1 TASKS 2.3: RAW AND TREATED EFFLUENT CHARACTERIZATION

1.1 FOCUS REPORT TASK DESCRIPTION

Submit data regarding the complete physical and chemical characterization of NPNS' raw wastewater (i.e. influent at Point A for the Project), to support the assessment of the appropriateness of the proposed treatment technology. The influent characterization results must be compared against the proposed treatment technology specifications.

1.2 EFFLUENT CHARACTERIZATION

1.2.1 General

The basic question that will be addressed in this document is:

- What are the expected list of contaminants that may be generated specifically by the new NPNS Effluent Treatment Facility (ETF)?

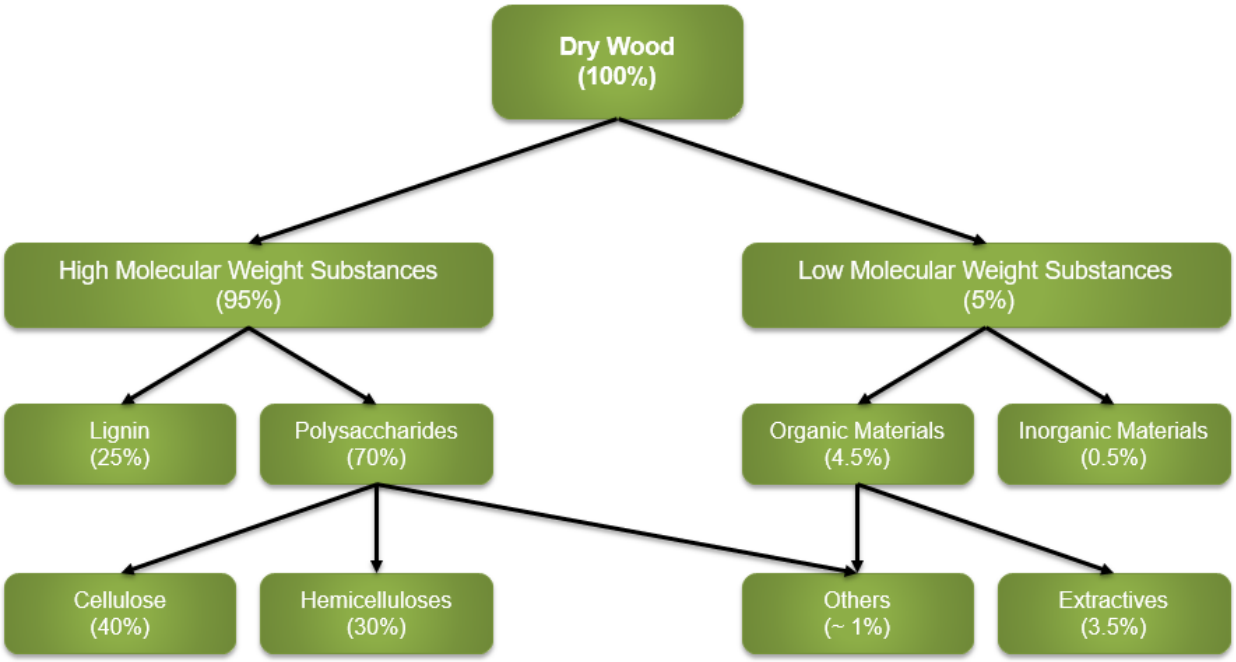
Effluents are a complex combination of compounds produced during the pulp and paper making process including wastewater from debarking, pulp washing, bleaching, regeneration of cooking chemicals and products from the breakdown of carbohydrates, lignin and extractives.

The composition and environmental impact of pulp and paper mill effluent has been a focus of scientific research for decades. There has been a significant amount of scientific data (see Section 1.5 for a full list of references used in this analysis) developed to better understand the composition and potential impact of pulp and paper mill effluents, especially in support of regulatory development efforts in the 1980's and 1990's. Most of the reported compounds are either non-chlorinated or have low degrees of chlorination and are expected to be readily biodegradable.

Wood is made up of cellulose fibres (fibre) bound together by lignin. The Kraft pulping process used at Northern Pulp utilizes chemicals to separate the fibres from the lignin. Wood chips are cooked in a solution of chemicals (referred to as cooking liquor) that dissolve the lignin from the wood chip leaving wood fibre. The lignin is then suspended in the spent chemical. The lignin and chemicals are then washed out of the cooked pulp solution so that they can be recovered and recycled for reuse. A portion of that wash water ends up as effluent that needs to be treated.

Effluent quality, or composition, reflects the nature of the raw water inputs, the furnish (fibres, fillers, etc.), the various processes used to break down the wood structure and the level and type of effluent treatment in place. The total wood mass of a living tree varies seasonally because of the moisture content, which can vary between 40% and 50% of the total wood mass. The chemical constituents of dry wood species can be categorized as structural substances and non-structural substances. Structural substances tend to be high-molecular weight (HMW) compounds such as cellulose, hemicelluloses and lignin. Non-structural substances are mostly low-molecular-weight (LMW) compounds such as extractives, some water-soluble organics, and inorganics. Figure 1-1, below, further expands on this categorization:

Figure 1-1: General Classification and Content of the Chemical Wood Components



The pulp fibres are naturally brown in color, the color of wood. The goal in bleaching chemical pulps is to remove essentially all of the residual lignin left after cooking, hence the process is often referred to as delignification. Chlorine was initially used to bleach the pulp in the 1970's and 1980's. Concerns about the release of organochlorine compounds into the environment prompted the development of Elemental Chlorine Free (ECF) and Totally Chlorine Free (TCF) bleaching processes in the 1990's. Chlorine dioxide (ClO_2) bleaching is referred to as ECF. NPNS converted to the ECF bleaching process in 1997. Chlorine dioxide (ECF technology) currently is the most common bleaching method worldwide. About 95% of all bleached Kraft pulp around the world is made using chlorine dioxide in ECF bleaching sequences. The bleaching, or delignification, of pulp at NPNS utilizes chlorine dioxide, sodium hydroxide, hydrogen peroxide and oxygen as the bleaching agents.

Advances in pulping technology, such as the replacement of chlorine with oxygen or chlorine dioxide, have considerably decreased the number of organic compounds and chlorinated compounds, as well as pollutant loads, that were found in pulp mill effluents 30 plus years ago.

In a bleached kraft pulp mill, the bleach plant effluent represents the majority of the pollutant load that must be treated in the secondary treatment system. These systems have been shown to biodegrade the resin and fatty acids, non-chlorinated and chlorinated phenolics and polyaromatic hydrocarbons to a level where the treated effluent is non-toxic and meets all regulated effluent discharge parameters (as discussed in Section 1.3).

1.2.2 Hardwood and Softwood Kraft Mill Effluents

The type of wood, hardwood versus softwood, that is used in the pulp production (ie. the furnish) affects the types of chemicals that are found in effluent. Typically, softwood pulp effluents have higher Chemical Oxygen Demand (COD) and colour content than those of hardwood pulp. The compounds responsible for colour are lignin fragments of high-molecular weight (HMW). In general, HMW compounds exhibit lower biodegradability than LMW compounds in the biological treatment process. Researchers have evaluated effluents from softwood and hardwood (eucalyptus) pulps by comparing typical effluent parameters such as AOX (Adsorbable Organic Halides), COD, BOD_5 (5-day Biochemical Oxygen Demand) and Colour of the different kinds of pulp production (conventional bleached pulps and oxygen delignified bleached pulps).

Traditionally, the separation between low molecular weight (LMW) and high molecular weight (HMW) is done at 1000 Daltons (grams/mole or g/mol, a unit of molecular mass). Bleached kraft mill effluents have an extended molecular weight distribution; from diverse LMW monomeric compounds to large and complex HMW molecules with molecular weights between 10,000 and 30,000 g/mol. The molecular weight distribution depends on the raw material and the bleaching process used. For example, the average molecular weight of organic matter in hardwood kraft pulp effluents is lower than the corresponding softwood effluents.

Research has shown that the HMW fraction contributed to approximately 40% of the total effluent load of COD both in softwood and hardwood ECF (elemental chlorine free) bleached pulps production (see Section 1.5). Additionally, the largest differences between softwood- and hardwood-derived effluents are in the aromatic region. The aromatic lignin-derived structures, such as syringyl and guaiacyl units, are not important structural elements in HMW effluent materials from ECF bleaching of oxygen delignified hardwood kraft pulps, but are important in softwood HMW effluents.

Similarly, research has shown that all HMW effluent fractions contained carbohydrates. The carbohydrates found in the HMW effluent materials were oligosaccharides, polysaccharides, or both, either in dissolved or colloidal form. As can be expected, the HMW hardwood kraft effluent fraction contained more carbohydrates (mainly xylan) than the corresponding samples from softwood kraft effluents. Significant levels of carboxylic acids, formed due to the oxidation of lignin structures in the bleaching process, also show up in the HMW effluent fractions.

The LMW compounds can be broadly classified into three main classes: acids, phenolic compounds and neutral compounds. The phenolic compounds and some of the acids are degradation products from lignin, while the resin acids, fatty acids, terpenes and sterols are residues of extractives present in the raw material (wood).

More than 50% of the wood used by Northern Pulp to make its products is mixed spruce (white, black and red), which are typically low in extractives (see Table 1.1) compared to other softwood species such as jack pine, balsam fir, larch and hemlock, also used at the mill. Some hardwoods, such as aspen, red maple, sugar maple and birch, are also present in the wood mix in some pulp grades, but typically consist of less than 20% of the total mix of the wood furnish.

Table 1-1 – Chemical Composition of Typical Wood Species Mix Furnish at Northern Pulp

Wood Species	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Total Extractives (%)	Inorganic content (%)
Mixed Spruce	39.5	30.6	27.5	2.1	0.3
Balsam Fir *Abies balsamea*	38.8	29.2	29.1	2.7	0.2
Jack Pine *Pinus banksiana*	41.0	24.8	28.6	5.4	0.2
Maple *Acer rubrum / Acer saccharum*	41.3	30.2	25.3	2.9	0.3
Aspen *Populus tremuloides*	53.0	27.8	16.3	2.7	0.2
Birch *Beluta papyrifera*	39.4	36.1	21.6	2.6	0.3
Larch **Larix laricina**	43.0	22.7	28.5	5.6	0.2
Hemlock *Tsuga canadensis*	37.7	28.2	30.5	3.4	0.2
Typical Wood Furnish	**40.5**	**29.7**	**26.7**	**2.7**	**0.26**

1.2.3 Organochlorines

Adsorbable Organic Halides (AOX) is a term used to describe a large number of organic halogen compounds in the effluent. AOX is the sum parameter of Adsorbable Organic Chlorine (Cl), Iodine (I) and Bromine (Br). The term AOX covers a large group of organic constituents from simple volatile substances to more complex molecules, including dioxins and furans. The vast majority of AOX compounds are formed in the bleaching process particularly when chlorine is used. In effluents from bleached pulp mills, the halogen ("X") component of AOX is almost entirely chlorine. Mills that have switched to ECF using chlorine dioxide, like NPNS did in 1997, have significantly reduced the amount of AOX in their effluent.

Chlorinated organic compounds are synthesized and degraded in the environment by natural biological and chemical processes. This natural production varies, depending on the geographical location. Organisms have evolved in environments with background concentrations of natural chlorinated organic compounds. Many compounds identical, or similar to those formed during ECF bleaching of pulp, are produced by natural processes. There is evidence that these organisms possess mechanisms for effective breakdown of these types of chlorinated substances.

Because of this, chlorinated compounds formed during ECF pulp production technology will neither be recalcitrant with respect to breakdown in the environment nor resistant to biodegradation. Pulp mill AOX will ultimately be mineralized through photochemical and biological processes. During this mineralization, the chlorinated organic material will be released as chloride ions (Cl^-) and carbon dioxide (CO_2), as can be observed by the analytical results presented in Table 1-2, where chloride levels in the untreated effluent (Point A) are notably greater than the raw water figures.

Individual substances present in effluents from current pulping and pre-bleaching processes are investigated to a lesser extent since they are recycled during chemical recovery. Numerous studies have firmly established that concentrations of PCDDs, PDCFs and polychlorophenols in effluents from ECF bleaching are close to or below the level of detection (see Section1.3.7). A large body of research, conducted after 1993, has concluded that substances identified in ECF bleaching are predicted to be readily biodegradable whereas less is known about the types of compounds in TCF bleaching effluent.

1.2.4 Physicochemical Properties of Pulping/ClO_2 Bleaching By-Products

High molecular weight, hydrophobic, chlorinated organic compounds exhibit substantially different environmental behavior and toxicological modes of action than more hydrophilic chlorinated or non-chlorinated compounds. Lower molecular weight, more soluble substances exhibit little tendency to biomagnify, and have less potential for exerting insidious or food-web mediated toxic effects at the community and ecosystem level.

Minimization of highly bioaccumulative and persistent substances in final effluent will limit effects of long-term exposure to the effluent and shift the focus of concern to possible immediate or limited duration (acute) environmental effects for organisms directly exposed, followed secondarily by ecological consequences at higher levels of biological organization. It is clear that 100% ClO_2 substitution drastically reduces the production of higher chlorinated, more bioaccumulative phenolics (3 chlorine substituents) in final effluents. Few compounds in treated ECF mill effluents exhibit a log Kow > 5.0 (the threshold for substantial biomagnification potential)[1] or have the additional property of being relatively persistent in living organisms due to their resistance to metabolic modification.

[1] The n-octanol/water partition coefficient (**Kow**) is used as a screening test for bio-accumulation test. The **log Kow** value is a very important parameter for predicting the distribution of a substance in various environmental compartments (water, soil, air, biota, etc). Substances with high log Kow values tend to adsorb more readily to organic matter in soils or sediments because of their low affinity for water. Chemicals with very high log Kow values (i.e, **>5.0**) are of greater concern because they may have the potential to bio-concentrate in living organisms. The assumption behind this is that the uptake of an organic substance is driven by its hydrophobicity. For organic substances with a **log Kow** value below 5,

Studies completed since 1993 suggest that some of the resin acids or naturally-occurring polycyclic aromatic hydrocarbons (PAHs) produced during the diagenesis of plant materials exhibit a similar environmental fate and effects as some of the compounds found in both ECF and TCF pulp mill effluents. Comparative research on the relative impact of TCF vs. ECF effluents is not readily available because of the very low volume of TCF pulps being produced (approximately 5% of the 38.0 million tonnes of pulp that was produced in 2018, according to the Confederation of European Paper Industries). The available data would indicate that both effluents, after treatment, show similar characteristics.

In general, the presently available studies on biodegradation and removal processes for constituents of pulp mill effluent emphasize the importance of effective secondary treatment in the reduction or elimination of whole effluent toxicity. Subsequent to past improvements in kraft mill effluent quality realized through ClO_2 substitution, future reductions in toxicant inputs where they are still occurring might be achieved through improvements in treatment, since (i) recent studies suggest that many bioactive compounds in final effluent are non-chlorinated compounds contributed by pulp mill processes other than bleaching, and (ii) most of the known deleterious substances in pulp mill effluent are amenable to biodegradation and/or removal through adsorption to particulates.

1.3 DATA ANALYSIS

To assess the content of the untreated and treated effluent at the mill, as well as to compare its characteristics to that of the receiving environment, samples sets of the following aqueous streams were taken on the following dates and a physical and chemical characterization performed:

- Raw water (Middle River) taken on April 24, 2018 and May 14, 2019;
- Untreated effluent (Point A) taken on May 29, 2018 and May 14, 2019;
- Treated effluent (Point C) taken on May 29, 2018, May 14, 2019 and July 17, 2019;

it is assumed that the affinity for the lipids of an organism is insufficient to exceed the bio-accumulation criterion.

- Caribou Harbour water taken on May 24 and May 25, 2019 averaging 6 samples to account for tide changes:
  - Flooding tide, Proposed Outfall Location, at the surface (0.5 m depth)
  - Flooding tide, Proposed Outfall Location, at the bottom (20 m depth);
  - Ebbing tide, Proposed Outfall Location, at the surface (0.5 m depth);
  - Ebbing tide, Proposed Outfall Location, at the bottom (21 m depth); and
  - Ebbing tide, in the Harbour, at the bottom (3 m depth).
  - Ebbing tide, in the Harbour, at the surface (0.5 m)

Production data, expressed in air dried metric tonnes (ADt), for the days when the effluent was sampled are as follows:

- Production rate:
  - May 29th, 2018: 853 ADt (948 ADUt[2])
  - May 14th, 2019: 673 ADt (748 ADUt)
  - July 17th, 2019: 754 ADt (838 ADUt)
- Effluent Flow at Point C:
  - May 29th, 2018: 67,496 m^3/day
  - May 14th, 2019: 62,800 m^3/day
  - July 17th, 2019: 75,992 m^3/day

A physical and chemical analysis was performed for a series of compounds typically found in pulp and paper mill effluents (as described earlier), which included the following categories:

- Inorganics and other parameters;
- Metals;
- Phenols;
- Fatty and resin acids;
- Polyaromatic hydrocarbons, volatile organics and PCB's;
- Petroleum hydrocarbons; and
- Dioxins and furans

The results of these analyses are presented in the sections that follow.

[2] Air dried unbleached metric tonnes, measured before the bleach plant.

1.3.1 Inorganics and Other Parameters

Table 1-2, below, shows the comparative results of the chemical analysis for various inorganic compounds, as well as compounds of interest from a regulatory and eutrophication context. The effluent sample tested includes analysis of both the liquid and solids portion of the samples. The Point A and Point C numbers highlighted below represent an average of test data from a full year of testing (2018). The highlighted parameters are collected and tested either daily or weekly by an accredited third party laboratory.

Table 1-2 – Analytical Results, Inorganics and Other Parameters

Inorganics	Units	Raw water	Point A	Point C	Caribou Harbour
Regulated parameters under the Pulp and Paper Effluent Regulations or addressed in the RWS					
Carbonaceous BOD	mg/l	ND	209	26	ND
Total Suspended Solids (TSS)	mg/l	4.4	365	29	2.5
Adsorbable Organic Halogen (AOX)	mg/l	0.05	1.2	1.02	**NA**
Colour	TCU	21	735	983	4.4
Total Nitrogen (N)	mg/l	0.489	3.2	4.7	0.15
pH	pH	7.23	7.7	7.6	7.7
Total Phosphorus (P)	mg/l	ND	1.4	1.5	ND
Total Chemical Oxygen Demand (COD)	mg/l	4.5	723	628	**NA**

The following results are based on the averages of the samples collected as described in section 1.3 above. Again all analyses were performed on the total sample that includes both the liquid and solid portions.

Inorganics	Units	Raw water	Point A	Point C	Caribou Harbour
Parameters where Point C results are greater than Caribou Harbour					
Total Alkalinity (Total as $CaCO_3$)	mg/l	18.5	190	343	91
Turbidity	NTU	15	55	28	1
Volatile Suspended Solids	mg/l	ND	90	37	0.88
Total Kjeldahl Nitrogen (TKN)	mg/l	0.13	2.8	4.6	0.20
Nitrogen (Ammonia Nitrogen)	mg/l	ND	0.9	1.54	ND
Dissolved Organic Carbon (C)	mg/l	4.4	260	15	1.9
Total Organic Carbon (C)	mg/l	4.1	230	170	2.3
Orthophosphate (P)	mg/l	0.007	0.62	0.39	ND
Reactive Silica (SiO_2)	mg/l	2.7	8.3	9.0	ND
Dissolved Chlorite (CLO_2^-)	mg/l	ND	ND	1.1	ND
Sulphide	mg/l	ND	0.33	1.3	ND
Parameters where Point C results are lower than Caribou Harbour					
Conductivity	μS/cm	125	1,350	1,570	42,500
Salinity	PSU	ND	ND	ND	28
Dissolved Chloride (Cl^-)	mg/l	23	140	170	16,000
Dissolved Sulphate (SO_4)	mg/l	7.7	280	270	1,930
Parameters where Point C results are the same as Caribou Harbour					
Nitrate + Nitrite (N)	mg/l	0.27	0.14	ND	ND
Nitrite (N)	mg/l	ND	0.035	ND	ND
Dissolved Chlorate (ClO_3^-)	mg/l	ND	103	ND	ND
Total Cyanide (CN)	mg/l	ND	ND	ND	ND

1.3.1.1 Regulated / RWS Parameters

The impact of regulated parameters, as well as those that have served as input to the Receiving Water Study were discussed in the original EARD. It is to be noted that there is, at this time, no valid analytical method for the measurement of adsorbable organic halogens (AOX) in sea water. As noted previously, AOX is not in itself a parameter that has any direct relevance to the environment. It has been created by the industry to represent the "catch all" or sum of all chlorinated compounds. In addition, the high COD number observed in sea water (3,808 mg/l, as tested) is believed to be the result of the high level of chlorides present in sea water. The chlorides can be oxidized during standard testing and result in heavy interference with the actual test results. Both test results were dismissed because of this and shown as "NA - not available" in Table 1-2.

1.3.1.2 Parameters where Point A or Point C results are greater than Caribou Harbour's

The majority of the parameters in this "category" fall under categories that are addressed in the receiving water study (nutrients, colour and suspended solids). Three of the listed compounds are not in this category: dissolved chlorites, dissolved chlorate and reactive silica.

The end products of chlorine dioxide (ClO_2) reactions are chloride (Cl^-), chlorite (ClO^-) and chlorate (ClO_3^-) all of which were tested for in the effluent samples. Chloride is addressed in a subsequent section. Chlorite was measured in the Point C effluent, but was non-detect at Point A. Chlorite, a water-soluble ion, can combine with metal ions to form solid salts (e.g. sodium chlorite). Chlorine dioxide and sodium chlorite are effective sanitizing agents that are preferred over chlorine (Cl_2) as they do not react with organic matters in food or water to form harmful organohalogen by-products. Chlorine dioxide is approved as a disinfectant for potable water (US EPA (2000) 40 CFR, Part 141.64) and the US FDA has approved its use in poultry processing (US FDA (1995) 60 CFR, Part 173) and the sanitization of fruits and vegetables (US FDA (1998) 21 CFR, Part 173.300).

Chlorite, as well as chlorate ions have been shown to undergo reduction by bacteria under anaerobic conditions to from chloride ions that are naturally present in the ocean. Anaerobic degradation is an important process in anoxic groundwater, sediments, and some soils. It has been known for over 40 years that chlorate ions can be reduced by mixed cultures under anaerobic conditions. Chlorate-respiring bacteria are widely distributed in the environment and utilize electron acceptors (e.g., chlorate ions) in lieu of oxygen to generate energy and produce carbon-based building blocks. The reduction of chlorate ions occurs in two steps; chlorate reduction with chlorate reductase enzyme followed by chlorite disproportionation catalyzed by chlorite dismutase (a non-respiratory enzyme). Oxygen and chloride are formed as the end products.

Chlorate was measured in the Point A effluent, but was non-detect at Point C after biological treatment. Through anaerobic degradation, as noted above, chlorate is effectively converted to chlorite or chloride in the anoxic zones which precede aerobic effluent treatments. It is therefore expected, and in line with the testing results, that chlorate measured at Point A was reduced to chloride through the treatment process.

The presence of reactive silica is a result of the use of organic material (wood) in the pulping process. Silica, or silicon dioxide (SiO_2), or silicate minerals are the forms in which the earth's silicon is most likely to be encountered: these are combinations of the elements silicon and oxygen, in different balances. Ninety percent of the earth's crust is comprised of these compounds. Commonly-known examples are quartz, agate, onyx, jasper, vermiculite, talc and feldspar.

Silica is naturally present in all plants: It is what plant biologists call a "non-essential beneficial plant nutrient," meaning that you don't need to apply it to your crops like nitrogen, phosphorus, and potassium (NPK fertilizers), but doing so can provide many benefits for both monocots (grasses, onions) and dicots (leafy greens, legumes). Plant decomposition would explain the presence of reactive silica in the raw water, while the higher levels of silica in the treated and untreated effluent can be explained by the higher concentration of plant material (wood) in the mill's process.

In the chemical recovery process present in kraft pulping, silica is considered a "non-process element", and is usually purged to avoid excessive fouling and plugging in the evaporators and the recovery boiler. This is typically done by the purging of fly ash from the recovery boiler's electrostatic precipitator and bottom ash from the bark boiler. Since the bark boiler uses a wet ash handling system, some of the silica present in the ash will be present in the ash pond leachate and, ultimately, in the untreated effluent.

The increase of colour from Point A to Point C occurs at the BHETF across the primary sedimentation basin in the ASB process. The colour increases as a result of anaerobic activity of the primary sediments that build up in the sedimentation basin. This colour increase will not occur in the treated effluent once the new ETF is in operation, as no solids are left to accumulate in the AST system for any extended period of time.

1.3.1.3 Parameters where Point C results are lower than Caribou Harbour

The parameters tested at levels below Caribou Harbour levels are related to differences between sea water and streams that would be considered "fresh" water and, as such, are addressed by the results of the receiving water study.

The increase in chloride content from Point A to Point C is as expected as a result of the reduction of chlorine dioxide to dissolved chloride ions (Cl^-). The natural concentration of chloride ion present in Caribou Harbour is 100 times greater than the chloride ion concentration of Point C effluent.

1.3.2 Metals

Table 1-3 below, shows the comparative results of the analysis of raw water, untreated effluent from Point A, treated effluent from Point C and water from Caribou Harbour for a full suite of metals.

Table 1-3: Analytical Results, Metals

Metals	Units	Raw water	Point A	Point C[3]	Caribou Harbour
Metals measured in higher concentrations at Point C than at Caribou Harbour					
Total Arsenic (As)	µg/l	ND	0.6	1.1	ND
Total Cadmium (Cd)	µg/l	ND	1.40	1.03	ND*
Total Chromium (Cr)	µg/l	0.75	3.4	2.3	ND
Total Lead (Pb)	µg/l	ND	4.3	2.4	ND
Total Manganese (Mn)	µg/l	38	2,600	2,500	ND
Total Nickel (Ni)	µg/l	ND	3.3	3.2	ND
Total Aluminum (Al)	µg/l	405	2,150	1,673	ND
Total Barium (Ba)	µg/l	32	415	367	13
Total Cobalt (Co)	µg/l	ND	0.78	0.51	ND
Total Copper (Cu)	µg/l	3.8	11.5	5.8	ND
Total Iron (Fe)	µg/l	405	1,130	465	ND
Total Mercury (Hg)	µg/l	ND	ND	0.022	ND
Total Phosphorus (P)	µg/l	ND	1,165	1,425	ND
Total Silver (Ag)	µg/l	ND	0.41	0.25	ND
Total Titanium (Ti)	µg/l	7.3	44	12	ND
Total Vanadium (V)	µg/l	ND	3.2	3.6	ND
Total Zinc (Zn)	µg/l	ND	255	110	ND
*** Cadmium of 0.12 µg/l was detected in one Caribou Harbour sample, all others were below the 0.1 µg/l detection limit.**					

[3] The metals analysis data for Point C, in addition to the samples collected for this report, were also taken from test data collected during annual testing done since 2015 and averaged.

Metals	Units	Raw water	Point A	Point C	Caribou Harbour
Metals measured in lower concentrations at Point C than at Caribou Harbour					
Total Boron (B)	µg/l	ND	58	70	3,630
Total Calcium (Ca)	µg/l	6,300	38,000	36,000	333,000
Total Magnesium (Mg)	µg/l	1,800	3,700	4,600	1,070,000
Total Potassium (K)	µg/l	760	11,500	18,000	320,000
Total Sodium (Na)	µg/l	15,500	225,000	340,000	8,700,000
Total Strontium (Sr)	µg/l	30	155	145	6,200
Total Uranium (U)	µg/l	ND	3.6	0.49	2.8
Metals detected at Point A but not detected at Point C or Caribou Harbour					
Total Thallium (Tl)	µg/l	ND	0.23	ND	ND

The following metals were not detected based on their individual detection limits (which are shown in italics) in any of the samples tested:

- Antimony (Sb) *(1 µg/l)*;
- *Beryllium (Be) (1 µg/l);*
- Bismuth (Bi) *(2 µg/l)*;
- *Selenium (Se) (1 µg/l);*
- Tin (Sn) *(2 µg/l)*; and
- Molybdenum (Mo) *(2 µg/l)*

1.3.2.1 Metals measured in higher concentrations at Point C than at Caribou Harbour

The first set of metals that need to be analyzed are those shown in italics in Table 1-3, which are arsenic, cadmium, chromium, lead, manganese and nickel. These metals are naturally present in wood and have been identified by the US EPA as being the main components in particulate matter generated by biomass boilers[4]. It is therefore natural to observe them in pulp and paper mill effluents. Two other metals shown in italics in the non-detect list above, beryllium and selenium, are also part of this group but have not been detected in any of the samples tested. Some of these metals are also present, in lesser quantities, in the raw water used by the mill and are naturally occurring in the environment.

Other metals, such as cobalt, titanium, copper, zinc and aluminum are also likely coming from the pulping process as non-process elements in the wood itself. As described earlier, these non-process elements are regularly purged from the system, either via the effluent or solid waste, in order to protect the integrity of the equipment and the process. Except for aluminum, which is used as alum (aluminum sulphate) in the treatment of raw water from Middle River, none of these metals are components of additives used in the pulping process.

It is important to note that the effluent from municipal treatment systems also contain some of these heavy metals. The most commonly encountered heavy metals in municipal wastewater include cadmium, mercury, lead and arsenic.

Table 1-3 shows that a low concentration of mercury is detected in the final Point C effluent, but is non-detect in any of the samples of Point A untreated effluent. Elements such as mercury cannot be created through the secondary treatment process if they were not present in the incoming effluent. This means that its release to the environment is likely caused by an external factor, such as, potentially the treatment of the Boat Harbour Landfill leachate in the current ASB. Implementation of the new ETF should eliminate the presence of mercury from the final effluent. Confirmation, through future testing, will be needed to confirm that mercury is non-detect in future effluent.

[4] https://www.federalregister.gov/documents/2015/01/21/2014-29569/national-emission-standards-for-hazardous-air-pollutants-for-major-sources-industrial-commercial-and

1.3.2.2 Metals measured in lower concentrations at Point C than at Caribou Harbour

The parameters tested at levels below Caribou Harbour levels are related to differences between sea water and streams that would be considered “fresh” water and, as such, are addressed by the results of the receiving water study.

1.3.3 Phenols

Table 1-4, below, shows the comparative results of the analysis of raw water, untreated effluent from Point A, treated effluent from Point C and water from Caribou Harbour for a full suite of phenols. All phenol results are based on 2019 data sets only.

Table 1-4: Analytical Results, Phenols

Phenols	Units	Raw water	Point A	Point C	Caribou Harbour
Total P&P Phenols	µg/l	ND	1400	6.13	ND[5]
Phenols measured at Point C but not in Caribou Harbour					
2-Chlrophenol	µg/l	ND	65	0.73	ND
o-Cresol	µg/l	ND	ND	0.78	ND
p-Cresol	µg/l	ND	ND	0.96	ND
Guaiacol	µg/l	ND	1300	1.2	ND
Catechol	µg/l	ND	8.4	2.8	ND
6-Chlorovanillin	µg/l	ND	4.8	0.63	ND
2,4 Dimethylphenol	µg/l	ND	ND	0.98	ND
Phenols measured at Point A but not at Point C nor in Caribou Harbour					
m-Cresol	µg/l	ND	3.1	ND	ND
Eugebol	µg/l	ND	12	ND	ND
Isoeugenol	µg/l	ND	2.6	ND	ND

[5] The analysis for the Phenols in Pulp and Paper Mill effluents in the raw water and Caribou water samples indicated non-detect (below the reportable detection limit of 5 and 10 µg/l respectively)

Phenols	Units	Raw water	Point A	Point C	Caribou Harbour
Phenols not detected					
3-Chlorophenol	µg/l	ND	ND	ND	ND
4-Chlorophenol	µg/l	ND	ND	ND	ND
5,6-Dichlorovanillin	µg/l	ND	ND	ND	ND
3,4,5 Trichlorosyringol	µg/l	ND	ND	ND	ND
2,6 Dichlorophenol	µg/l	ND	ND	ND	ND
3,5 Dichlorophenol	µg/l	ND	ND	ND	ND
2,3 Dichlorophenol	µg/l	ND	ND	ND	ND
3,4 Dichlorophenol	µg/l	ND	ND	ND	ND
2,4 +2.5- Dichlorophenol	µg/l	ND	ND	ND	ND
2-Nitrophenol	µg/l	ND	ND	ND	ND
4-Nitrophenol	µg/l	ND	ND	ND	ND
2,4,6-Trichlorophenol	µg/l	ND	ND	ND	ND
2,3,5 Trichlorophenol	µg/l	ND	ND	ND	ND
2,3,6 Trichlorophenol	µg/l	ND	ND	ND	ND
2,4,5 Trichlorophenol	µg/l	ND	ND	ND	ND
2,3,4 Trichlorophenol	µg/l	ND	ND	ND	ND
3,4,5 Trichlorophenol	µg/l	ND	ND	ND	ND
4-Chloroguaiacol	µg/l	ND	ND	ND	ND
4,5 Dichloroguaiacol	µg/l	ND	ND	ND	ND
4,6 Dichloroguaiacol	µg/l	ND	ND	ND	ND
2,3,5,6 Tetrachlorophenol	µg/l	ND	ND	ND	ND
2,3,4,6 Tetrachlorophenol	µg/l	ND	ND	ND	ND
2,3,4,5 Tetrachlorophenol	µg/l	ND	ND	ND	ND
4 Chlorocatechol	µg/l	ND	ND	ND	ND
3,5 Dichlorocatechol	µg/l	ND	ND	ND	ND
4,5 Dichlorocatechol	µg/l	ND	ND	ND	ND

Phenols	Units	Raw water	Point A	Point C	Caribou Harbour
3,4,5 Trichloroguaiacol	µg/l	ND	ND	ND	ND
4,5,6 Trichloroguaiacol	µg/l	ND	ND	ND	ND
Pentachlorophenol	µg/l	ND	ND	ND	ND
23,4,5 Trichlorocatechol	µg/l	ND	ND	ND	ND
Tetrachlorocatechol	µg/l	ND	ND	ND	ND
Tetrachloroguaiacol	µg/l	ND	ND	ND	ND
4,5 Dichloroveratrol	µg/l	ND	ND	ND	ND
3,4,5 Trichloroveratrol	µg/l	ND	ND	ND	ND
3,4,5,6 Tetrachloroveratrol	µg/l	ND	ND	ND	ND

Phenols are the basic structural unit in a wide variety of synthetic organic compounds. Phenol and its higher homology are aromatic molecules containing hydroxyl group attached to the benzene ring structure. The origin of phenol in the environment is both industrial and natural. Phenol pollution has been associated with pulp and paper mills, coal mines, refineries, wood preservation, plants & various chemicals industries as well as their wastewaters. Due to their high inhibitory and antibacterial activity, high levels of phenols may create problems in the operation of biological treatment plants. They also add odour to drinking and food processing water and have mutagenic and carcinogenic effects. Phenol is also a priority pollutant and is included in the EPA list (1979).

