds acceptance limits for Ul- 2X RDL acceptable for low level metals determination.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Maria Magdalena Florescu, Ph.D., P.Chem., QP, Inorganics Manager

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Bureau Veritas Laboratories
4000 19st N.E, Calgary, Alberta Canada T2E 6P8 Tel:(403) 291-3077 Toll-free 800-563-6266 Fax (403) 291-9468 www.bvna.com

C183638_COC

C#650479-01-01

650479

INVOICE TO:		Report Information		Project Information	
Company Name	#13592 Government of Yukon	Company Name	#44232 Government of Yukon	Quotation #	C10319
Contact Name	Devon O'Connor	Contact Name	Devon O'Connor	P.O. #	
Address	Financial Svcs. Brance V-Fin Box 2703	Address	Box 2703	Project #	Icy Waters
	Whitehorse YT Y1A 2C6		Whitehorse AB Y1A 2C6	Project Name	
Phone	(867) 667-3102 Fax:	Phone	(867) 667-3102 Fax:	Site #	
Email	devon.o'connor@yukon.ca	Email	devon.o'connor@yukon.ca	Sampled By	

Regulatory Criteria

Special Instructions

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to Bureau Veritas

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	CSR VOC + VPH in Water	LEPH & HEPH with CSR/CCME PAH in Water	Low Level Dissolved Metals with CV Hg	Low Level Total Metals with CV Hg	Alkalinity @25C (pp, total), CO3,HCO3,OH	Ammonia-N (Total)	Carbon (Total Organic)	Nitrate+Nitrite (N) (low level)	Nitrogen (Tot. Diss) - FF/FP	Nitrogen (Total)	# of Bottles	Comments
1		FSHLK	oct 29	16:00	W			X	X	X	X	X	X	X	X	X	X		
2		USFRLO	oct 29	14:55						X	X	X	X	X	X	X	X		
3		LLOUT	oct 29	14:15						X	X	X	X	X	X	X	X		
4		DITCH1	oct 29	13:20						X	X	X	X	X	X	X	X		
5		PS-1	oct 29	11:40						X	X	X	X	X	X	X	X		
6		PS-2b	oct 29	10:20				X	X	X	X	X	X	X	X	X	X		
7		PS-3	oct 29	10:50						X	X	X	X	X	X	X	X		
8		PS-4								X	X	X	X	X	X	X	X		
9		PS-5a	oct 29	12:25						X	X	X	X	X	X	X	X		
10		PS-6	oct 28	16:00						X	X	X	X	X	X	X	X		

Turnaround Time (TAT) Required

Please provide advance notice for rush projects

Regular (Standard) TAT
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:
Rush Confirmation Number
(call lab for #)

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
				2011/10/30	1400	

Lab Use Only: Time Sensitive | Temperature (°C) on Receipt: See Attn | Custody Seal Intact on Cooler? Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

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4000 19st N.E, Calgary, Alberta Canada T2E 6P8 Tel (403) 291-3077 Toll-free 800-563-6266 Fax (403) 291-9468 www.bvna.com

C183638_COC

Order #:

INVOICE TO:		Report Information		Project Information	
Company Name	#13592 Government of Yukon	Company Name	#44232 Government of Yukon	Quotation #	C10319
Contact Name	Devon O'Connor	Contact Name	Devon O'Connor	P.O. #	
Address	Financial Svcs. Brance V-Fin Box 2703	Address	Box 2703	Project #	Icy Waters
	Whitehorse YT Y1A 2C6		Whitehorse AB Y1A 2C6	Project Name	
Phone	(867) 667-3102 Fax:	Phone	(867) 667-3102 Fax:	Site #	
Email	devon.o'connor@yukon.ca	Email	devon.o'connor@yukon.ca	Sampled By	

Chain Of Custody Record: C#650479-01-02

Project Manager: Customer Solutions

Regulatory Criteria

Special Instructions

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to Bureau Veritas

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	Orthophosphate by Konelab (low level)	Residual Chlorine, Free	Total Phosphorus Low Level Dissolved	Total Phosphorus Low Level Total	Total Suspended Solids (NFR)	Un-ionized Ammonia as N @ 15 C	Low level chloride/sulphate by AC	Conductivity @25C	Ion Balance	Sum of cations, anions	# of Bottles	Comments
1		FSHLK	oct 29	16:00	W			X	X	X	X	X	X	X	X	X	X		+ESR VOC+VPH, LEPH& HEPH
2		USFRLO	oct 29	14:55				X	X	X	X	X	X	X	X	X	X		
3		LLOUT	oct 29	14:15				X	X	X	X	X	X	X	X	X	X		
4		DITCH1	oct 29	13:20				X	X	X	X	X	X	X	X	X	X		
5		PS-1	oct 29	11:40				X	X	X	X	X	X	X	X	X	X		
6		PS-2b	oct 29	10:20				X	X	X	X	X	X	X	X	X	X		
7		PS-3	oct 29	10:50				X	X	X	X	X	X	X	X	X	X		
8		PS-4						X	X	X	X	X	X	X	X	X	X		
9		PS-5a	oct 29	12:25				X	X	X	X	X	X	X	X	X	X		
10		PS-6	oct 29	16:00				X	X	X	X	X	X	X	X	X	X		

Analysis Requested

Turnaround Time (TAT) Required

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Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:
Rush Confirmation Number: (call lab for #)

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal intact on Cooler?
			The Rogue Logan	2021/10/30	14:00			5°C Actual	Yes / No

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BUREAU VERITAS

INVOICE TO:		Report Information		Project Information	
Company Name	#13592 Government of Yukon	Company Name	#44232 Government of Yukon	Quotation #	C10319
Contact Name	Devon O'Connor	Contact Name	Devon O'Connor	P.O. #	
Address	Financial Svcs. Brance V-Fin Box 2703	Address	Box 2703	Project #	Icy Waters
	Whitehorse YT Y1A 2C6		Whitehorse AB Y1A 2C6	Project Name	
Phone	(867) 667-3102 Fax:	Phone	(867) 667-3102 Fax:	Site #	
Email	devon.o'connor@yukon.ca	Email	devon.o'connor@yukon.ca	Sampled By	

C183638_COC

C#650479-02-01

ile Order #:

650479

ect Manager

Customer Solutions

Regulatory Criteria

Special Instructions

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

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Date Required: Time Required:
Rush Confirmation Number: (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	CSR VOC + VPH in Water	LEPH & HEPH with CSR/CCME PAH in Water	Low Level Dissolved Metals with CV Hg	Low Level Total Metals with CV Hg	Alkalinity @25C (pp, total), CO3,HCO3,OH	Ammonia-N (Total)	Carbon (Total Organic)	Nitrate+Nitrite (N) (low level)	Nitrogen (Tot. Diss) - FF/FP	Nitrogen (Total)	# of Bottles	Comments
1		PS-7	oct 28	14:40	W			X	X	X	X	X	X	X	X	X	X		
2		PS-8	oct 28	15:20						X	X	X	X	X	X	X	X		
3		PC-D	oct 28	14:05				X	X	X	X	X	X	X	X	X	X		
4		PC-SA	oct 28	13:30				X	X	X	X	X	X	X	X	X	X		
5		PC-H	oct 28	12:50				X	X	X	X	X	X	X	X	X	X		
6		HL	oct 28	11:40				X	X	X	X	X	X	X	X	X	X		
7		MC-PH	oct 28	10:40				X	X	X	X	X	X	X	X	X	X		
8		MC-MV	oct 28	10:05				X	X	X	X	X	X	X	X	X	X		
9		MC-USY	oct 28	9:55				X	X	X	X	X	X	X	X	X	X		
10		REP-1	oct 28	9:15	W			X	X	X	X	X	X	X	X	X	X		NoVPH, no LEPH/HEPH/PAH

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
			By courier company	2019/10/30	N:00		☐	5 cc Actr	☐ Yes ☑ No

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order #:

479

Manager

C#650479-02-02

Customer Solutions

INVOICE TO:		Report Information		Project Information	
Company Name	#13592 Government of Yukon	Company Name	#44232 Government of Yukon	Quotation #	C10319
Contact Name	Devon O'Connor	Contact Name	Devon O'Connor	P.O. #	
Address	Financial Svcs. Brance V-Fin Box 2703	Address	Box 2703	Project #	Icy Waters
	Whitehorse YT Y1A 2C6		Whitehorse AB Y1A 2C6	Project Name	
Phone	(867) 667-3102 Fax	Phone	(867) 667-3102 Fax	Site #	
Email	devon.o'connor@yukon.ca	Email	devon.o'connor@yukon.ca	Sampled By	

Regulatory Criteria

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Job Specific Rush TAT (if applies to entire submission)
Date Required: _____ Time Required: _____
Rush Confirmation Number: _____
(call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y / N)	Metals Field Filtered ? (Y / N)	Orthophosphate by Konelab (low level)	Residual Chlorine, Free	Total Phosphorus Low Level Dissolved	Total Phosphorus Low Level Total	Total Suspended Solids (NFR)	Un-ionized Ammonia as N @ 15 C	Low level chloride/sulphate by AC	Conductivity @25C	Ion Balance	Sum of cations, anions	# of Bottles	Comments
1		PS-7	oct 23	14:40	W			X	X	X	X	X	X	X	X	X	X		
2		PS-8	oct 23	15:20				X	X	X	X	X	X	X	X	X	X		
3		PC-D	oct 23	14:05				X	X	X	X	X	X	X	X	X	X		
4		PC-SA	oct 23	13:30				X	X	X	X	X	X	X	X	X	X		
5		PC-H	oct 23	12:50				X	X	X	X	X	X	X	X	X	X		
6		HL	oct 23	11:40				X	X	X	X	X	X	X	X	X	X		
7		MC-PH	oct 23	10:40				X	X	X	X	X	X	X	X	X	X		
8		MC-MV	oct 23	10:06				X	X	X	X	X	X	X	X	X	X		
9		MC-USY	oct 23	9:05				X	X	X	X	X	X	X	X	X	X		
10		REP-1	Oct 23	3:15				X	X	X	X	X	X	X	X	X	X		

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
			Renuka Lagoo	2023/10/30	14:00		☐	See Note	☐ Yes ☒ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

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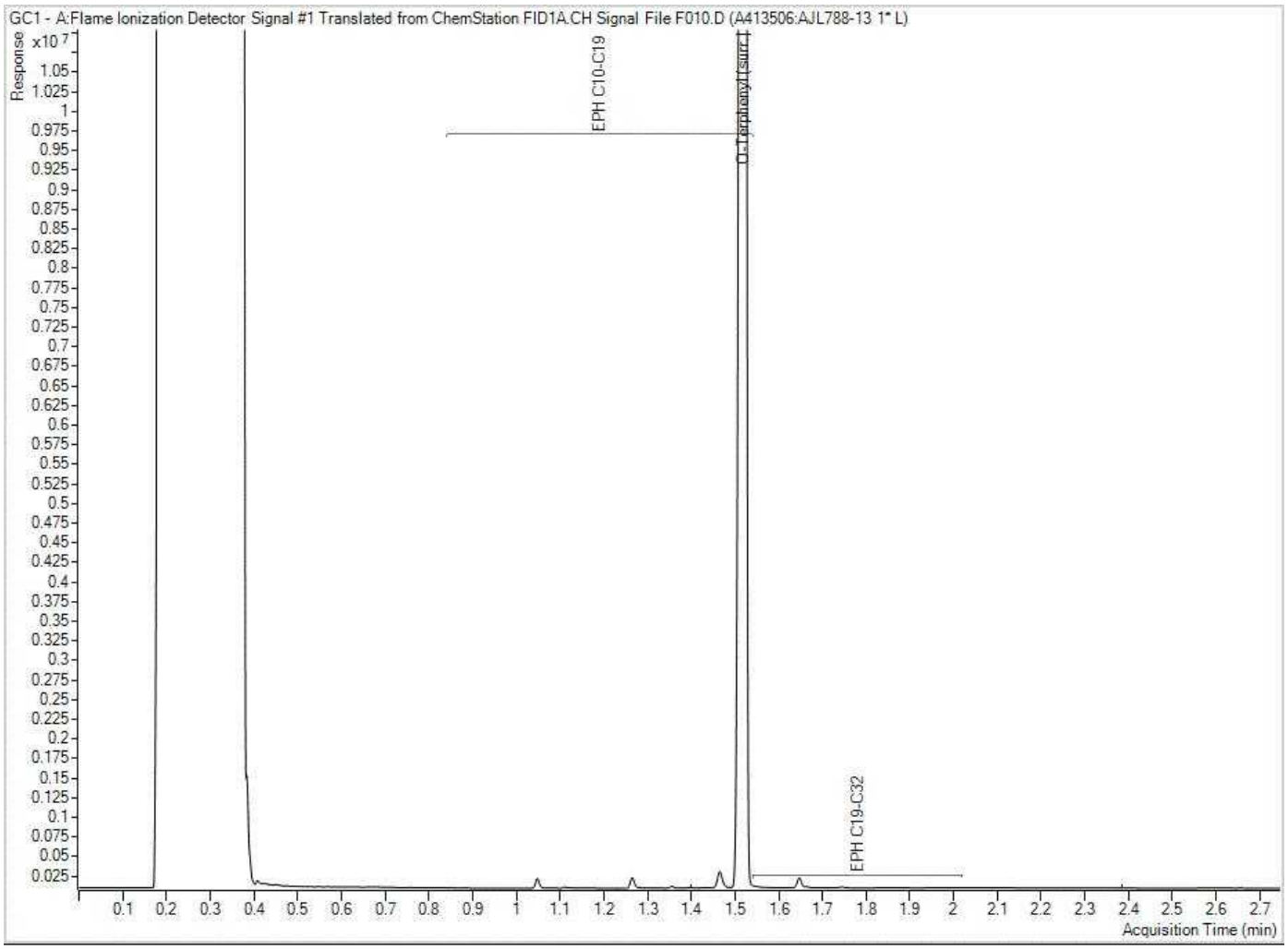
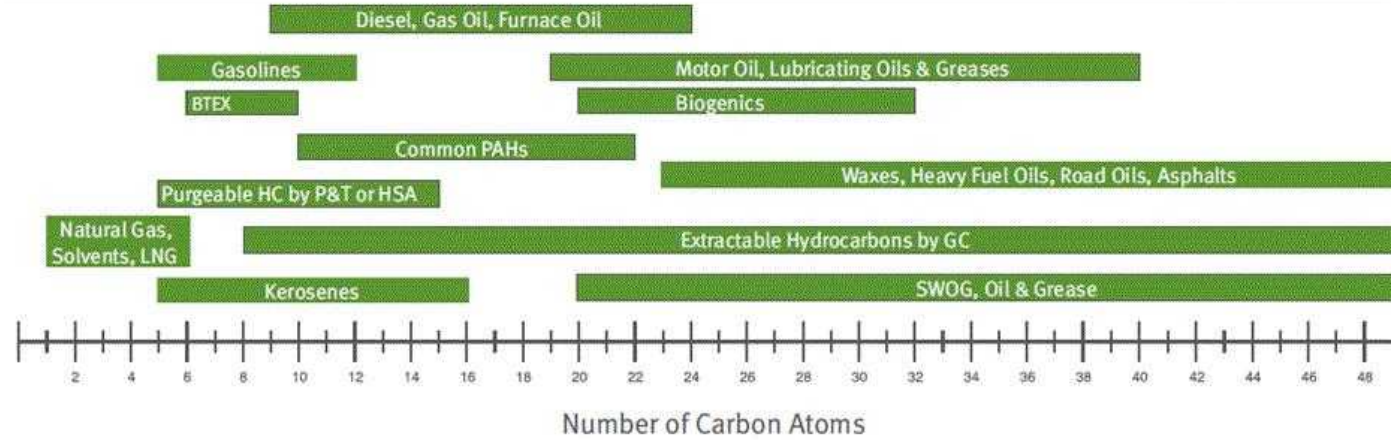
White: Bureau Veritas Yellow: Client

Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL788

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: FSHLK

EPH in Water when PAH required Chromatogram



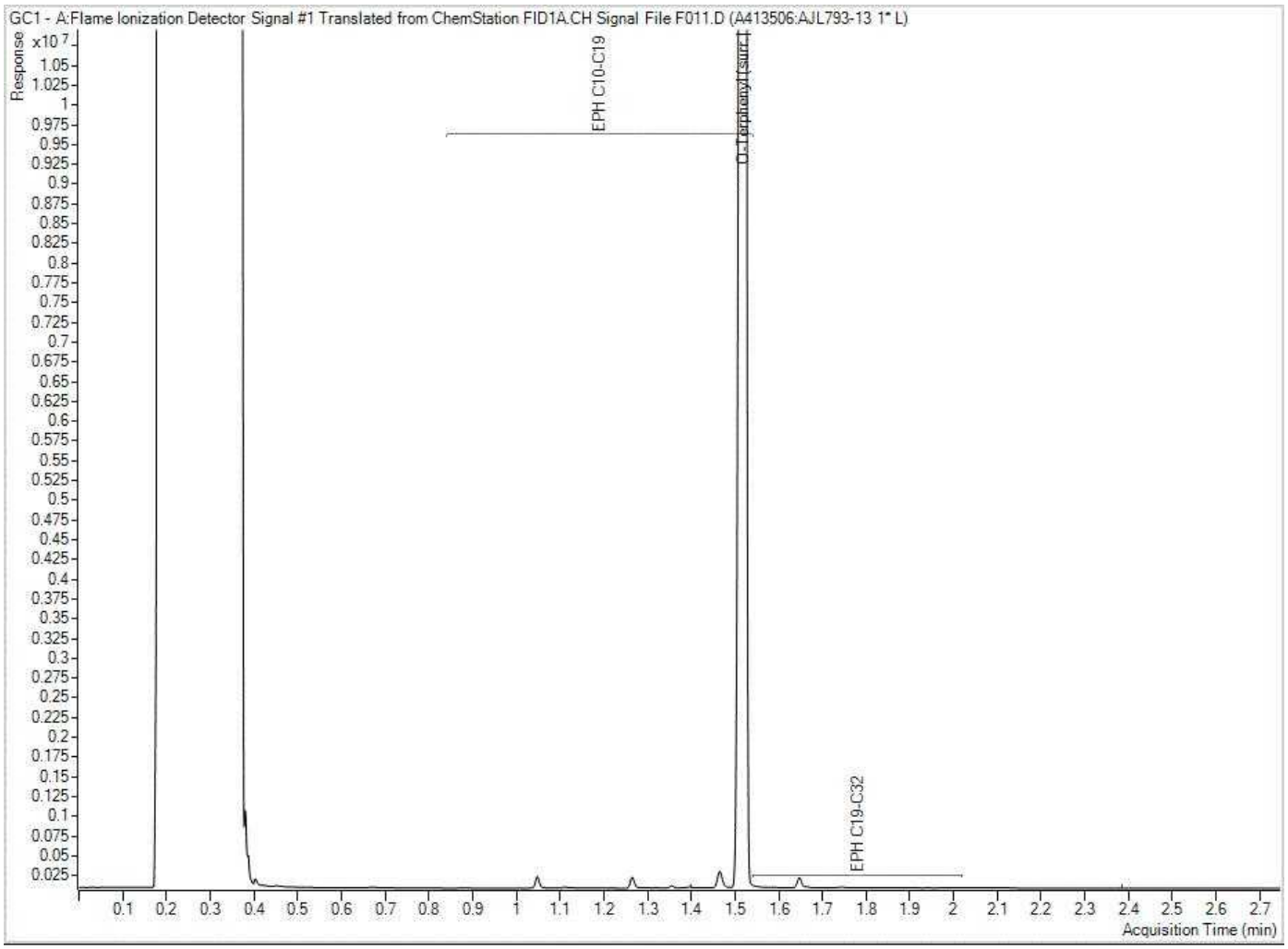


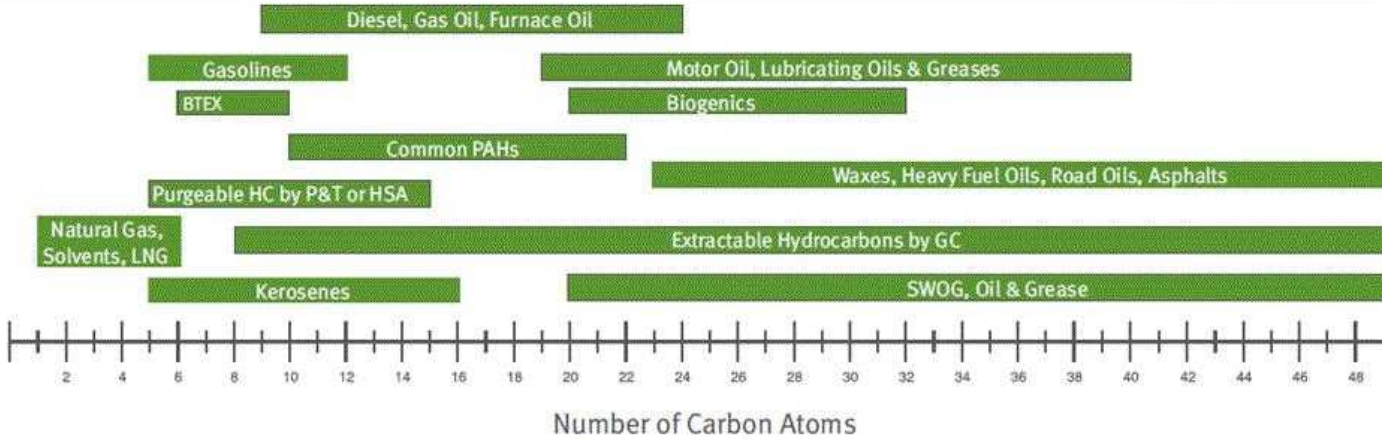
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL793