There are typically two types of phenols encountered in pulp and paper mill effluents: wood-based phenols, which would originate from the unbleached side of the mill, and chlorinated phenols, which would be present in bleach plant effluents. Both are considered to be of intermediate molecular weight (from 100 to 1000 Daltons.), are moderately to highly soluble in water and are readily biodegradable, as can be seen when comparing the test results between Points A and C.

These compounds, for the most part, have low log Kow values (see Section 1.2.4) and are not likely to biomagnify or bioaccummulate. Their environmental half-life, when known, is measured in days to weeks, depending on the level of chlorination of the molecule.

When considering the products of ECF bleaching of pulp, it is important to recognize that many of the chlorinated substances produced in this process are also formed in nature. Several chlorophenolic isomers with biogenic origin have been isolated. Studies in Sweden have demonstrated that 2,4,6-trichlorophenol and its methylated analogue 2,4,6-trichloroanisole are ubiquitous in humus-rich waters and are formed by the action of microorganisms. Some degradation products from natural chlorinated lignin are similar to those occurring in bleached kraft mill effluents.

The US EPA, in its effluent standards for new facilities, has set specific limits on certain chlorophenols, mainly chloroform, trichlorosyringol, 3,4,5 &6-trichlorocatechols, 3,4,5&6-trichloroguaiacols, 3,4,5&6 trichlorophenols, tetrachlorocatechol, tetrachloroguaiacol, 2,3,4,6-tetrachlorophenol and pentachlorophenol, all measured at the outlet of the bleach plant. None of these compounds have been detected in Northern Pulp's effluent, except for chloroform, which is shown in Table 1-8 to be fully biodegraded in the BHETF.

The Quebec government, in its Regulation respecting pulp and paper mills[6], regulates the level of phenolic compounds that can be released to the environment from landfill leachates to 50 µg/l, in the premise that this level of phenolic compound discharge can readily be managed by natural means. This regulated level is far above the total level present in the treated effluent at Point C.

Catechol and guaiacol, as well as certain cresol and chorovanillin isomers, have been recognized in the literature as potentially having certain endocrine disrupting effects. Because of this, the following compounds should be further considered as compounds of potential concern (COPC) in treated effluent in future Human Health Risk Assessments:

- o-cresol (CAS #95-48-7);
- p-cresol (CAS #106-44-5);
- m-cresol(CAS #108-39-4);
- Guaiacol (CAS# 90-05-1);
- Catechol: (CAS# 120-80-9);
- 6-chlorovanillin (CAS #18268-76-3); and
- 5,6,dichlorovanillin (CAS #18268-69-4)

[6] Environment Quality Act (chapter Q-2, ss. 31, 46, 53.30, 70, 115.27, 115.34 and 124.1). http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/Q-2,%20r.%2027#sc-nb:11

1.3.4 Fatty Acids and Resin Acids

Table 1-5 and Table 1-6, below, show the comparative results of the analysis of raw water, untreated effluent from Point A, treated effluent from Point C and water from Caribou Harbour for a comprehensive suite of fatty and resin acids. All fatty and resin acid results are based on 2019 data sets only.

Table 1-5: Analytical Results, Fatty Acids

Fatty Acids	Units	Raw water	Point A	Point C	Caribou Harbour
Total Fatty Acids	mg/l	ND	ND	0.335	ND
Fatty acids measured at Point C but not in Caribou Harbour					
9,10-Dichlorostearic acid	mg/l	ND	ND	0.008	ND
Docosanoic acid (C22)	mg/l	ND	ND	0.180	ND
Eicosanoic acid (C20)	mg/l	ND	ND	0.054	ND
Hexadecanoic acid (C16)	mg/l	ND	0.36	0.027	ND
Linoleic acid (C18:2)	mg/l	ND	2.1	0.013	ND
Octadecanoic acid (C18)	mg/l	ND	ND	0.029	ND
Oleic acid (C18:1)	mg/l	ND	0.65	0.030	ND
Fatty acids not detected					
Decanoic Acid (C10)	mg/l	ND	ND	ND	ND
Dodecanoic acid (C12)	mg/l	ND	ND	ND	ND
Linolenic acid (C18:3)	mg/l	ND	ND	ND	ND
Tetradecanoic acid (C14)	mg/l	ND	ND	ND	ND
Undecanoic acid (C11)	mg/l	ND	ND	ND	ND

Table 1-6: Analytical Results, Resin Acids

Resin Acids	Units	Raw water	Point A	Point C	Caribou Harbour
Total Resin Acids	mg/l	ND	ND	0.57	ND
Resin acids measured at Point C but not in Caribou Harbour					
Abietic acid	mg/l	ND	0.32	0.14	ND
Dehydroabietic acid	mg/l	ND	0.32	0.12	ND
Isopimaric acid	mg/l	ND	ND	0.19	ND
Neoabietic acid	mg/l	ND	ND	0.014	ND
Pimaric acid	mg/l	ND	ND	0.08	ND
Sandaracopimaric acid	mg/l	ND	ND	0.035	ND
Resin acids not detected					
12,14-Dichlorodehydroabietic acid	mg/l	ND	ND	ND	ND
12-Chlorodehydroabietic acid	mg/l	ND	ND	ND	ND
14-Chlorodehydroabietic acid	mg/l	ND	ND	ND	ND
Palustric acid	mg/l	ND	ND	ND	ND

Recent reviews of biochemical responses of fish in mesocosms, found that many effluents actually inhibited MFO activity (Mixed Function Oxidase, a measurement of liver enzymes), as well as activity of conjugating enzymes, at concentrations as low 0.25 mg/l, likely due to the presence of fatty and resin acids and chlorophenols. The inhibition of enzyme responses could raise the possibility that comparisons of responses to technology may be confounded by “false negatives” due to toxicity of effluent components. Despite a large number of studies involving effluents from mills using many different bleaching sequences, there is no strong evidence that bleaching was the source of toxic components in final effluent.

Resin and fatty acids are considered intermediate molecular weight compounds with extreme water insolubility properties, which means that they will preferentially be found in suspended solids and/or in sediments. Some of the resin and fatty acids present in effluent at Point A are reduced in concentration at Point C indicating removal through the BHETF treatment system. There are a significant number of resin and fatty acids that are not present in the incoming effluent at Point A, but are present in the final effluent at Point C. Resin and fatty acids are compounds found in wood and would be expected in untreated effluent, albeit in quantities close to detection limits.

1.3.5 Polyaromatic Hydrocarbons (PAHs) and Volatile Organics (VOCs)

Table 1-7 and Table 1-8, below, show the comparative results of the analysis of raw water, untreated effluent from Point A, treated effluent from Point C and water from Caribou Harbour for a comprehensive suite of polyaromatic hydrocarbons and volatile organics.

Table 1-7: Analytical Results, Polyaromatic Hydrocarbons

Polyaromatic Hydrocarbons	Units	Raw water	Point A	Point C	Caribou Harbour
Polyaromatic hydrocarbons measured at Point C but not in Caribou Harbour					
Fluoranthene	µg/l	ND	ND	0.04	ND
Phenanthrene	µg/l	ND	0.039	0.044	ND
Polyaromatic hydrocarbons not detected					
1-Methylnaphthalene	µg/l	ND	ND	ND	ND
2-Methylnaphthalene	µg/l	ND	ND	ND	ND
Acenaphthene	µg/l	ND	ND	ND	ND
Acenaphthylene	µg/l	ND	ND	ND	ND
Anthracene	µg/l	ND	ND	ND	ND
Benzo(a)anthracene	µg/l	ND	ND	ND	ND
Benzo(a)pyrene	µg/l	ND	ND	ND	ND
Benzo(b)fluoranthene	µg/l	ND	ND	ND	ND
Benzo(b/j)fluoranthene	µg/l	ND	ND	ND	ND
Benzo(g,h,i)perylene	µg/l	ND	ND	ND	ND
Benzo(j)fluoranthene	µg/l	ND	ND	ND	ND
Benzo(k)fluoranthene	µg/l	ND	ND	ND	ND
Chrysene	µg/l	ND	ND	ND	ND
Dibenz(a,h)anthracene	µg/l	ND	ND	ND	ND

Polyaromatic Hydrocarbons	Units	Raw water	Point A	Point C	Caribou Harbour
Fluorene	µg/l	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	µg/l	ND	ND	ND	ND
Naphthalene	µg/l	ND	ND	ND	ND
Perylene	µg/l	ND	ND	ND	ND
Pyrene	µg/l	ND	ND	ND	ND

Table 1-8: Analytical Results, Volatile Organics

Volatile Organics	Units	Raw water	Point A	Point C	Caribou Harbour
Volatile organics measured at Point A but not at Point C nor in Caribou Harbour					
Chloroform[7]	µg/l	2.1	8.7	ND	ND
Volatile organics not detected					
1,1-Dichloroethane	µg/l	ND	ND	ND	ND
1,1-Dichloroethylene	µg/l	ND	ND	ND	ND
1,1,1-Trichloroethane	µg/l	ND	ND	ND	ND
1,1,2-Trichloroethane	µg/l	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	µg/l	ND	ND	ND	ND
Ethylene Dibromide	µg/l	ND	ND	ND	ND
1,2-Dichlorobenzene	µg/l	ND	ND	ND	ND
1,2-Dichloroethane	µg/l	ND	ND	ND	ND
cis-1,2-Dichloroethylene	µg/l	ND	ND	ND	ND
trans-1,2-Dichloroethylene	µg/l	ND	ND	ND	ND
1,2-Dichloropropane	µg/l	ND	ND	ND	ND
1,3-Dichlorobenzene	µg/l	ND	ND	ND	ND
cis-1,3-Dichloropropene	µg/l	ND	ND	ND	ND
trans-1,3-Dichloropropene	µg/l	ND	ND	ND	ND
1,4-Dichlorobenzene	µg/l	ND	ND	ND	ND
Benzene	µg/l	ND	ND	ND	ND
Bromodichloromethane	µg/l	ND	ND	ND	ND

[7] Production data for days when samples were taken for chloroform testing are shown in Section 1.2.1.

Volatile Organics	Units	Raw water	Point A	Point C	Caribou Harbour
Bromoform	µg/l	ND	ND	ND	ND
Bromomethane	µg/l	ND	ND	ND	ND
Carbon Tetrachloride	µg/l	ND	ND	ND	ND
Chlorobenzene	µg/l	ND	ND	ND	ND
Chloroethane	µg/l	ND	ND	ND	ND
Chloromethane	µg/l	ND	ND	ND	ND
Dibromochloromethane	µg/l	ND	ND	ND	ND
Methylene Chloride (Dichloromethane)	µg/l	ND	ND	ND	ND
Ethylbenzene	µg/l	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	µg/l	ND	ND	ND	ND
Styrene	µg/l	ND	ND	ND	ND
Tetrachloroethylene	µg/l	ND	ND	ND	ND
Toluene	µg/l	ND	ND	ND	ND
Trichloroethylene	µg/l	ND	ND	ND	ND
Trichlorofluoromethane (FREON 11)	µg/l	ND	ND	ND	ND
Vinyl Chloride	µg/l	ND	ND	ND	ND
o-Xylene	µg/l	ND	ND	ND	ND
p+m-Xylene	µg/l	ND	ND	ND	ND
Total Xylenes	µg/l	ND	ND	ND	ND

1.3.5.1 Polyaromatic Hydrocarbons

Polyaromatic hydrocarbons (PAH) are composed of multiple aromatic rings (organic rings in which the electrons are delocalized). The simplest such chemicals are naphthalene, having two aromatic rings, and the three-ring compounds anthracene and phenanthrene. PAHs are uncharged, non-polar molecules found in coal and in tar deposits. They are also produced by the thermal decomposition of organic matter (for example, products of combustion in engines and incinerators or forest fires).

The greater majority of all polyaromatic hydrocarbons tested were not detected in any of the samples, as presented in Table 1-7. Two compounds, however, were detected in the effluent: fluoranthene and phenanthrene.

Fluoranthene, which was detected only in the treated effluent at Point C, is typically found in many combustion products, along with other PAHs. Its presence is usually an indicator of less efficient or lower-temperature combustion. Its detection only at Point C, not at Point A, would indicate that release to the environment is likely caused by an external factor, such as the treatment of Boat Harbour Landfill leachate in the current ASB. Implementation of the new ETF should eliminate the presence of this compound from the final effluent. Confirmation, through future testing, will be needed to confirm that it is non-detect in future effluent.

Phenanthrene is a polycyclic aromatic hydrocarbon composed of three fused benzene rings which takes its name from the two terms 'phenyl' and 'anthracene.' It has a role as an environmental contaminant and is naturally present as a metabolic by-product in certain rodents. It is an ortho-fused polycyclic arene, an ortho-fused tricyclic hydrocarbon and is also an indicator of less efficient or lower-temperature combustion and is typically one of the components of cigarette smoke. Its detection at Point C and Point A are in a similar range.

1.3.5.2 Volatile Organics

The health impact of volatile organics (VOCs) is felt mainly by their release to atmosphere, as they are extremely biodegradable. Short-term exposure to high levels of some VOCs have been known to cause breathing problems, headaches, irritation of the eyes, nose and throat. Some people may be more sensitive to VOC’s, such as people with asthma.

Most people are not affected by short-term exposure to the low levels of VOCs typically found in homes and automobiles. For long-term exposure to low levels of VOCs, research is ongoing to better understand any health effects from these exposures. Long-term exposure to high levels of some VOCs, however, may result in health effects. For example, in industrial workers, exposure to high levels of some VOCs such as benzene and formaldehyde, has been linked with increased cancer rates.

The only volatile organic compound detected in the various samples tested has been chloroform, which is an extremely volatile but, as shown in Table 1-8 is a readily biodegradable compound generated during the bleaching of pulp with hypochlorite, chlorine, or chlorine dioxide. Hypochlorite bleaching (common in some mechanical pulping applications) results in the greatest amount of chloroform generation while chlorine dioxide bleaching, the only chlorine-based chemical used for bleaching at Northern Pulp, results in the least amount of chloroform generation. As chloroform is generated, it partitions to air and to bleach plant effluent (though, some of the chloroform remains with the pulp). Any chloroform found in bleach plant effluent that is not emitted to the air prior to reaching the wastewater treatment plant is volatilized and degraded during secondary treatment. As would be expected, chloroform is not present in the Point C final effluent.

The major effect from acute (short-term) inhalation exposure to chloroform is central nervous system depression. Chronic (long-term) exposure to chloroform by inhalation in humans has resulted in effects on the liver, including hepatitis and jaundice, and central nervous system effects, such as depression and irritability. Chloroform has been shown to be carcinogenic in animals after oral exposure, resulting in an increase in kidney and liver tumors. The US EPA has classified chloroform as a Group B2, probable human carcinogen.

Because of this air/water partitioning phenomenon, the US EPA decided to regulate chloroform in pulp and paper mill effluent at the discharge of the bleach plant[8]. For existing kraft mills, the daily chloroform discharge standard is 6.92 kg/ADt while the monthly standard is 4.14 kg/ADt, all measured on unbleached pulp production. Based on Northern Pulp effluent testing, combined with the effluent flows and production rates at the times of testing, the chloroform content at Northern Pulp was 0.00071 kg/ADt. US mills can be exempt from chloroform testing if their bleach plant operates under specified conditions and testing demonstrates that the results are consistently below the applicable limits. NPNS results are well below the US EPA limits.

Other volatile and chlorinated organics are also regulated by the US EPA along with chloroform. The other regulated compounds, with their respective limits, are shown in Table 1-9, below.

[8] 40 CFR Part 430

Table 1-9 Regulated Limits of Various Chlorinated Organics by US EPA

Compound	Regulated Limit (Monthly testing)
2,3,7,8-TCDD	Non-detect (10 pg/l *detection limit)*
2,3,7,8-TCDF	31.9 pg/l
Trichlorosyringol	Non-detect *(2.5 µg/l detection limit)*
3,4,5-Trichlorocatechol	Non-detect *(5.0 µg/l detection limit)*
3,4,6-Trichlorocatechol	Non-detect *(5.0 µg/l detection limit)*
3,4,5-Trichloroguaiacol	Non-detect *(2.5 µg/l detection limit)*
3,4,6-Trichloroguaiacol	Non-detect *(2.5 µg/l detection limit)*
4,5,6-Trichloroguaiacol	Non-detect *(2.5 µg/l detection limit)*
2,4,5-Trichlorophenol	Non-detect *(2.5 µg/l detection limit)*
2,4,6-Trichlorophenol	Non-detect *(2.5 µg/l detection limit)*
Tetrachlorocatechol	Non-detect *(5.0 µg/l detection limit)*
Tetrachloroguaiacol	Non-detect *(5.0 µg/l detection limit)*
2,3,4,6-Tetrachlorophenol	Non-detect *(2.5 µg/l detection limit)*
Pentachlorophenol	Non-detect *(5.0 µg/l detection limit)*

All parameters listed in Table 1-9 have yielded non-detect results for Northern Pulp's effluent.

1.3.6 Petroleum Hydrocarbons and Polychlorinated Biphenyls

1.3.6.1 Petroleum Hydrocarbons

Table 1-10, below, shows the comparative results of the analysis of raw water, untreated effluent from Point A, treated effluent from Point C and water from Caribou Harbour for a comprehensive suite of petroleum hydrocarbons (PAHs).

Table 1-10: Analytical Results, Petroleum Hydrocarbons

Petroleum Hydrocarbons	Units	Raw water	Point A	Point C	Caribou Harbour
Petroleum hydrocarbons measured at Point C but not in Caribou Harbour					
>C10-C16 Hydrocarbons	mg/l	ND	0.26	0.09	ND
>C16-C21 Hydrocarbons	mg/l	ND	0.62	0.12	ND
>C21-<C32 Hydrocarbons	mg/l	ND	1.5	0.24	ND
Modified TPH (Tier1)	mg/l	ND	2.38	0.30	ND
Petroleum hydrocarbons measured at Point A but not at Point C nor in Caribou Harbour					
C6 - C10 (less BTEX)	mg/l	ND	0.12	ND	ND
Polyaromatic hydrocarbons not detected					
Benzene	mg/l	ND	ND	ND	ND
Toluene	mg/l	ND	ND	ND	ND
Ethylbenzene	mg/l	ND	ND	ND	ND
Total Xylenes	mg/l	ND	ND	ND	ND

Testing for petroleum hydrocarbons in pulp and paper mill effluents can be misleading at times, as the presence of wood extractives in the effluent sample can cause a large bias in the results, making it appear that there are petroleum hydrocarbons present in the samples when there are not. Several precautions and laboratory procedures must be undertaken to help alleviate the bias and ensure test results obtained are a more accurate representation of the levels of petroleum hydrocarbons present in the effluent.

A survey of bioaccumulation studies carried out by ECCC[9] has shown that bio-concentration of petroleum hydrocarbons could occur after short exposure times but that the majority of organisms also exhibit rapid depuration once the contaminant is removed. None of the studies carried out by ECCC showed any significant measured or modelled bioaccumulation of petroleum hydrocarbons in fish and clams. The installation of the spill basin, along with detailed diversion and isolation procedures in case of a spill at the mill are mitigation measures to reduce the environmental risk from petroleum hydrocarbon spills.

[9] http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=7BF1F2C0-1#toc15

1.3.6.2 Polychlorinated Biphenyls

Analytical results for the following polychlorinated biphenyls (PCBs) showed non-detectable levels, at the same detection limit (0.05 µg/l) for all samples tested including Middle River, Point A effluent, Point C effluent and Caribou Harbour. All test results are based on 2019 data sets only:

- Aroclor 1016;
- Aroclor 1221;
- Aroclor 1232:
- Aroclor 1248:
- Aroclor 1242:
- Aroclor 1254; and
- Aroclor 1260

1.3.7 Dioxins and Furans

Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), commonly known as dioxins and furans, are toxic chemicals found in very small amounts in the environment, including air, water and soil. As a result of their presence in the environment, they are also present in some foods. They have largely been created by human activity, to a great extent as the result of burning plastics, with the biggest sources in Canada coming from the burning of municipal and medical waste. Other major sources include[7]:

- The production of iron and steel;
- Backyard burning of household waste, especially plastics;
- Fuel burning, including diesel fuel and fuel for agricultural purposes and home heating;
- Wood burning, especially if the wood has been chemically treated;
- Electrical power generation; and
- Tobacco smoke.

Dioxins can also be produced from natural processes, such as forest fires and volcanic eruptions. Most dioxins are introduced to the environment through the air. The airborne chemical can attach to small particles that can travel long distances in the atmosphere, which means that Canadians may also be exposed to dioxins and furans created in other countries.

There are 210 different dioxins and furans. All dioxins have the same basic chemical "skeleton," and they all have chlorine atoms as part of their make-up. Furans are similar, but have a different "skeleton". These substances vary widely in toxicity. The one considered most toxic is referred to as 2,3,7,8-tetrachlorodibenzo-p-dioxin, or simply TCDD[10].

Table 1-11, below, shows the analytical results for dioxin and furan testing carried out on the various samples, expressed in toxic equivalents, as defined by the World Health Organization (WHO). All test results are based on 2019 data sets only. A Toxic equivalency factor (TEF) expresses the toxicity of dioxins, furans and PCBs in terms of the most toxic form of dioxin, 2,3,7,8-TCDD[11]. The toxicity of the individual congeners may vary by orders of magnitude. With the TEFs, the toxicity of a mixture of dioxins and dioxin-like compounds can be expressed in a single number – the toxic equivalency (TEQ). It is a single figure resulting from the product of the concentration and individual TEF values of each congener. The TEF/TEQ concept has been developed to facilitate risk assessment and regulatory control.

The laboratory testing for all dioxin congeners was carried out using gas chromatography with mass spectrometry detection. In this test method, samples are extracted, cleaned, and concentrated, extracts are analyzed using high resolution gas chromatography / high resolution mass spectrometry (HRGC/HRMS). An individual CDD/CDF is identified by comparing the gas chromatograph retention time and ion abundance ratio of two exact mass to charge (m/z) ratios with the corresponding retention time of an authentic standard and the theoretical or acquired ion-abundance ratio of the two exact m/z's. Quantitative analysis is performed using selected ion current profile (SICP) areas.

[10] https://www.canada.ca/en/health-canada/services/healthy-living/your-health/environment/dioxins-furans.html
[11] Tetrachlorodibenzodioxin

Table 1-11: Analytical Results, Dioxins and Furans

Dioxins and Furans	TEF	Units	Raw water	Point A	Point C	Caribou Harbour
2,3,7,8-Tetra CDD[12]	1.00	pg/l	ND	ND	ND	ND
1,2,3,7,8-Penta CDD	1.00	pg/l	ND	ND	ND	ND
1,2,3,4,7,8-Hexa CDD	0.10	pg/l	ND	ND	ND	ND
1,2,3,6,7,8-Hexa CDD	0.10	pg/l	ND	0.1250	ND	ND
1,2,3,7,8,9-Hexa CDD	0.10	pg/l	ND	ND	ND	ND
1,2,3,4,6,7,8-Hepta CDD	0.01	pg/l	ND	0.5460	ND	ND
Octa CDD	0.00468	pg/l	ND	0.1140	0.0012	ND
2,3,7,8-Tetra CDF[13]	0.1	pg/l	ND	ND	ND	ND
1,2,3,7,8-Penta CDF	0.03	pg/l	ND	ND	ND	ND
2,3,4,7,8-Penta CDF	0.3	pg/l	ND	ND	ND	ND
1,2,3,4,7,8-Hexa CDF	0.1	pg/l	ND	ND	ND	ND
1,2,3,6,7,8-Hexa CDF	0.1	pg/l	ND	ND	ND	ND
2,3,4,6,7,8-Hexa CDF	0.1	pg/l	ND	ND	ND	ND
1,2,3,7,8,9-Hexa CDF	0.1	pg/l	ND	ND	ND	ND
1,2,3,4,6,7,8-Hepta CDF	0.01	pg/l	ND	ND	ND	ND
1,2,3,4,7,8,9-Hepta CDF	0.01	pg/l	ND	ND	ND	ND
Octa CDF	0.0003	pg/l	ND	0.0010	ND	ND

Laboratory testing was carried out for all dioxin congeners. The presence of any dioxin and furans congeners in the samples analyzed would indicate that, despite the non-detect analytical results for most congeners, other dioxin congeners could be present in the samples: in such a circumstance, the full detection limit is used to quantify the results. The calculated values are presented in Table 1-12, below.

[12] Chlorodibenzodioxin
[13] Chlorodibenzofuran

Table 1-12: Analytical Results, Dioxins and Furans (with detection limit adjustments)

Dioxins and Furans	TEF	Units	Raw water	Point A	Point C[14]	Caribou Harbour[16]
2,3,7,8-Tetra CDD[15]	1.00	pg/l	1.13	1.07	1.1400	1.0197
1,2,3,7,8-Penta CDD	1.00	pg/l	0.992	1.09	1.1275	0.9997
1,2,3,4,7,8-Hexa CDD	0.10	pg/l	0.122	0.12	0.1458	0.1119
1,2,3,6,7,8-Hexa CDD	0.10	pg/l	0.106	0.125	0.1225	0.0994
1,2,3,7,8,9-Hexa CDD	0.10	pg/l	0.103	0.102	0.1127	0.0973
1,2,3,4,6,7,8-Hepta CDD	0.01	pg/l	0.01	0.546	0.0137	0.0104
Octa CDD	0.00468	pg/l	0.0046	0.114	0.0046	0.0006
2,3,7,8-Tetra CDF[16]	0.1	pg/l	0.106	0.0986	0.1450	0.1014
1,2,3,7,8-Penta CDF	0.03	pg/l	0.0322	0.034	0.0364	0.0336
2,3,4,7,8-Penta CDF	0.3	pg/l	0.324	0.342	0.3653	0.3390
1,2,3,4,7,8-Hexa CDF	0.1	pg/l	0.0872	0.112	0.1115	0.0955
1,2,3,6,7,8-Hexa CDF	0.1	pg/l	0.0728	0.0934	0.1058	0.0834
2,3,4,6,7,8-Hexa CDF	0.1	pg/l	0.0822	0.106	0.1168	0.0953
1,2,3,7,8,9-Hexa CDF	0.1	pg/l	0.0912	0.117	0.1288	0.1067
1,2,3,4,6,7,8-Hepta CDF	0.01	pg/l	0.0086	0.012	0.0105	0.0092
1,2,3,4,7,8,9-Hepta CDF	0.01	pg/l	0.0098	0.0112	0.0125	0.0110
Octa CDF	0.0003	pg/l	0.0004	0.001	0.0003	0.0004
TOTAL TOXIC EQUIVALENCY	**1.00**	**pg/l**	**3.282**	**4.094**	**3.675**	**3.213**

The results shown above indicate that the total toxic equivalency (TEQ) at Point C is in line with the TEQ of raw water or Caribou Harbour samples. The results demonstrate the effectiveness of the *Pulp and Paper Effluent Regulations* in achieving the virtual elimination of dioxins and furans in pulp and paper mill effluents including NPNS.

[14] Point C data is the averaged data from regulatory test data that is required under the Pulp and Paper Effluent Regulations
[15] Chlorodibenzodioxin
[16] Chlorodibenzofuran

1.4 CONCLUSIONS

A chemical analysis of the raw water, the untreated and treated effluent as well at the sea water at the proposed discharge point was carried out to try to identify the source and contribution of various streams to mill-related loading in the Northumberland Strait. The purpose of this screening was also to establish whether the effluent characteristics found at Point C were representative of the future effluent characteristics with the new ETF and to identify compounds that could warrant further scrutiny within the impact assessment framework that is ongoing at the mill.

A comparison of the untreated and treated effluent components against published effluent composition data showed that the mill's effluent shows no appreciable difference from effluent characteristics from other bleached kraft mills. An analysis of the current system's performance outlined further in Section 2.4 shows that it provides effective treatment and is comparable, performance-wise, to other mills in Canada and elsewhere. Based on its design criteria, the future ETF would also be expected to provide performance that is comparable to other mills in Canada and elsewhere. It is therefore quite reasonable, since current and future systems have comparable performance that Point C can be used as an accurate representation of what the effluent from the new ETF will resemble.

The analysis does show that some components of the Point C effluent, such as mercury and some polyaromatic hydrocarbons appear to come from sources other than Northern Pulp's effluent: these compounds are readily identifiable and, as such, can be considered in that context.

The analysis shows that because of their potential impact on the receiving waters and despite no direct indication that these effects have been observed in the environment, some compounds should be considered for further scrutiny, either as part of future testing or as part of more long-term investigations, such as the Environmental Effects Monitoring (EEM) program or Human Health Risk Assessment (HHRA). These compounds are:

- Routine testing, following established testing frequency protocols and exemptions included in the US pulp and paper regulatory framework:
  - Chloroform;
  - Dioxins and furans;
  - Trichlorosyringol;
  - 3,4,5-Trichlorocatechol;
  - 3,4,6-Trichlorocatechol;
  - 3,4,5-Trichloroguaiacol;
  - 3,4,6-Trichloroguaiacol;
  - 4,5,6-Trichloroguaiacol;
  - 2,4,5-Trichlorophenol;
  - 2,4,6-Trichlorophenol;
  - Tetrachlorocatechol;
  - Tetrachloroguaiacol;
  - 2,3,4,6-Tetrachlorophenol;
  - Pentachlorophenol

Longer term impact assessment:

- o-cresol'
- p-cresol;
- m-cresol;
- Guaiacol;
- Catechol;
- 6-chlorovanillin; and
- 5,6,dichlorovanillin.

1.5 REFERENCES

- Adav S. S., M. Y. Chen, D. J. Lee, N. Q. Ren, “Degradation of phenol by Acinetobacter strain isolated from aerobic granules,” Chemosphere, vol. 67, pp. 1566-1572
- Balan, A. G. and M. S. T. Murugesan, “*Design of experiments in the biodegradation of phenol using immobilized*,” Pseudomonas pictorium (NICM – 2077) on activated carbon. Bioproc. Eng, vol. 22, pp. 101-107.
- Berry, R. M., Luthe, C. E., Voss, R. H., et al., P. & P. Canada, 92(6): 43 (1991).
- Bolaños R. M. L., M. B. A. Varesche, M. Zaiat, and E. Foresti, *“Phenol degradation in horizontal-flow anaerobic immobilized biomass (HAIB) reactor under mesophilic conditions*,” Water Sci. Technol, vol. 44, pp. 167-174, 2001.
- Colodette JL, Gomes CM, Rabelo M. *Progess in eucalyptus kraft pulp bleaching. In: 2nd International Colloquium on Eucalyptus Pulp* (2ICEP); Concepcion-Chile; 2005, pp. 1–18.
- Dahl O. Process modifications to reduce effluent loads. In: Dahl O, editor. *Environmental management and control*. 1st Ed. Paperi ja Puu Oy; Helsinki; 2008, pp. 70–84. ISBN: 978-952-5216-30-1.
- Dahlman O, Reimann A, Stromberg L, Mörck R. *High molecular weight effluent materials from modern ECF and TCF bleaching*. Tappi J. 1995;78 (12):99–109. ISBN: 978-952-5216-30-1.
- Drew, R., and J. Frangos. *Human Health Assessment – Bel Bay Pulp Mill Effluent*, Document TR081205-RJF, Toxicos Toxicology Consultants, July 2006.
- Engwall, M., D. Broman, L. Dencker, C. Näf, Y. Zebühr, and B. Brunström. 1997. *Toxic potencies of extracts of sediment and settling particulate matter collected in the recipient of ableached mill effluent before and after abandoning chlorine bleaching*. Environmental Toxicology and Chemistry, 16:1187-1194
- Environmental Protection Agency, Water Quality Office: *The Impact of Oily Materials on Activated Sludge Systems,* Water Pollution Control Research Series, Project 12050 DSH, March 1971.
- European Commission, Joint Research Centre, Institute for Prospective Technological Studies. Integrated Pollution and Prevention Control. *Best Available Techniques (BAT) reference document for the production of pulp, paper and board*. 2015

- Grimvall, A., K. Laniewski, H. Borén, S. Jonsson, and S. Kaugare. 1994. *Organohalogens of natural or unknown origin in surface water and precipitation*. Toxicology and Environmental Chemistry. 46:183-196
- Herstad Svärd S, Basta J, Wäne G, Jour P. *Comparative characterization of the bleach plant effluents from modern ECF bleaching—eucalyptus and softwood pulps*. In: 30th pulp & paper annual meeting, ABTCP. 3–7 November 1997, Sâo Paulo, Brazil; pp. 49–62
- Hynninen P. Effluent treatment. In: Dahl O, editor. *Environmental management and control*. 1st Ed. Paperi ja Puu Oy; Helsinki; 2008. pp. 86–116
- International Finance Corporation (IFC). *Environmental, health, and safety guidelines pulp and paper mills*. 2007
- Juuti, S., T. Vartiainen, P. Joutsenoja, and J. Ruuskanen. 1996. *Volatile organochlorine compounds formed in the bleaching of pulp with ClO_2*, Chemosphere, 33:437-448
- Lehtinen K. *Relationship of the technical development of pulping and bleaching to effluent quality and aquatic toxicity*. In: Borton DL, Hall T, Fisher R, Thomas J, editors. Pulp & paper mill effluent environmental fate & effects. Destech Publications Inc.; Lancaster-PA; 2004.
- Logan BE. 1998. A review of chlorate- and perchlorate-respiring microorganisms. Biorem J 2(2):69 79
- McDonough, T. J., TAPPI J., 78(3): 55 (1995).
- Mounteer AH, Passos FML, Borges AC, Silva DO. *Detecting structural and functional differences in activated sludge bacterial communities originating from laboratory treatment of elementally and totally chlorine-free bleaching effluents*. Can J Microbiol. 2002; 48(3):245–55.
- National Research Council (US) Committee on Oil in the Sea: *III: Inputs, Fates, and Effect*s, National Academies Press (US); Washington (DC): 2003
- Pryke, D., et. Al.: *"ECF and TCF: Toxicity: an Analysis of Recent Published Data".* The Alliance for Environmental Technology (International Association) joint research, October 1994.
- Ragnar M, Lindström ME. *A comparison of emerging technologies*. Pap ja Puu. 2004; 86(1):39–44.
- Smith, T.J., R.H. Wearne and A.F.A. Wallis. 1994b. *Characteristics of the chlorinated organic substances in filtrates from bleaching of oxygen-delignified eucalypt kraft pulp*. Water Science and Technology, 29:61-71.

- Solomon, K., H. Bergman, R. Hugget, D. Mackay, and B. McKague. 1993. *A review and assessment of the ecological risks associated with the use of chlorine dioxide for the bleaching of pulp*. Report prepared for the Alliance for Environmental Technology, October, 1993.
- Solomon, K., D. Bright, P. Hodson, K.J. Lehtinen, B. McKague, and J. Rodgers. 2000. *Evaluation of Ecological Risks Associated with the use of Chlorine Dioxide for the Bleaching of Pulp: Scientific Progress Since 1993*. Report prepared for the Alliance for Environmental Technology, January, 2000.
- Souza L, Mounteer AH, Silva C., Dalvi L. *A study on biological removal of recalcitrant organic matter in eucalyptus kraft pulp ECF bleaching filtrates*. In: Tappi International Environmental Conference, CD-ROM. Atlanta, GA (USA): Tappi Press; 3–5 May 2003, pp. 1–8.
- Springer A. *Industrial environmental control: Pulp and paper industry*. 3rd Ed. Atlanta, GA (USA): TAPPI Press; 2000.
- Tarkpea, Maria; et al. *Toxicity of conventional, elemental chlorine-free, and totally chlorine–free kraft-pulp bleaching effluents assessed by short-term lethal and sub-leathal bioassays*". Environmental Toxicology and Chemistry. **18** (11): 2487–2496, 1999).
- Teleman A, Hausalo T, Tenkanen M, Vuorinen T. *Identification of the acidic degradation products of hexenuronic acid and characterisation of hexenuronic acid-substituted xylooligosaccharides by NMR spectroscopy.* Carbohydr Res. 1996; 280(2):197–208. doi:10.1016/0008-6215(95)00309-6.
- Ventorim G, Oliveira KD, Colodette JL, Da Costa MM. *Effect of pulp kappa number, lignin and hexenuronic acid contents on oxygen delignification performance*. Sci For Sci. 2006;71:87–97.
- Xu J, Trimble JJ, Steinberg L, et al. 2004. Chlorate and nitrate reduction pathways are separately induced in the perchlorate-respiring bacterium Dechlorosoma sp. KJ and the chlorate-respiring bacterium Pseudomonas sp. PDA. Water Res 38:673-680
- Yousefian S, Reeve D. *Classes of compounds responsible for COD and colour in bleached kraft mill effluents*. In: International environemental conference & exhibit: Setting the environmental course for the 21st century. 6–10 May 2000, Denver, CO (USA); pp. 657–65.

1.6 SIGNATURES

Signature 

Name: Ken Frei (OIQ #123617)
Title: Principal Consultant, Process & Environment

Signature 

Name: Guy R. Martin (OIQ # 040521)
Title: Vice-President, Consulting Services

Fresh Water

Northern Pulp Nova Scotia Corporation
Focus Report
October 2019 | 17-6461

DILLON CONSULTING

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 43013552
Your Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your C.O.C. #: 656364-01-01

Attention: Penny Allen

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
B3S 1B3

Report Date: 2018/05/04
Report #: R5103280
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B893755
Received: 2018/04/25, 09:52

Sample Matrix: Drinking Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	3	N/A	2018/04/26	N/A	SM 22 4500-CO2 D
Alkalinity	3	N/A	2018/05/02	ATL SOP 00013	EPA 310.2 R1974 m
Carbonaceous BOD	2	2018/04/26	2018/05/01	ATL SOP 00041	SM 22 5210B m
Chloride	2	N/A	2018/05/02	ATL SOP 00014	SM 22 4500-Cl- E m
Chloride	1	N/A	2018/05/03	ATL SOP 00014	SM 22 4500-Cl- E m
Chemical Oxygen Demand (COD)	2	N/A	2018/05/03	ATL SOP 00042	SM 22 5220D m
TC/EC Drinking Water CFU/100mL	3	N/A	2018/04/25	ATL SOP 00096	OMOE E3407 V5.2
Colour	3	N/A	2018/05/03	ATL SOP 00020	SM 22 2120C m
Conductance - water	3	N/A	2018/04/26	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	2	2018/04/26	2018/04/26	ATL SOP 00113	Atl. RBCA v3.1 m
Fluoride	3	N/A	2018/04/26	ATL SOP 00043	SM 23 4500-F- C m
Hardness (calculated as CaCO3)	3	N/A	2018/04/27	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	3	2018/04/26	2018/04/26	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	3	N/A	2018/05/03	N/A	Auto Calc.
Anion and Cation Sum	3	N/A	2018/05/03	N/A	Auto Calc.
Nitrogen Ammonia - water	3	N/A	2018/05/02	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	3	N/A	2018/05/03	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	3	N/A	2018/05/02	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N)	3	N/A	2018/05/04	ATL SOP 00018	ASTM D3867-16
pH (1)	3	N/A	2018/04/26	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	3	N/A	2018/05/02	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	2	N/A	2018/05/01	ATL SOP 00118	Atl. RBCA v3.1 m
Sat. pH and Langelier Index (@ 20C)	3	N/A	2018/05/03	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	3	N/A	2018/05/03	ATL SOP 00049	Auto Calc.
Reactive Silica	3	N/A	2018/05/02	ATL SOP 00022	EPA 366.0 m
Sulphate	3	N/A	2018/05/03	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc)	3	N/A	2018/05/03	N/A	Auto Calc.
Organic carbon - Total (TOC) (2)	3	N/A	2018/04/26	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	2	N/A	2018/05/02	N/A	Atl. RBCA v3 m

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 43013552
Your Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your C.O.C. #: 656364-01-01

Attention: Penny Allen

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
B3S 1B3

Report Date: 2018/05/04
Report #: R5103280
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B893755
Received: 2018/04/25, 09:52

Sample Matrix: Drinking Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Total Suspended Solids	2	2018/05/01	2018/05/02	ATL SOP 00007	SM 22 2540D m
Turbidity	3	N/A	2018/04/26	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(2) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 43013552
Your Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your C.O.C. #: 656364-01-01

Attention: Penny Allen

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
B3S 1B3

Report Date: 2018/05/04
Report #: R5103280
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B893755
Received: 2018/04/25, 09:52

Encryption Key



Maxxam
04 May 2018 13:48:54

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: MComeau@maxxam.ca
Phone# (902) 420-0203
==========

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

RESULTS OF ANALYSES OF DRINKING WATER

Maxxam ID				GNN275		
Sampling Date				2018/04/24 14:45		
COC Number				656364-01-01		
	UNITS	MAC	AO	RAW H2O DEPT. 8	RDL	QC Batch
Calculated Parameters						
Anion Sum	me/L	-	-	1.28	N/A	5500108
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	19	1.0	5500104
Calculated TDS	mg/L	-	500	76	1.0	5500112
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	ND	1.0	5500104
Cation Sum	me/L	-	-	1.29	N/A	5500108
Hardness (CaCO3)	mg/L	-	-	26	1.0	5500106
Ion Balance (% Difference)	%	-	-	0.390	N/A	5500107
Langelier Index (@ 20C)	N/A	-	-	-1.97		5500110
Langelier Index (@ 4C)	N/A	-	-	-2.22		5500111
Nitrate (N)	mg/L	**10**	-	0.22	0.050	5500109
Saturation pH (@ 20C)	N/A	-	-	9.22		5500110
Saturation pH (@ 4C)	N/A	-	-	9.47		5500111
Inorganics						
Total Alkalinity (Total as CaCO3)	mg/L	-	-	19	5.0	5511380
Carbonaceous BOD	mg/L	-	-	ND	5.0	5502249
Total Chemical Oxygen Demand	mg/L	-	-	9.9	5.0	5513173
Dissolved Chloride (Cl)	mg/L	-	250	26	1.0	5511384

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,AO: Guideline - Summary of Guidelines for Canadian Drinking Water Quality (SGCDWQ), Health Canada, Feb. 2017

MAC= Maximum Acceptable Concentration (MAC) - established for substances that are known or suspected to cause adverse effects on health.

AO= Aesthetic Objectives (AO) - apply to characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water.

Note 1 Turbidity guideline value of 0.3 NTU based on conventional treatment system. For slow sand or diatomaceous earth filtration 1.0 NTU and for membrane filtration 0.1 NTU.
Note 2 Aluminum guideline value of 0.1 mg/L is for treatment plants using aluminum-based coagulants, 0.2mg/L applies to other types of treatment systems.

N/A = Not Applicable

ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

RESULTS OF ANALYSES OF DRINKING WATER

Maxxam ID				GNN275		
Sampling Date				2018/04/24 14:45		
COC Number				656364-01-01		
	UNITS	MAC	AO	RAW H2O DEPT. 8	RDL	QC Batch
Colour	TCU	-	15	15	5.0	5511395
Dissolved Fluoride (F-)	mg/L	**1.5**	-	ND	0.10	5502208
Nitrate + Nitrite (N)	mg/L	-	-	0.22	0.050	5511404
Nitrite (N)	mg/L	**1**	-	ND	0.010	5511407
Nitrogen (Ammonia Nitrogen)	mg/L	-	-	ND	0.050	5511259
Total Organic Carbon (C)	mg/L	-	-	3.8	0.50	5502220
Orthophosphate (P)	mg/L	-	-	ND	0.010	5511396
pH	pH	-	7.0 : 10.5	7.25	N/A	5502206
Reactive Silica (SiO2)	mg/L	-	-	2.8	0.50	5511390
Total Suspended Solids	mg/L	-	-	6.4	1.0	5508910
Dissolved Sulphate (SO4)	mg/L	-	500	7.5	2.0	5511388
Turbidity	NTU	**0.3**	-	**16**	0.10	5502237
Conductivity	uS/cm	-	-	140	1.0	5502207

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,AO: Guideline - Summary of Guidelines for Canadian Drinking Water Quality (SGCDWQ), Health Canada, Feb. 2017

MAC= Maximum Acceptable Concentration (MAC) - established for substances that are known or suspected to cause adverse effects on health.

AO= Aesthetic Objectives (AO) - apply to characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water.

Note 1 Turbidity guideline value of 0.3 NTU based on conventional treatment system. For slow sand or diatomaceous earth filtration 1.0 NTU and for membrane filtration 0.1 NTU.
Note 2 Aluminum guideline value of 0.1 mg/L is for treatment plants using aluminum-based coagulants, 0.2mg/L applies to other types of treatment systems.

ND = Not detected

N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

ELEMENTS BY ICP/MS (DRINKING WATER)

Maxxam ID				GNN273	GNN274	GNN275		
Sampling Date				2018/04/24 15:00	2018/04/24 11:30	2018/04/24 14:45		
COC Number				656364-01-01	656364-01-01	656364-01-01		
	UNITS	MAC	AO	SCALEHOUSE	MILL LAB	RAW H2O DEPT. 8	RDL	QC Batch
Metals								
Total Aluminum (Al)	ug/L	-	100	ND	110	450	5.0	5502257
Total Antimony (Sb)	ug/L	**6**	-	ND	ND	ND	1.0	5502257
Total Arsenic (As)	ug/L	**10**	-	ND	ND	ND	1.0	5502257
Total Barium (Ba)	ug/L	**1000**	-	270	28	35	1.0	5502257
Total Beryllium (Be)	ug/L	-	-	ND	ND	ND	1.0	5502257
Total Bismuth (Bi)	ug/L	-	-	ND	ND	ND	2.0	5502257
Total Boron (B)	ug/L	**5000**	-	ND	ND	ND	50	5502257
Total Cadmium (Cd)	ug/L	**5**	-	0.020	ND	ND	0.010	5502257
Total Calcium (Ca)	ug/L	-	-	92000	6600	6800	100	5502257
Total Chromium (Cr)	ug/L	**50**	-	ND	ND	ND	1.0	5502257
Total Cobalt (Co)	ug/L	-	-	ND	ND	ND	0.40	5502257
Total Copper (Cu)	ug/L	-	1000	15	ND	4.0	2.0	5502257
Total Iron (Fe)	ug/L	-	300	160	ND	450	50	5502257
Total Lead (Pb)	ug/L	**10**	-	0.88	ND	ND	0.50	5502257
Total Magnesium (Mg)	ug/L	-	-	14000	1900	2000	100	5502257
Total Manganese (Mn)	ug/L	-	50	270	10	41	2.0	5502257
Total Molybdenum (Mo)	ug/L	-	-	2.5	ND	ND	2.0	5502257
Total Nickel (Ni)	ug/L	-	-	ND	ND	ND	2.0	5502257
Total Phosphorus (P)	ug/L	-	-	ND	ND	ND	100	5502257

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,AO: Guideline - Summary of Guidelines for Canadian Drinking Water Quality (SGCDWQ), Health Canada, Feb. 2017

MAC= Maximum Acceptable Concentration (MAC) - established for substances that are known or suspected to cause adverse effects on health.

AO= Aesthetic Objectives (AO) - apply to characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water.

Note 1 Turbidity guideline value of 0.3 NTU based on conventional treatment system. For slow sand or diatomaceous earth filtration 1.0 NTU and for membrane filtration 0.1 NTU.
Note 2 Aluminum guideline value of 0.1 mg/L is for treatment plants using aluminum-based coagulants, 0.2mg/L applies to other types of treatment systems.

ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

ELEMENTS BY ICP/MS (DRINKING WATER)

Maxxam ID				GNN273	GNN274	GNN275		
Sampling Date				2018/04/24 15:00	2018/04/24 11:30	2018/04/24 14:45		
COC Number				656364-01-01	656364-01-01	656364-01-01		
	UNITS	MAC	AO	SCALEHOUSE	MILL LAB	RAW H2O DEPT. 8	RDL	QC Batch
Total Potassium (K)	ug/L	-	-	3100	650	780	100	5502257
Total Selenium (Se)	ug/L	50	-	ND	ND	ND	1.0	5502257
Total Silver (Ag)	ug/L	-	-	ND	ND	ND	0.10	5502257
Total Sodium (Na)	ug/L	-	200000	77000	23000	17000	100	5502257
Total Strontium (Sr)	ug/L	-	-	460	31	33	2.0	5502257
Total Thallium (Tl)	ug/L	-	-	ND	ND	ND	0.10	5502257
Total Tin (Sn)	ug/L	-	-	ND	ND	ND	2.0	5502257
Total Titanium (Ti)	ug/L	-	-	ND	ND	8.8	2.0	5502257
Total Uranium (U)	ug/L	20	-	3.2	ND	ND	0.10	5502257
Total Vanadium (V)	ug/L	-	-	ND	ND	ND	2.0	5502257
Total Zinc (Zn)	ug/L	-	5000	9.1	5.9	ND	5.0	5502257

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,AO: Guideline - Summary of Guidelines for Canadian Drinking Water Quality (SGCDWQ), Health Canada, Feb. 2017

MAC= Maximum Acceptable Concentration (MAC) - established for substances that are known or suspected to cause adverse effects on health.

AO= Aesthetic Objectives (AO) - apply to characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water.

Note 1 Turbidity guideline value of 0.3 NTU based on conventional treatment system. For slow sand or diatomaceous earth filtration 1.0 NTU and for membrane filtration 0.1 NTU.
Note 2 Aluminum guideline value of 0.1 mg/L is for treatment plants using aluminum-based coagulants, 0.2mg/L applies to other types of treatment systems.

ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

ATLANTIC RBCA HYDROCARBONS (DRINKING WATER)

Maxxam ID				GNN274	GNN275		
Sampling Date				2018/04/24 11:30	2018/04/24 14:45		
COC Number				656364-01-01	656364-01-01		
	UNITS	MAC	AO	MILL LAB	RAW H2O DEPT. 8	RDL	QC Batch
Petroleum Hydrocarbons							
Benzene	mg/L	**0.005**	-	ND	ND	0.0010	5508798
Toluene	mg/L	**0.06**	0.024	ND	ND	0.0010	5508798
Ethylbenzene	mg/L	**0.14**	0.0016	ND	ND	0.0010	5508798
Total Xylenes	mg/L	**0.09**	0.02	ND	ND	0.0020	5508798
C6 - C10 (less BTEX)	mg/L	-	-	ND	ND	0.010	5508798
>C10-C16 Hydrocarbons	mg/L	-	-	ND	ND	0.050	5502235
>C16-C21 Hydrocarbons	mg/L	-	-	ND	ND	0.050	5502235
>C21-<C32 Hydrocarbons	mg/L	-	-	ND	ND	0.10	5502235
Modified TPH (Tier1)	mg/L	-	-	ND	ND	0.10	5500167
Reached Baseline at C32	mg/L	-	-	NA	NA	N/A	5502235
Hydrocarbon Resemblance	mg/L	-	-	NA	NA	N/A	5502235
Surrogate Recovery (%)							
Isobutylbenzene - Extractable	%	-	-	84	95		5502235
n-Dotriacontane - Extractable	%	-	-	104	110		5502235
Isobutylbenzene - Volatile	%	-	-	89	73		5508798

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,AO: Guideline - Summary of Guidelines for Canadian Drinking Water Quality (SGCDWQ), Health Canada, Feb. 2017

MAC= Maximum Acceptable Concentration (MAC) - established for substances that are known or suspected to cause adverse effects on health.

AO= Aesthetic Objectives (AO) - apply to characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water.

Note 1 Turbidity guideline value of 0.3 NTU based on conventional treatment system. For slow sand or diatomaceous earth filtration 1.0 NTU and for membrane filtration 0.1 NTU.
Note 2 Aluminum guideline value of 0.1 mg/L is for treatment plants using aluminum-based coagulants, 0.2mg/L applies to other types of treatment systems.

ND = Not detected

N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

MICROBIOLOGY COLILERT (DRINKING WATER)

Maxxam ID			GNN273	GNN274	GNN275		
Sampling Date			2018/04/24 15:00	2018/04/24 11:30	2018/04/24 14:45		
COC Number			656364-01-01	656364-01-01	656364-01-01		
Registration #				2002-026118			
	UNITS	MAC	SCALEHOUSE	MILL LAB	RAW H2O DEPT. 8	RDL	QC Batch
Microbiological							
Escherichia coli	CFU/100mL	1	ND	ND	ND	1.0	5500127
Total Coliforms	CFU/100mL	1	ND	ND	ND	1.0	5500127

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC: Guideline - Summary of Guidelines for Canadian Drinking Water Quality (SGCDWQ), Health Canada, Feb. 2017

MAC= Maximum Acceptable Concentration (MAC) - established for substances that are known or suspected to cause adverse effects on health.

AO= Aesthetic Objectives (AO) - apply to characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water.

Note 1 Turbidity guideline value of 0.3 NTU based on conventional treatment system. For slow sand or diatomaceous earth filtration 1.0 NTU and for membrane filtration 0.1 NTU.
Note 2 Aluminum guideline value of 0.1 mg/L is for treatment plants using aluminum-based coagulants, 0.2mg/L applies to other types of treatment systems.

ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

GENERAL COMMENTS

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

Package 1	6.0°C
Package 2	3.0°C
Package 3	2.7°C
Package 4	5.3°C
Package 5	4.0°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5500127	LKE	Method Blank	Escherichia coli	2018/04/25	ND, RDL=1.0		CFU/100mL	
			Total Coliforms	2018/04/25	ND, RDL=1.0		CFU/100mL	
5502206	JMV	QC Standard	pH	2018/04/26		101	%	97 - 103
5502206	JMV	RPD	pH	2018/04/26	2.0		%	N/A
5502207	JMV	Spiked Blank	Conductivity	2018/04/26		102	%	80 - 120
5502207	JMV	Method Blank	Conductivity	2018/04/26	ND, RDL=1.0		uS/cm	
5502207	JMV	RPD	Conductivity	2018/04/26	0.24		%	25
5502208	JMV	Matrix Spike	Dissolved Fluoride (F-)	2018/04/26		98	%	80 - 120
5502208	JMV	Spiked Blank	Dissolved Fluoride (F-)	2018/04/26		105	%	80 - 120
5502208	JMV	Method Blank	Dissolved Fluoride (F-)	2018/04/26	ND, RDL=0.10		mg/L	
5502208	JMV	RPD	Dissolved Fluoride (F-)	2018/04/26	0		%	25
5502209	JMV	QC Standard	pH	2018/04/26		100	%	97 - 103
5502209	JMV	RPD	pH	2018/04/26	7.6 (1)		%	N/A
5502210	JMV	Spiked Blank	Conductivity	2018/04/26		101	%	80 - 120
5502210	JMV	Method Blank	Conductivity	2018/04/26	ND, RDL=1.0		uS/cm	
5502210	JMV	RPD	Conductivity	2018/04/26	0.29		%	25
5502211	JMV	Matrix Spike	Dissolved Fluoride (F-)	2018/04/26		100	%	80 - 120
5502211	JMV	Spiked Blank	Dissolved Fluoride (F-)	2018/04/26		102	%	80 - 120
5502211	JMV	Method Blank	Dissolved Fluoride (F-)	2018/04/26	ND, RDL=0.10		mg/L	
5502211	JMV	RPD	Dissolved Fluoride (F-)	2018/04/26	NC		%	25
5502220	LMP	Matrix Spike	Total Organic Carbon (C)	2018/04/26		102	%	85 - 115
5502220	LMP	Spiked Blank	Total Organic Carbon (C)	2018/04/26		100	%	80 - 120
5502220	LMP	Method Blank	Total Organic Carbon (C)	2018/04/26	ND, RDL=0.50		mg/L	
5502220	LMP	RPD	Total Organic Carbon (C)	2018/04/26	3.5		%	15
5502224	LMP	Matrix Spike	Total Organic Carbon (C)	2018/04/26		103	%	85 - 115
5502224	LMP	Spiked Blank	Total Organic Carbon (C)	2018/04/26		99	%	80 - 120
5502224	LMP	Method Blank	Total Organic Carbon (C)	2018/04/26	ND, RDL=0.50		mg/L	
5502224	LMP	RPD	Total Organic Carbon (C)	2018/04/26	3.7		%	15
5502235	MGN	Matrix Spike	Isobutylbenzene - Extractable	2018/04/26		103	%	30 - 130
			n-Dotriacontane - Extractable	2018/04/26		116	%	30 - 130
			>C10-C16 Hydrocarbons	2018/04/26		107	%	70 - 130
			>C16-C21 Hydrocarbons	2018/04/26		101	%	70 - 130
			>C21-<C32 Hydrocarbons	2018/04/26		123	%	70 - 130
5502235	MGN	Spiked Blank	Isobutylbenzene - Extractable	2018/04/26		95	%	30 - 130
			n-Dotriacontane - Extractable	2018/04/26		110	%	30 - 130
			>C10-C16 Hydrocarbons	2018/04/26		102	%	70 - 130
			>C16-C21 Hydrocarbons	2018/04/26		101	%	70 - 130
			>C21-<C32 Hydrocarbons	2018/04/26		121	%	70 - 130
5502235	MGN	Method Blank	Isobutylbenzene - Extractable	2018/04/26		90	%	30 - 130
			n-Dotriacontane - Extractable	2018/04/26		105	%	30 - 130
			>C10-C16 Hydrocarbons	2018/04/26	ND, RDL=0.050		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C16-C21 Hydrocarbons	2018/04/26	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2018/04/26	ND, RDL=0.10		mg/L	
5502235	MGN	RPD	>C10-C16 Hydrocarbons	2018/04/26	NC		%	40
			>C16-C21 Hydrocarbons	2018/04/26	NC		%	40
			>C21-<C32 Hydrocarbons	2018/04/26	NC		%	40
5502237	JMV	QC Standard	Turbidity	2018/04/26		104	%	80 - 120
5502237	JMV	Spiked Blank	Turbidity	2018/04/26		93	%	80 - 120
5502237	JMV	Method Blank	Turbidity	2018/04/26	ND, RDL=0.10		NTU	
5502237	JMV	RPD	Turbidity	2018/04/26	4.7		%	20
5502249	MGR	QC Standard	Carbonaceous BOD	2018/05/01		117	%	80 - 120
5502249	MGR	Spiked Blank	Carbonaceous BOD	2018/05/01		107	%	80 - 120
5502249	MGR	Method Blank	Carbonaceous BOD	2018/05/01	ND, RDL=2.0		mg/L	
5502249	MGR	RPD	Carbonaceous BOD	2018/05/01	NC		%	25
5502257	BAN	Matrix Spike	Total Aluminum (Al)	2018/04/26		100	%	80 - 120
			Total Antimony (Sb)	2018/04/26		103	%	80 - 120
			Total Arsenic (As)	2018/04/26		98	%	80 - 120
			Total Barium (Ba)	2018/04/26		98	%	80 - 120
			Total Beryllium (Be)	2018/04/26		103	%	80 - 120
			Total Bismuth (Bi)	2018/04/26		101	%	80 - 120
			Total Boron (B)	2018/04/26		102	%	80 - 120
			Total Cadmium (Cd)	2018/04/26		100	%	80 - 120
			Total Calcium (Ca)	2018/04/26		NC	%	80 - 120
			Total Chromium (Cr)	2018/04/26		99	%	80 - 120
			Total Cobalt (Co)	2018/04/26		99	%	80 - 120
			Total Copper (Cu)	2018/04/26		97	%	80 - 120
			Total Iron (Fe)	2018/04/26		104	%	80 - 120
			Total Lead (Pb)	2018/04/26		101	%	80 - 120
			Total Magnesium (Mg)	2018/04/26		103	%	80 - 120
			Total Manganese (Mn)	2018/04/26		98	%	80 - 120
			Total Molybdenum (Mo)	2018/04/26		104	%	80 - 120
			Total Nickel (Ni)	2018/04/26		102	%	80 - 120
			Total Phosphorus (P)	2018/04/26		106	%	80 - 120
			Total Potassium (K)	2018/04/26		103	%	80 - 120
			Total Selenium (Se)	2018/04/26		100	%	80 - 120
			Total Silver (Ag)	2018/04/26		103	%	80 - 120
			Total Sodium (Na)	2018/04/26		98	%	80 - 120
			Total Strontium (Sr)	2018/04/26		NC	%	80 - 120
			Total Thallium (Tl)	2018/04/26		102	%	80 - 120
			Total Tin (Sn)	2018/04/26		102	%	80 - 120
			Total Titanium (Ti)	2018/04/26		100	%	80 - 120
			Total Uranium (U)	2018/04/26		105	%	80 - 120
			Total Vanadium (V)	2018/04/26		101	%	80 - 120
			Total Zinc (Zn)	2018/04/26		97	%	80 - 120
5502257	BAN	Spiked Blank	Total Aluminum (Al)	2018/04/26		102	%	80 - 120
			Total Antimony (Sb)	2018/04/26		103	%	80 - 120
			Total Arsenic (As)	2018/04/26		99	%	80 - 120
			Total Barium (Ba)	2018/04/26		99	%	80 - 120

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Beryllium (Be)	2018/04/26		102	%	80 - 120
			Total Bismuth (Bi)	2018/04/26		102	%	80 - 120
			Total Boron (B)	2018/04/26		104	%	80 - 120
			Total Cadmium (Cd)	2018/04/26		101	%	80 - 120
			Total Calcium (Ca)	2018/04/26		105	%	80 - 120
			Total Chromium (Cr)	2018/04/26		101	%	80 - 120
			Total Cobalt (Co)	2018/04/26		101	%	80 - 120
			Total Copper (Cu)	2018/04/26		101	%	80 - 120
			Total Iron (Fe)	2018/04/26		108	%	80 - 120
			Total Lead (Pb)	2018/04/26		101	%	80 - 120
			Total Magnesium (Mg)	2018/04/26		108	%	80 - 120
			Total Manganese (Mn)	2018/04/26		102	%	80 - 120
			Total Molybdenum (Mo)	2018/04/26		105	%	80 - 120
			Total Nickel (Ni)	2018/04/26		102	%	80 - 120
			Total Phosphorus (P)	2018/04/26		106	%	80 - 120
			Total Potassium (K)	2018/04/26		105	%	80 - 120
			Total Selenium (Se)	2018/04/26		100	%	80 - 120
			Total Silver (Ag)	2018/04/26		98	%	80 - 120
			Total Sodium (Na)	2018/04/26		103	%	80 - 120
			Total Strontium (Sr)	2018/04/26		102	%	80 - 120
			Total Thallium (Tl)	2018/04/26		102	%	80 - 120
			Total Tin (Sn)	2018/04/26		103	%	80 - 120
			Total Titanium (Ti)	2018/04/26		100	%	80 - 120
			Total Uranium (U)	2018/04/26		105	%	80 - 120
			Total Vanadium (V)	2018/04/26		102	%	80 - 120
			Total Zinc (Zn)	2018/04/26		100	%	80 - 120
5502257	BAN	Method Blank	Total Aluminum (Al)	2018/04/26	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2018/04/26	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2018/04/26	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2018/04/26	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2018/04/26	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Boron (B)	2018/04/26	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2018/04/26	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2018/04/26	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2018/04/26	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2018/04/26	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2018/04/26	ND, RDL=2.0		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Iron (Fe)	2018/04/26	ND, RDL=50		ug/L	
			Total Lead (Pb)	2018/04/26	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2018/04/26	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2018/04/26	ND, RDL=100		ug/L	
			Total Potassium (K)	2018/04/26	ND, RDL=100		ug/L	
			Total Selenium (Se)	2018/04/26	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2018/04/26	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2018/04/26	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2018/04/26	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2018/04/26	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2018/04/26	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2018/04/26	ND, RDL=5.0		ug/L	
5502257	BAN	RPD	Total Aluminum (Al)	2018/04/26	NC		%	20
			Total Antimony (Sb)	2018/04/26	NC		%	20
			Total Arsenic (As)	2018/04/26	12		%	20
			Total Barium (Ba)	2018/04/26	0.62		%	20
			Total Beryllium (Be)	2018/04/26	NC		%	20
			Total Bismuth (Bi)	2018/04/26	NC		%	20
			Total Boron (B)	2018/04/26	NC		%	20
			Total Cadmium (Cd)	2018/04/26	NC		%	20
			Total Calcium (Ca)	2018/04/26	2.3		%	20
			Total Chromium (Cr)	2018/04/26	NC		%	20
			Total Cobalt (Co)	2018/04/26	NC		%	20
			Total Copper (Cu)	2018/04/26	4.6		%	20
			Total Iron (Fe)	2018/04/26	NC		%	20
			Total Lead (Pb)	2018/04/26	NC		%	20
			Total Magnesium (Mg)	2018/04/26	2.9		%	20