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: PS-2B

EPH in Water when PAH required Chromatogram





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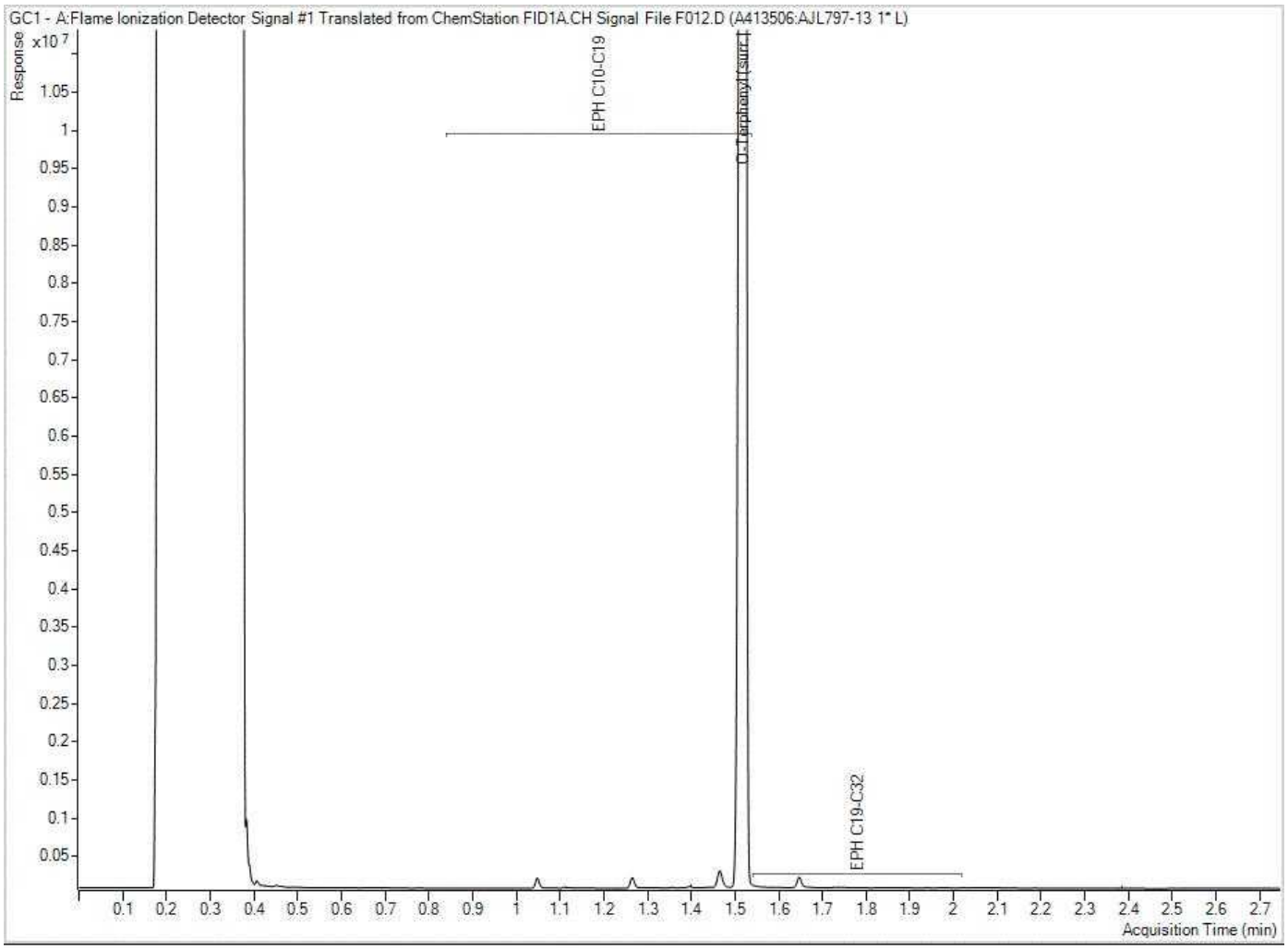
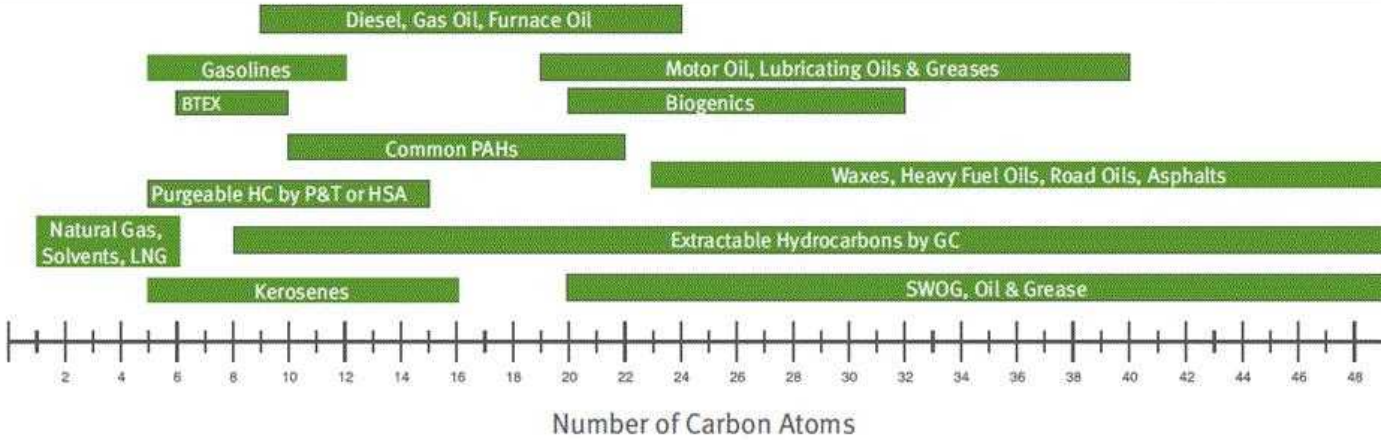
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL797

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: PS-7

EPH in Water when PAH required Chromatogram





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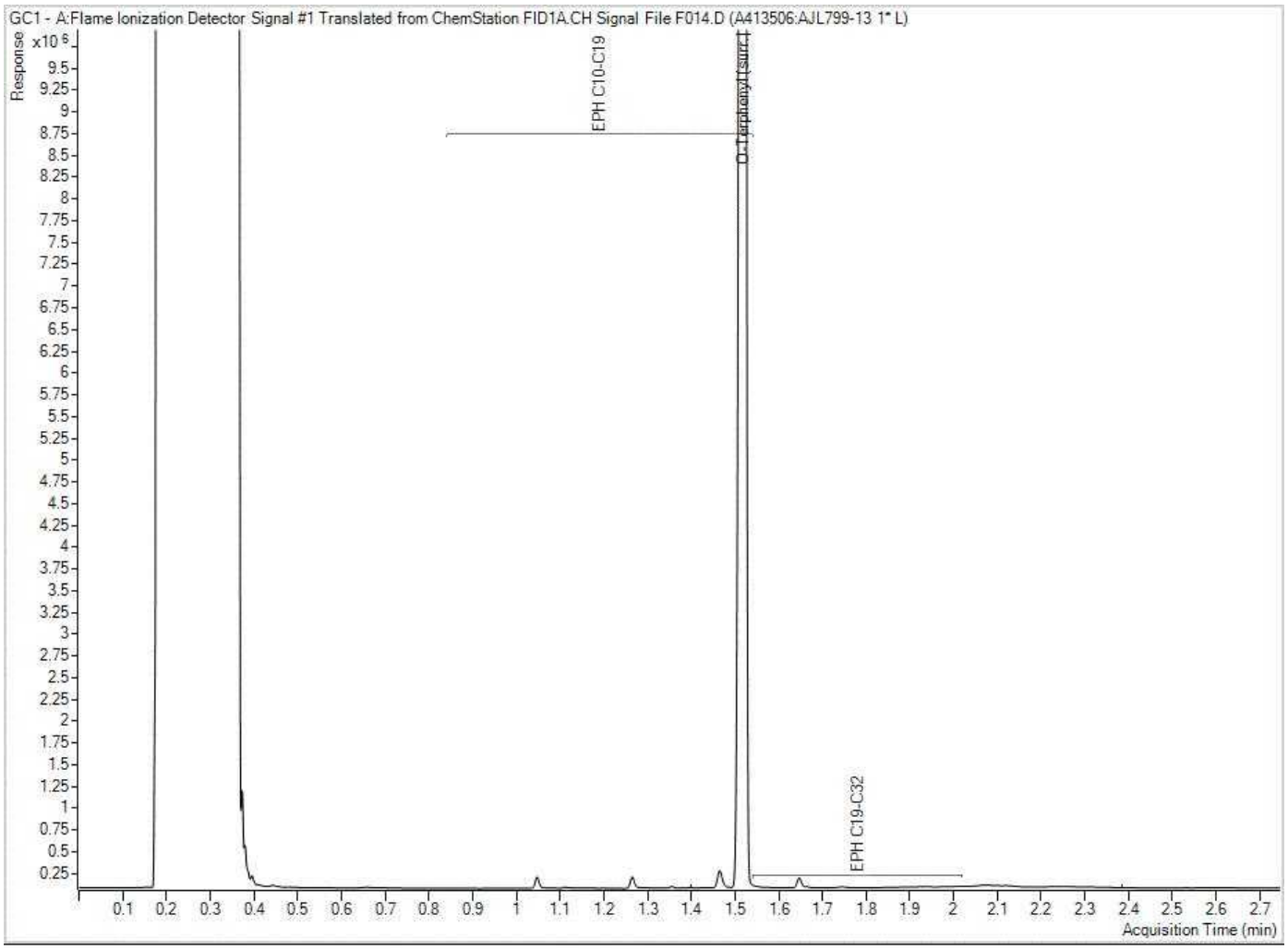
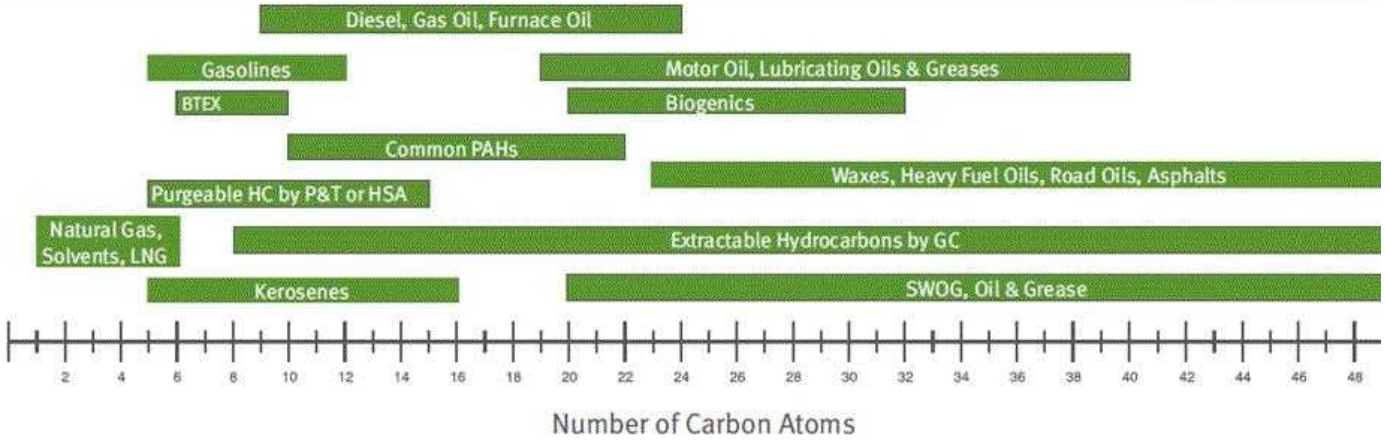
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL799