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2018/04/26	0.36		%	20
			Total Molybdenum (Mo)	2018/04/26	NC		%	20
			Total Nickel (Ni)	2018/04/26	NC		%	20
			Total Phosphorus (P)	2018/04/26	NC		%	20
			Total Potassium (K)	2018/04/26	2.8		%	20
			Total Selenium (Se)	2018/04/26	NC		%	20
			Total Silver (Ag)	2018/04/26	NC		%	20
			Total Sodium (Na)	2018/04/26	1.5		%	20
			Total Strontium (Sr)	2018/04/26	2.1		%	20
			Total Thallium (Tl)	2018/04/26	NC		%	20
			Total Tin (Sn)	2018/04/26	NC		%	20
			Total Titanium (Ti)	2018/04/26	NC		%	20
			Total Uranium (U)	2018/04/26	5.7		%	20
			Total Vanadium (V)	2018/04/26	NC		%	20
			Total Zinc (Zn)	2018/04/26	NC		%	20
5508798	MS3	Matrix Spike [GNN275-09]	Isobutylbenzene - Volatile	2018/05/01		86	%	70 - 130
			Benzene	2018/05/01		106	%	70 - 130
			Toluene	2018/05/01		108	%	70 - 130
			Ethylbenzene	2018/05/01		103	%	70 - 130
			Total Xylenes	2018/05/01		101	%	70 - 130
5508798	MS3	Spiked Blank	Isobutylbenzene - Volatile	2018/05/01		78	%	70 - 130
			Benzene	2018/05/01		115	%	70 - 130
			Toluene	2018/05/01		111	%	70 - 130
			Ethylbenzene	2018/05/01		100	%	70 - 130
			Total Xylenes	2018/05/01		97	%	70 - 130
5508798	MS3	Method Blank	Isobutylbenzene - Volatile	2018/05/02		98	%	70 - 130
			Benzene	2018/05/02	ND, RDL=0.0010		mg/L	
			Toluene	2018/05/02	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2018/05/02	ND, RDL=0.0010		mg/L	
			Total Xylenes	2018/05/02	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2018/05/02	ND, RDL=0.010		mg/L	
5508798	MS3	RPD [GNN274-09]	Benzene	2018/05/01	NC		%	40
			Toluene	2018/05/01	NC		%	40
			Ethylbenzene	2018/05/01	NC		%	40
			Total Xylenes	2018/05/01	NC		%	40
			C6 - C10 (less BTEX)	2018/05/01	NC		%	40
5508910	AM6	QC Standard	Total Suspended Solids	2018/05/02		101	%	80 - 120
5508910	AM6	Method Blank	Total Suspended Solids	2018/05/02	ND, RDL=1.0		mg/L	
5508910	AM6	RPD	Total Suspended Solids	2018/05/02	2.4		%	20
5511259	MCN	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2018/05/02		100	%	80 - 120
5511259	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2018/05/02		97	%	80 - 120
5511259	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2018/05/02	ND, RDL=0.050		mg/L	
5511259	MCN	RPD	Nitrogen (Ammonia Nitrogen)	2018/05/02	18		%	20

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5511380	MCN	Matrix Spike	Total Alkalinity (Total as CaCO3)	2018/05/02		NC	%	80 - 120
5511380	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2018/05/02		102	%	80 - 120
5511380	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2018/05/02	ND, RDL=5.0		mg/L	
5511380	MCN	RPD	Total Alkalinity (Total as CaCO3)	2018/05/02	0.35 (2)		%	25
5511384	MCN	Matrix Spike	Dissolved Chloride (Cl)	2018/05/03		NC	%	80 - 120
5511384	MCN	QC Standard	Dissolved Chloride (Cl)	2018/05/03		107	%	80 - 120
5511384	MCN	Spiked Blank	Dissolved Chloride (Cl)	2018/05/02		98	%	80 - 120
5511384	MCN	Method Blank	Dissolved Chloride (Cl)	2018/05/02	ND, RDL=1.0		mg/L	
5511384	MCN	RPD	Dissolved Chloride (Cl)	2018/05/03	0.41		%	25
5511388	MCN	Matrix Spike	Dissolved Sulphate (SO4)	2018/05/03		NC	%	80 - 120
5511388	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2018/05/03		96	%	80 - 120
5511388	MCN	Method Blank	Dissolved Sulphate (SO4)	2018/05/03	ND, RDL=2.0		mg/L	
5511388	MCN	RPD	Dissolved Sulphate (SO4)	2018/05/03	1.6 (2)		%	25
5511390	MCN	Matrix Spike	Reactive Silica (SiO2)	2018/05/02		86	%	80 - 120
5511390	MCN	Spiked Blank	Reactive Silica (SiO2)	2018/05/02		95	%	80 - 120
5511390	MCN	Method Blank	Reactive Silica (SiO2)	2018/05/02	ND, RDL=0.50		mg/L	
5511390	MCN	RPD	Reactive Silica (SiO2)	2018/05/02	19		%	25
5511395	MCN	Spiked Blank	Colour	2018/05/03		98	%	80 - 120
5511395	MCN	Method Blank	Colour	2018/05/03	ND, RDL=5.0		TCU	
5511395	MCN	RPD	Colour	2018/05/03	2.6		%	20
5511396	MCN	Matrix Spike	Orthophosphate (P)	2018/05/02		89	%	80 - 120
5511396	MCN	Spiked Blank	Orthophosphate (P)	2018/05/02		96	%	80 - 120
5511396	MCN	Method Blank	Orthophosphate (P)	2018/05/02	ND, RDL=0.010		mg/L	
5511396	MCN	RPD	Orthophosphate (P)	2018/05/02	NC		%	25
5511404	MCN	Matrix Spike	Nitrate + Nitrite (N)	2018/05/03		93	%	80 - 120
5511404	MCN	Spiked Blank	Nitrate + Nitrite (N)	2018/05/03		97	%	80 - 120
5511404	MCN	Method Blank	Nitrate + Nitrite (N)	2018/05/03	ND, RDL=0.050		mg/L	
5511404	MCN	RPD	Nitrate + Nitrite (N)	2018/05/03	1.6		%	25
5511407	MCN	Matrix Spike	Nitrite (N)	2018/05/02		88	%	80 - 120
5511407	MCN	Spiked Blank	Nitrite (N)	2018/05/02		99	%	80 - 120
5511407	MCN	Method Blank	Nitrite (N)	2018/05/02	ND, RDL=0.010		mg/L	
5511407	MCN	RPD	Nitrite (N)	2018/05/02	NC		%	25
5513173	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2018/05/03		102	%	80 - 120
5513173	ZZH	QC Standard	Total Chemical Oxygen Demand	2018/05/03		103	%	80 - 120
5513173	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2018/05/03		103	%	80 - 120
5513173	ZZH	Method Blank	Total Chemical Oxygen Demand	2018/05/03	ND, RDL=5.0		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5513173	ZZH	RPD	Total Chemical Oxygen Demand	2018/05/03	NC		%	25

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) Poor duplicate results due to sample matrix, results confirmed by repeat analysis.

(2) Elevated reporting limit due to sample matrix.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

VALIDATION SIGNATURE PAGE

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

Jason Wang, Bedford Micro

Kevin MacDonald, Inorganics Supervisor

Rosemarie MacDonald, Scientific Specialist (Organics)

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B893755
Report Date: 2018/05/04

Dillon Consulting Limited
Client Project #: 18-7281-1000
Site Location: NORTHERN PULP
Your P.O. #: 43013552
Sampler Initials: JAM

RESULTS OF ANALYSES OF DRINKING WATER

Maxxam ID				GNN273			GNN274		
Sampling Date				2018/04/24 15:00			2018/04/24 11:30		
COC Number				656364-01-01			656364-01-01		
	UNITS	MAC	AO	SCALEHOUSE	RDL	QC Batch	MILL LAB	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	9.48	N/A	5500108	1.57	N/A	5500108
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	230	1.0	5500104	16	1.0	5500104
Calculated TDS	mg/L	-	500	520	1.0	5500112	95	1.0	5500112
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	ND	1.0	5500104	ND	1.0	5500104
Cation Sum	me/L	-	-	9.24	N/A	5500108	1.51	N/A	5500108
Hardness (CaCO3)	mg/L	-	-	290	1.0	5500106	24	1.0	5500106
Ion Balance (% Difference)	%	-	-	1.28	N/A	5500107	1.95	N/A	5500107
Langelier Index (@ 20C)	N/A	-	-	0.481		5500110	-2.20		5500110
Langelier Index (@ 4C)	N/A	-	-	0.233		5500111	-2.45		5500111
Nitrate (N)	mg/L	**10**	-	ND	0.050	5500109	0.22	0.050	5500109
Saturation pH (@ 20C)	N/A	-	-	7.15		5500110	9.32		5500110
Saturation pH (@ 4C)	N/A	-	-	7.40		5500111	9.57		5500111
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	-	-	230 (1)	25	5511380	16	5.0	5511380
Carbonaceous BOD	mg/L	-	-				ND	5.0	5502249
Total Chemical Oxygen Demand	mg/L	-	-				ND	5.0	5513173
Dissolved Chloride (Cl)	mg/L	-	250	160	1.0	5511384	27	1.0	5511384
Colour	TCU	-	15	ND	5.0	5511395	ND	5.0	5511395

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,AO: Guideline - Summary of Guidelines for Canadian Drinking Water Quality (SGCDWQ), Health Canada, Feb. 2017

MAC= Maximum Acceptable Concentration (MAC) - established for substances that are known or suspected to cause adverse effects on health.

AO= Aesthetic Objectives (AO) - apply to characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water.

Note 1 Turbidity guideline value of 0.3 NTU based on conventional treatment system. For slow sand or diatomaceous earth filtration 1.0 NTU and for membrane filtration 0.1 NTU.
Note 2 Aluminum guideline value of 0.1 mg/L is for treatment plants using aluminum-based coagulants, 0.2mg/L applies to other types of treatment systems.

N/A = Not Applicable

ND = Not detected

(1) Elevated reporting limit due to sample matrix.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11720 Dillon Consulting Limited	Quotation #	B62271	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Penny Allen	P.O. #	43008169	B893755	656364
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	137 Chain Lake Dr Suite 100 Halifax NS B3S 1B3	Project #	18-7281-1000	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 x Fax:	Phone	(902) 450-4000 x Fax: (902) 450-2008 x	Project Name		C#656364-01-01	Maryann Comeau
Email	AP@northernpulp.com	Email	pallen@dillon.ca, kregan@dillin.ca	Site #	Northern Pulp		
				Sampled By	JAM/AUR		

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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: ☐

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	Atlantic RCAp-MS Total Metals in Water	Fluoride	TC/EC Drinking Water CFU/100mL	RBCA Hydrocarbons in Water	Total Suspended Solids	Carbonaceous BOD	Chemical Oxygen Demand (COD)	# of Bottles	Comments / Hazards / Other Required Analysis
1		~~Construction Gate (Reg # 2002-026118)~~						X	X	X						NOT COLLECTED
2		Scalehouse (Reg # 2002-026118)	04/24/18	3:00pm	H_2O			X	X	X					4	
3		Mill Lab (Reg # 2002-026118)	04/24/18	11:30am	H_2O			X	X	X	X	X	X	X	12	
4		Raw H2O Dept. 8	04/24/18	2:45pm	H_2O			X	X	X	X	X	X	X	12	
5																
6																
7																
8																
9																2018 APR 25 9:52
10																

* 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?
Asia Reid Asia Reid	18/04/25						☐	See ACTR	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715991-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/05
Report #: R5739943
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9662
Received: 2019/05/15, 13:12

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/05/22	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/05/17	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/05/17	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/16	2019/05/21	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/05/17	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/17	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/05/16	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/05/16	2019/05/16	CAM SOP-00457	OMOE E3015 5 m
Dioxins/Furans in Water (EPS 1/RM/23) (1, 6)	1	2019/05/31	2019/06/02	BRL SOP-00406 (mod)	EPS 1/RM/23 m
Organic carbon - Diss (DOC) (7)	1	N/A	2019/05/16	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/05/22	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/05/16	2019/05/16	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/05/17		
Hardness (calculated as CaCO3)	1	N/A	2019/05/17	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/17	2019/05/17	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/16	2019/05/16	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/05/22	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/05/22	N/A	Auto Calc.
Organic Halogen (Adsorbable) (2)	1	2019/05/16	2019/05/16	PTC SOP-00056	Coulometric - Titr.
Chlorate and Chlorite by IC (3)	1	N/A	2019/05/16	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (4)	1	N/A	2019/05/22	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (3)	1	2019/05/17	2019/05/22	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/05/16	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/05/17	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/05/17	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/05/21	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/16	2019/05/16	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/05/16	2019/05/17	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/05/17	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (5)	1	2019/05/16	2019/05/21		
pH (8)	1	N/A	2019/05/22	ATL SOP 00003	SM 23 4500-H+ B m

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715991-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/05
Report #: R5739943
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9662
Received: 2019/05/15, 13:12

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Phosphorus - ortho	1	N/A	2019/05/20	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	1	N/A	2019/05/21	ATL SOP 00118	Atl. RBCA v3.1 m
Salinity (9)	1	N/A	2019/05/21		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/05/22	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/05/22	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/05/17	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/05/17	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2019/05/17	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/05/21	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/05/16	2019/05/17	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (7)	1	N/A	2019/05/16	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/05/21	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/05/16	2019/05/17	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/16	2019/05/21	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/05/22	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/16	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/05/22	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715991-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/05
Report #: R5739943
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9662
Received: 2019/05/15, 13:12

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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Edm Petrol Offsite
(3) This test was performed by Bedford to Calgary Offsite
(4) This test was performed by Bedford to Burnaby - Offsite
(5) This test was performed by Bedford to Montreal Subcontrac
(6) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(7) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(8) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(9) Non-accredited test method

Encryption Key

Neyousha Shahisavandi
Project Manager Assistant
05 Jun 2019 14:13:36

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

BV Labs Job #: B9C9662
Report Date: 2019/06/05

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	1.11	N/A	N/A	6122693
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	18	1.0	0.20	6122686
Calculated TDS	mg/L	65	1.0	0.20	6122701
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	6122686
Cation Sum	me/L	1.05	N/A	N/A	6122693
Hardness (CaCO3)	mg/L	21	1.0	1.0	6122689
Ion Balance (% Difference)	%	2.78	N/A	N/A	6122691
Langelier Index (@ 20C)	N/A	-2.08			6122697
Langelier Index (@ 4C)	N/A	-2.33			6122699
Nitrate (N)	mg/L	0.32	0.050	N/A	6122695
Saturation pH (@ 20C)	N/A	9.31			6122697
Saturation pH (@ 4C)	N/A	9.56			6122699
Sulphide (as H2S)	mg/L	ND	0.021	0.011	6122964
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	18	5.0	N/A	6124604
Carbonaceous BOD	mg/L	ND	5.0	N/A	6122932
Total Chemical Oxygen Demand	mg/L	ND	20	N/A	6127139
Dissolved Chlorate (ClO3-)	mg/L	ND	0.10	N/A	6134118
Dissolved Chloride (Cl-)	mg/L	20	1.0	N/A	6124605
Dissolved Chlorite (CLO2-)	mg/L	ND	0.10	N/A	6134118
Colour	TCU	26	5.0	N/A	6124568
Total Kjeldahl Nitrogen (TKN)	mg/L	0.13	0.10	0.060	6125745
Nitrate + Nitrite (N)	mg/L	0.32	0.050	N/A	6124610
Nitrite (N)	mg/L	ND	0.010	N/A	6124611
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	N/A	6125246
Dissolved Organic Carbon (C)	mg/L	4.4	0.50	N/A	6124868
Total Organic Carbon (C)	mg/L	4.3	0.50	N/A	6124855
Orthophosphate (P)	mg/L	0.013	0.010	N/A	6124609
pH	pH	7.22	N/A	N/A	6132815
Total Phosphorus	mg/L	ND	0.020	N/A	6124631
Salinity	N/A	ND	2.0	N/A	6130613
Reactive Silica (SiO2)	mg/L	2.7	0.50	N/A	6124608
Total Suspended Solids	mg/L	2.4	1.0	N/A	6124744

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9662
Report Date: 2019/06/05

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Dissolved Sulphate (SO4)	mg/L	7.8	2.0	N/A	6124607
Sulphide	mg/L	ND	0.020	0.010	6127439
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6125117
Turbidity	NTU	14	0.10	0.10	6132843
Volatile Suspended Solids	mg/L	ND	2.0	N/A	6133009
Conductivity	uS/cm	110	1.0	N/A	6132816
Nutritional Parameters					
Total Nitrogen (N)	mg/L	0.489	0.020	N/A	6135156
Organic Halogens					
Adsorbable Organic Halogen	mg/L	0.05	0.01	N/A	6126539
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6125980

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	ND	0.013	N/A	6127107

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	360	5.0	N/A	6124570
Total Antimony (Sb)	ug/L	ND	1.0	N/A	6124570
Total Arsenic (As)	ug/L	ND	1.0	N/A	6124570
Total Barium (Ba)	ug/L	30	1.0	N/A	6124570
Total Beryllium (Be)	ug/L	ND	1.0	N/A	6124570
Total Bismuth (Bi)	ug/L	ND	2.0	N/A	6124570
Total Boron (B)	ug/L	ND	50	N/A	6124570
Total Cadmium (Cd)	ug/L	ND	0.010	N/A	6124570
Total Calcium (Ca)	ug/L	5800	100	N/A	6124570
Total Chromium (Cr)	ug/L	1.5	1.0	N/A	6124570
Total Cobalt (Co)	ug/L	ND	0.40	N/A	6124570
Total Copper (Cu)	ug/L	3.5	0.50	N/A	6124570
Total Iron (Fe)	ug/L	360	50	N/A	6124570
Total Lead (Pb)	ug/L	ND	0.50	N/A	6124570
Total Magnesium (Mg)	ug/L	1600	100	N/A	6124570
Total Manganese (Mn)	ug/L	34	2.0	N/A	6124570
Total Molybdenum (Mo)	ug/L	ND	2.0	N/A	6124570
Total Nickel (Ni)	ug/L	ND	2.0	N/A	6124570
Total Phosphorus (P)	ug/L	ND	100	N/A	6124570
Total Potassium (K)	ug/L	740	100	N/A	6124570
Total Selenium (Se)	ug/L	ND	1.0	N/A	6124570
Total Silver (Ag)	ug/L	ND	0.10	N/A	6124570
Total Sodium (Na)	ug/L	14000	100	N/A	6124570
Total Strontium (Sr)	ug/L	27	2.0	N/A	6124570
Total Thallium (Tl)	ug/L	ND	0.10	N/A	6124570
Total Tin (Sn)	ug/L	ND	2.0	N/A	6124570
Total Titanium (Ti)	ug/L	5.7	2.0	N/A	6124570
Total Uranium (U)	ug/L	ND	0.10	N/A	6124570
Total Vanadium (V)	ug/L	ND	2.0	N/A	6124570
Total Zinc (Zn)	ug/L	ND	5.0	N/A	6124570

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6124966
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6124966
Acenaphthene	ug/L	ND	0.010	N/A	6124966
Acenaphthylene	ug/L	ND	0.010	N/A	6124966
Anthracene	ug/L	ND	0.010	N/A	6124966
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6124966
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6124966
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6124966
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6123000
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6124966
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6124966
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6124966
Chrysene	ug/L	ND	0.010	N/A	6124966
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6124966
Fluoranthene	ug/L	ND	0.010	N/A	6124966
Fluorene	ug/L	ND	0.010	N/A	6124966
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6124966
Naphthalene	ug/L	ND	0.20	N/A	6124966
Perylene	ug/L	ND	0.010	N/A	6124966
Phenanthrene	ug/L	ND	0.010	N/A	6124966
Pyrene	ug/L	ND	0.010	N/A	6124966
Surrogate Recovery (%)					
D10-Anthracene	%	89			6124966
D14-Terphenyl	%	90			6124966
D8-Acenaphthylene	%	86			6124966

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6124567
1,1-Dichloroethylene	ug/L	ND	0.50	1.0	6124567
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6124567
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6124567
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6124567
Ethylene Dibromide	ug/L	ND	0.20	0.50	6124567
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6124567
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6124567
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6124567
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6124567
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6124567
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6124567
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6124567
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6124567
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6124567
Benzene	ug/L	ND	1.0	N/A	6124567
Bromodichloromethane	ug/L	ND	1.0	0.20	6124567
Bromoform	ug/L	ND	1.0	0.20	6124567
Bromomethane	ug/L	ND	0.50	N/A	6124567
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6124567
Chlorobenzene	ug/L	ND	1.0	N/A	6124567
Chloroethane	ug/L	ND	8.0	N/A	6124567
Chloroform	ug/L	2.1	1.0	0.20	6124567
Chloromethane	ug/L	ND	8.0	N/A	6124567
Dibromochloromethane	ug/L	ND	1.0	0.20	6124567
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6124567
Ethylbenzene	ug/L	ND	1.0	N/A	6124567
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6124567
Styrene	ug/L	ND	1.0	N/A	6124567
Tetrachloroethylene	ug/L	ND	1.0	N/A	6124567
Toluene	ug/L	ND	1.0	N/A	6124567
Trichloroethylene	ug/L	ND	1.0	N/A	6124567
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6124567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Vinyl Chloride	ug/L	ND	0.50	2.0	6124567
o-Xylene	ug/L	ND	1.0	N/A	6124567
p+m-Xylene	ug/L	ND	2.0	N/A	6124567
Total Xylenes	ug/L	ND	1.0	1.0	6124567
Total Trihalomethanes	ug/L	2.1	1.0	N/A	6124567
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	97			6124567
D4-1,2-Dichloroethane	%	110			6124567
D8-Toluene	%	100			6124567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6122979
Toluene	mg/L	ND	0.0010	N/A	6122979
Ethylbenzene	mg/L	ND	0.0010	N/A	6122979
Total Xylenes	mg/L	ND	0.0020	N/A	6122979
C6 - C10 (less BTEX)	mg/L	ND	0.010	N/A	6122979
>C10-C16 Hydrocarbons	mg/L	ND	0.050	N/A	6124752
>C16-C21 Hydrocarbons	mg/L	ND	0.050	N/A	6124752
>C21-<C32 Hydrocarbons	mg/L	ND	0.10	N/A	6124752
Modified TPH (Tier1)	mg/L	ND	0.10	N/A	6122285
Reached Baseline at C32	mg/L	NA	N/A	N/A	6124752
Hydrocarbon Resemblance	mg/L	NA	N/A	N/A	6124752
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	97			6124752
n-Dotriacontane - Extractable	%	98			6124752
Isobutylbenzene - Volatile	%	106			6122979

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6124907
Aroclor 1221	ug/L	ND	0.050	N/A	6124907
Aroclor 1232	ug/L	ND	0.050	N/A	6124907
Aroclor 1248	ug/L	ND	0.050	N/A	6124907
Aroclor 1242	ug/L	ND	0.050	N/A	6124907
Aroclor 1254	ug/L	ND	0.050	N/A	6124907
Aroclor 1260	ug/L	ND	0.050	N/A	6124907
Calculated Total PCB	ug/L	ND	0.050	N/A	6123002
Surrogate Recovery (%)					
Decachlorobiphenyl	%	90			6124907

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JSI550			
Sampling Date		2019/05/14 13:00			
COC Number		715991-01-01			
	UNITS	Raw Water	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	ND	0.072	N/A	6134119
Total Resin Acids	mg/L	ND	0.060	N/A	6134119
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND	0.0060	N/A	6134119
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6134119
Docosanoic acid (C22)	mg/L	ND	0.0060	N/A	6134119
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6134119
Eicosanoic acid (C20)	mg/L	ND	0.0060	N/A	6134119
Hexadecanoic acid (C16)	mg/L	ND	0.0060	N/A	6134119
Linoleic acid (C18:2)	mg/L	ND	0.0060	N/A	6134119
Linolenic acid (C18:3)	mg/L	ND	0.0060	N/A	6134119
Octadecanoic acid (C18)	mg/L	ND	0.0060	N/A	6134119
Oleic acid (C18:1)	mg/L	ND	0.0060	N/A	6134119
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6134119
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6134119
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6134119
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6134119
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6134119
Abietic acid	mg/L	ND	0.0060	N/A	6134119
Dehydroabietic acid	mg/L	ND	0.0060	N/A	6134119
Isopimaric acid	mg/L	ND	0.0060	N/A	6134119
Neoabietic acid	mg/L	ND (1)	0.0060	N/A	6134119
Palustric acid	mg/L	ND (1)	0.0060	N/A	6134119
Pimaric acid	mg/L	ND	0.0060	N/A	6134119
Sandaracopimaric acid	mg/L	ND	0.0060	N/A	6134119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Matrix spike exceeds acceptance limits due to matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JSI550							
Sampling Date		2019/05/14 13:00							
COC Number		715991-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	Raw Water	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/L	ND	1.13	9.76	N/A	1.00	1.13		6151976
1,2,3,7,8-Penta CDD *	pg/L	ND	0.992	9.76	N/A	1.00	0.992		6151976
1,2,3,4,7,8-Hexa CDD *	pg/L	ND	1.22	9.76	N/A	0.100	0.122		6151976
1,2,3,6,7,8-Hexa CDD *	pg/L	ND	1.06	9.76	N/A	0.100	0.106		6151976
1,2,3,7,8,9-Hexa CDD *	pg/L	ND	1.03	9.76	N/A	0.100	0.103		6151976
1,2,3,4,6,7,8-Hepta CDD *	pg/L	ND	1.00	9.76	N/A	0.0100	0.0100		6151976
Octa CDD *	pg/L	15.6	1.03	97.6	N/A	0.000300	0.00468		6151976
Total Tetra CDD *	pg/L	ND	1.13	9.76	N/A			0	6151976
Total Penta CDD *	pg/L	ND	0.992	9.76	N/A			0	6151976
Total Hexa CDD *	pg/L	ND (1)	1.98	9.76	N/A			0	6151976
Total Hepta CDD *	pg/L	1.17	1.00	9.76	N/A			1	6151976
2,3,7,8-Tetra CDF **	pg/L	ND	1.06	9.76	N/A	0.100	0.106		6151976
1,2,3,7,8-Penta CDF **	pg/L	ND	1.07	9.76	N/A	0.0300	0.0321		6151976
2,3,4,7,8-Penta CDF **	pg/L	ND	1.08	9.76	N/A	0.300	0.324		6151976
1,2,3,4,7,8-Hexa CDF **	pg/L	ND	0.872	9.76	N/A	0.100	0.0872		6151976
1,2,3,6,7,8-Hexa CDF **	pg/L	ND	0.727	9.76	N/A	0.100	0.0727		6151976
2,3,4,6,7,8-Hexa CDF **	pg/L	ND	0.822	9.76	N/A	0.100	0.0822		6151976
1,2,3,7,8,9-Hexa CDF **	pg/L	ND	0.911	9.76	N/A	0.100	0.0911		6151976
1,2,3,4,6,7,8-Hepta CDF **	pg/L	ND	0.867	9.76	N/A	0.0100	0.00867		6151976
1,2,3,4,7,8,9-Hepta CDF **	pg/L	ND	0.986	9.76	N/A	0.0100	0.00986		6151976
Octa CDF **	pg/L	ND	1.05	97.6	N/A	0.000300	0.000315		6151976
Total Tetra CDF **	pg/L	ND	1.06	9.76	N/A			0	6151976
Total Penta CDF **	pg/L	ND	1.08	9.76	N/A			0	6151976
Total Hexa CDF **	pg/L	ND	0.827	9.76	N/A			0	6151976
Total Hepta CDF **	pg/L	ND	0.923	9.76	N/A			0	6151976

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JSI550							
Sampling Date		2019/05/14 13:00							
COC Number		715991-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	Raw Water	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/L						3.28		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	107							6151976
C13-1234678 HeptaCDF **	%	105							6151976
C13-123678 HexaCDD *	%	129							6151976
C13-123678 HexaCDF **	%	92							6151976
C13-12378 PentaCDD *	%	91							6151976
C13-12378 PentaCDF **	%	73							6151976
C13-2378 TetraCDD *	%	107							6151976
C13-2378 TetraCDF **	%	94							6151976
C13-OCDD *	%	107							6151976

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

GENERAL COMMENTS

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

Package 1	15.3°C

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6122932	MLW	QC Standard	Carbonaceous BOD	2019/05/21		105	%	80 - 120
6122932	MLW	Spiked Blank	Carbonaceous BOD	2019/05/21		110	%	80 - 120
6122932	MLW	Method Blank	Carbonaceous BOD	2019/05/21	ND, RDL=2.0		mg/L	
6122932	MLW	RPD	Carbonaceous BOD	2019/05/21	4.6		%	25
			Carbonaceous BOD	2019/05/21	5.4		%	25
6122979	THL	Matrix Spike	Isobutylbenzene - Volatile	2019/05/21		110	%	70 - 130
			Benzene	2019/05/21		132 (1)	%	70 - 130
			Toluene	2019/05/21		136 (1)	%	70 - 130
			Ethylbenzene	2019/05/21		138 (1)	%	70 - 130
			Total Xylenes	2019/05/21		133 (1)	%	70 - 130
6122979	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/05/21		106	%	70 - 130
			Benzene	2019/05/21		99	%	70 - 130
			Toluene	2019/05/21		101	%	70 - 130
			Ethylbenzene	2019/05/21		102	%	70 - 130
			Total Xylenes	2019/05/21		101	%	70 - 130
6122979	THL	Method Blank	Isobutylbenzene - Volatile	2019/05/21		106	%	70 - 130
			Benzene	2019/05/21	ND, RDL=0.0010		mg/L	
			Toluene	2019/05/21	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/05/21	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/05/21	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/05/21	ND, RDL=0.010		mg/L	
6122979	THL	RPD	Benzene	2019/05/21	NC		%	40
			Toluene	2019/05/21	NC		%	40
			Ethylbenzene	2019/05/21	NC		%	40
			Total Xylenes	2019/05/21	NC		%	40
			C6 - C10 (less BTEX)	2019/05/21	NC		%	40
6124567	ASL	Matrix Spike	4-Bromofluorobenzene	2019/05/16		102	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		114	%	70 - 130
			D8-Toluene	2019/05/16		96	%	70 - 130
			1,1-Dichloroethane	2019/05/16		104	%	70 - 130
			1,1-Dichloroethylene	2019/05/16		107	%	70 - 130
			1,1,1-Trichloroethane	2019/05/16		106	%	70 - 130
			1,1,2-Trichloroethane	2019/05/16		104	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/16		108	%	70 - 130
			Ethylene Dibromide	2019/05/16		106	%	70 - 130
			1,2-Dichlorobenzene	2019/05/16		91	%	70 - 130
			1,2-Dichloroethane	2019/05/16		107	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/16		97	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/16		103	%	70 - 130
			1,2-Dichloropropane	2019/05/16		102	%	70 - 130
			1,3-Dichlorobenzene	2019/05/16		88	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/16		101	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/16		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/16		86	%	70 - 130
			Benzene	2019/05/16		92	%	70 - 130
			Bromodichloromethane	2019/05/16		98	%	70 - 130
			Bromoform	2019/05/16		101	%	70 - 130
			Bromomethane	2019/05/16		99	%	60 - 140

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbon Tetrachloride	2019/05/16		101	%	70 - 130
			Chlorobenzene	2019/05/16		97	%	70 - 130
			Chloroethane	2019/05/16		90	%	60 - 140
			Chloroform	2019/05/16		97	%	70 - 130
			Chloromethane	2019/05/16		101	%	60 - 140
			Dibromochloromethane	2019/05/16		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/16		100	%	70 - 130
			Ethylbenzene	2019/05/16		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/16		99	%	70 - 130
			Styrene	2019/05/16		101	%	70 - 130
			Tetrachloroethylene	2019/05/16		93	%	70 - 130
			Toluene	2019/05/16		97	%	70 - 130
			Trichloroethylene	2019/05/16		96	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/16		92	%	60 - 140
			Vinyl Chloride	2019/05/16		95	%	60 - 140
			o-Xylene	2019/05/16		97	%	70 - 130
			p+m-Xylene	2019/05/16		95	%	70 - 130
6124567	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/16		100	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		106	%	70 - 130
			D8-Toluene	2019/05/16		98	%	70 - 130
			1,1-Dichloroethane	2019/05/16		103	%	70 - 130
			1,1-Dichloroethylene	2019/05/16		109	%	70 - 130
			1,1,1-Trichloroethane	2019/05/16		106	%	70 - 130
			1,1,2-Trichloroethane	2019/05/16		99	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/16		99	%	70 - 130
			Ethylene Dibromide	2019/05/16		100	%	70 - 130
			1,2-Dichlorobenzene	2019/05/16		92	%	70 - 130
			1,2-Dichloroethane	2019/05/16		100	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/16		95	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/16		105	%	70 - 130
			1,2-Dichloropropane	2019/05/16		101	%	70 - 130
			1,3-Dichlorobenzene	2019/05/16		90	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/16		100	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/16		104	%	70 - 130
			1,4-Dichlorobenzene	2019/05/16		89	%	70 - 130
			Benzene	2019/05/16		91	%	70 - 130
			Bromodichloromethane	2019/05/16		96	%	70 - 130
			Bromoform	2019/05/16		94	%	70 - 130
			Bromomethane	2019/05/16		95	%	60 - 140
			Carbon Tetrachloride	2019/05/16		102	%	70 - 130
			Chlorobenzene	2019/05/16		94	%	70 - 130
			Chloroethane	2019/05/16		89	%	60 - 140
			Chloroform	2019/05/16		95	%	70 - 130
			Chloromethane	2019/05/16		99	%	60 - 140
			Dibromochloromethane	2019/05/16		99	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/16		96	%	70 - 130
			Ethylbenzene	2019/05/16		98	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/16		97	%	70 - 130
			Styrene	2019/05/16		103	%	70 - 130
			Tetrachloroethylene	2019/05/16		98	%	70 - 130
			Toluene	2019/05/16		98	%	70 - 130
			Trichloroethylene	2019/05/16		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/16		94	%	60 - 140
			Vinyl Chloride	2019/05/16		95	%	60 - 140

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			o-Xylene	2019/05/16		98	%	70 - 130
			p+m-Xylene	2019/05/16		96	%	70 - 130
6124567	ASL	Method Blank	4-Bromofluorobenzene	2019/05/16		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		108	%	70 - 130
			D8-Toluene	2019/05/16		100	%	70 - 130
			1,1-Dichloroethane	2019/05/16	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/16	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/16	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/16	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/16	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/16	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/16	ND, RDL=0.50		ug/L	
			1,4-Dichlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Benzene	2019/05/16	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/16	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/16	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/16	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/16	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/16	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/16	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/16	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/16	ND, RDL=1.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Methylene Chloride(Dichloromethane)	2019/05/16	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/16	ND, RDL=2.0		ug/L	
			Styrene	2019/05/16	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/16	ND, RDL=1.0		ug/L	
			Toluene	2019/05/16	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/16	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/16	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/16	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/16	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/16	ND, RDL=2.0		ug/L	
			Total Xylenes	2019/05/16	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/16	ND, RDL=1.0		ug/L	
6124567	ASL	RPD [JSI550-10]	1,1-Dichloroethane	2019/05/16	NC		%	40
			1,1-Dichloroethylene	2019/05/16	NC		%	40
			1,1,1-Trichloroethane	2019/05/16	NC		%	40
			1,1,2-Trichloroethane	2019/05/16	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/16	NC		%	40
			Ethylene Dibromide	2019/05/16	NC		%	40
			1,2-Dichlorobenzene	2019/05/16	NC		%	40
			1,2-Dichloroethane	2019/05/16	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/16	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/16	NC		%	40
			1,2-Dichloropropane	2019/05/16	NC		%	40
			1,3-Dichlorobenzene	2019/05/16	NC		%	40
			cis-1,3-Dichloropropene	2019/05/16	NC		%	40
			trans-1,3-Dichloropropene	2019/05/16	NC		%	40
			1,4-Dichlorobenzene	2019/05/16	NC		%	40
			Benzene	2019/05/16	NC		%	40
			Bromodichloromethane	2019/05/16	NC		%	40
			Bromoform	2019/05/16	NC		%	40
			Bromomethane	2019/05/16	NC		%	40
			Carbon Tetrachloride	2019/05/16	NC		%	40
			Chlorobenzene	2019/05/16	NC		%	40
			Chloroethane	2019/05/16	NC		%	40
			Chloroform	2019/05/16	1.4		%	40
			Chloromethane	2019/05/16	NC		%	40
			Dibromochloromethane	2019/05/16	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/16	NC		%	40
			Ethylbenzene	2019/05/16	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/16	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2019/05/16	NC		%	40
			Tetrachloroethylene	2019/05/16	NC		%	40
			Toluene	2019/05/16	NC		%	40
			Trichloroethylene	2019/05/16	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/16	NC		%	40
			Vinyl Chloride	2019/05/16	NC		%	40
			o-Xylene	2019/05/16	NC		%	40
			p+m-Xylene	2019/05/16	NC		%	40
			Total Xylenes	2019/05/16	NC		%	40
			Total Trihalomethanes	2019/05/16	1.4		%	40
6124568	NRG	Spiked Blank	Colour	2019/05/16		105	%	80 - 120
6124568	NRG	Method Blank	Colour	2019/05/16	ND, RDL=5.0		TCU	
6124568	NRG	RPD	Colour	2019/05/16	NC		%	20
6124570	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/16		98	%	80 - 120
			Total Antimony (Sb)	2019/05/16		101	%	80 - 120
			Total Arsenic (As)	2019/05/16		98	%	80 - 120
			Total Barium (Ba)	2019/05/16		97	%	80 - 120
			Total Beryllium (Be)	2019/05/16		98	%	80 - 120
			Total Bismuth (Bi)	2019/05/16		96	%	80 - 120
			Total Boron (B)	2019/05/16		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/16		97	%	80 - 120
			Total Calcium (Ca)	2019/05/16		101	%	80 - 120
			Total Chromium (Cr)	2019/05/16		99	%	80 - 120
			Total Cobalt (Co)	2019/05/16		103	%	80 - 120
			Total Copper (Cu)	2019/05/16		96	%	80 - 120
			Total Iron (Fe)	2019/05/16		104	%	80 - 120
			Total Lead (Pb)	2019/05/16		99	%	80 - 120
			Total Magnesium (Mg)	2019/05/16		102	%	80 - 120
			Total Manganese (Mn)	2019/05/16		98	%	80 - 120
			Total Molybdenum (Mo)	2019/05/16		99	%	80 - 120
			Total Nickel (Ni)	2019/05/16		100	%	80 - 120
			Total Phosphorus (P)	2019/05/16		103	%	80 - 120
			Total Potassium (K)	2019/05/16		103	%	80 - 120
			Total Selenium (Se)	2019/05/16		98	%	80 - 120
			Total Silver (Ag)	2019/05/16		98	%	80 - 120
			Total Sodium (Na)	2019/05/16		98	%	80 - 120
			Total Strontium (Sr)	2019/05/16		98	%	80 - 120
			Total Thallium (Tl)	2019/05/16		100	%	80 - 120
			Total Tin (Sn)	2019/05/16		101	%	80 - 120
			Total Titanium (Ti)	2019/05/16		100	%	80 - 120
			Total Uranium (U)	2019/05/16		103	%	80 - 120
			Total Vanadium (V)	2019/05/16		98	%	80 - 120
			Total Zinc (Zn)	2019/05/16		97	%	80 - 120
6124570	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/16		99	%	80 - 120
			Total Antimony (Sb)	2019/05/16		100	%	80 - 120
			Total Arsenic (As)	2019/05/16		97	%	80 - 120
			Total Barium (Ba)	2019/05/16		98	%	80 - 120
			Total Beryllium (Be)	2019/05/16		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/16		98	%	80 - 120
			Total Boron (B)	2019/05/16		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/16		96	%	80 - 120
			Total Calcium (Ca)	2019/05/16		104	%	80 - 120
			Total Chromium (Cr)	2019/05/16		100	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cobalt (Co)	2019/05/16		104	%	80 - 120
			Total Copper (Cu)	2019/05/16		100	%	80 - 120
			Total Iron (Fe)	2019/05/16		104	%	80 - 120
			Total Lead (Pb)	2019/05/16		99	%	80 - 120
			Total Magnesium (Mg)	2019/05/16		104	%	80 - 120
			Total Manganese (Mn)	2019/05/16		100	%	80 - 120
			Total Molybdenum (Mo)	2019/05/16		100	%	80 - 120
			Total Nickel (Ni)	2019/05/16		101	%	80 - 120
			Total Phosphorus (P)	2019/05/16		103	%	80 - 120
			Total Potassium (K)	2019/05/16		102	%	80 - 120
			Total Selenium (Se)	2019/05/16		97	%	80 - 120
			Total Silver (Ag)	2019/05/16		96	%	80 - 120
			Total Sodium (Na)	2019/05/16		100	%	80 - 120
			Total Strontium (Sr)	2019/05/16		101	%	80 - 120
			Total Thallium (Tl)	2019/05/16		100	%	80 - 120
			Total Tin (Sn)	2019/05/16		98	%	80 - 120
			Total Titanium (Ti)	2019/05/16		101	%	80 - 120
			Total Uranium (U)	2019/05/16		103	%	80 - 120
			Total Vanadium (V)	2019/05/16		99	%	80 - 120
			Total Zinc (Zn)	2019/05/16		98	%	80 - 120
6124570	BAN	Method Blank	Total Aluminum (Al)	2019/05/16	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/16	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/16	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/16	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/16	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/16	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/16	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/16	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/16	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/16	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/16	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/16	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/16	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/05/16	ND, RDL=5.0		ug/L	
6124570	BAN	RPD	Total Aluminum (Al)	2019/05/16	NC		%	20
			Total Antimony (Sb)	2019/05/16	NC		%	20
			Total Arsenic (As)	2019/05/16	NC		%	20
			Total Barium (Ba)	2019/05/16	2.3		%	20
			Total Beryllium (Be)	2019/05/16	NC		%	20
			Total Bismuth (Bi)	2019/05/16	NC		%	20
			Total Boron (B)	2019/05/16	NC		%	20
			Total Cadmium (Cd)	2019/05/16	NC		%	20
			Total Calcium (Ca)	2019/05/16	3.3		%	20
			Total Chromium (Cr)	2019/05/16	NC		%	20
			Total Cobalt (Co)	2019/05/16	1.7		%	20
			Total Copper (Cu)	2019/05/16	3.0		%	20
			Total Iron (Fe)	2019/05/16	2.0		%	20
			Total Lead (Pb)	2019/05/16	NC		%	20
			Total Magnesium (Mg)	2019/05/16	4.2		%	20
			Total Manganese (Mn)	2019/05/16	2.7		%	20
			Total Molybdenum (Mo)	2019/05/16	NC		%	20
			Total Nickel (Ni)	2019/05/16	NC		%	20
			Total Phosphorus (P)	2019/05/16	10		%	20
			Total Potassium (K)	2019/05/16	7.2		%	20
			Total Selenium (Se)	2019/05/16	NC		%	20
			Total Silver (Ag)	2019/05/16	NC		%	20
			Total Sodium (Na)	2019/05/16	2.1		%	20
			Total Strontium (Sr)	2019/05/16	3.3		%	20
			Total Thallium (Tl)	2019/05/16	NC		%	20
			Total Tin (Sn)	2019/05/16	NC		%	20
			Total Titanium (Ti)	2019/05/16	NC		%	20
			Total Uranium (U)	2019/05/16	NC		%	20

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Vanadium (V)	2019/05/16	NC		%	20
			Total Zinc (Zn)	2019/05/16	0.77		%	20
6124604	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/17		NC	%	80 - 120
6124604	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/17		104	%	80 - 120
6124604	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/17	ND, RDL=5.0		mg/L	
6124604	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/05/17	4.0		%	25
6124605	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/17		NC	%	80 - 120
6124605	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/17		99	%	80 - 120
6124605	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/05/17	ND, RDL=1.0		mg/L	
6124605	SRM	RPD	Dissolved Chloride (Cl-)	2019/05/17	0.69		%	25
6124607	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/17		98	%	80 - 120
6124607	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/17		99	%	80 - 120
6124607	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/05/17	ND, RDL=2.0		mg/L	
6124607	SRM	RPD	Dissolved Sulphate (SO4)	2019/05/17	0.29		%	25
6124608	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/05/17		88	%	80 - 120
6124608	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/05/17		95	%	80 - 120
6124608	SRM	Method Blank	Reactive Silica (SiO2)	2019/05/17	ND, RDL=0.50		mg/L	
6124608	SRM	RPD	Reactive Silica (SiO2)	2019/05/17	0.090		%	25
6124609	SRM	Matrix Spike	Orthophosphate (P)	2019/05/20		82	%	80 - 120
6124609	SRM	Spiked Blank	Orthophosphate (P)	2019/05/20		97	%	80 - 120
6124609	SRM	Method Blank	Orthophosphate (P)	2019/05/20	0.011, RDL=0.010		mg/L	
6124609	SRM	RPD	Orthophosphate (P)	2019/05/20	9.4		%	25
6124610	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/05/17		94	%	80 - 120
6124610	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/05/17		96	%	80 - 120
6124610	SRM	Method Blank	Nitrate + Nitrite (N)	2019/05/17	ND, RDL=0.050		mg/L	
6124610	SRM	RPD	Nitrate + Nitrite (N)	2019/05/17	5.8		%	25
6124611	SRM	Matrix Spike	Nitrite (N)	2019/05/17		96	%	80 - 120
6124611	SRM	Spiked Blank	Nitrite (N)	2019/05/17		94	%	80 - 120
6124611	SRM	Method Blank	Nitrite (N)	2019/05/17	ND, RDL=0.010		mg/L	
6124611	SRM	RPD	Nitrite (N)	2019/05/17	NC		%	20
6124631	MCN	Matrix Spike	Total Phosphorus	2019/05/17		118	%	80 - 120
6124631	MCN	Spiked Blank	Total Phosphorus	2019/05/17		100	%	80 - 120
6124631	MCN	Method Blank	Total Phosphorus	2019/05/17	ND, RDL=0.020		mg/L	
6124631	MCN	RPD	Total Phosphorus	2019/05/17	13		%	25
6124744	AM6	QC Standard	Total Suspended Solids	2019/05/21		97	%	80 - 120
6124744	AM6	Method Blank	Total Suspended Solids	2019/05/21	ND, RDL=1.0		mg/L	
6124744	AM6	RPD	Total Suspended Solids	2019/05/21	19		%	20
6124752	MGN	Matrix Spike	Isobutylbenzene - Extractable	2019/05/16		96	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/16		102	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/16		96	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/16		84	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/16		96	%	70 - 130
6124752	MGN	Spiked Blank	Isobutylbenzene - Extractable	2019/05/16		94	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/16		101	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/16		92	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C16-C21 Hydrocarbons	2019/05/16		84	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/16		95	%	70 - 130
6124752	MGN	Method Blank	Isobutylbenzene - Extractable	2019/05/16		98	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/16		99	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/16	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/16	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/16	ND, RDL=0.10		mg/L	
6124752	MGN	RPD	>C10-C16 Hydrocarbons	2019/05/16	NC		%	40
			>C16-C21 Hydrocarbons	2019/05/16	2.0		%	40
			>C21-<C32 Hydrocarbons	2019/05/16	13		%	40
6124855	SSI	Matrix Spike	Total Organic Carbon (C)	2019/05/16		96	%	85 - 115
6124855	SSI	Spiked Blank	Total Organic Carbon (C)	2019/05/16		100	%	80 - 120
6124855	SSI	Method Blank	Total Organic Carbon (C)	2019/05/16	ND, RDL=0.50		mg/L	
6124855	SSI	RPD	Total Organic Carbon (C)	2019/05/16	NC (2)		%	15
6124868	SSI	Matrix Spike	Dissolved Organic Carbon (C)	2019/05/16		100	%	85 - 115
6124868	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/05/16		103	%	80 - 120
6124868	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/05/16	ND, RDL=0.50		mg/L	
6124868	SSI	RPD	Dissolved Organic Carbon (C)	2019/05/16	2.7		%	15
6124907	RGE	Matrix Spike [JSI550-09]	Decachlorobiphenyl	2019/05/17		84	%	30 - 130
			Aroclor 1254	2019/05/17		105	%	70 - 130
6124907	RGE	Spiked Blank	Decachlorobiphenyl	2019/05/17		89	%	30 - 130
			Aroclor 1254	2019/05/17		99	%	70 - 130
6124907	RGE	Method Blank	Decachlorobiphenyl	2019/05/17		96	%	30 - 130
			Aroclor 1016	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/05/17	ND, RDL=0.050		ug/L	
6124907	RGE	RPD	Aroclor 1016	2019/05/17	NC		%	40
			Aroclor 1221	2019/05/17	NC		%	40
			Aroclor 1232	2019/05/17	NC		%	40
			Aroclor 1248	2019/05/17	NC		%	40
			Aroclor 1242	2019/05/17	NC		%	40
			Aroclor 1254	2019/05/17	NC		%	40
			Aroclor 1260	2019/05/17	NC		%	40
6124966	KKE	Matrix Spike	D10-Anthracene	2019/05/16		97	%	50 - 130
			D14-Terphenyl	2019/05/16		98	%	50 - 130
			D8-Acenaphthylene	2019/05/16		93	%	50 - 130
			1-Methylnaphthalene	2019/05/16		82	%	50 - 130
			2-Methylnaphthalene	2019/05/16		84	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acenaphthene	2019/05/16		95	%	50 - 130
			Acenaphthylene	2019/05/16		95	%	50 - 130
			Anthracene	2019/05/16		95	%	50 - 130
			Benzo(a)anthracene	2019/05/16		90	%	50 - 130
			Benzo(a)pyrene	2019/05/16		81	%	50 - 130
			Benzo(b)fluoranthene	2019/05/16		89	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/16		86	%	50 - 130
			Benzo(j)fluoranthene	2019/05/16		79	%	50 - 130
			Benzo(k)fluoranthene	2019/05/16		77	%	50 - 130
			Chrysene	2019/05/16		108	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/16		80	%	50 - 130
			Fluoranthene	2019/05/16		98	%	50 - 130
			Fluorene	2019/05/16		99	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/16		81	%	50 - 130
			Naphthalene	2019/05/16		86	%	50 - 130
			Perylene	2019/05/16		76	%	50 - 130
			Phenanthrene	2019/05/16		101	%	50 - 130
			Pyrene	2019/05/16		96	%	50 - 130
6124966	KKE	Spiked Blank	D10-Anthracene	2019/05/16		103	%	50 - 130
			D14-Terphenyl	2019/05/16		102	%	50 - 130
			D8-Acenaphthylene	2019/05/16		101	%	50 - 130
			1-Methylnaphthalene	2019/05/16		88	%	50 - 130
			2-Methylnaphthalene	2019/05/16		90	%	50 - 130
			Acenaphthene	2019/05/16		102	%	50 - 130
			Acenaphthylene	2019/05/16		103	%	50 - 130
			Anthracene	2019/05/16		100	%	50 - 130
			Benzo(a)anthracene	2019/05/16		92	%	50 - 130
			Benzo(a)pyrene	2019/05/16		84	%	50 - 130
			Benzo(b)fluoranthene	2019/05/16		90	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/16		89	%	50 - 130
			Benzo(j)fluoranthene	2019/05/16		83	%	50 - 130
			Benzo(k)fluoranthene	2019/05/16		84	%	50 - 130
			Chrysene	2019/05/16		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/16		82	%	50 - 130
			Fluoranthene	2019/05/16		103	%	50 - 130
			Fluorene	2019/05/16		108	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/16		85	%	50 - 130
			Naphthalene	2019/05/16		92	%	50 - 130
			Perylene	2019/05/16		79	%	50 - 130
			Phenanthrene	2019/05/16		107	%	50 - 130
			Pyrene	2019/05/16		101	%	50 - 130
6124966	KKE	Method Blank	D10-Anthracene	2019/05/16		103	%	50 - 130
			D14-Terphenyl	2019/05/16		103	%	50 - 130
			D8-Acenaphthylene	2019/05/16		99	%	50 - 130
			1-Methylnaphthalene	2019/05/16	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/05/16	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/05/16	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/05/16	ND, RDL=0.010		ug/L	
			Anthracene	2019/05/16	ND, RDL=0.010		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(a)anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Chrysene	2019/05/16	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Fluorene	2019/05/16	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/05/16	ND, RDL=0.010		ug/L	
			Naphthalene	2019/05/16	ND, RDL=0.20		ug/L	
			Perylene	2019/05/16	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/05/16	ND, RDL=0.010		ug/L	
			Pyrene	2019/05/16	ND, RDL=0.010		ug/L	
6124966	KKE	RPD	1-Methylnaphthalene	2019/05/16	NC		%	40
			2-Methylnaphthalene	2019/05/16	NC		%	40
			Acenaphthene	2019/05/16	NC		%	40
			Acenaphthylene	2019/05/16	NC		%	40
			Anthracene	2019/05/16	NC		%	40
			Benzo(a)anthracene	2019/05/16	NC		%	40
			Benzo(a)pyrene	2019/05/16	NC		%	40
			Benzo(b)fluoranthene	2019/05/16	NC		%	40
			Benzo(g,h,i)perylene	2019/05/16	NC		%	40
			Benzo(j)fluoranthene	2019/05/16	NC		%	40
			Benzo(k)fluoranthene	2019/05/16	NC		%	40
			Chrysene	2019/05/16	NC		%	40
			Dibenz(a,h)anthracene	2019/05/16	NC		%	40
			Fluoranthene	2019/05/16	NC		%	40
			Fluorene	2019/05/16	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/05/16	NC		%	40
			Naphthalene	2019/05/16	NC		%	40
			Perylene	2019/05/16	NC		%	40
			Phenanthrene	2019/05/16	NC		%	40
			Pyrene	2019/05/16	NC		%	40
6125117	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/16		39 (3)	%	80 - 120
6125117	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/16		109	%	80 - 120
6125117	BKE	Method Blank	Total Cyanide (CN)	2019/05/16	ND, RDL=0.0050		mg/L	
6125117	BKE	RPD	Total Cyanide (CN)	2019/05/16	NC		%	20

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6125246	MCN	Matrix Spike [JSI550-15]	Nitrogen (Ammonia Nitrogen)	2019/05/16		98	%	80 - 120
6125246	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/16		102	%	80 - 120
6125246	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/16	ND, RDL=0.050		mg/L	
6125246	MCN	RPD [JSI550-15]	Nitrogen (Ammonia Nitrogen)	2019/05/16	NC		%	20
6125745	SSV	Matrix Spike [JSI550-05]	Total Kjeldahl Nitrogen (TKN)	2019/05/17		99	%	80 - 120
6125745	SSV	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/05/17		95	%	80 - 120
6125745	SSV	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/05/17		98	%	80 - 120
6125745	SSV	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/05/17	ND, RDL=0.10		mg/L	
6125745	SSV	RPD [JSI550-05]	Total Kjeldahl Nitrogen (TKN)	2019/05/17	8.0		%	20
6126539	éB3	QC Standard	Adsorbable Organic Halogen			97	%	84 - 111
6126539	éB3	Method Blank	Adsorbable Organic Halogen		ND, RDL=0.5		mg/L	
6127107	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/17		97	%	80 - 120
6127107	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/17		105	%	80 - 120
6127107	CCR	Method Blank	Total Mercury (Hg)	2019/05/17	ND, RDL=0.013		ug/L	
6127107	CCR	RPD	Total Mercury (Hg)	2019/05/17	NC		%	20
6127139	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/05/17		102	%	80 - 120
6127139	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/17		99	%	80 - 120
6127139	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/17		101	%	80 - 120
6127139	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/17	ND, RDL=20		mg/L	
6127139	ZZH	RPD	Total Chemical Oxygen Demand	2019/05/17	4.2		%	25
6127439	GTO	Matrix Spike	Sulphide	2019/05/17		95	%	80 - 120
6127439	GTO	Spiked Blank	Sulphide	2019/05/17		92	%	80 - 120
6127439	GTO	Method Blank	Sulphide	2019/05/17	ND, RDL=0.020		mg/L	
6127439	GTO	RPD	Sulphide	2019/05/17	NC		%	20
6130613	BBD	QC Standard	Salinity	2019/05/21		101	%	80 - 120
6130613	BBD	Method Blank	Salinity	2019/05/21	ND, RDL=2.0		N/A	
6130613	BBD	RPD [JSI550-06]	Salinity	2019/05/21	NC		%	25
6132815	EMT	QC Standard	pH	2019/05/22		101	%	97 - 103
6132815	EMT	RPD	pH	2019/05/22	0.46		%	N/A
6132816	EMT	Spiked Blank	Conductivity	2019/05/22		103	%	80 - 120
6132816	EMT	Method Blank	Conductivity	2019/05/22	1.2, RDL=1.0		uS/cm	
6132816	EMT	RPD	Conductivity	2019/05/22	0.53		%	10
6132843	EMT	QC Standard	Turbidity	2019/05/22		109	%	80 - 120
6132843	EMT	Spiked Blank	Turbidity	2019/05/22		98	%	80 - 120
6132843	EMT	Method Blank	Turbidity	2019/05/22	ND, RDL=0.10		NTU	
6132843	EMT	RPD	Turbidity	2019/05/22	11		%	20
6133009	AM6	QC Standard	Volatile Suspended Solids	2019/05/22		95	%	80 - 120
6133009	AM6	Method Blank	Volatile Suspended Solids	2019/05/22	ND, RDL=2.0		mg/L	
6133009	AM6	RPD	Volatile Suspended Solids	2019/05/22	0		%	25
6134118	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/16		103	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/16		100	%	80 - 120
6134118	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/16		98	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/16		95	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6134118	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/16	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/16	ND, RDL=0.10		mg/L	
6134119	SJ1	Matrix Spike [JSI550-21]	9,10-Dichlorostearic acid	2019/05/22		93	%	50 - 130
			Decanoic Acid (C10)	2019/05/22		90	%	50 - 130
			Docosanoic acid (C22)	2019/05/22		91	%	50 - 130
			Dodecanoic acid (C12)	2019/05/22		89	%	50 - 130
			Eicosanoic acid (C20)	2019/05/22		98	%	50 - 130
			Hexadecanoic acid (C16)	2019/05/22		94	%	50 - 130
			Linoleic acid (C18:2)	2019/05/22		88	%	50 - 130
			Linolenic acid (C18:3)	2019/05/22		84	%	50 - 130
			Octadecanoic acid (C18)	2019/05/22		103	%	50 - 130
			Oleic acid (C18:1)	2019/05/22		100	%	50 - 130
			Tetradecanoic acid (C14)	2019/05/22		88	%	50 - 130
			Undecanoic acid (C11)	2019/05/22		99	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/05/22		84	%	50 - 130
			12-Chlorodehydroabietic acid	2019/05/22		81	%	50 - 130
			14-Chlorodehydroabietic acid	2019/05/22		84	%	50 - 130
			Abietic acid	2019/05/22		62	%	50 - 130
			Dehydroabietic acid	2019/05/22		99	%	50 - 130
			Isopimaric acid	2019/05/22		86	%	50 - 130
			Neoabietic acid	2019/05/22		22 (3)	%	50 - 130
			Palustric acid	2019/05/22		11 (3)	%	50 - 130
			Pimaric acid	2019/05/22		89	%	50 - 130
			Sandaracopimaric acid	2019/05/22		87	%	50 - 130
6134119	SJ1	Spiked Blank	9,10-Dichlorostearic acid	2019/05/22		98	%	50 - 130
			Decanoic Acid (C10)	2019/05/22		90	%	50 - 130
			Docosanoic acid (C22)	2019/05/22		96	%	50 - 130
			Dodecanoic acid (C12)	2019/05/22		90	%	50 - 130
			Eicosanoic acid (C20)	2019/05/22		101	%	50 - 130
			Hexadecanoic acid (C16)	2019/05/22		96	%	50 - 130
			Linoleic acid (C18:2)	2019/05/22		92	%	50 - 130
			Linolenic acid (C18:3)	2019/05/22		88	%	50 - 130
			Octadecanoic acid (C18)	2019/05/22		106	%	50 - 130
			Oleic acid (C18:1)	2019/05/22		103	%	50 - 130
			Tetradecanoic acid (C14)	2019/05/22		89	%	50 - 130
			Undecanoic acid (C11)	2019/05/22		98	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/05/22		86	%	50 - 130
			12-Chlorodehydroabietic acid	2019/05/22		81	%	50 - 130
			14-Chlorodehydroabietic acid	2019/05/22		85	%	50 - 130
			Abietic acid	2019/05/22		69	%	50 - 130
			Dehydroabietic acid	2019/05/22		95	%	50 - 130
			Isopimaric acid	2019/05/22		87	%	50 - 130
			Neoabietic acid	2019/05/22		57	%	50 - 130
			Palustric acid	2019/05/22		62	%	50 - 130
			Pimaric acid	2019/05/22		91	%	50 - 130
			Sandaracopimaric acid	2019/05/22		88	%	50 - 130
6134119	SJ1	Method Blank	Total Fatty Acids	2019/05/22	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/05/22	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/05/22	ND, RDL=0.0060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Decanoic Acid (C10)	2019/05/22	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/05/22	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/05/22	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/05/22	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/05/22	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/05/22	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/05/22	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/05/22	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/05/22	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/05/22	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/05/22	ND, RDL=0.0060		mg/L	
			12,14-Dichlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
6134119	SJ1	RPD [JSI550-21]	Total Fatty Acids	2019/05/22	NC		%	30
			Total Resin Acids	2019/05/22	NC		%	30
			9,10-Dichlorostearic acid	2019/05/22	NC		%	30
			Decanoic Acid (C10)	2019/05/22	NC		%	30
			Docosanoic acid (C22)	2019/05/22	NC		%	30
			Dodecanoic acid (C12)	2019/05/22	NC		%	30
			Eicosanoic acid (C20)	2019/05/22	NC		%	30
			Hexadecanoic acid (C16)	2019/05/22	NC		%	30
			Linoleic acid (C18:2)	2019/05/22	NC		%	30
			Linolenic acid (C18:3)	2019/05/22	NC		%	30
			Octadecanoic acid (C18)	2019/05/22	NC		%	30
			Oleic acid (C18:1)	2019/05/22	NC		%	30
			Tetradecanoic acid (C14)	2019/05/22	NC		%	30

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Undecanoic acid (C11)	2019/05/22	NC		%	30
			12,14-Dichlorodehydroabietic acid	2019/05/22	NC		%	30
			12-Chlorodehydroabietic acid	2019/05/22	NC		%	30
			14-Chlorodehydroabietic acid	2019/05/22	NC		%	30
			Abietic acid	2019/05/22	NC		%	30
			Dehydroabietic acid	2019/05/22	NC		%	30
			Isopimaric acid	2019/05/22	NC		%	30
			Neoabietic acid	2019/05/22	NC		%	30
			Palustric acid	2019/05/22	NC		%	30
			Pimaric acid	2019/05/22	NC		%	30
			Sandaracopimaric acid	2019/05/22	NC		%	30
6135156	IC4	Matrix Spike	Total Nitrogen (N)	2019/05/22		92	%	80 - 120
6135156	IC4	Spiked Blank	Total Nitrogen (N)	2019/05/22		98	%	80 - 120
6135156	IC4	Method Blank	Total Nitrogen (N)	2019/05/22	ND, RDL=0.020		mg/L	
6151976	OBC	Spiked Blank	C13-1234678 HeptaCDD	2019/06/02		93	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/02		94	%	30 - 130
			C13-123678 HexaCDD	2019/06/02		116	%	30 - 130
			C13-123678 HexaCDF	2019/06/02		89	%	30 - 130
			C13-12378 PentaCDD	2019/06/02		83	%	30 - 130
			C13-12378 PentaCDF	2019/06/02		65	%	30 - 130
			C13-2378 TetraCDD	2019/06/02		95	%	30 - 130
			C13-2378 TetraCDF	2019/06/02		97	%	30 - 130
			C13-OCDD	2019/06/02		102	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/02		93	%	80 - 140
			1,2,3,7,8-Penta CDD	2019/06/02		112	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2019/06/02		92	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2019/06/02		107	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2019/06/02		99	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2019/06/02		110	%	80 - 140
			Octa CDD	2019/06/02		81	%	80 - 140
			2,3,7,8-Tetra CDF	2019/06/02		103	%	80 - 140
			1,2,3,7,8-Penta CDF	2019/06/02		136	%	80 - 140
			2,3,4,7,8-Penta CDF	2019/06/02		113	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2019/06/02		122	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2019/06/02		137	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2019/06/02		132	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2019/06/02		132	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2019/06/02		109	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2019/06/02		96	%	80 - 140
			Octa CDF	2019/06/02		88	%	80 - 140
6151976	OBC	RPD	2,3,7,8-Tetra CDD	2019/06/02	11		%	35
			1,2,3,7,8-Penta CDD	2019/06/02	16		%	35
			1,2,3,4,7,8-Hexa CDD	2019/06/02	10		%	35
			1,2,3,6,7,8-Hexa CDD	2019/06/02	7.8		%	35
			1,2,3,7,8,9-Hexa CDD	2019/06/02	11		%	35
			1,2,3,4,6,7,8-Hepta CDD	2019/06/02	29		%	35
			Octa CDD	2019/06/02	0		%	35
			2,3,7,8-Tetra CDF	2019/06/02	17		%	35
			1,2,3,7,8-Penta CDF	2019/06/02	33		%	35
			2,3,4,7,8-Penta CDF	2019/06/02	20		%	35
			1,2,3,4,7,8-Hexa CDF	2019/06/02	31		%	35
			1,2,3,6,7,8-Hexa CDF	2019/06/02	37 (3)		%	35
			2,3,4,6,7,8-Hexa CDF	2019/06/02	28		%	35

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDF	2019/06/02	36 (3)		%	35
			1,2,3,4,6,7,8-Hepta CDF	2019/06/02	21		%	35
			1,2,3,4,7,8,9-Hepta CDF	2019/06/02	16		%	35
			Octa CDF	2019/06/02	0		%	35
6151976	OBC	Method Blank	C13-1234678 HeptaCDD	2019/06/02		97	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/02		99	%	30 - 130
			C13-123678 HexaCDD	2019/06/02		114	%	30 - 130
			C13-123678 HexaCDF	2019/06/02		87	%	30 - 130
			C13-12378 PentaCDD	2019/06/02		70	%	30 - 130
			C13-12378 PentaCDF	2019/06/02		58	%	30 - 130
			C13-2378 TetraCDD	2019/06/02		99	%	30 - 130
			C13-2378 TetraCDF	2019/06/02		81	%	30 - 130
			C13-OCDD	2019/06/02		97	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/02	ND, EDL=1.02		pg/L	
			1,2,3,7,8-Penta CDD	2019/06/02	ND, EDL=1.13		pg/L	
			1,2,3,4,7,8-Hexa CDD	2019/06/02	ND, EDL=1.19		pg/L	
			1,2,3,6,7,8-Hexa CDD	2019/06/02	ND, EDL=1.03		pg/L	
			1,2,3,7,8,9-Hexa CDD	2019/06/02	ND, EDL=1.00		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2019/06/02	ND, EDL=1.05		pg/L	
			Octa CDD	2019/06/02	1.21, EDL=1.07		pg/L	
			Total Tetra CDD	2019/06/02	ND, EDL=1.02		pg/L	
			Total Penta CDD	2019/06/02	ND, EDL=1.13		pg/L	
			Total Hexa CDD	2019/06/02	ND, EDL=2.15 (4)		pg/L	
			Total Hepta CDD	2019/06/02	ND, EDL=1.05		pg/L	
			2,3,7,8-Tetra CDF	2019/06/02	ND, EDL=1.10		pg/L	
			1,2,3,7,8-Penta CDF	2019/06/02	ND, EDL=1.04		pg/L	
			2,3,4,7,8-Penta CDF	2019/06/02	ND, EDL=1.05		pg/L	
			1,2,3,4,7,8-Hexa CDF	2019/06/02	ND, EDL=0.836		pg/L	
			1,2,3,6,7,8-Hexa CDF	2019/06/02	ND, EDL=0.697		pg/L	
			2,3,4,6,7,8-Hexa CDF	2019/06/02	ND, EDL=0.789		pg/L	
			1,2,3,7,8,9-Hexa CDF	2019/06/02	ND, EDL=0.874		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2019/06/02	ND, EDL=0.996		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2019/06/02	ND, EDL=1.13		pg/L	
			Octa CDF	2019/06/02	ND, EDL=1.06		pg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tetra CDF	2019/06/02	ND, EDL=1.10		pg/L	
			Total Penta CDF	2019/06/02	ND, EDL=1.05		pg/L	
			Total Hexa CDF	2019/06/02	ND, EDL=0.793		pg/L	
			Total Hepta CDF	2019/06/02	ND, EDL=1.06		pg/L	

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) Matrix Spike exceeds acceptance limits, probable matrix interference.