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: PC-D

EPH in Water when PAH required Chromatogram





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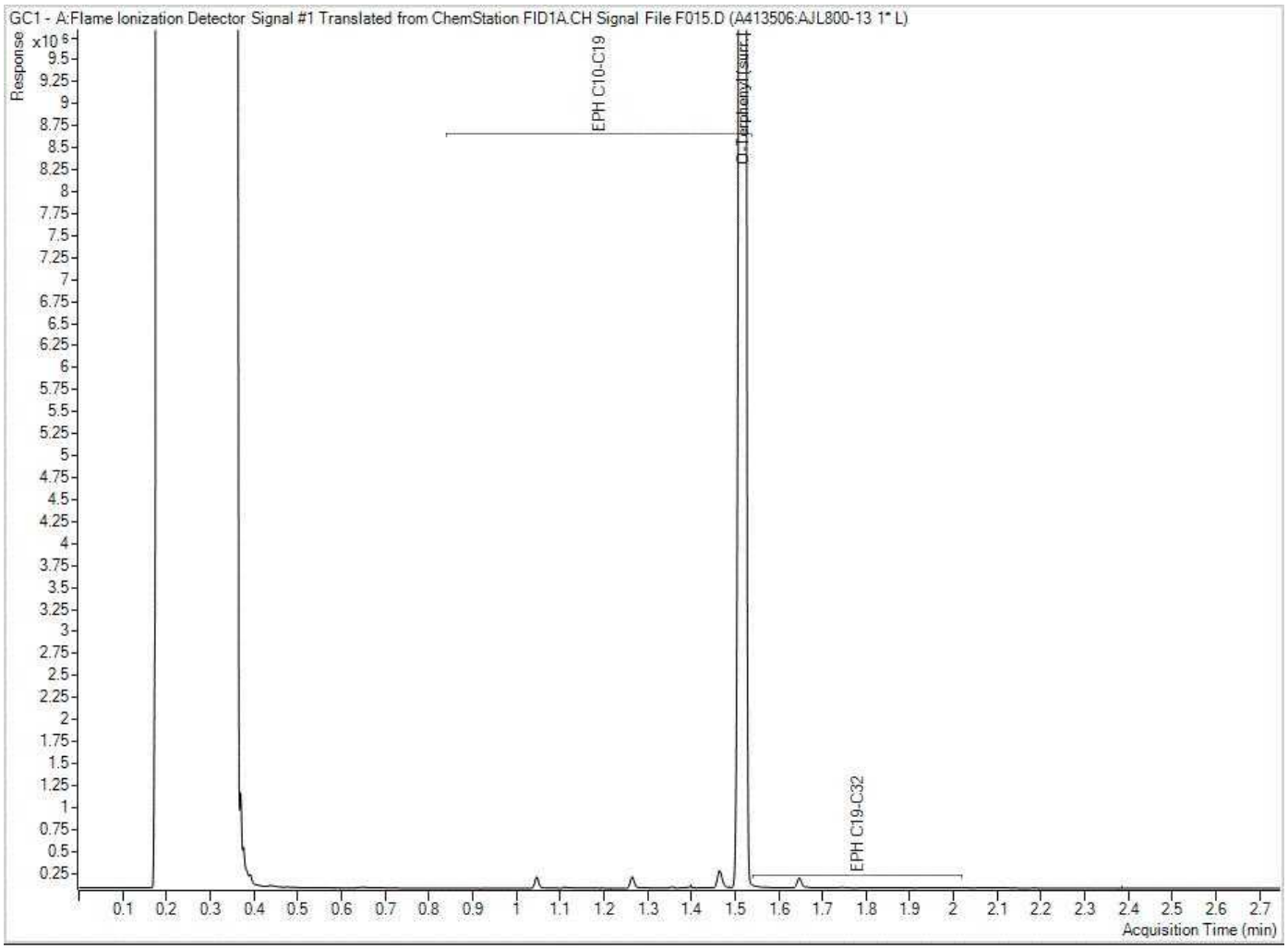
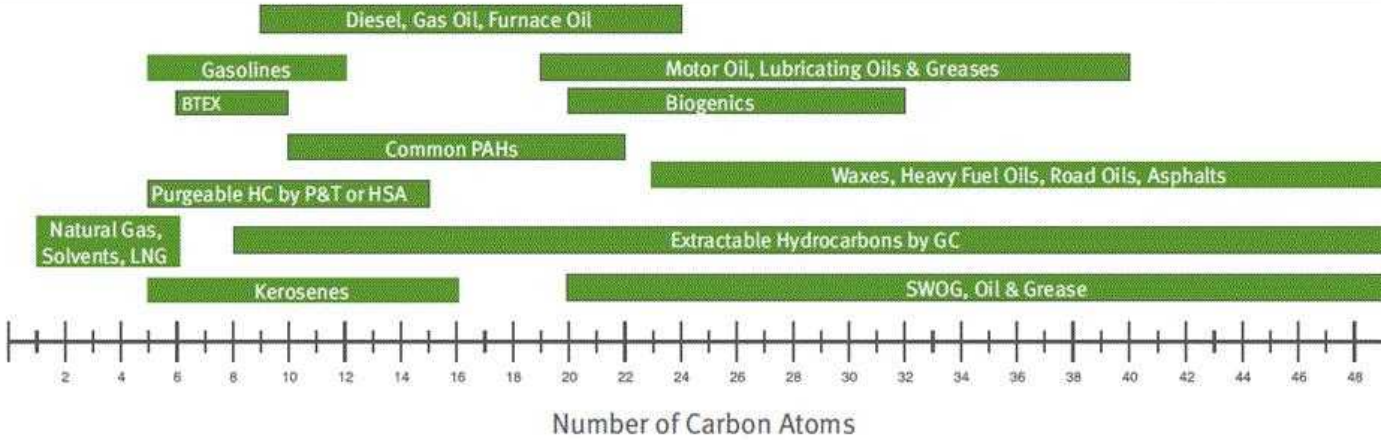
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL800

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: PC-SA

EPH in Water when PAH required Chromatogram



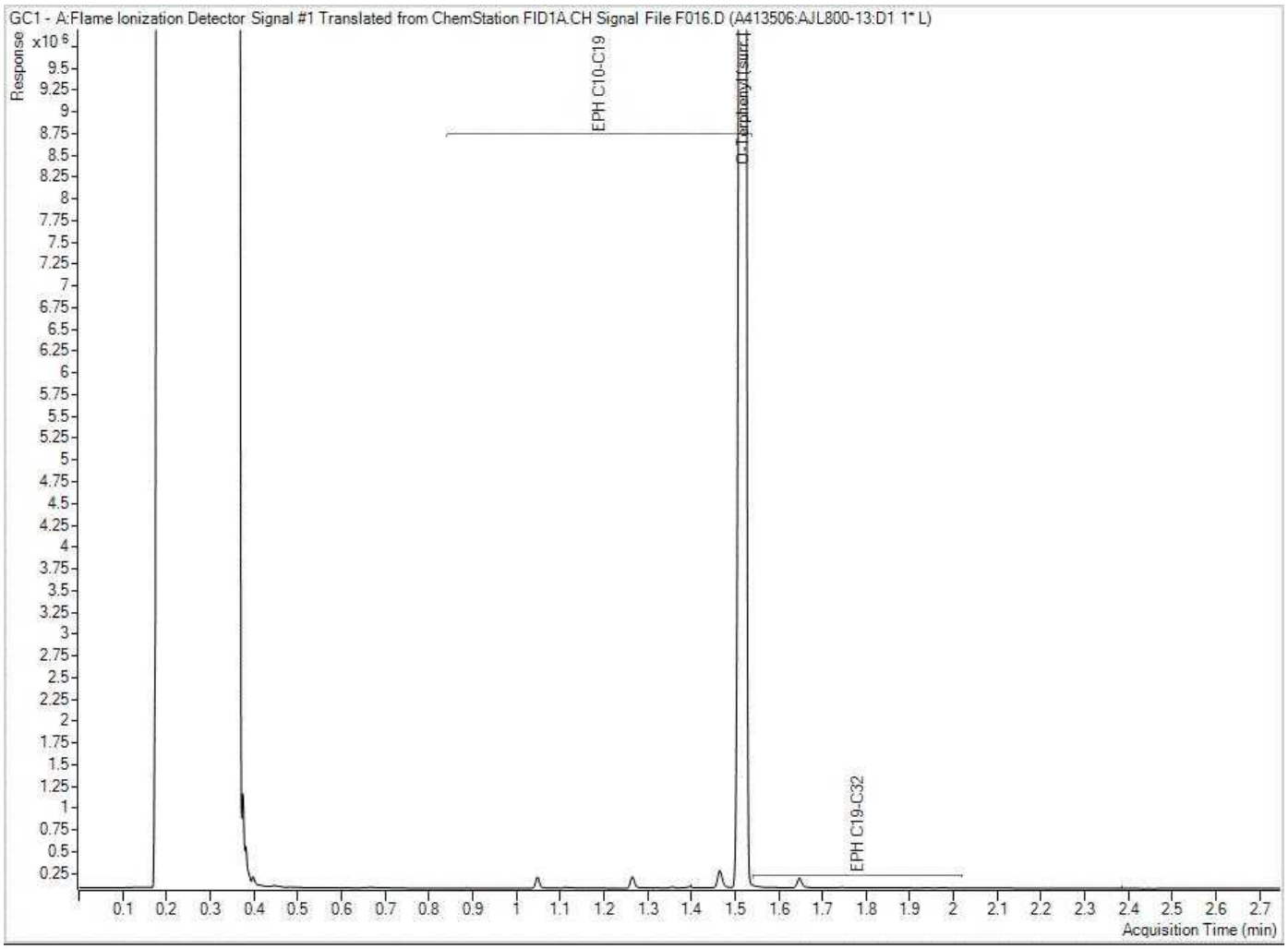


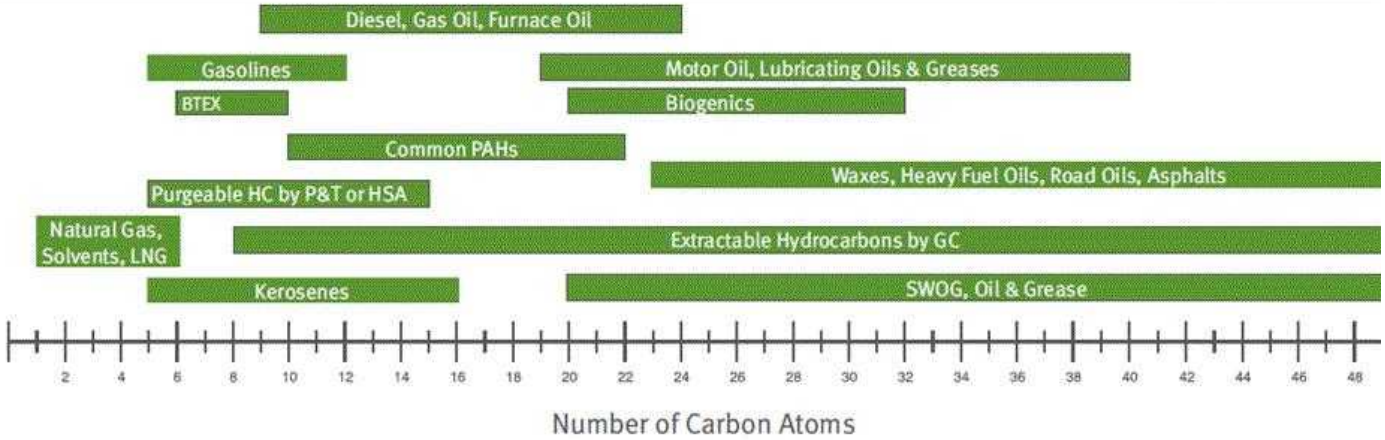
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL800 Lab-Dup