(2) Elevated reporting limit due to turbidity.

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

(4) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE

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



Brad Newman, Scientific Service Specialist



David Huang, BBY Scientific Specialist



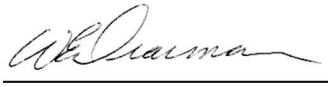
Harry (Peng) Liang, Senior Analyst



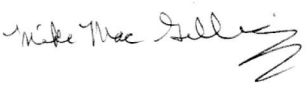
Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics



Gayle Simpson, Senior Analyst



Eric Dearman, Scientific Specialist



Mike MacGillivray, Scientific Specialist (Inorganics)

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE(CONT'D)

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

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Rosemarie MacDonald, Scientific Specialist (Organics)

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Maxxam
A Bureau Veritas Group Company

Your Project #: B9C9662
Your C.O.C. #: n-a

Attention: BEDFORD CUSTOMER SERVICE

Maxxam Analytics
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/05/22
Report #: R2441444
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917289
Received: 2019/05/16, 08:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/05/21	2019/05/22	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam 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 Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing. Maxxam 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 Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Your Project #: B9C9662
Your C.O.C. #: n-a

Attention: BEDFORD CUSTOMER SERVICE

Maxxam Analytics
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/05/22
Report #: R2441444
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917289
Received: 2019/05/16, 08:45

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: SRetailleau@maxxam.ca
Phone# (514)448-9001 Ext:7066232
==========
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

PHENOLS BY GCMS (WATER)

Maxxam ID		GK8447		
Sampling Date		2019/05/14 13:00		
	Units	**JS1550-13R/RAW WATER**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	<5.0	5.0	1990581
Phenol	ug/L	<0.50	0.50	1990581
2-Chlorophenol	ug/L	<0.50	0.50	1990581
3-Chlorophenol	ug/L	<0.50	0.50	1990581
4-Chlorophenol	ug/L	<0.50	0.50	1990581
o-Cresol	ug/L	<0.50	0.50	1990581
m-Cresol	ug/L	<0.50	0.50	1990581
p-Cresol	ug/L	<0.50	0.50	1990581
Guaiacol	ug/L	<0.50	0.50	1990581
Catechol	ug/L	<0.50	0.50	1990581
Eugenol	ug/L	<0.50	0.50	1990581
Isoeugenol	ug/L	<0.50	0.50	1990581
6-Chlorovanillin	ug/L	<0.50	0.50	1990581
5,6-Dichlorovanillin	ug/L	<0.50	0.50	1990581
3,4,5-Trichlorosyringol	ug/L	<0.50	0.50	1990581
2,4-Dimethylphenol	ug/L	<0.50	0.50	1990581
2,6-Dichlorophenol	ug/L	<0.50	0.50	1990581
3,5-Dichlorophenol	ug/L	<0.50	0.50	1990581
2,3-Dichlorophenol	ug/L	<0.50	0.50	1990581
3,4-Dichlorophenol	ug/L	<0.50	0.50	1990581
2,4 + 2,5-Dichlorophenol	ug/L	<0.50	0.50	1990581
2-Nitrophenol	ug/L	<1.0	1.0	1990581
4-Nitrophenol	ug/L	<5.0	5.0	1990581
2,4,6-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,3,5-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,3,6-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,4,5-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,3,4-Trichlorophenol	ug/L	<0.50	0.50	1990581
3,4,5-Trichlorophenol	ug/L	<0.50	0.50	1990581
4-Chloroguaiacol	ug/L	<0.50	0.50	1990581
4,5-Dichloroguaiacol	ug/L	<0.50	0.50	1990581
4,6-Dichloroguaiacol	ug/L	<0.50	0.50	1990581
2,3,5,6-Tetrachlorophenol	ug/L	<0.50	0.50	1990581
2,3,4,6-Tetrachlorophenol	ug/L	<0.50	0.50	1990581
2,3,4,5-Tetrachlorophenol	ug/L	<0.50	0.50	1990581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

PHENOLS BY GCMS (WATER)

Maxxam ID		GK8447		
Sampling Date		2019/05/14 13:00		
	Units	**JS1550-13R/RAW WATER**	**RDL**	**QC Batch**
4-Chlorocatechol	ug/L	<0.50	0.50	1990581
3,5-Dichlorocatechol	ug/L	<0.50	0.50	1990581
4,5-Dichlorocatechol	ug/L	<0.50	0.50	1990581
3,4,5-Trichloroguaiacol	ug/L	<0.50	0.50	1990581
4,5,6-Trichloroguaiacol	ug/L	<0.50	0.50	1990581
Pentachlorophenol	ug/L	<0.50	0.50	1990581
3,4,5-Trichlorocatechol	ug/L	<0.50	0.50	1990581
Tetrachlorocatechol	ug/L	<0.50	0.50	1990581
Tetrachloroguaiacol	ug/L	<0.50	0.50	1990581
4,5-Dichloroveratrol	ug/L	<0.50	0.50	1990581
3,4,5-Trichloroveratrol	ug/L	<0.50	0.50	1990581
3,4,5,6-Tetrachloroveratrol	ug/L	<0.50	0.50	1990581
Surrogate Recovery (%)				
D6-Phenol	%	106	N/A	1990581
Tribromophenol-2,4,6	%	86	N/A	1990581
Trifluoro-m-cresol	%	104	N/A	1990581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

GENERAL COMMENTS

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

Package 1	1.7°C

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total Regl. P&P Phenols calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1990581	MA1	Spiked Blank	D6-Phenol	2019/05/22		116	%	50 - 130
			Tribromophenol-2,4,6	2019/05/22		95	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		116	%	50 - 130
			Phenol	2019/05/22		117	%	50 - 130
			2-Chlorophenol	2019/05/22		111	%	50 - 130
			3-Chlorophenol	2019/05/22		114	%	50 - 130
			4-Chlorophenol	2019/05/22		111	%	50 - 130
			o-Cresol	2019/05/22		120	%	50 - 130
			m-Cresol	2019/05/22		120	%	50 - 130
			p-Cresol	2019/05/22		117	%	50 - 130
			2,4-Dimethylphenol	2019/05/22		108	%	50 - 130
			2,6-Dichlorophenol	2019/05/22		116	%	50 - 130
			3,5-Dichlorophenol	2019/05/22		105	%	50 - 130
			2,3-Dichlorophenol	2019/05/22		109	%	50 - 130
			3,4-Dichlorophenol	2019/05/22		110	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/05/22		111	%	50 - 130
			2-Nitrophenol	2019/05/22		109	%	50 - 130
			4-Nitrophenol	2019/05/22		107	%	50 - 130
			2,4,6-Trichlorophenol	2019/05/22		110	%	50 - 130
			2,3,5-Trichlorophenol	2019/05/22		102	%	50 - 130
			2,3,6-Trichlorophenol	2019/05/22		117	%	50 - 130
			2,4,5-Trichlorophenol	2019/05/22		113	%	50 - 130
			2,3,4-Trichlorophenol	2019/05/22		110	%	50 - 130
			3,4,5-Trichlorophenol	2019/05/22		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/05/22		103	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/05/22		110	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/05/22		102	%	50 - 130
			Pentachlorophenol	2019/05/22		94	%	50 - 130
1990581	MA1	Spiked Blank DUP	D6-Phenol	2019/05/22		112	%	50 - 130
			Tribromophenol-2,4,6	2019/05/22		92	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		110	%	50 - 130
			Phenol	2019/05/22		115	%	50 - 130
			2-Chlorophenol	2019/05/22		108	%	50 - 130
			3-Chlorophenol	2019/05/22		111	%	50 - 130
			4-Chlorophenol	2019/05/22		108	%	50 - 130
			o-Cresol	2019/05/22		119	%	50 - 130
			m-Cresol	2019/05/22		119	%	50 - 130
			p-Cresol	2019/05/22		113	%	50 - 130
			2,4-Dimethylphenol	2019/05/22		106	%	50 - 130
			2,6-Dichlorophenol	2019/05/22		113	%	50 - 130
			3,5-Dichlorophenol	2019/05/22		104	%	50 - 130
			2,3-Dichlorophenol	2019/05/22		108	%	50 - 130
			3,4-Dichlorophenol	2019/05/22		109	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/05/22		108	%	50 - 130
			2-Nitrophenol	2019/05/22		108	%	50 - 130
			4-Nitrophenol	2019/05/22		106	%	50 - 130
			2,4,6-Trichlorophenol	2019/05/22		109	%	50 - 130
			2,3,5-Trichlorophenol	2019/05/22		101	%	50 - 130
			2,3,6-Trichlorophenol	2019/05/22		115	%	50 - 130
			2,4,5-Trichlorophenol	2019/05/22		113	%	50 - 130
			2,3,4-Trichlorophenol	2019/05/22		109	%	50 - 130
			3,4,5-Trichlorophenol	2019/05/22		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/05/22		102	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/05/22		109	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/05/22		102	%	50 - 130
			Pentachlorophenol	2019/05/22		92	%	50 - 130
1990581	MA1	Method Blank	D6-Phenol	2019/05/22		108	%	50 - 130
			Total of Regl. P&P Phenols	2019/05/22	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/05/22		89	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		105	%	50 - 130
			Phenol	2019/05/22	<0.50		ug/L	
			2-Chlorophenol	2019/05/22	<0.50		ug/L	
			3-Chlorophenol	2019/05/22	<0.50		ug/L	
			4-Chlorophenol	2019/05/22	<0.50		ug/L	
			o-Cresol	2019/05/22	<0.50		ug/L	
			m-Cresol	2019/05/22	<0.50		ug/L	
			p-Cresol	2019/05/22	<0.50		ug/L	
			Guaiacol	2019/05/22	<0.50		ug/L	
			Catechol	2019/05/22	<0.50		ug/L	
			Eugenol	2019/05/22	<0.50		ug/L	
			Isoeugenol	2019/05/22	<0.50		ug/L	
			6-Chlorovanillin	2019/05/22	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/05/22	<0.50		ug/L	
			2,4-Dimethylphenol	2019/05/22	<0.50		ug/L	
			2,6-Dichlorophenol	2019/05/22	<0.50		ug/L	
			3,5-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2,3-Dichlorophenol	2019/05/22	<0.50		ug/L	
			3,4-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2-Nitrophenol	2019/05/22	<1.0		ug/L	
			4-Nitrophenol	2019/05/22	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			4-Chloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/05/22	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/05/22	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			4-Chlorocatechol	2019/05/22	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/05/22	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/05/22	<0.50		ug/L	
			Pentachlorophenol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/05/22	<0.50		ug/L	
			Tetrachlorocatechol	2019/05/22	<0.50		ug/L	
			Tetrachloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/05/22	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/05/22	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

MAXXAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac RUSH Job# B9C9662

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)
☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JSI550-13R\Raw Water	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/14 13:00	2019/05/22

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	2	2	1	Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) _____ (print) BETHANY MOORE Date and Time 2019/05/15 14:38

Received by (Sign) _____ (print) Maurie Donley Date and Time 2019/05/16 08:45

Subcontract Comments:
[redacted]

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:
National: N001
Regional:

B917289_COC

16-May-19 08:45
Sophie Retailleau
B917289
LD

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☐ COC Must be Attached
Sender (Print) BETHANY MOORE Initial BM

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler, Ice, Tape-custody seal, Date&Sign
Date Shipped May 15/19 Number of coolers ____
Shipper (Print) _____ Initial _____

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9C9662	715991
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Project Name		C#715991-01-01	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions:
- Add
Total organic Carbon
- Colour (Tcu)
- Total Nitrogen
- Dissolved organic carbon

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	TSS/VSS	Carbonaceous BOD	Chemical Oxygen Demand (COD)	Organic Halogen (Adsorbable)	Total Kjeldahl Nitrogen in Water	Phosphorus Total Colourimetry	Salinity	Dioxins/Furans in Water (EPS 1/RM/23)	PAH and PCB	Atlantic VOC in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1	SID#442675	Raw Water	May 14/19	13:00pm	W			X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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: May 22 2019 Time Required: NOON ☒

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Ryan Roddick	19/05/14	1330				

Lab Use Only: Time Sensitive ☐ | Temperature (°C) on Receipt (6, 14, 16) | Custody Seal Intact on Cooler? ☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

2019 MAY 15 13:12

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9C9662	715991
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Project Name		C#715991-01-02	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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: May 22 2019 Time Required: Noon

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	RBCA Hydrocarbons in Water	Phenols in Pulp and Paper Mill Effluents	Atlantic RCAp-MS (Includes Sodium)	Mercury - Total (CVAA,LL)	Sulphide (H2S)	Chlorate and Chlorite by IC	Total Cyanide	Resin and Fatty Acids			# of Bottles	Comments / Hazards / Other Required Analysis
1	SID#442675	Raw Water	May 14/19	13:00 pm	W			X	X	X	X	X	X	X	X				
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

* 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?
Ryan Reddick Ryan Reddick	19/05/14	1330pm					☐	16, 14, 6	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

2019 MAY 15 13:12

Point A

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 715285-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/11
Report #: R5748921
Version: 4 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9866
Received: 2019/05/15, 12:49

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/05/23	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/05/21	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/05/17	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/16	2019/05/21	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/05/21	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/17	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/05/21	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/05/23	2019/05/23	CAM SOP-00457	OMOE E3015 5 m
Dioxins/Furans in Water (EPS 1/RM/23) (1, 6)	1	2019/06/03	2019/06/09	BRL SOP-00406 (mod)	EPS 1/RM/23 m
Organic carbon - Diss (DOC) (7)	1	N/A	2019/05/17	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/05/23	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/06/05	2019/06/05	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/05/21		
Hardness (calculated as CaCO3)	1	N/A	2019/05/21	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/23	2019/05/23	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/16	2019/05/17	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/05/23	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/05/23	N/A	Auto Calc.
Organic Halogen (Adsorbable) (2)	1	2019/05/23	2019/05/23	PTC SOP-00056	Coulometric - Titr.
Chlorate and Chlorite by IC (3)	1	N/A	2019/05/19	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (4)	1	N/A	2019/05/22	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (3)	1	2019/05/21	2019/05/23	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/05/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/05/21	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/05/21	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/05/22	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/16	2019/05/16	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/05/17	2019/05/21	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/05/21	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (5)	1	2019/05/16	2019/05/23		
pH (8)	1	N/A	2019/05/23	ATL SOP 00003	SM 23 4500-H+ B m

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 715285-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/11
Report #: R5748921
Version: 4 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9866
Received: 2019/05/15, 12:49

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Phosphorus - ortho	1	N/A	2019/05/22	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	1	N/A	2019/05/17	ATL SOP 00118	Atl. RBCA v3.1 m
Salinity (9)	1	N/A	2019/05/21		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/05/23	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/05/23	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/05/21	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/05/21	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2019/05/21	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/05/22	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/05/17	2019/05/21	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (7)	1	N/A	2019/05/17	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/06/05	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/05/16	2019/05/17	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/16	2019/05/21	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/05/23	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/16	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/05/22	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 715285-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/11
Report #: R5748921
Version: 4 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9866
Received: 2019/05/15, 12:49

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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Edm Petrol Offsite
(3) This test was performed by Bedford to Calgary Offsite
(4) This test was performed by Bedford to Burnaby - Offsite
(5) This test was performed by Bedford to Montreal Subcontrac
(6) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(7) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(8) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(9) Non-accredited test method

Encryption Key



Neyousha Shahisavandi
Project Manager Assistant
11 Jun 2019 16:00:53

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

BV Labs Job #: B9C9866
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	12.2	N/A	N/A	6122693
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	190	1.0	0.20	6122686
Calculated TDS	mg/L	760	1.0	0.20	6122701
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	6122686
Cation Sum	me/L	12.2	N/A	N/A	6122693
Hardness (CaCO3)	mg/L	110	1.0	1.0	6122689
Ion Balance (% Difference)	%	0.0800	N/A	N/A	6122691
Langelier Index (@ 20C)	N/A	-0.568			6122697
Langelier Index (@ 4C)	N/A	-0.814			6122699
Nitrate (N)	mg/L	0.20	0.050	N/A	6122695
Saturation pH (@ 20C)	N/A	7.67			6122697
Saturation pH (@ 4C)	N/A	7.91			6122699
Sulphide (as H2S)	mg/L	0.34	0.021	0.011	6122964
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	190 (1)	50	N/A	6130645
Carbonaceous BOD	mg/L	190	43	N/A	6122932
Total Chemical Oxygen Demand	mg/L	820	20	N/A	6127143
Dissolved Chlorate (ClO3-)	mg/L	53 (2)	1.0	N/A	6154325
Dissolved Chloride (Cl-)	mg/L	130	5.0	N/A	6130647
Dissolved Chlorite (CLO2-)	mg/L	ND (2)	1.0	N/A	6154325
Colour	TCU	590	100	N/A	6130899
Total Kjeldahl Nitrogen (TKN)	mg/L	3.8	1.0	0.60	6128661
Nitrate + Nitrite (N)	mg/L	0.28	0.050	N/A	6130657
Nitrite (N)	mg/L	0.071	0.010	N/A	6130658
Nitrogen (Ammonia Nitrogen)	mg/L	1.7	0.050	N/A	6130801
Dissolved Organic Carbon (C)	mg/L	260 (3)	5.0	N/A	6127728
Total Organic Carbon (C)	mg/L	290 (3)	5.0	N/A	6127724
Orthophosphate (P)	mg/L	1.2	0.050	N/A	6130656

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Elevated reporting limit due to method blank performance.
(2) Detection limits raised due to sample matrix.
(3) Elevated reporting limit due to turbidity.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
pH	pH	7.10	N/A	N/A	6133108
Total Phosphorus	mg/L	1.9	0.040	N/A	6124637
Salinity	N/A	ND	2.0	N/A	6130613
Reactive Silica (SiO2)	mg/L	10	0.50	N/A	6130655
Total Suspended Solids	mg/L	120	5.0	N/A	6124744
Dissolved Sulphate (SO4)	mg/L	230	10	N/A	6130654
Sulphide	mg/L	0.32	0.020	0.010	6130992
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6137355
Turbidity	NTU	56	0.10	0.10	6135407
Volatile Suspended Solids	mg/L	90	20	N/A	6133009
Conductivity	uS/cm	1200	1.0	N/A	6133115
Nutritional Parameters					
Total Nitrogen (N)	mg/L	3.06 (1)	0.20	N/A	6136917
Organic Halogens					
Adsorbable Organic Halogen	mg/L	0.81	0.25	N/A	6136366
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6125984

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) RDL raised due to sample matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	ND	0.013	N/A	6131192

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	2300	5.0	N/A	6124570
Total Antimony (Sb)	ug/L	ND	1.0	N/A	6124570
Total Arsenic (As)	ug/L	ND	1.0	N/A	6124570
Total Barium (Ba)	ug/L	480	1.0	N/A	6124570
Total Beryllium (Be)	ug/L	ND	1.0	N/A	6124570
Total Bismuth (Bi)	ug/L	ND	2.0	N/A	6124570
Total Boron (B)	ug/L	60	50	N/A	6124570
Total Cadmium (Cd)	ug/L	1.4	0.010	N/A	6124570
Total Calcium (Ca)	ug/L	38000	100	N/A	6124570
Total Chromium (Cr)	ug/L	4.4	1.0	N/A	6124570
Total Cobalt (Co)	ug/L	1.0	0.40	N/A	6124570
Total Copper (Cu)	ug/L	10	0.50	N/A	6124570
Total Iron (Fe)	ug/L	1400	50	N/A	6124570
Total Lead (Pb)	ug/L	3.7	0.50	N/A	6124570
Total Magnesium (Mg)	ug/L	4900	100	N/A	6124570
Total Manganese (Mn)	ug/L	2700	2.0	N/A	6124570
Total Molybdenum (Mo)	ug/L	ND	2.0	N/A	6124570
Total Nickel (Ni)	ug/L	3.4	2.0	N/A	6124570
Total Phosphorus (P)	ug/L	1500	100	N/A	6124570
Total Potassium (K)	ug/L	9000	100	N/A	6124570
Total Selenium (Se)	ug/L	ND	1.0	N/A	6124570
Total Silver (Ag)	ug/L	0.32	0.10	N/A	6124570
Total Sodium (Na)	ug/L	220000	100	N/A	6124570
Total Strontium (Sr)	ug/L	170	2.0	N/A	6124570
Total Thallium (Tl)	ug/L	0.26	0.10	N/A	6124570
Total Tin (Sn)	ug/L	ND	2.0	N/A	6124570
Total Titanium (Ti)	ug/L	65	2.0	N/A	6124570
Total Uranium (U)	ug/L	0.43	0.10	N/A	6124570
Total Vanadium (V)	ug/L	4.0	2.0	N/A	6124570
Total Zinc (Zn)	ug/L	190	5.0	N/A	6124570

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6124966
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6124966
Acenaphthene	ug/L	ND	0.010	N/A	6124966
Acenaphthylene	ug/L	ND (1)	0.030	N/A	6124966
Anthracene	ug/L	ND (1)	0.020	N/A	6124966
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6124966
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6124966
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6124966
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6123000
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6124966
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6124966
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6124966
Chrysene	ug/L	ND	0.010	N/A	6124966
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6124966
Fluoranthene	ug/L	ND (1)	0.40	N/A	6124966
Fluorene	ug/L	ND (1)	0.090	N/A	6124966
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6124966
Naphthalene	ug/L	ND	0.20	N/A	6124966
Perylene	ug/L	ND	0.010	N/A	6124966
Phenanthrene	ug/L	0.019	0.010	N/A	6124966
Pyrene	ug/L	ND (1)	0.050	N/A	6124966
Surrogate Recovery (%)					
D10-Anthracene	%	114			6124966
D14-Terphenyl	%	95			6124966
D8-Acenaphthylene	%	93			6124966

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6124567
1,1-Dichloroethylene	ug/L	ND (1)	11	22	6124567
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6124567
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6124567
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6124567
Ethylene Dibromide	ug/L	ND	0.20	0.50	6124567
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6124567
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6124567
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6124567
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6124567
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6124567
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6124567
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6124567
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6124567
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6124567
Benzene	ug/L	ND	1.0	N/A	6124567
Bromodichloromethane	ug/L	ND	1.0	0.20	6124567
Bromoform	ug/L	ND	1.0	0.20	6124567
Bromomethane	ug/L	ND	0.50	N/A	6124567
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6124567
Chlorobenzene	ug/L	ND	1.0	N/A	6124567
Chloroethane	ug/L	ND	8.0	N/A	6124567
Chloroform	ug/L	13	1.0	0.20	6124567
Chloromethane	ug/L	ND	8.0	N/A	6124567
Dibromochloromethane	ug/L	ND	1.0	0.20	6124567
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6124567
Ethylbenzene	ug/L	ND	1.0	N/A	6124567
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6124567
Styrene	ug/L	ND	1.0	N/A	6124567
Tetrachloroethylene	ug/L	ND	1.0	N/A	6124567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated VOC RDL(s) due to matrix interference.

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Toluene	ug/L	ND	1.0	N/A	6124567
Trichloroethylene	ug/L	ND	1.0	N/A	6124567
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6124567
Vinyl Chloride	ug/L	ND	0.50	2.0	6124567
o-Xylene	ug/L	ND	1.0	N/A	6124567
p+m-Xylene	ug/L	ND	2.0	N/A	6124567
Total Xylenes	ug/L	ND	1.0	1.0	6124567
Total Trihalomethanes	ug/L	13	1.0	N/A	6124567
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	98			6124567
D4-1,2-Dichloroethane	%	111			6124567
D8-Toluene	%	100			6124567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

BV Labs Job #: B9C9866
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6127651
Toluene	mg/L	ND	0.0010	N/A	6127651
Ethylbenzene	mg/L	ND	0.0010	N/A	6127651
Total Xylenes	mg/L	ND	0.0020	N/A	6127651
C6 - C10 (less BTEX)	mg/L	0.14 (1)	0.010	N/A	6127651
>C10-C16 Hydrocarbons	mg/L	0.17	0.050	N/A	6158877
>C16-C21 Hydrocarbons	mg/L	0.23	0.050	N/A	6158877
>C21-<C32 Hydrocarbons	mg/L	0.68	0.10	N/A	6158877
Modified TPH (Tier1)	mg/L	1.2	0.10	N/A	6156528
Reached Baseline at C32	mg/L	Yes	N/A	N/A	6158877
Hydrocarbon Resemblance	mg/L	COMMENT (2)	N/A	N/A	6158877
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	90			6158877
n-Dotriacontane - Extractable	%	83 (3)			6158877
Isobutylbenzene - Volatile	%	73			6127651

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Interference from Volatile Organic Compounds (VOCs) in the gasoline range.
(2) Unidentified compound(s) in fuel / lube range. One product in lube oil range.
(3) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6127147
Aroclor 1221	ug/L	ND	0.050	N/A	6127147
Aroclor 1232	ug/L	ND	0.050	N/A	6127147
Aroclor 1248	ug/L	ND	0.050	N/A	6127147
Aroclor 1242	ug/L	ND	0.050	N/A	6127147
Aroclor 1254	ug/L	ND	0.050	N/A	6127147
Aroclor 1260	ug/L	ND	0.050	N/A	6127147
Calculated Total PCB	ug/L	ND	0.050	N/A	6123002
Surrogate Recovery (%)					
Decachlorobiphenyl	%	29 (1)			6127147

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) PCB surrogate not within acceptance limits. Analysis was repeated with similar results.

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	ND	3.6	N/A	6154327
Total Resin Acids	mg/L	ND	3.0	N/A	6154327
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND (1)	0.30	N/A	6154327
Decanoic Acid (C10)	mg/L	ND (1)	0.30	N/A	6154327
Docosanoic acid (C22)	mg/L	ND (1)	0.30	N/A	6154327
Dodecanoic acid (C12)	mg/L	ND (1)	0.30	N/A	6154327
Eicosanoic acid (C20)	mg/L	ND (1)	0.30	N/A	6154327
Hexadecanoic acid (C16)	mg/L	0.36 (1)	0.30	N/A	6154327
Linoleic acid (C18:2)	mg/L	2.1 (1)	0.30	N/A	6154327
Linolenic acid (C18:3)	mg/L	ND (1)	0.30	N/A	6154327
Octadecanoic acid (C18)	mg/L	ND (1)	0.30	N/A	6154327
Oleic acid (C18:1)	mg/L	0.65 (1)	0.30	N/A	6154327
Tetradecanoic acid (C14)	mg/L	ND (1)	0.30	N/A	6154327
Undecanoic acid (C11)	mg/L	ND (1)	0.30	N/A	6154327
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND (1)	0.30	N/A	6154327
12-Chlorodehydroabietic acid	mg/L	ND (1)	0.30	N/A	6154327
14-Chlorodehydroabietic acid	mg/L	ND (1)	0.30	N/A	6154327
Abietic acid	mg/L	0.32 (1)	0.30	N/A	6154327
Dehydroabietic acid	mg/L	0.32 (1)	0.30	N/A	6154327
Isopimaric acid	mg/L	ND (1)	0.30	N/A	6154327
Neoabietic acid	mg/L	ND (1)	0.30	N/A	6154327
Palustric acid	mg/L	ND (1)	0.30	N/A	6154327
Pimaric acid	mg/L	ND (1)	0.30	N/A	6154327
Sandaracopimaric acid	mg/L	ND (1)	0.30	N/A	6154327

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Detection limits raised due to dilution as a result of sample matrix interference.