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: PC-SA

EPH in Water when PAH required Chromatogram





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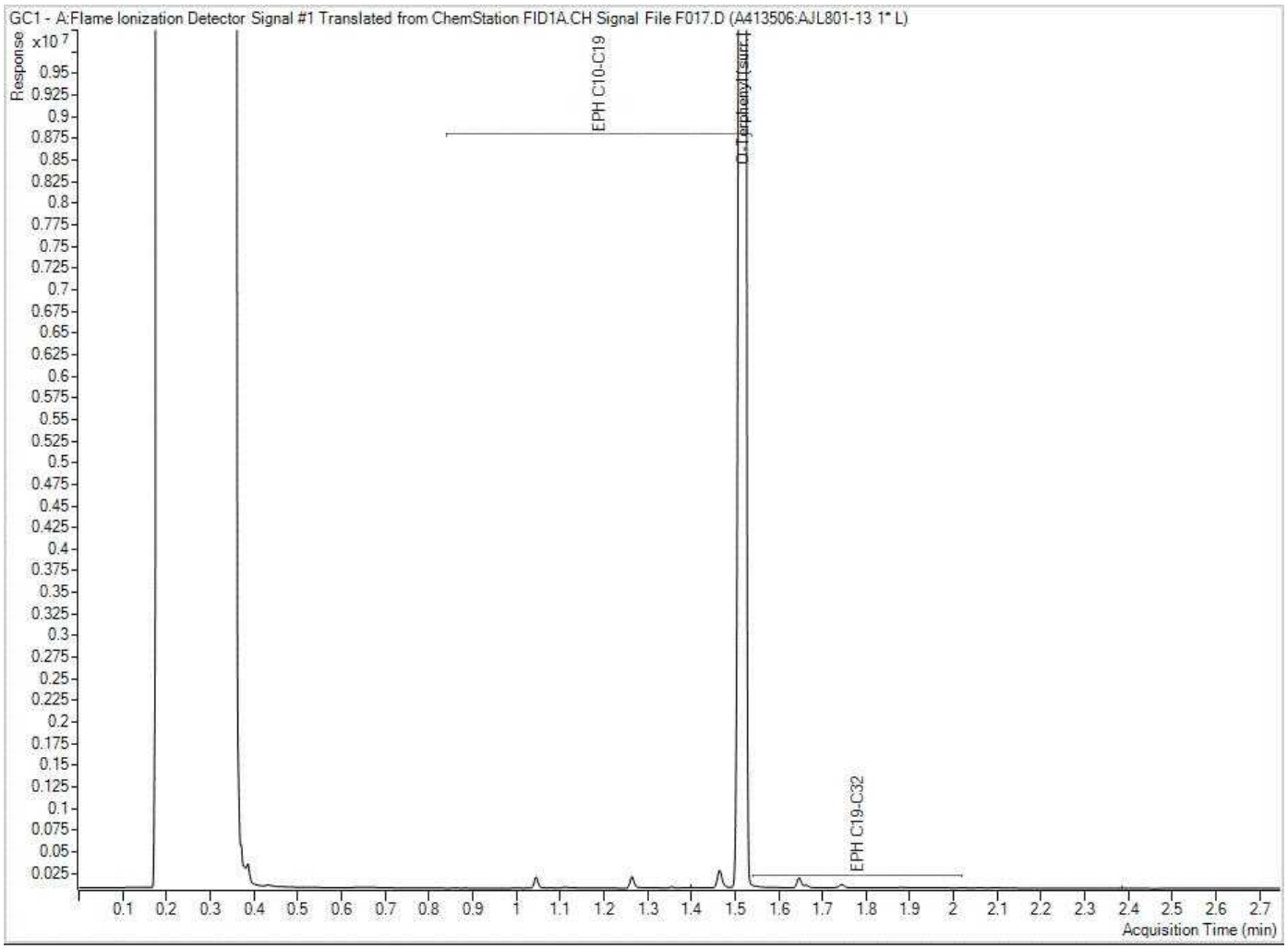
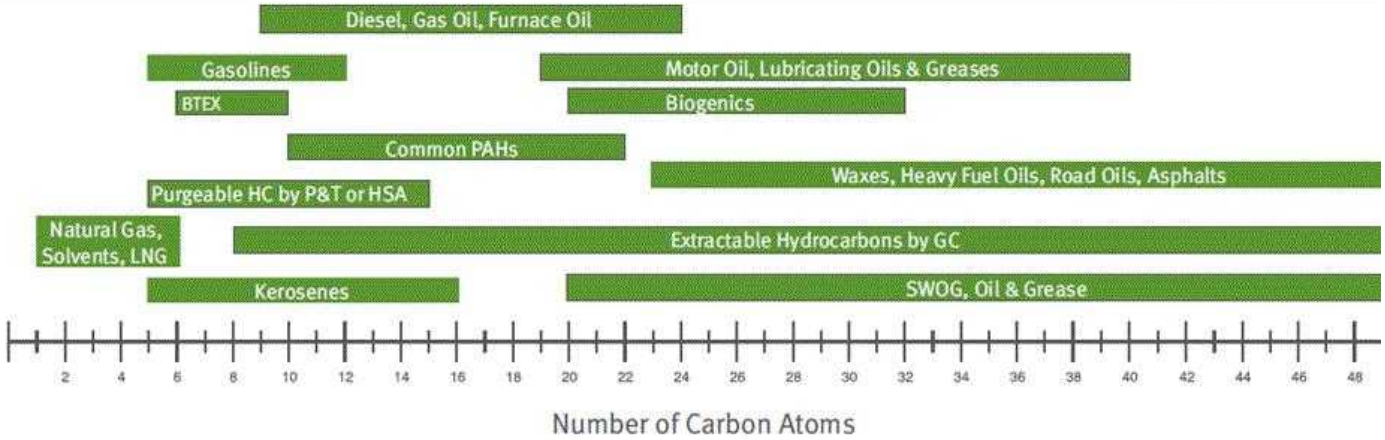
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL801

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: PC-H

EPH in Water when PAH required Chromatogram



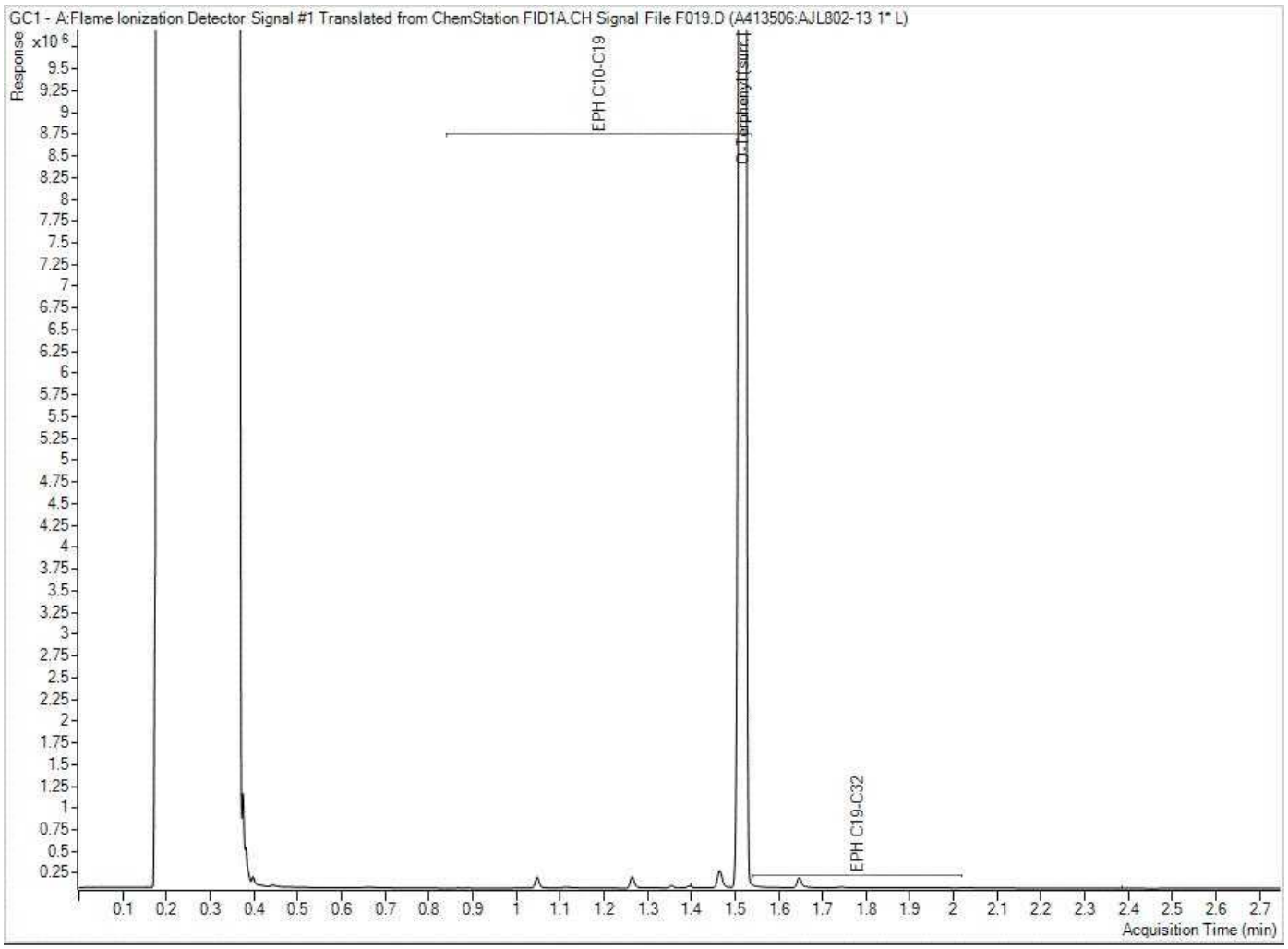


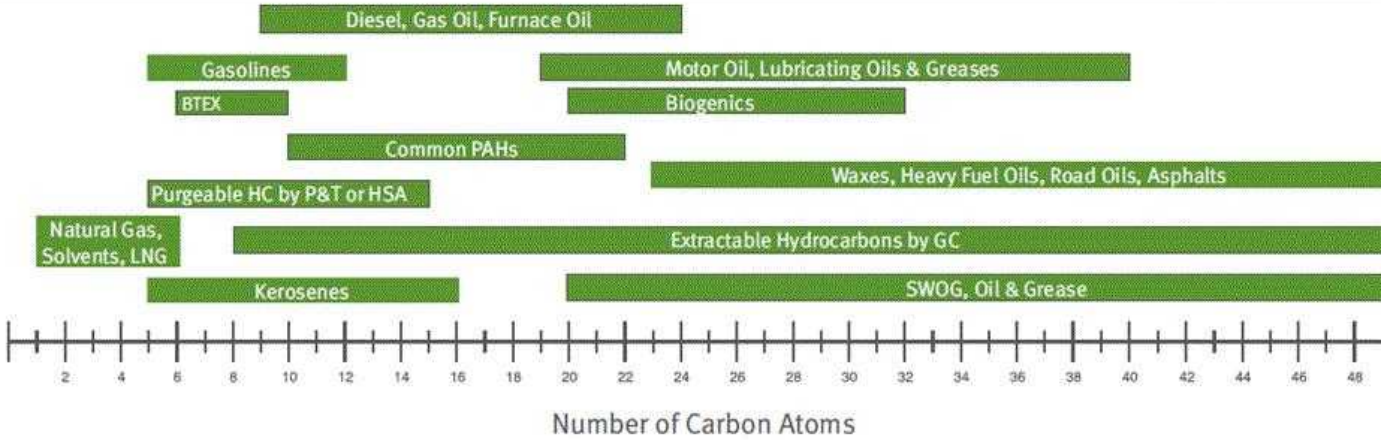
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL802

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: HL

EPH in Water when PAH required Chromatogram





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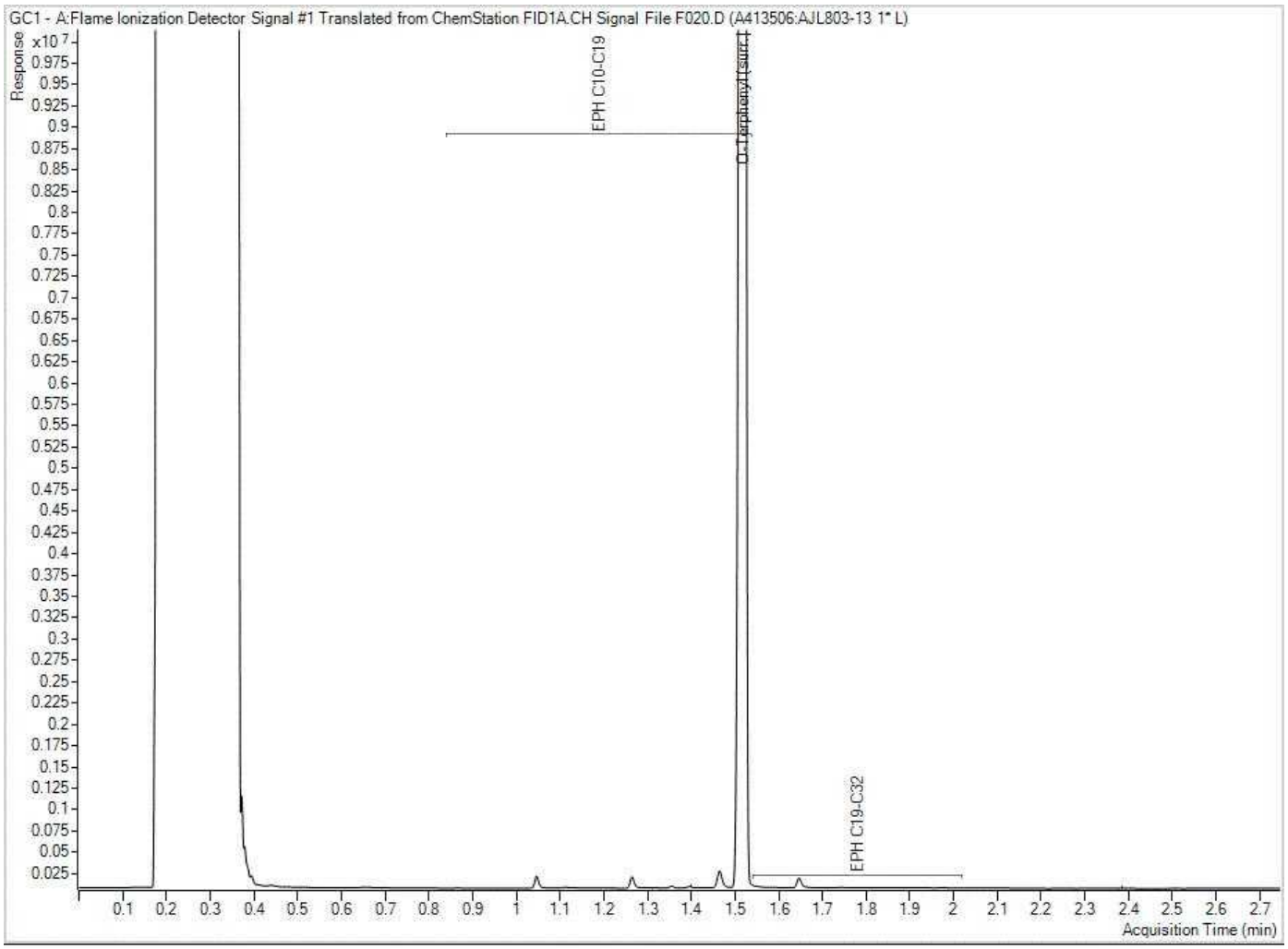
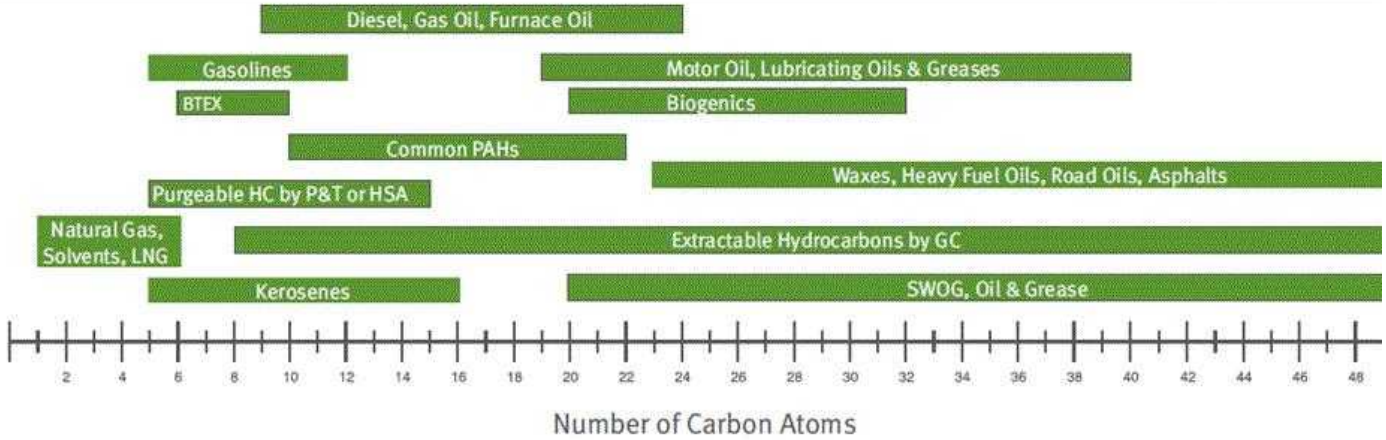
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL803

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: MC-PH

EPH in Water when PAH required Chromatogram





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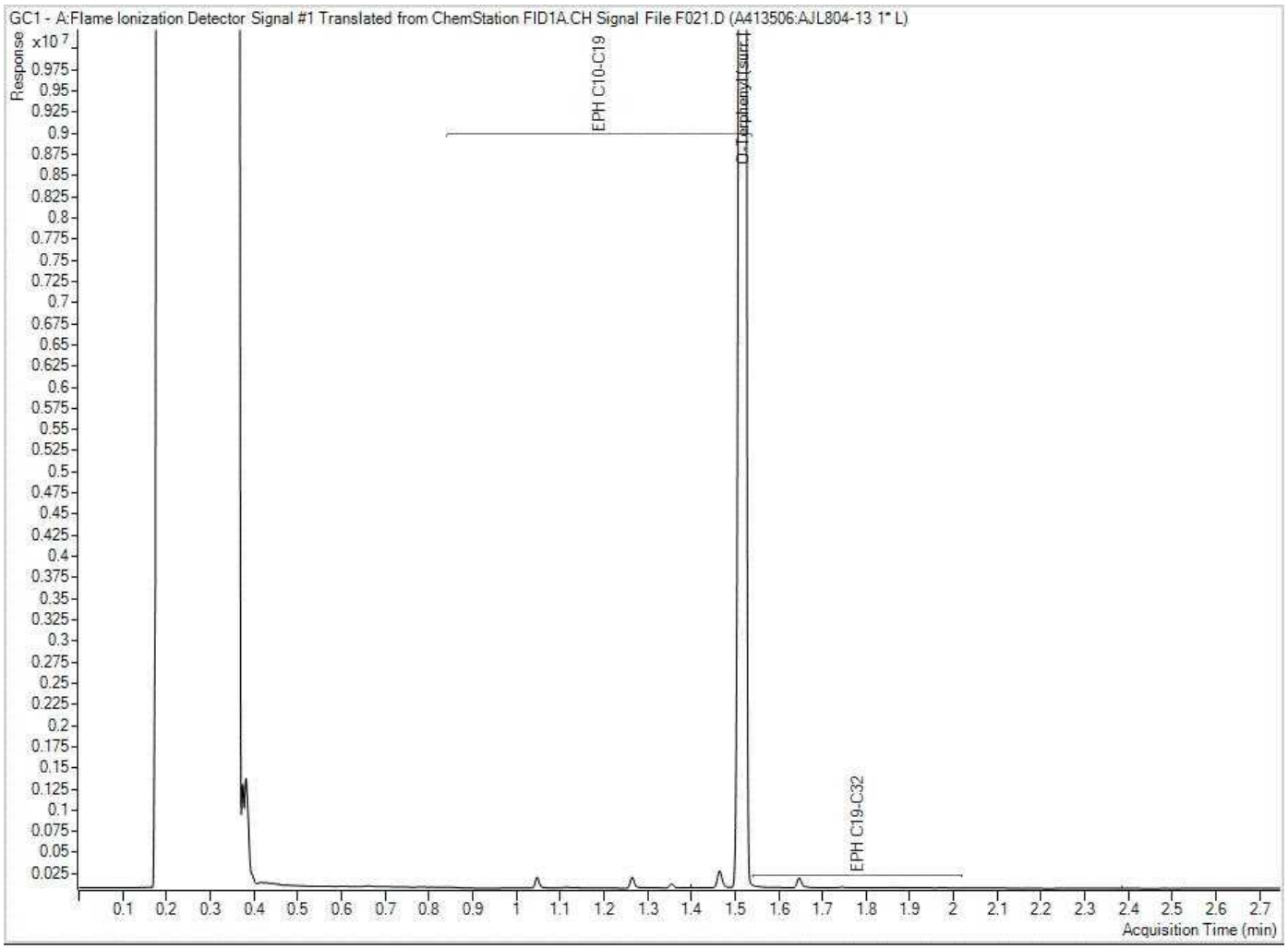
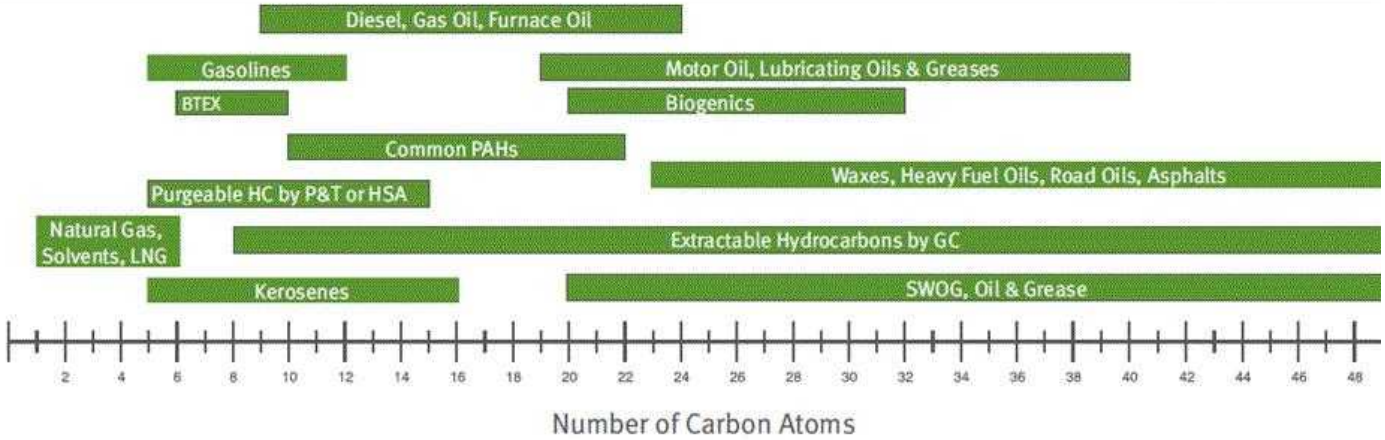
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL804