BV Labs Job #: B9C9866
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JSK186							
Sampling Date		2019/05/14 13:15							
COC Number		715285-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	POINT A 14-MAY	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/L	ND	1.07	9.66	N/A	1.00	1.07		6164383
1,2,3,7,8-Penta CDD *	pg/L	ND	1.09	9.66	N/A	1.00	1.09		6164383
1,2,3,4,7,8-Hexa CDD *	pg/L	ND	1.20	9.66	N/A	0.100	0.120		6164383
1,2,3,6,7,8-Hexa CDD *	pg/L	1.25	1.05	9.66	N/A	0.100	0.125		6164383
1,2,3,7,8,9-Hexa CDD *	pg/L	ND	1.02	9.66	N/A	0.100	0.102		6164383
1,2,3,4,6,7,8-Hepta CDD *	pg/L	54.6	1.05	9.66	N/A	0.0100	0.546		6164383
Octa CDD *	pg/L	380	0.994	96.6	N/A	0.000300	0.114		6164383
Total Tetra CDD *	pg/L	ND	1.07	9.66	N/A			0	6164383
Total Penta CDD *	pg/L	ND	1.09	9.66	N/A			0	6164383
Total Hexa CDD *	pg/L	14.5	1.08	9.66	N/A			2	6164383
Total Hepta CDD *	pg/L	114	1.05	9.66	N/A			2	6164383
2,3,7,8-Tetra CDF **	pg/L	ND	0.985	9.66	N/A	0.100	0.0985		6164383
1,2,3,7,8-Penta CDF **	pg/L	ND	1.13	9.66	N/A	0.0300	0.0339		6164383
2,3,4,7,8-Penta CDF **	pg/L	ND	1.14	9.66	N/A	0.300	0.342		6164383
1,2,3,4,7,8-Hexa CDF **	pg/L	ND	1.12	9.66	N/A	0.100	0.112		6164383
1,2,3,6,7,8-Hexa CDF **	pg/L	ND	0.934	9.66	N/A	0.100	0.0934		6164383
2,3,4,6,7,8-Hexa CDF **	pg/L	ND	1.06	9.66	N/A	0.100	0.106		6164383
1,2,3,7,8,9-Hexa CDF **	pg/L	ND	1.17	9.66	N/A	0.100	0.117		6164383
1,2,3,4,6,7,8-Hepta CDF **	pg/L	ND (1)	1.20	9.66	N/A	0.0100	0.0120		6164383
1,2,3,4,7,8,9-Hepta CDF **	pg/L	ND	1.12	9.66	N/A	0.0100	0.0112		6164383
Octa CDF **	pg/L	3.33	1.06	96.6	N/A	0.000300	0.000999		6164383
Total Tetra CDF **	pg/L	ND	0.985	9.66	N/A			0	6164383
Total Penta CDF **	pg/L	ND	1.13	9.66	N/A			0	6164383

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JSK186							
Sampling Date		2019/05/14 13:15							
COC Number		715285-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	POINT A 14-MAY	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Total Hexa CDF **	pg/L	ND	1.06	9.66	N/A			0	6164383
Total Hepta CDF **	pg/L	ND (1)	1.80	9.66	N/A			0	6164383
TOTAL TOXIC EQUIVALENCY	pg/L						4.09		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	82							6164383
C13-1234678 HeptaCDF **	%	77							6164383
C13-123678 HexaCDD *	%	113							6164383
C13-123678 HexaCDF **	%	83							6164383
C13-12378 PentaCDD *	%	82							6164383
C13-12378 PentaCDF **	%	65							6164383
C13-2378 TetraCDD *	%	101							6164383
C13-2378 TetraCDF **	%	77							6164383
C13-OCDD *	%	80							6164383

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

GENERAL COMMENTS

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

Package 1	8.3°C

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6122932	MLW	QC Standard	Carbonaceous BOD	2019/05/21		105	%	80 - 120
6122932	MLW	Spiked Blank	Carbonaceous BOD	2019/05/21		110	%	80 - 120
6122932	MLW	Method Blank	Carbonaceous BOD	2019/05/21	ND, RDL=2.0		mg/L	
6122932	MLW	RPD	Carbonaceous BOD	2019/05/21	4.6		%	25
			Carbonaceous BOD	2019/05/21	5.4		%	25
6124567	ASL	Matrix Spike	4-Bromofluorobenzene	2019/05/16		102	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		114	%	70 - 130
			D8-Toluene	2019/05/16		96	%	70 - 130
			1,1-Dichloroethane	2019/05/16		104	%	70 - 130
			1,1-Dichloroethylene	2019/05/16		107	%	70 - 130
			1,1,1-Trichloroethane	2019/05/16		106	%	70 - 130
			1,1,2-Trichloroethane	2019/05/16		104	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/16		108	%	70 - 130
			Ethylene Dibromide	2019/05/16		106	%	70 - 130
			1,2-Dichlorobenzene	2019/05/16		91	%	70 - 130
			1,2-Dichloroethane	2019/05/16		107	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/16		97	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/16		103	%	70 - 130
			1,2-Dichloropropane	2019/05/16		102	%	70 - 130
			1,3-Dichlorobenzene	2019/05/16		88	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/16		101	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/16		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/16		86	%	70 - 130
			Benzene	2019/05/16		92	%	70 - 130
			Bromodichloromethane	2019/05/16		98	%	70 - 130
			Bromoform	2019/05/16		101	%	70 - 130
			Bromomethane	2019/05/16		99	%	60 - 140
			Carbon Tetrachloride	2019/05/16		101	%	70 - 130
			Chlorobenzene	2019/05/16		97	%	70 - 130
			Chloroethane	2019/05/16		90	%	60 - 140
			Chloroform	2019/05/16		97	%	70 - 130
			Chloromethane	2019/05/16		101	%	60 - 140
			Dibromochloromethane	2019/05/16		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/16		100	%	70 - 130
			Ethylbenzene	2019/05/16		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/16		99	%	70 - 130
			Styrene	2019/05/16		101	%	70 - 130
			Tetrachloroethylene	2019/05/16		93	%	70 - 130
			Toluene	2019/05/16		97	%	70 - 130
			Trichloroethylene	2019/05/16		96	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/16		92	%	60 - 140
			Vinyl Chloride	2019/05/16		95	%	60 - 140
			o-Xylene	2019/05/16		97	%	70 - 130
			p+m-Xylene	2019/05/16		95	%	70 - 130
6124567	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/16		100	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		106	%	70 - 130
			D8-Toluene	2019/05/16		98	%	70 - 130
			1,1-Dichloroethane	2019/05/16		103	%	70 - 130
			1,1-Dichloroethylene	2019/05/16		109	%	70 - 130
			1,1,1-Trichloroethane	2019/05/16		106	%	70 - 130
			1,1,2-Trichloroethane	2019/05/16		99	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/16		99	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethylene Dibromide	2019/05/16		100	%	70 - 130
			1,2-Dichlorobenzene	2019/05/16		92	%	70 - 130
			1,2-Dichloroethane	2019/05/16		100	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/16		95	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/16		105	%	70 - 130
			1,2-Dichloropropane	2019/05/16		101	%	70 - 130
			1,3-Dichlorobenzene	2019/05/16		90	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/16		100	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/16		104	%	70 - 130
			1,4-Dichlorobenzene	2019/05/16		89	%	70 - 130
			Benzene	2019/05/16		91	%	70 - 130
			Bromodichloromethane	2019/05/16		96	%	70 - 130
			Bromoform	2019/05/16		94	%	70 - 130
			Bromomethane	2019/05/16		95	%	60 - 140
			Carbon Tetrachloride	2019/05/16		102	%	70 - 130
			Chlorobenzene	2019/05/16		94	%	70 - 130
			Chloroethane	2019/05/16		89	%	60 - 140
			Chloroform	2019/05/16		95	%	70 - 130
			Chloromethane	2019/05/16		99	%	60 - 140
			Dibromochloromethane	2019/05/16		99	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/16		96	%	70 - 130
			Ethylbenzene	2019/05/16		98	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/16		97	%	70 - 130
			Styrene	2019/05/16		103	%	70 - 130
			Tetrachloroethylene	2019/05/16		98	%	70 - 130
			Toluene	2019/05/16		98	%	70 - 130
			Trichloroethylene	2019/05/16		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/16		94	%	60 - 140
			Vinyl Chloride	2019/05/16		95	%	60 - 140
			o-Xylene	2019/05/16		98	%	70 - 130
			p+m-Xylene	2019/05/16		96	%	70 - 130
6124567	ASL	Method Blank	4-Bromofluorobenzene	2019/05/16		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		108	%	70 - 130
			D8-Toluene	2019/05/16		100	%	70 - 130
			1,1-Dichloroethane	2019/05/16	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/16	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/16	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/16	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,2-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/16	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/16	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/16	ND, RDL=0.50		ug/L	
			1,4-Dichlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Benzene	2019/05/16	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/16	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/16	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/16	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/16	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/16	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/16	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/16	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/16	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/16	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/16	ND, RDL=2.0		ug/L	
			Styrene	2019/05/16	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/16	ND, RDL=1.0		ug/L	
			Toluene	2019/05/16	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/16	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/16	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/16	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/16	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/16	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Xylenes	2019/05/16	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/16	ND, RDL=1.0		ug/L	
6124567	ASL	RPD	1,1-Dichloroethane	2019/05/16	NC		%	40
			1,1-Dichloroethylene	2019/05/16	NC		%	40
			1,1,1-Trichloroethane	2019/05/16	NC		%	40
			1,1,2-Trichloroethane	2019/05/16	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/16	NC		%	40
			Ethylene Dibromide	2019/05/16	NC		%	40
			1,2-Dichlorobenzene	2019/05/16	NC		%	40
			1,2-Dichloroethane	2019/05/16	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/16	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/16	NC		%	40
			1,2-Dichloropropane	2019/05/16	NC		%	40
			1,3-Dichlorobenzene	2019/05/16	NC		%	40
			cis-1,3-Dichloropropene	2019/05/16	NC		%	40
			trans-1,3-Dichloropropene	2019/05/16	NC		%	40
			1,4-Dichlorobenzene	2019/05/16	NC		%	40
			Benzene	2019/05/16	NC		%	40
			Bromodichloromethane	2019/05/16	NC		%	40
			Bromoform	2019/05/16	NC		%	40
			Bromomethane	2019/05/16	NC		%	40
			Carbon Tetrachloride	2019/05/16	NC		%	40
			Chlorobenzene	2019/05/16	NC		%	40
			Chloroethane	2019/05/16	NC		%	40
			Chloroform	2019/05/16	1.4		%	40
			Chloromethane	2019/05/16	NC		%	40
			Dibromochloromethane	2019/05/16	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/16	NC		%	40
			Ethylbenzene	2019/05/16	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/16	NC		%	40
			Styrene	2019/05/16	NC		%	40
			Tetrachloroethylene	2019/05/16	NC		%	40
			Toluene	2019/05/16	NC		%	40
			Trichloroethylene	2019/05/16	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/16	NC		%	40
			Vinyl Chloride	2019/05/16	NC		%	40
			o-Xylene	2019/05/16	NC		%	40
			p+m-Xylene	2019/05/16	NC		%	40
			Total Xylenes	2019/05/16	NC		%	40
			Total Trihalomethanes	2019/05/16	1.4		%	40
6124570	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/16		98	%	80 - 120
			Total Antimony (Sb)	2019/05/16		101	%	80 - 120
			Total Arsenic (As)	2019/05/16		98	%	80 - 120
			Total Barium (Ba)	2019/05/16		97	%	80 - 120
			Total Beryllium (Be)	2019/05/16		98	%	80 - 120
			Total Bismuth (Bi)	2019/05/16		96	%	80 - 120
			Total Boron (B)	2019/05/16		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/16		97	%	80 - 120
			Total Calcium (Ca)	2019/05/16		101	%	80 - 120
			Total Chromium (Cr)	2019/05/16		99	%	80 - 120
			Total Cobalt (Co)	2019/05/16		103	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Copper (Cu)	2019/05/16		96	%	80 - 120
			Total Iron (Fe)	2019/05/16		104	%	80 - 120
			Total Lead (Pb)	2019/05/16		99	%	80 - 120
			Total Magnesium (Mg)	2019/05/16		102	%	80 - 120
			Total Manganese (Mn)	2019/05/16		98	%	80 - 120
			Total Molybdenum (Mo)	2019/05/16		99	%	80 - 120
			Total Nickel (Ni)	2019/05/16		100	%	80 - 120
			Total Phosphorus (P)	2019/05/16		103	%	80 - 120
			Total Potassium (K)	2019/05/16		103	%	80 - 120
			Total Selenium (Se)	2019/05/16		98	%	80 - 120
			Total Silver (Ag)	2019/05/16		98	%	80 - 120
			Total Sodium (Na)	2019/05/16		98	%	80 - 120
			Total Strontium (Sr)	2019/05/16		98	%	80 - 120
			Total Thallium (Tl)	2019/05/16		100	%	80 - 120
			Total Tin (Sn)	2019/05/16		101	%	80 - 120
			Total Titanium (Ti)	2019/05/16		100	%	80 - 120
			Total Uranium (U)	2019/05/16		103	%	80 - 120
			Total Vanadium (V)	2019/05/16		98	%	80 - 120
			Total Zinc (Zn)	2019/05/16		97	%	80 - 120
6124570	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/16		99	%	80 - 120
			Total Antimony (Sb)	2019/05/16		100	%	80 - 120
			Total Arsenic (As)	2019/05/16		97	%	80 - 120
			Total Barium (Ba)	2019/05/16		98	%	80 - 120
			Total Beryllium (Be)	2019/05/16		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/16		98	%	80 - 120
			Total Boron (B)	2019/05/16		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/16		96	%	80 - 120
			Total Calcium (Ca)	2019/05/16		104	%	80 - 120
			Total Chromium (Cr)	2019/05/16		100	%	80 - 120
			Total Cobalt (Co)	2019/05/16		104	%	80 - 120
			Total Copper (Cu)	2019/05/16		100	%	80 - 120
			Total Iron (Fe)	2019/05/16		104	%	80 - 120
			Total Lead (Pb)	2019/05/16		99	%	80 - 120
			Total Magnesium (Mg)	2019/05/16		104	%	80 - 120
			Total Manganese (Mn)	2019/05/16		100	%	80 - 120
			Total Molybdenum (Mo)	2019/05/16		100	%	80 - 120
			Total Nickel (Ni)	2019/05/16		101	%	80 - 120
			Total Phosphorus (P)	2019/05/16		103	%	80 - 120
			Total Potassium (K)	2019/05/16		102	%	80 - 120
			Total Selenium (Se)	2019/05/16		97	%	80 - 120
			Total Silver (Ag)	2019/05/16		96	%	80 - 120
			Total Sodium (Na)	2019/05/16		100	%	80 - 120
			Total Strontium (Sr)	2019/05/16		101	%	80 - 120
			Total Thallium (Tl)	2019/05/16		100	%	80 - 120
			Total Tin (Sn)	2019/05/16		98	%	80 - 120
			Total Titanium (Ti)	2019/05/16		101	%	80 - 120
			Total Uranium (U)	2019/05/16		103	%	80 - 120
			Total Vanadium (V)	2019/05/16		99	%	80 - 120
			Total Zinc (Zn)	2019/05/16		98	%	80 - 120
6124570	BAN	Method Blank	Total Aluminum (Al)	2019/05/16	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/16	ND, RDL=1.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Arsenic (As)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/16	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/16	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/16	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/16	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/16	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/16	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/16	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/16	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/16	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/16	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/16	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/16	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Zinc (Zn)	2019/05/16	ND, RDL=5.0		ug/L	
6124570	BAN	RPD	Total Aluminum (Al)	2019/05/16	NC		%	20
			Total Antimony (Sb)	2019/05/16	NC		%	20
			Total Arsenic (As)	2019/05/16	NC		%	20
			Total Barium (Ba)	2019/05/16	2.3		%	20
			Total Beryllium (Be)	2019/05/16	NC		%	20
			Total Bismuth (Bi)	2019/05/16	NC		%	20
			Total Boron (B)	2019/05/16	NC		%	20
			Total Cadmium (Cd)	2019/05/16	NC		%	20
			Total Calcium (Ca)	2019/05/16	3.3		%	20
			Total Chromium (Cr)	2019/05/16	NC		%	20
			Total Cobalt (Co)	2019/05/16	1.7		%	20
			Total Copper (Cu)	2019/05/16	3.0		%	20
			Total Iron (Fe)	2019/05/16	2.0		%	20
			Total Lead (Pb)	2019/05/16	NC		%	20
			Total Magnesium (Mg)	2019/05/16	4.2		%	20
			Total Manganese (Mn)	2019/05/16	2.7		%	20
			Total Molybdenum (Mo)	2019/05/16	NC		%	20
			Total Nickel (Ni)	2019/05/16	NC		%	20
			Total Phosphorus (P)	2019/05/16	10		%	20
			Total Potassium (K)	2019/05/16	7.2		%	20
			Total Selenium (Se)	2019/05/16	NC		%	20
			Total Silver (Ag)	2019/05/16	NC		%	20
			Total Sodium (Na)	2019/05/16	2.1		%	20
			Total Strontium (Sr)	2019/05/16	3.3		%	20
			Total Thallium (Tl)	2019/05/16	NC		%	20
			Total Tin (Sn)	2019/05/16	NC		%	20
			Total Titanium (Ti)	2019/05/16	NC		%	20
			Total Uranium (U)	2019/05/16	NC		%	20
			Total Vanadium (V)	2019/05/16	NC		%	20
			Total Zinc (Zn)	2019/05/16	0.77		%	20
6124637	MCN	Matrix Spike	Total Phosphorus	2019/05/17		117	%	80 - 120
6124637	MCN	Spiked Blank	Total Phosphorus	2019/05/17		94	%	80 - 120
6124637	MCN	Method Blank	Total Phosphorus	2019/05/17	ND, RDL=0.020		mg/L	
6124637	MCN	RPD	Total Phosphorus	2019/05/17	NC		%	25
6124744	AM6	QC Standard	Total Suspended Solids	2019/05/21		97	%	80 - 120
6124744	AM6	Method Blank	Total Suspended Solids	2019/05/21	ND, RDL=1.0		mg/L	
6124744	AM6	RPD	Total Suspended Solids	2019/05/21	19		%	20
6124966	KKE	Matrix Spike	D10-Anthracene	2019/05/16		97	%	50 - 130
			D14-Terphenyl	2019/05/16		98	%	50 - 130
			D8-Acenaphthylene	2019/05/16		93	%	50 - 130
			1-Methylnaphthalene	2019/05/16		82	%	50 - 130
			2-Methylnaphthalene	2019/05/16		84	%	50 - 130
			Acenaphthene	2019/05/16		95	%	50 - 130
			Acenaphthylene	2019/05/16		95	%	50 - 130
			Anthracene	2019/05/16		95	%	50 - 130
			Benzo(a)anthracene	2019/05/16		90	%	50 - 130
			Benzo(a)pyrene	2019/05/16		81	%	50 - 130
			Benzo(b)fluoranthene	2019/05/16		89	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/16		86	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(j)fluoranthene	2019/05/16		79	%	50 - 130
			Benzo(k)fluoranthene	2019/05/16		77	%	50 - 130
			Chrysene	2019/05/16		108	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/16		80	%	50 - 130
			Fluoranthene	2019/05/16		98	%	50 - 130
			Fluorene	2019/05/16		99	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/16		81	%	50 - 130
			Naphthalene	2019/05/16		86	%	50 - 130
			Perylene	2019/05/16		76	%	50 - 130
			Phenanthrene	2019/05/16		101	%	50 - 130
			Pyrene	2019/05/16		96	%	50 - 130
6124966	KKE	Spiked Blank	D10-Anthracene	2019/05/16		103	%	50 - 130
			D14-Terphenyl	2019/05/16		102	%	50 - 130
			D8-Acenaphthylene	2019/05/16		101	%	50 - 130
			1-Methylnaphthalene	2019/05/16		88	%	50 - 130
			2-Methylnaphthalene	2019/05/16		90	%	50 - 130
			Acenaphthene	2019/05/16		102	%	50 - 130
			Acenaphthylene	2019/05/16		103	%	50 - 130
			Anthracene	2019/05/16		100	%	50 - 130
			Benzo(a)anthracene	2019/05/16		92	%	50 - 130
			Benzo(a)pyrene	2019/05/16		84	%	50 - 130
			Benzo(b)fluoranthene	2019/05/16		90	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/16		89	%	50 - 130
			Benzo(j)fluoranthene	2019/05/16		83	%	50 - 130
			Benzo(k)fluoranthene	2019/05/16		84	%	50 - 130
			Chrysene	2019/05/16		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/16		82	%	50 - 130
			Fluoranthene	2019/05/16		103	%	50 - 130
			Fluorene	2019/05/16		108	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/16		85	%	50 - 130
			Naphthalene	2019/05/16		92	%	50 - 130
			Perylene	2019/05/16		79	%	50 - 130
			Phenanthrene	2019/05/16		107	%	50 - 130
			Pyrene	2019/05/16		101	%	50 - 130
6124966	KKE	Method Blank	D10-Anthracene	2019/05/16		103	%	50 - 130
			D14-Terphenyl	2019/05/16		103	%	50 - 130
			D8-Acenaphthylene	2019/05/16		99	%	50 - 130
			1-Methylnaphthalene	2019/05/16	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/05/16	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/05/16	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/05/16	ND, RDL=0.010		ug/L	
			Anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(g,h,i)perylene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Chrysene	2019/05/16	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Fluorene	2019/05/16	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/05/16	ND, RDL=0.010		ug/L	
			Naphthalene	2019/05/16	ND, RDL=0.20		ug/L	
			Perylene	2019/05/16	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/05/16	ND, RDL=0.010		ug/L	
			Pyrene	2019/05/16	ND, RDL=0.010		ug/L	
6124966	KKE	RPD	1-Methylnaphthalene	2019/05/16	NC		%	40
			2-Methylnaphthalene	2019/05/16	NC		%	40
			Acenaphthene	2019/05/16	NC		%	40
			Acenaphthylene	2019/05/16	NC		%	40
			Anthracene	2019/05/16	NC		%	40
			Benzo(a)anthracene	2019/05/16	NC		%	40
			Benzo(a)pyrene	2019/05/16	NC		%	40
			Benzo(b)fluoranthene	2019/05/16	NC		%	40
			Benzo(g,h,i)perylene	2019/05/16	NC		%	40
			Benzo(j)fluoranthene	2019/05/16	NC		%	40
			Benzo(k)fluoranthene	2019/05/16	NC		%	40
			Chrysene	2019/05/16	NC		%	40
			Dibenz(a,h)anthracene	2019/05/16	NC		%	40
			Fluoranthene	2019/05/16	NC		%	40
			Fluorene	2019/05/16	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/05/16	NC		%	40
			Naphthalene	2019/05/16	NC		%	40
			Perylene	2019/05/16	NC		%	40
			Phenanthrene	2019/05/16	NC		%	40
			Pyrene	2019/05/16	NC		%	40
6127143	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/05/17		99	%	80 - 120
6127143	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/17		101	%	80 - 120
6127143	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/17		101	%	80 - 120
6127143	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/17	ND, RDL=20		mg/L	
6127143	ZZH	RPD	Total Chemical Oxygen Demand	2019/05/17	4.4		%	25
6127147	RGE	Spiked Blank	Decachlorobiphenyl	2019/05/17		87	%	30 - 130
			Aroclor 1254	2019/05/17		90	%	70 - 130
6127147	RGE	Method Blank	Decachlorobiphenyl	2019/05/17		80	%	30 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Aroclor 1016	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/05/17	ND, RDL=0.050		ug/L	
6127147	RGE	RPD	Aroclor 1016	2019/05/17	NC		%	40
			Aroclor 1221	2019/05/17	NC		%	40
			Aroclor 1232	2019/05/17	NC		%	40
			Aroclor 1248	2019/05/17	NC		%	40
			Aroclor 1242	2019/05/17	NC		%	40
			Aroclor 1254	2019/05/17	NC		%	40
			Aroclor 1260	2019/05/17	NC		%	40
6127651	THL	Matrix Spike	Isobutylbenzene - Volatile	2019/05/17		101	%	70 - 130
			Benzene	2019/05/17		116	%	70 - 130
			Toluene	2019/05/17		116	%	70 - 130
			Ethylbenzene	2019/05/17		117	%	70 - 130
			Total Xylenes	2019/05/17		116	%	70 - 130
6127651	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/05/17		103	%	70 - 130
			Benzene	2019/05/17		102	%	70 - 130
			Toluene	2019/05/17		104	%	70 - 130
			Ethylbenzene	2019/05/17		103	%	70 - 130
			Total Xylenes	2019/05/17		104	%	70 - 130
6127651	THL	Method Blank	Isobutylbenzene - Volatile	2019/05/17		102	%	70 - 130
			Benzene	2019/05/17	ND, RDL=0.0010		mg/L	
			Toluene	2019/05/17	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/05/17	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/05/17	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/05/17	ND, RDL=0.010		mg/L	
6127651	THL	RPD	Benzene	2019/05/17	NC		%	40
			Toluene	2019/05/17	NC		%	40
			Ethylbenzene	2019/05/17	NC		%	40
			Total Xylenes	2019/05/17	NC		%	40
			C6 - C10 (less BTEX)	2019/05/17	NC		%	40
6127724	SSI	Matrix Spike	Total Organic Carbon (C)	2019/05/17		98	%	85 - 115
6127724	SSI	Spiked Blank	Total Organic Carbon (C)	2019/05/17		101	%	80 - 120
6127724	SSI	Method Blank	Total Organic Carbon (C)	2019/05/17	ND, RDL=0.50		mg/L	
6127724	SSI	RPD	Total Organic Carbon (C)	2019/05/17	NC (1)		%	15
6127728	SSI	Matrix Spike	Dissolved Organic Carbon (C)	2019/05/17		98	%	85 - 115

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6127728	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/05/17		100	%	80 - 120
6127728	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/05/17	ND, RDL=0.50		mg/L	
6127728	SSI	RPD	Dissolved Organic Carbon (C)	2019/05/17	1.3		%	15
6128661	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2019/05/22		85	%	80 - 120
6128661	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/05/21		102	%	80 - 120
6128661	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/05/21		104	%	80 - 120
6128661	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/05/21	ND, RDL=0.10		mg/L	
6128661	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2019/05/22	NC (2)		%	20
6130613	BBD	QC Standard	Salinity	2019/05/21		101	%	80 - 120
6130613	BBD	Method Blank	Salinity	2019/05/21	ND, RDL=2.0		N/A	
6130613	BBD	RPD	Salinity	2019/05/21	NC		%	25
6130645	SRM	Matrix Spike [JSK186-06]	Total Alkalinity (Total as CaCO3)	2019/05/21		NC	%	80 - 120
6130645	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/21		105	%	80 - 120
6130645	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/21	7.4, RDL=5.0		mg/L	
6130645	SRM	RPD [JSK186-06]	Total Alkalinity (Total as CaCO3)	2019/05/21	14 (3)		%	25
6130647	SRM	Matrix Spike [JSK186-06]	Dissolved Chloride (Cl-)	2019/05/21		NC	%	80 - 120
6130647	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/21		102	%	80 - 120
6130647	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/05/21	ND, RDL=1.0		mg/L	
6130647	SRM	RPD [JSK186-06]	Dissolved Chloride (Cl-)	2019/05/21	0.40		%	25
6130654	SRM	Matrix Spike [JSK186-06]	Dissolved Sulphate (SO4)	2019/05/21		NC	%	80 - 120
6130654	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/21		103	%	80 - 120
6130654	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/05/21	ND, RDL=2.0		mg/L	
6130654	SRM	RPD [JSK186-06]	Dissolved Sulphate (SO4)	2019/05/21	0.67		%	25
6130655	SRM	Matrix Spike [JSK186-06]	Reactive Silica (SiO2)	2019/05/21		NC	%	80 - 120
6130655	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/05/21		104	%	80 - 120
6130655	SRM	Method Blank	Reactive Silica (SiO2)	2019/05/21	ND, RDL=0.50		mg/L	
6130655	SRM	RPD [JSK186-06]	Reactive Silica (SiO2)	2019/05/21	0.26		%	25
6130656	SRM	Matrix Spike [JSK186-06]	Orthophosphate (P)	2019/05/22		NC	%	80 - 120
6130656	SRM	Spiked Blank	Orthophosphate (P)	2019/05/22		102	%	80 - 120
6130656	SRM	Method Blank	Orthophosphate (P)	2019/05/22	ND, RDL=0.010		mg/L	
6130656	SRM	RPD [JSK186-06]	Orthophosphate (P)	2019/05/22	0.10		%	25
6130657	SRM	Matrix Spike [JSK186-06]	Nitrate + Nitrite (N)	2019/05/21		70 (4)	%	80 - 120
6130657	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/05/21		105	%	80 - 120
6130657	SRM	Method Blank	Nitrate + Nitrite (N)	2019/05/21	ND, RDL=0.050		mg/L	
6130657	SRM	RPD [JSK186-06]	Nitrate + Nitrite (N)	2019/05/21	0.29		%	25
6130658	SRM	Matrix Spike [JSK186-06]	Nitrite (N)	2019/05/21		80	%	80 - 120
6130658	SRM	Spiked Blank	Nitrite (N)	2019/05/21		107	%	80 - 120
6130658	SRM	Method Blank	Nitrite (N)	2019/05/21	ND, RDL=0.010		mg/L	
6130658	SRM	RPD [JSK186-06]	Nitrite (N)	2019/05/21	0.53		%	20
6130801	NRG	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/05/21		NC	%	80 - 120
6130801	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/21		98	%	80 - 120
6130801	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/21	ND, RDL=0.050		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6130801	NRG	RPD	Nitrogen (Ammonia Nitrogen)	2019/05/21	0.50		%	20
6130899	NRG	Spiked Blank	Colour	2019/05/21		99	%	80 - 120
6130899	NRG	Method Blank	Colour	2019/05/21	ND, RDL=5.0		TCU	
6130899	NRG	RPD	Colour	2019/05/21	NC		%	20
6130992	GTO	Matrix Spike	Sulphide	2019/05/21		87	%	80 - 120
6130992	GTO	Spiked Blank	Sulphide	2019/05/21		94	%	80 - 120
6130992	GTO	Method Blank	Sulphide	2019/05/21	ND, RDL=0.020		mg/L	
6130992	GTO	RPD	Sulphide	2019/05/21	NC		%	20
6131192	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/23		101	%	80 - 120
6131192	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/23		99	%	80 - 120
6131192	CCR	Method Blank	Total Mercury (Hg)	2019/05/23	ND, RDL=0.013		ug/L	
6131192	CCR	RPD	Total Mercury (Hg)	2019/05/23	NC		%	20
6133009	AM6	QC Standard	Volatile Suspended Solids	2019/05/22		95	%	80 - 120
6133009	AM6	Method Blank	Volatile Suspended Solids	2019/05/22	ND, RDL=2.0		mg/L	
6133009	AM6	RPD	Volatile Suspended Solids	2019/05/22	0		%	25
6133108	EMT	QC Standard	pH	2019/05/22		101	%	97 - 103
6133108	EMT	RPD	pH	2019/05/22	0.38		%	N/A
6133115	EMT	Spiked Blank	Conductivity	2019/05/23		102	%	80 - 120
6133115	EMT	Method Blank	Conductivity	2019/05/23	1.3, RDL=1.0		uS/cm	
6133115	EMT	RPD	Conductivity	2019/05/23	0.83		%	10
6135407	EMT	QC Standard	Turbidity	2019/05/23		111	%	80 - 120
6135407	EMT	Spiked Blank	Turbidity	2019/05/23		101	%	80 - 120
6135407	EMT	Method Blank	Turbidity	2019/05/23	ND, RDL=0.10		NTU	
6135407	EMT	RPD	Turbidity	2019/05/23	3.0		%	20
6136917	IC4	Spiked Blank	Total Nitrogen (N)	2019/05/22		98	%	80 - 120
6136917	IC4	Method Blank	Total Nitrogen (N)	2019/05/22	ND, RDL=0.020		mg/L	
6137355	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/23		96	%	80 - 120
6137355	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/23		101	%	80 - 120
6137355	BKE	Method Blank	Total Cyanide (CN)	2019/05/23	ND, RDL=0.0050		mg/L	
6137355	BKE	RPD	Total Cyanide (CN)	2019/05/23	NC		%	20
6154325	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/23		NC	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/23		NC	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/23		NC	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/23		NC	%	80 - 120
6154325	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/19		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/19		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/19		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/19		92	%	80 - 120
6154325	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/19	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/19	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/19	ND, RDL=0.10		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Chlorite (CLO2-)	2019/05/19	ND, RDL=0.10		mg/L	
6154325	KD9	RPD	Dissolved Chlorate (ClO3-)	2019/05/23	6.7		%	20
			Dissolved Chlorite (CLO2-)	2019/05/23	NC		%	20
6154327	SJ1	Matrix Spike	9,10-Dichlorostearic acid	2019/05/22		95	%	50 - 130
			Decanoic Acid (C10)	2019/05/22		93	%	50 - 130
			Docosanoic acid (C22)	2019/05/22		92	%	50 - 130
			Dodecanoic acid (C12)	2019/05/22		91	%	50 - 130
			Eicosanoic acid (C20)	2019/05/22		101	%	50 - 130
			Hexadecanoic acid (C16)	2019/05/22		93	%	50 - 130
			Linoleic acid (C18:2)	2019/05/22		90	%	50 - 130
			Linolenic acid (C18:3)	2019/05/22		88	%	50 - 130
			Octadecanoic acid (C18)	2019/05/22		100	%	50 - 130
			Oleic acid (C18:1)	2019/05/22		98	%	50 - 130
			Tetradecanoic acid (C14)	2019/05/22		92	%	50 - 130
			Undecanoic acid (C11)	2019/05/22		103	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/05/22		89	%	50 - 130
			12-Chlorodehydroabietic acid	2019/05/22		84	%	50 - 130
			14-Chlorodehydroabietic acid	2019/05/22		88	%	50 - 130
			Abietic acid	2019/05/22		78	%	50 - 130
			Dehydroabietic acid	2019/05/22		99	%	50 - 130
			Isopimaric acid	2019/05/22		90	%	50 - 130
			Neoabietic acid	2019/05/22		59	%	50 - 130
			Palustric acid	2019/05/22		58	%	50 - 130
			Pimaric acid	2019/05/22		95	%	50 - 130
			Sandaracopimaric acid	2019/05/22		91	%	50 - 130
6154327	SJ1	Spiked Blank	9,10-Dichlorostearic acid	2019/05/22		97	%	50 - 130
			Decanoic Acid (C10)	2019/05/22		91	%	50 - 130
			Docosanoic acid (C22)	2019/05/22		95	%	50 - 130
			Dodecanoic acid (C12)	2019/05/22		91	%	50 - 130
			Eicosanoic acid (C20)	2019/05/22		101	%	50 - 130
			Hexadecanoic acid (C16)	2019/05/22		98	%	50 - 130
			Linoleic acid (C18:2)	2019/05/22		91	%	50 - 130
			Linolenic acid (C18:3)	2019/05/22		87	%	50 - 130
			Octadecanoic acid (C18)	2019/05/22		108	%	50 - 130
			Oleic acid (C18:1)	2019/05/22		104	%	50 - 130
			Tetradecanoic acid (C14)	2019/05/22		91	%	50 - 130
			Undecanoic acid (C11)	2019/05/22		100	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/05/22		87	%	50 - 130
			12-Chlorodehydroabietic acid	2019/05/22		83	%	50 - 130
			14-Chlorodehydroabietic acid	2019/05/22		86	%	50 - 130
			Abietic acid	2019/05/22		74	%	50 - 130
			Dehydroabietic acid	2019/05/22		96	%	50 - 130
			Isopimaric acid	2019/05/22		91	%	50 - 130
			Neoabietic acid	2019/05/22		62	%	50 - 130
			Palustric acid	2019/05/22		63	%	50 - 130
			Pimaric acid	2019/05/22		92	%	50 - 130
			Sandaracopimaric acid	2019/05/22		90	%	50 - 130
6154327	SJ1	Method Blank	Total Fatty Acids	2019/05/22	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/05/22	ND, RDL=0.060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			9,10-Dichlorostearic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/05/22	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/05/22	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/05/22	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/05/22	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/05/22	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/05/22	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/05/22	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/05/22	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/05/22	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/05/22	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/05/22	ND, RDL=0.0060		mg/L	
			12,14-Dichlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
6158877	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/06/05		97	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/05		118	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/05		95	%	70 - 130
			>C16-C21 Hydrocarbons	2019/06/05		88	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/06/05		111	%	70 - 130
6158877	BCD	Method Blank	Isobutylbenzene - Extractable	2019/06/05		91	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/05		109	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/05	ND, RDL=0.050		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C16-C21 Hydrocarbons	2019/06/05	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/06/05	ND, RDL=0.10		mg/L	
6164383	OBC	Spiked Blank	C13-1234678 HeptaCDD	2019/06/09		86	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/09		72	%	30 - 130
			C13-123678 HexaCDD	2019/06/09		110	%	30 - 130
			C13-123678 HexaCDF	2019/06/09		73	%	30 - 130
			C13-12378 PentaCDD	2019/06/09		71	%	30 - 130
			C13-12378 PentaCDF	2019/06/09		49	%	30 - 130
			C13-2378 TetraCDD	2019/06/09		76	%	30 - 130
			C13-2378 TetraCDF	2019/06/09		61	%	30 - 130
			C13-OCDD	2019/06/09		92	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/09		92	%	80 - 140
			1,2,3,7,8-Penta CDD	2019/06/09		109	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2019/06/09		88	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2019/06/09		98	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2019/06/09		85	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2019/06/09		112	%	80 - 140
			Octa CDD	2019/06/09		80	%	80 - 140
			2,3,7,8-Tetra CDF	2019/06/09		111	%	80 - 140
			1,2,3,7,8-Penta CDF	2019/06/09		125	%	80 - 140
			2,3,4,7,8-Penta CDF	2019/06/09		115	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2019/06/09		122	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2019/06/09		130	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2019/06/09		135	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2019/06/09		139	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2019/06/09		113	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2019/06/09		113	%	80 - 140
			Octa CDF	2019/06/09		87	%	80 - 140
6164383	OBC	RPD	2,3,7,8-Tetra CDD	2019/06/09	11		%	35
			1,2,3,7,8-Penta CDD	2019/06/09	0.92		%	35
			1,2,3,4,7,8-Hexa CDD	2019/06/09	2.3		%	35
			1,2,3,6,7,8-Hexa CDD	2019/06/09	6.9		%	35
			1,2,3,7,8,9-Hexa CDD	2019/06/09	13		%	35
			1,2,3,4,6,7,8-Hepta CDD	2019/06/09	0		%	35
			Octa CDD	2019/06/09	0		%	35
			2,3,7,8-Tetra CDF	2019/06/09	7.5		%	35
			1,2,3,7,8-Penta CDF	2019/06/09	4.1		%	35
			2,3,4,7,8-Penta CDF	2019/06/09	4.4		%	35
			1,2,3,4,7,8-Hexa CDF	2019/06/09	10		%	35
			1,2,3,6,7,8-Hexa CDF	2019/06/09	6.3		%	35
			2,3,4,6,7,8-Hexa CDF	2019/06/09	3.8		%	35
			1,2,3,7,8,9-Hexa CDF	2019/06/09	5.2		%	35
			1,2,3,4,6,7,8-Hepta CDF	2019/06/09	4.5		%	35
			1,2,3,4,7,8,9-Hepta CDF	2019/06/09	5.5		%	35
			Octa CDF	2019/06/09	0		%	35
6164383	OBC	Method Blank	C13-1234678 HeptaCDD	2019/06/09		88	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/09		82	%	30 - 130
			C13-123678 HexaCDD	2019/06/09		99	%	30 - 130
			C13-123678 HexaCDF	2019/06/09		66	%	30 - 130
			C13-12378 PentaCDD	2019/06/09		70	%	30 - 130
			C13-12378 PentaCDF	2019/06/09		55	%	30 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			C13-2378 TetraCDD	2019/06/09		83	%	30 - 130
			C13-2378 TetraCDF	2019/06/09		62	%	30 - 130
			C13-OCDD	2019/06/09		86	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/09	ND, EDL=1.19		pg/L	
			1,2,3,7,8-Penta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			1,2,3,4,7,8-Hexa CDD	2019/06/09	ND, EDL=1.23		pg/L	
			1,2,3,6,7,8-Hexa CDD	2019/06/09	ND, EDL=1.07		pg/L	
			1,2,3,7,8,9-Hexa CDD	2019/06/09	ND, EDL=1.04		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			Octa CDD	2019/06/09	1.27, EDL=1.17		pg/L	
			Total Tetra CDD	2019/06/09	ND, EDL=1.19		pg/L	
			Total Penta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			Total Hexa CDD	2019/06/09	ND, EDL=1.11		pg/L	
			Total Hepta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			2,3,7,8-Tetra CDF	2019/06/09	ND, EDL=1.14		pg/L	
			1,2,3,7,8-Penta CDF	2019/06/09	ND, EDL=1.17		pg/L	
			2,3,4,7,8-Penta CDF	2019/06/09	ND, EDL=1.18		pg/L	
			1,2,3,4,7,8-Hexa CDF	2019/06/09	ND, EDL=1.14		pg/L	
			1,2,3,6,7,8-Hexa CDF	2019/06/09	ND, EDL=0.953		pg/L	
			2,3,4,6,7,8-Hexa CDF	2019/06/09	ND, EDL=1.08		pg/L	
			1,2,3,7,8,9-Hexa CDF	2019/06/09	ND, EDL=1.20		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2019/06/09	ND, EDL=0.997		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2019/06/09	ND, EDL=1.13		pg/L	
			Octa CDF	2019/06/09	ND, EDL=1.19		pg/L	
			Total Tetra CDF	2019/06/09	ND, EDL=1.14		pg/L	
			Total Penta CDF	2019/06/09	ND, EDL=1.18		pg/L	
			Total Hexa CDF	2019/06/09	ND, EDL=1.09		pg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Hepta CDF	2019/06/09	ND, EDL=1.06		pg/L	