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: MC-MV

EPH in Water when PAH required Chromatogram





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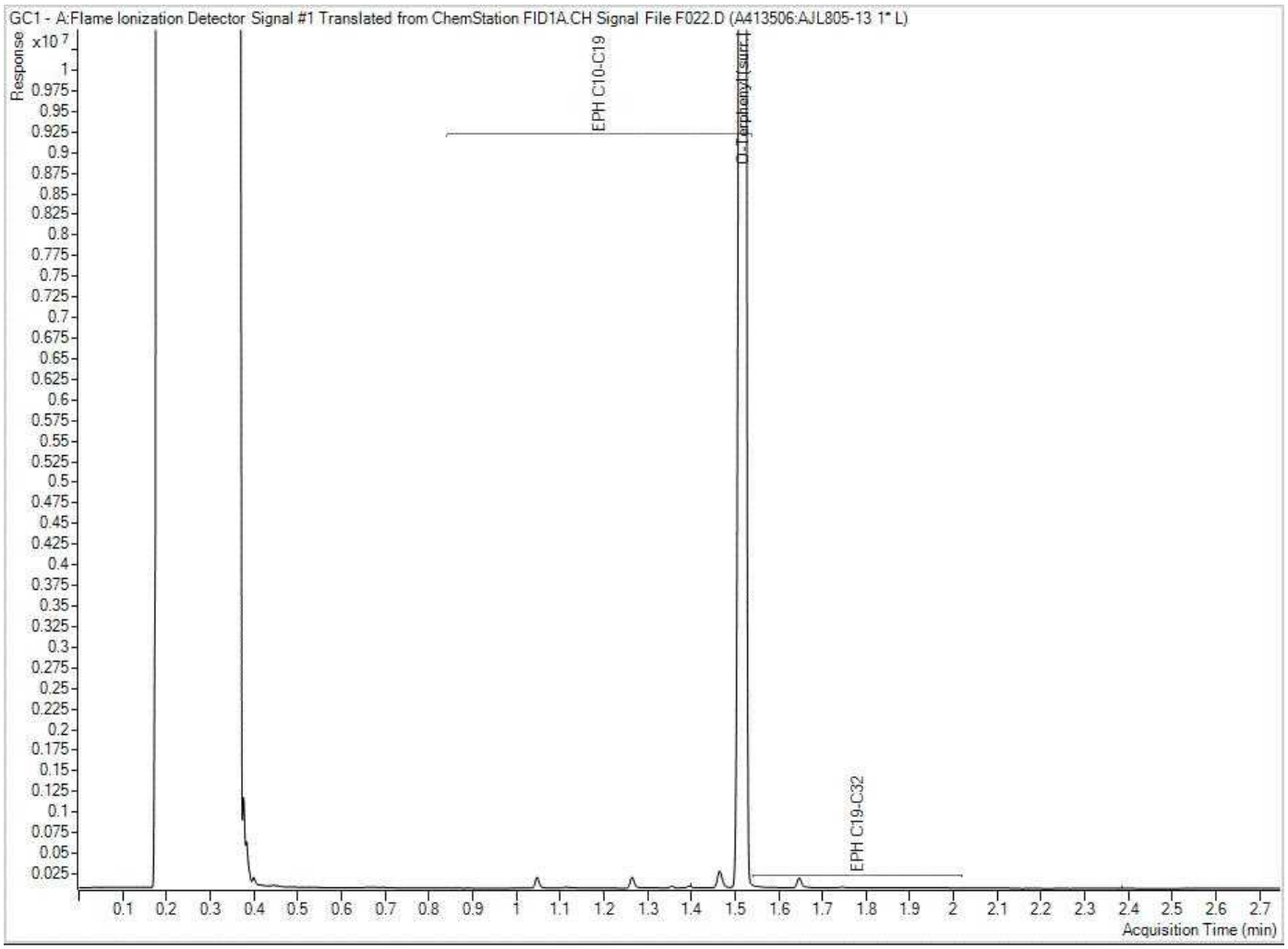
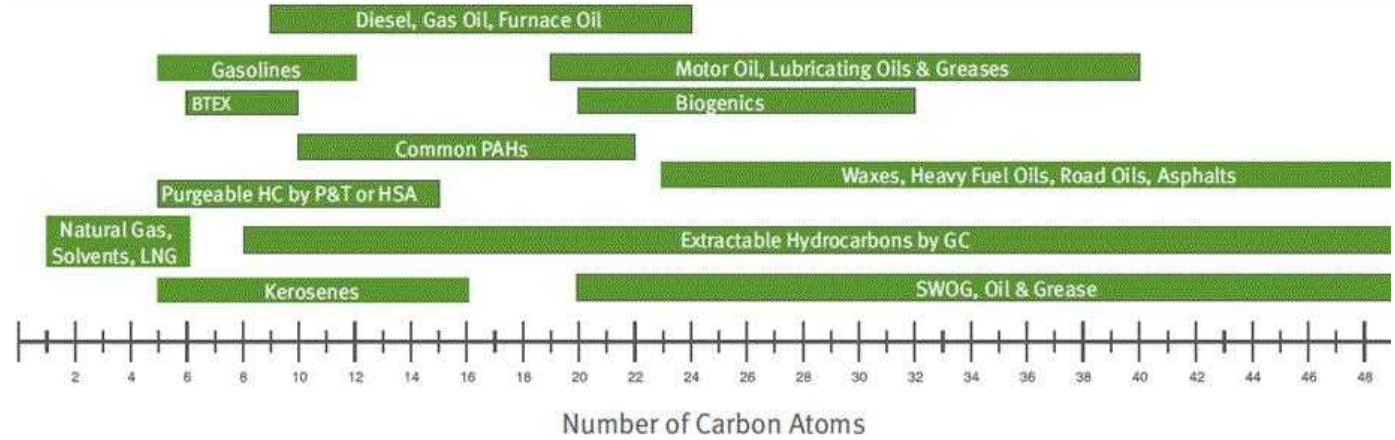
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL805

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: MC-USY

EPH in Water when PAH required Chromatogram





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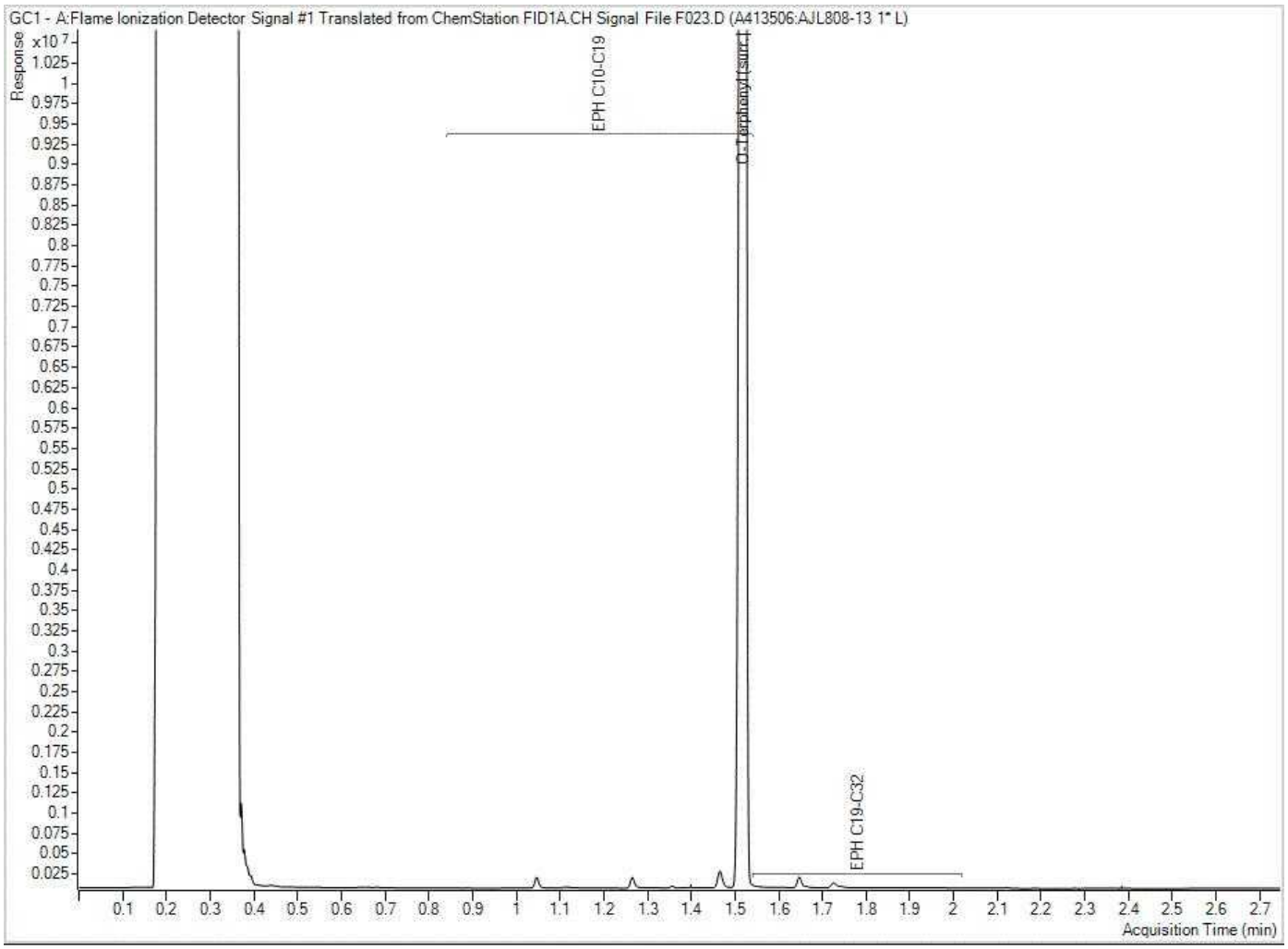
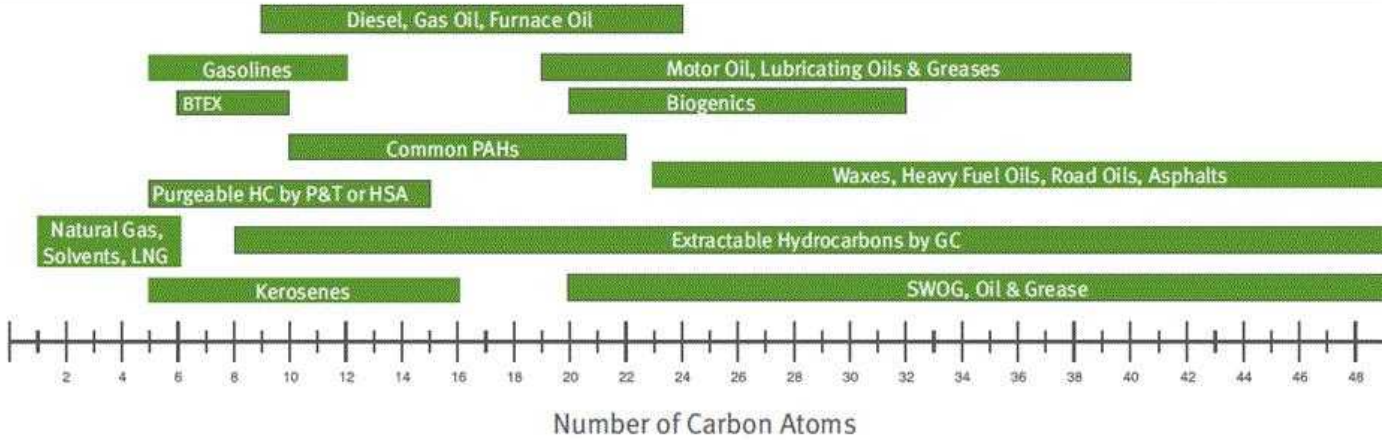
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL808

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: FIELD BLANK

EPH in Water when PAH required Chromatogram





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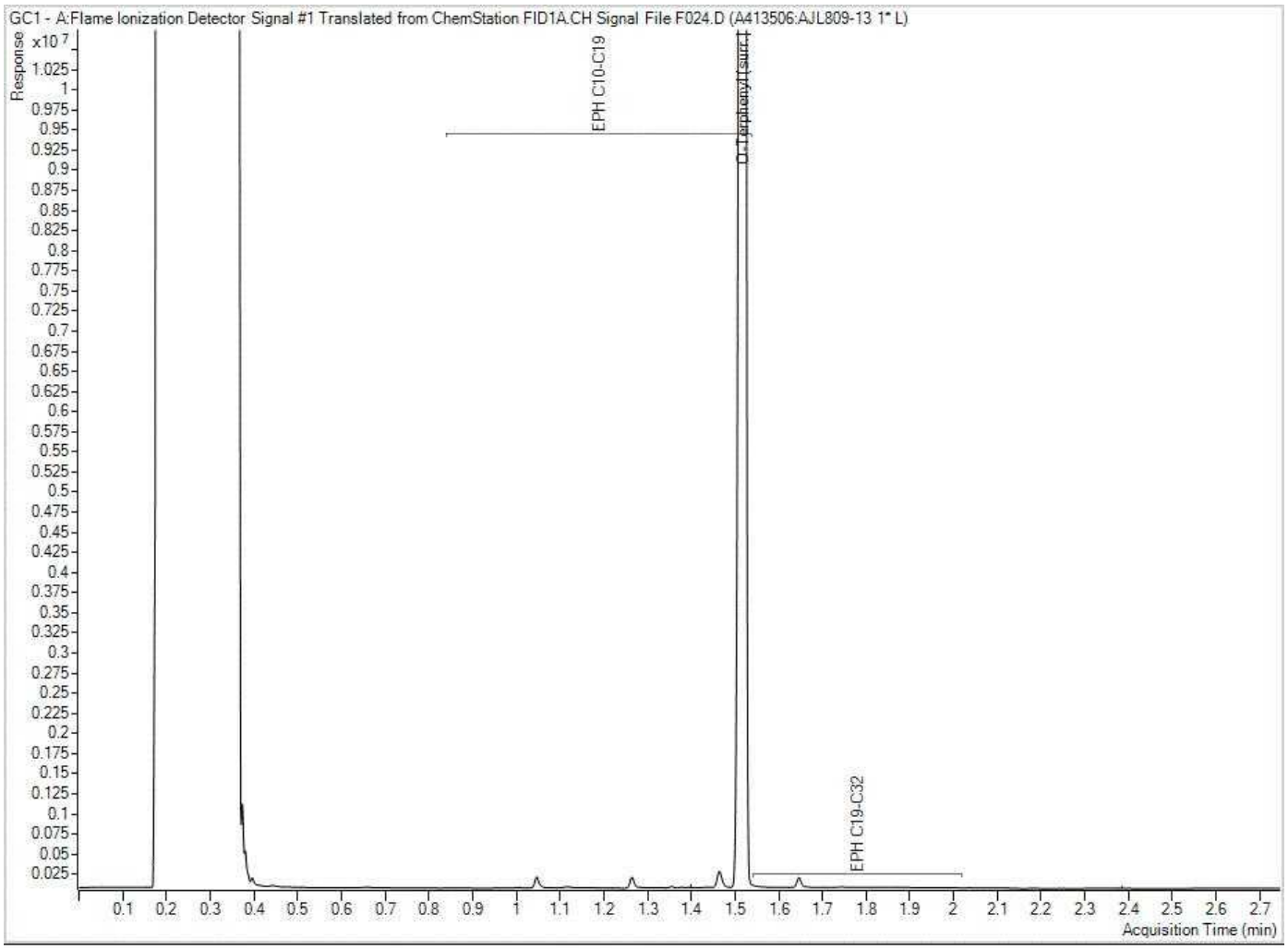
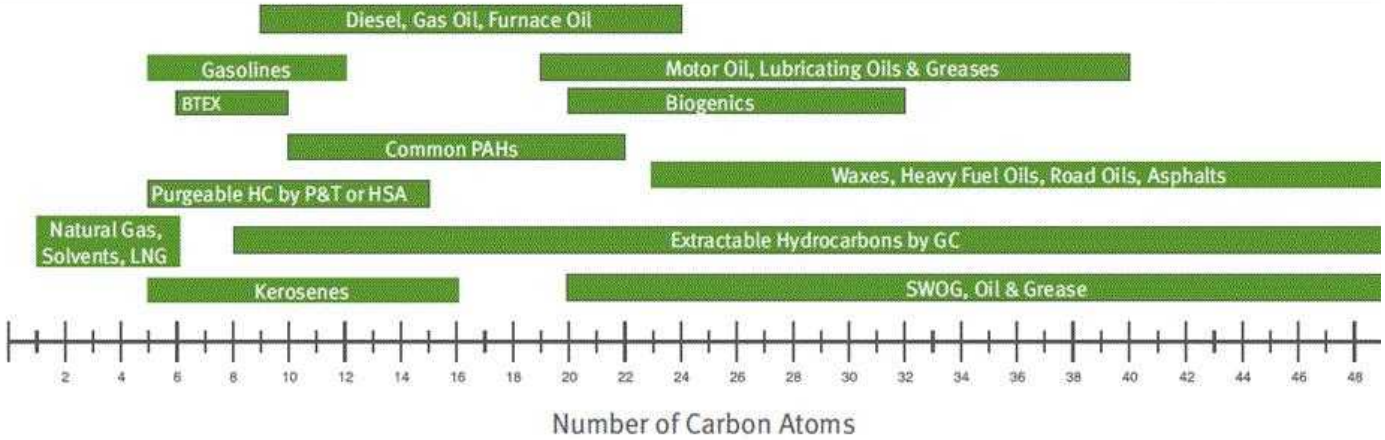
Bureau Veritas Job #: C183638
Report Date: 2021/11/11
Bureau Veritas Sample: AJL809

Government of Yukon
Client Project #: Icy Waters
Site Reference: Porter McIntyre Fish Creeks
Client ID: TRIP BLANK

EPH in Water when PAH required Chromatogram





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

Photo 1. FSH-LK

Fish Lake sampling location. Sample collected immediately downstream of control structure.

Photo 2. DITCH 3

Fish Creek sampling location upstream of Louise Lake at Ditch 3 control structure.

Photo 3. LLOUT

Louise Lake outlet sampling location.

Photo 4. DITCH 1

Fish Creek downstream of diversion around IWL site. ,1 L/s through stoplogs at time of sampling.

Photo 5. Diversion from ATCO generation flow to IWL site.

Junction where portion of water is diverted to IWL, remainder of water flows through turbine and on to PS-3.

Photo 6. PS-3

Fish Creek flow from tailrace of Plant 1. Sampling location downstream of Fish Lake Road culvert crossing.

Photo 7. PS-1

Sample location at impounded freshwater accumulation. Flow is routed to IWL hatchery.

Photo 8. PS-2b

Compliance sampling location for licence EQS. Sample collected downstream of Haeckel Hill Road.

Photo 9. PC-D

Municipal Landfill access road sampling location. Upstream of roadway crossing.

Photo 10. PC-SA

Porter Creek sampling location immediately downstream of Centennial Street culvert outlet.

Photo 11. PC-H

Porter Creek sampling location upstream of Holly Street culvert crossing.

Photo 12. HL

Hidden Lake sampling location on west shore.

Photo 13. PS-6

McIntyre Creek sampling location at Copper Haul road. Sample collected upstream of culvert crossing.

Photo 14. PS-5a

Compliance sampling location for licence EQS. Sample collected upstream of Fish Lake Road crossing.

Photo 15. PS-8

McIntyre Creek sampling location at outlet of Headpond 2. Sample collected upstream of control structure.

Photo 16. PS-7

Compliance sampling location for licence EQS. Sample collected upstream of Fish Lake Road crossing.

Photo 17. MC-PH

Location known as Pumphouse Pond, near Yukon University.

Photo 18. MC-MV

McIntyre Creek upstream of Mountainview Drive.

Photo 19. MC-USY

Downstream most location on McIntyre Creek upstream of the confluence with Yukon River.

Photo 20. PC-D

Porter Creek June 8th, 2021 at the landfill access road during typical flow.

Photo 21. Porter Creek Downstream of landfill access road.

June 8th beaver induced ponding of Porter Creek on the north side of the Alaska Highway near Rabbit's Foot Canyon.

Photo 22. Porter Creek near Birch Road

June 8th beaver induced ponding on the north side of the Alaska Highway off Birch Road.

Photo 23. Porter Creek at Alaska Highway Crossing

June 8th minimal flow of Porter Creek at the culver running beneath the Alaska Highway.

Photo 24. Porter Creek at Dogwood Street

June 8th flow in Porter Creek off Dogwood Street at the northwest corner of Versluce Meadows.

Photo 25. PC-H

June 8th Porter Creek flows at the culvert upstream of Holly Street.

Photo 26. Porter Creek near Hidden Lake

June 8th beaver dam located between Holly Street (left frame) and Hidden Lake (right frame) preventing any further surface flow from reaching Hidden Lake.