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) Elevated reporting limit due to turbidity.

(2) Due to a high concentration of NOx, the sample required dilution. The detection limit was adjusted accordingly.

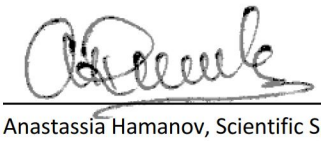
(3) Elevated reporting limit due to method blank performance.

(4) Poor spike recovery due to sample matrix.

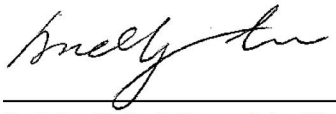
Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE

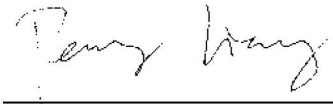
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



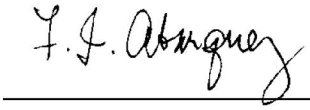
Anastassia Hamanov, Scientific Specialist



Andy Lu, Ph.D., P.Chem., Scientific Specialist



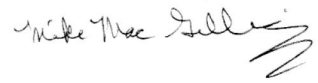
Harry (Peng) Liang, Senior Analyst



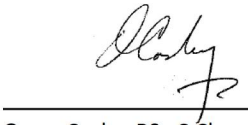
Filomena Abarquez, Senior Analyst



Eric Dearman, Scientific Specialist



Mike MacGillivray, Scientific Specialist (Inorganics)



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE(CONT'D)

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

Rosemarie MacDonald, Scientific Specialist (Organics)

Jingyuan Song, QP, Organics – Senior Analyst

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 715285-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/06
Report #: R5741304
Version: 3 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: B9C9866
Received: 2019/05/15, 12:49

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Water (PIRI)	1	2019/06/05	2019/06/05	ATL SOP 00113	Atl. RBCA v3.1 m
ModTPH (T1) Calc. for Water	1	N/A	2019/06/05	N/A	Atl. RBCA v3 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

BV Labs - Partial/Rush Results

BV Labs Job #: B9C9866
Report Date: 2019/06/06

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
>C10-C16 Hydrocarbons	mg/L	0.17	0.050	N/A	6158877
>C16-C21 Hydrocarbons	mg/L	0.23	0.050	N/A	6158877
>C21-<C32 Hydrocarbons	mg/L	0.68	0.10	N/A	6158877
Modified TPH (Tier1)	mg/L	1.2	0.10	N/A	6156528
Reached Baseline at C32	mg/L	Yes	N/A	N/A	6158877
Hydrocarbon Resemblance	mg/L	COMMENT (1)	N/A	N/A	6158877
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	90			6158877
n-Dotriacontane - Extractable	%	83 (2)			6158877

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Unidentified compound(s) in fuel / lube range. One product in lube oil range.
(2) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/06

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

GENERAL COMMENTS

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

Package 1	8.3°C

Results relate only to the items tested.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/06

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6158877	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/06/05		97	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/05		118	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/05		95	%	70 - 130
			>C16-C21 Hydrocarbons	2019/06/05		88	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/06/05		111	%	70 - 130
6158877	BCD	Method Blank	Isobutylbenzene - Extractable	2019/06/05		91	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/05		109	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/05	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/06/05	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/06/05	ND, RDL=0.10		mg/L	

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.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/06

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

VALIDATION SIGNATURE PAGE

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

Rosemarie MacDonald, Scientific Specialist (Organics)

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

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Maxxam
A Bureau Veritas Group Company

Your Project #: BEDENV JOB# B9C9866
Your C.O.C. #: N-A

Attention: Maryann Comeau

Maxxam Analytics
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/05/23
Report #: R2441773
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917725
Received: 2019/05/17, 08:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/05/21	2019/05/23	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam 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 Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing. Maxxam 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 Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Your Project #: BEDENV JOB# B9C9866
Your C.O.C. #: N-A

Attention: Maryann Comeau

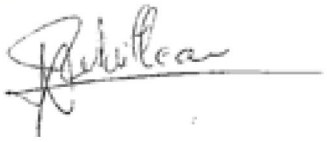
Maxxam Analytics
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/05/23
Report #: R2441773
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917725
Received: 2019/05/17, 08:45

Encryption Key



Sophie Retailleau
Project Manager
23 May 2019 15:47:13

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: SRetailleau@maxxam.ca
Phone# (514)448-9001 Ext:7066232

==========

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

PHENOLS BY GCMS (WATER)

Maxxam ID		GL0763		
Sampling Date		2019/05/14 13:15		
COC Number		N-A		
	Units	**JSK186-13R\POINT A 14-MAY**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	1400	25	1990581
Phenol	ug/L	65	2.5	1990581
2-Chlorophenol	ug/L	<2.5	2.5	1990581
3-Chlorophenol	ug/L	<2.5	2.5	1990581
4-Chlorophenol	ug/L	<2.5	2.5	1990581
o-Cresol	ug/L	3.1	2.5	1990581
m-Cresol	ug/L	<2.5	2.5	1990581
p-Cresol	ug/L	<16 (1)	16	1990581
Guaiacol	ug/L	1300	25	1990581
Catechol	ug/L	8.4	2.5	1990581
Eugenol	ug/L	12	2.5	1990581
Isoeugenol	ug/L	2.6	2.5	1990581
6-Chlorovanillin	ug/L	4.8	2.5	1990581
5,6-Dichlorovanillin	ug/L	<2.5	2.5	1990581
3,4,5-Trichlorosyringol	ug/L	<2.5	2.5	1990581
2,4-Dimethylphenol	ug/L	<2.5	2.5	1990581
2,6-Dichlorophenol	ug/L	<2.5	2.5	1990581
3,5-Dichlorophenol	ug/L	<2.5	2.5	1990581
2,3-Dichlorophenol	ug/L	<2.5	2.5	1990581
3,4-Dichlorophenol	ug/L	<2.5	2.5	1990581
2,4 + 2,5-Dichlorophenol	ug/L	<2.5	2.5	1990581
2-Nitrophenol	ug/L	<5.0	5.0	1990581
4-Nitrophenol	ug/L	<25	25	1990581
2,4,6-Trichlorophenol	ug/L	<2.5	2.5	1990581
2,3,5-Trichlorophenol	ug/L	<2.5	2.5	1990581
2,3,6-Trichlorophenol	ug/L	<2.5	2.5	1990581
2,4,5-Trichlorophenol	ug/L	<2.5	2.5	1990581
2,3,4-Trichlorophenol	ug/L	<2.5	2.5	1990581
3,4,5-Trichlorophenol	ug/L	<2.5	2.5	1990581
4-Chloroguaiacol	ug/L	2.5	2.5	1990581
4,5-Dichloroguaiacol	ug/L	<2.5	2.5	1990581
4,6-Dichloroguaiacol	ug/L	<4.0 (1)	4.0	1990581
2,3,5,6-Tetrachlorophenol	ug/L	<2.5	2.5	1990581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
(1) Detection limit raised due to matrix interference.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

PHENOLS BY GCMS (WATER)

Maxxam ID		GL0763		
Sampling Date		2019/05/14 13:15		
COC Number		N-A		
	Units	**JSK186-13R\POINT A 14-MAY**	**RDL**	**QC Batch**
2,3,4,6-Tetrachlorophenol	ug/L	<2.5	2.5	1990581
2,3,4,5-Tetrachlorophenol	ug/L	<2.5	2.5	1990581
4-Chlorocatechol	ug/L	<2.5	2.5	1990581
3,5-Dichlorocatechol	ug/L	<2.5	2.5	1990581
4,5-Dichlorocatechol	ug/L	<2.5	2.5	1990581
3,4,5-Trichloroguaiacol	ug/L	<2.5	2.5	1990581
4,5,6-Trichloroguaiacol	ug/L	<2.5	2.5	1990581
Pentachlorophenol	ug/L	<2.5	2.5	1990581
3,4,5-Trichlorocatechol	ug/L	<2.5	2.5	1990581
Tetrachlorocatechol	ug/L	<2.5	2.5	1990581
Tetrachloroguaiacol	ug/L	<2.5	2.5	1990581
4,5-Dichloroveratrol	ug/L	<2.5	2.5	1990581
3,4,5-Trichloroveratrol	ug/L	<2.5	2.5	1990581
3,4,5,6-Tetrachloroveratrol	ug/L	<2.5	2.5	1990581
Surrogate Recovery (%)				
D6-Phenol	%	112	N/A	1990581
Tribromophenol-2,4,6	%	124	N/A	1990581
Trifluoro-m-cresol	%	110	N/A	1990581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

GENERAL COMMENTS

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

Package 1	2.7°C

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total Regl. P&P Phenols calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Reported detection limits are multiplied by dilution factors used for sample analysis.

Due to the sample matrix, a better detection limit cannot be reported.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1990581	MA1	Spiked Blank	D6-Phenol	2019/05/22		116	%	50 - 130
			Tribromophenol-2,4,6	2019/05/22		95	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		116	%	50 - 130
			Phenol	2019/05/22		117	%	50 - 130
			2-Chlorophenol	2019/05/22		111	%	50 - 130
			3-Chlorophenol	2019/05/22		114	%	50 - 130
			4-Chlorophenol	2019/05/22		111	%	50 - 130
			o-Cresol	2019/05/22		120	%	50 - 130
			m-Cresol	2019/05/22		120	%	50 - 130
			p-Cresol	2019/05/22		117	%	50 - 130
			2,4-Dimethylphenol	2019/05/22		108	%	50 - 130
			2,6-Dichlorophenol	2019/05/22		116	%	50 - 130
			3,5-Dichlorophenol	2019/05/22		105	%	50 - 130
			2,3-Dichlorophenol	2019/05/22		109	%	50 - 130
			3,4-Dichlorophenol	2019/05/22		110	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/05/22		111	%	50 - 130
			2-Nitrophenol	2019/05/22		109	%	50 - 130
			4-Nitrophenol	2019/05/22		107	%	50 - 130
			2,4,6-Trichlorophenol	2019/05/22		110	%	50 - 130
			2,3,5-Trichlorophenol	2019/05/22		102	%	50 - 130
			2,3,6-Trichlorophenol	2019/05/22		117	%	50 - 130
			2,4,5-Trichlorophenol	2019/05/22		113	%	50 - 130
			2,3,4-Trichlorophenol	2019/05/22		110	%	50 - 130
			3,4,5-Trichlorophenol	2019/05/22		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/05/22		103	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/05/22		110	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/05/22		102	%	50 - 130
			Pentachlorophenol	2019/05/22		94	%	50 - 130
1990581	MA1	Spiked Blank DUP	D6-Phenol	2019/05/22		112	%	50 - 130
			Tribromophenol-2,4,6	2019/05/22		92	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		110	%	50 - 130
			Phenol	2019/05/22		115	%	50 - 130
			2-Chlorophenol	2019/05/22		108	%	50 - 130
			3-Chlorophenol	2019/05/22		111	%	50 - 130
			4-Chlorophenol	2019/05/22		108	%	50 - 130
			o-Cresol	2019/05/22		119	%	50 - 130
			m-Cresol	2019/05/22		119	%	50 - 130
			p-Cresol	2019/05/22		113	%	50 - 130
			2,4-Dimethylphenol	2019/05/22		106	%	50 - 130
			2,6-Dichlorophenol	2019/05/22		113	%	50 - 130
			3,5-Dichlorophenol	2019/05/22		104	%	50 - 130
			2,3-Dichlorophenol	2019/05/22		108	%	50 - 130
			3,4-Dichlorophenol	2019/05/22		109	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/05/22		108	%	50 - 130
			2-Nitrophenol	2019/05/22		108	%	50 - 130
			4-Nitrophenol	2019/05/22		106	%	50 - 130
			2,4,6-Trichlorophenol	2019/05/22		109	%	50 - 130
			2,3,5-Trichlorophenol	2019/05/22		101	%	50 - 130
			2,3,6-Trichlorophenol	2019/05/22		115	%	50 - 130
			2,4,5-Trichlorophenol	2019/05/22		113	%	50 - 130
			2,3,4-Trichlorophenol	2019/05/22		109	%	50 - 130
			3,4,5-Trichlorophenol	2019/05/22		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/05/22		102	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/05/22		109	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/05/22		102	%	50 - 130
			Pentachlorophenol	2019/05/22		92	%	50 - 130
1990581	MA1	Method Blank	D6-Phenol	2019/05/22		108	%	50 - 130
			Total of Regl. P&P Phenols	2019/05/22	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/05/22		89	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		105	%	50 - 130
			Phenol	2019/05/22	<0.50		ug/L	
			2-Chlorophenol	2019/05/22	<0.50		ug/L	
			3-Chlorophenol	2019/05/22	<0.50		ug/L	
			4-Chlorophenol	2019/05/22	<0.50		ug/L	
			o-Cresol	2019/05/22	<0.50		ug/L	
			m-Cresol	2019/05/22	<0.50		ug/L	
			p-Cresol	2019/05/22	<0.50		ug/L	
			Guaiacol	2019/05/22	<0.50		ug/L	
			Catechol	2019/05/22	<0.50		ug/L	
			Eugenol	2019/05/22	<0.50		ug/L	
			Isoeugenol	2019/05/22	<0.50		ug/L	
			6-Chlorovanillin	2019/05/22	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/05/22	<0.50		ug/L	
			2,4-Dimethylphenol	2019/05/22	<0.50		ug/L	
			2,6-Dichlorophenol	2019/05/22	<0.50		ug/L	
			3,5-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2,3-Dichlorophenol	2019/05/22	<0.50		ug/L	
			3,4-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2-Nitrophenol	2019/05/22	<1.0		ug/L	
			4-Nitrophenol	2019/05/22	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			4-Chloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/05/22	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/05/22	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			4-Chlorocatechol	2019/05/22	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/05/22	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/05/22	<0.50		ug/L	
			Pentachlorophenol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/05/22	<0.50		ug/L	
			Tetrachlorocatechol	2019/05/22	<0.50		ug/L	
			Tetrachloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/05/22	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/05/22	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

MAXXAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Maxxam
A Bureau Veritas Group Company

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac

Job# B9C9866

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JSK186-13R\POINT A 14-MAY	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/14 13:15	2019/05/24

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	2	3	3	Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) KG (print) KIM GRACE Date and Time 2019/05/15 16:39

Received by (Sign) TLN (print) TRONG-LUAN NGUYEN Date and Time 2019-05-17 08:45
UPS W-534

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:

National: N001

Regional:

17-May-19 08:45
Sophie Retailleau
B917725
TLN

B917725_COC

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☑ COC Must be Attached

Sender (Print) KIM GRACE Initial KG

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler/Ice, Tape-custody seal, Date&Sign
Date Shipped May 16/19 Number of coolers
Shipper (Print) _____ Initial _____

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel (902) 420-0203 Toll-free 800-563-6266 Fax (902) 420-8612 www.maxxam.ca

Chain Of Custody Record

Page 1 of 2

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	Maxxam Job #	Bottle Order #
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B1C9866	715285
Address	PO Box 549 Station Main	Address	349 Simpson Lane	Project #	Effluent Treatment Plant		
	New Glasgow NS B2H 5E8		Pictou NS B0K 1X2	Project Name		Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax	Phone	(902) 755-7178 Fax	Site #		C#715285-01-01	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Sampled By			

Regulatory Criteria:

Special Instructions:

* Specify Water, Surface/Ground/Tap water/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

	Sample Barcode Label	Sample Location/Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	TSS/VSS	Carbonaceous BOD	Chemical Oxygen Demand (COD)	Organic Halogen (Adsorbable)	Total Kjeldahl Nitrogen in Water	Phosphorus Total Colourimetry	Salinity	Dioxins/Furans in Water (EPS 1/RM/23)	PAH and PCB	Atlantic VOC in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1		Point A	May 14/15	1:15pm				X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

* 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?
Mike Pidgeon	15/5/15						☐	12, 8, 5	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White Maxxam Yellow Client

2015 MAY 15 12:45

Maxxam

Maxxam Analytics International Corporation o/a Maxxam Analytics
300 Bluewater Road, Bedford, Nova Scotia, Canada B4B 1G9 Tel (902) 420-0203 Toll Free (800) 565-4296 Fax (902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO		Report Information		Project Information		Laboratory Use Only	
Company Name	#22436 Northern Pulp N.S	Company Name	#11067 Northern Pulp N.S	Quotation #	B88084	Maxxam Job #	Bottle Order #
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B4C9860	
Address	PO Box 549 Station Main	Address	340 Semple Lane	Project #	Effluent Treatment Plant		
	New Glasgow NS B2H 5E6		Pictou NS B0K 1X0	Project Name		Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax	Phone	(902) 755-7178 Fax	Site #			
Email	AP@northernpulp.com	Email	boat.harbour@nfcweb.ca	Sampled By			Maxxam Comm.

Regulatory Criteria	Special Instructions	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)	Turnaround Time (TAT) Required
* Specify Matrix: Surface Ground Water Sewage Effluent, Sediment, Pesticide Monocrotophos, Tissue, Soil Sludge, Biota		Field Filtered & Preserved; Lab Filtration Required; HRGCA Hydrocarbons in Water; Phenolics in Pulp and Paper Mill Effluents; Atlantic RCAP-MS (Indicator Scan); Mercury - Total (CVAA,LL); Sulphide (H2S); Chlorate and Chlorite by IC; Total Cyanide; Resin and Fatty Acids	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:

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample Location/ Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	HRGCA Hydrocarbons in Water	Phenolics in Pulp and Paper Mill Effluents	Atlantic RCAP-MS (Indicator Scan)	Mercury - Total (CVAA,LL)	Sulphide (H2S)	Chlorate and Chlorite by IC	Total Cyanide	Resin and Fatty Acids			# of Bottles	Comments / Hazards / Other Required Analysis
1		Point A	May 14/15	1:15 p.m.				X	X	X	X	X	X	X	X				
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

* 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 or Cooler?
Mike Pidgeon	15/5/15							12.8,5	Yes No

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

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

MAY 19 2015 12:49

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 715285-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/03
Report #: R5736986
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: B9C9866
Received: 2019/05/15, 12:49

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chlorate and Chlorite by IC (1)	1	N/A	2019/05/19	CAL SOP-00040	SM 22 4110D m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Bedford to Calgary Offsite

Encryption Key

Neyousha Shahisavandi
Project Manager Assistant
03 Jun 2019 15:45:31

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

BV Labs - Partial/Rush Results

BV Labs Job #: B9C9866
Report Date: 2019/06/03

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JSK186			
Sampling Date		2019/05/14 13:15			
COC Number		715285-01-01			
	UNITS	POINT A 14-MAY	RDL	MDL	QC Batch
Inorganics					
Dissolved Chlorate (ClO3-)	mg/L	53 (1)	1.0	N/A	6154325
Dissolved Chlorite (CLO2-)	mg/L	ND (1)	1.0	N/A	6154325

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Detection limits raised due to sample matrix.

BV Labs - Partial Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/03

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

GENERAL COMMENTS

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

Package 1	8.3°C

Results relate only to the items tested.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/03

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6154325	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/23		NC	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/23		NC	%	80 - 120
6154325	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/19		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/19		92	%	80 - 120
6154325	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/19	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/19	ND, RDL=0.10		mg/L	
6154325	KD9	RPD	Dissolved Chlorate (ClO3-)	2019/05/23	6.7		%	20
			Dissolved Chlorite (CLO2-)	2019/05/23	NC		%	20

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

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

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

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

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).

BV Labs - Partial Results

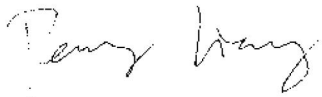
Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9866
Report Date: 2019/06/03

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

VALIDATION SIGNATURE PAGE

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



Harry (Peng) Liang, Senior Analyst

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

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9C9866	715285
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Project Name		C#715285-01-01	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	TSS/VSS	Carbonaceous BOD	Chemical Oxygen Demand (COD)	Organic Halogen (Adsorbable)	Total Kjeldahl Nitrogen in Water	Phosphorus Total Colourimetry	Salinity	Dioxins/Furans in Water (EPS 1/RM/23)	PAH and PCB	Atlantic VOC in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1		Point A	May14/19	1:15pm				X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

* 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?
Mike Richard Mike Pidgeon	19/5/15							12, 8, 5	Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

2019 MAY 15 12:49

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9C9866	715285
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Project Name		C#715285-01-02	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	RBCA Hydrocarbons in Water	Phenols in Pulp and Paper Mill Effluents	Atlantic RCAp-MS (Includes Sodium)	Mercury - Total (CVAA,LL)	Sulphide (H2S)	Chlorate and Chlorite by IC	Total Cyanide	Resin and Fatty Acids			# of Bottles	Comments / Hazards / Other Required Analysis
1		Point A	May 14/19	1:15 pm				X	X	X	X	X	X	X	X				
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

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:

* 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		
Mike Pidgeon	19/5/15						Time Sensitive	Temperature (°C) on Receipt: 12, 8, 5	Custody Seal Intact on Cooler? Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

2019 MAY 15 12:49

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 43013552
Your Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 663334-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2018/06/14
Report #: R5237724
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8C8596
Received: 2018/05/30, 13:20

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
ABN Compounds in Water by GC/MS (1)	1	2018/06/04	2018/06/04	CAM SOP-00301	EPA 8270 m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2018/06/05	N/A	SM 22 4500-CO2 D
Alkalinity	1	N/A	2018/06/05	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2018/06/01	N/A	Auto Calc.
Biochemical Oxygen Demand	1	2018/05/31	2018/06/05	ATL SOP 00041	SM 22 5210B m
Biochemical Oxygen Demand (Dissolved)	1	2018/05/31	2018/06/05	ATL SOP 00041	SM 22 5210B m
Residual Chlorine, Total	1	N/A	2018/05/30	ATL SOP 00038	HACH 8167 m
Chloride	1	N/A	2018/06/06	ATL SOP 00014	SM 22 4500-Cl- E m
Str. Acid Diss. Cyanide water (5)	1	N/A	2018/05/31	ATL SOP 00040	EPA 335.3 m
Soluble COD	1	N/A	2018/06/04	ATL SOP 00042	SM 22 5220D m
Chemical Oxygen Demand (COD)	1	N/A	2018/06/04	ATL SOP 00042	SM 22 5220D m
TC/EC Non Drinking Water CFU/100mL	1	N/A	2018/05/30	ATL SOP 00096	OMOE E3407 V5.2
Colour	1	N/A	2018/06/05	ATL SOP 00020	SM 22 2120C m
Acid Extractables by GC/MS (1)	1	2018/06/05	2018/06/05	CAM SOP-00332	EPA 8270 m
Conductance - water	1	N/A	2018/06/05	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2018/06/04	2018/06/07	ATL SOP 00113	Atl. RBCA v3.1 m
Petroleum Hydro. CCME F1 & BTEX in Water (1)	1	N/A	2018/06/05	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 6)	1	2018/06/06	2018/06/07	CAM SOP-00316	CCME PHC-CWS m
Fluoride	1	N/A	2018/06/05	ATL SOP 00043	SM 23 4500-F- C m
Fecal coliform in water (CFU/100 mL)	1	N/A	2018/05/30	ATL SOP 00071	SM 22 9222D
Hardness (calculated as CaCO3)	1	N/A	2018/06/04	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	1	2018/05/31	2018/06/01	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	1	N/A	2018/06/06	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2018/06/05	N/A	Auto Calc.
Organic Halogen (Adsorbable) (2)	1	2018/06/04	2018/06/04	PTC SOP-00056	Coulometric - Titr.
Chlorate and Chlorite by IC (3)	1	N/A	2018/06/03	CAL SOP-00040	SM 22 4110D m
Gylcol in Water (3)	1	N/A	2018/06/05	CAL SOP-00093	BCMOE Glycols 09/17
Nitrogen Ammonia - water	1	N/A	2018/06/05	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2018/06/06	ATL SOP 00016	USGS I-2547-11m

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 43013552
Your Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 663334-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2018/06/14
Report #: R5237724
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8C8596
Received: 2018/05/30, 13:20

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Nitrogen - Nitrite	1	N/A	2018/06/05	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2018/06/06	ATL SOP 00018	ASTM D3867-16
Animal and Vegetable Oil and Grease (1)	1	N/A	2018/06/13	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease (1)	1	2018/06/02	2018/06/03	CAM SOP-00326	EPA1664B m,SM5520A m
PAH in Water by GC/MS (SIM)	1	2018/05/31	2018/06/01	ATL SOP 00103	EPA 8270D 2014 m
pH (7)	1	N/A	2018/06/05	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	1	N/A	2018/06/05	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	1	N/A	2018/06/05	ATL SOP 00118	Atl. RBCA v3.1 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2018/06/06	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2018/06/06	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2018/06/05	ATL SOP 00022	EPA 366.0 m
Sulphite in Water (4)	1	2018/06/02	2018/06/02		
Sulphate	1	N/A	2018/06/05	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2018/06/06	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2018/06/06	N/A	Auto Calc.
Nitrogen TKN - water (as N)	1	2018/06/01	2018/06/04	ATL SOP 00019	EPA 351.2 R2 m
Organic carbon - Total (TOC) (8)	1	N/A	2018/06/08	ATL SOP 00203	SM 23 5310B m
Mineral/Synthetic O & G (TPH Heavy Oil) (1, 9)	1	2018/06/13	2018/06/13	CAM SOP-00326	EPA1664B m,SM5520F m
ModTPH (T1) Calc. for Water	1	N/A	2018/06/07	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2018/06/01	2018/06/04	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2018/06/01	2018/06/07	ATL SOP 00007	SM 22 2540D m
Turbidity	1	N/A	2018/06/05	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2018/05/31	ATL SOP 00133	EPA 8260C R3 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 43013552
Your Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your C.O.C. #: 663334-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2018/06/14
Report #: R5237724
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8C8596
Received: 2018/05/30, 13:20

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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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 Maxxam Analytics Mississauga
(2) This test was performed by Bedford to Edm Petrol Offsite
(3) This test was performed by Bedford to Calgary Offsite
(4) This test was performed by Bedford to Calgary Subcontract
(5) Strong acid dissociable cyanide value may include contribution from thiocyanate.
(6) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(7) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(8) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(9) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

Sam Sherker
Project Manager Assistant
14 Jun 2018 14:42:46

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: MComeau@maxxam.ca
Phone# (902) 420-0203

==========

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	3.8	0.50	0.10	5554936
Anion Sum	me/L	14.8	N/A	N/A	5555408
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	190	1.0	0.20	5555404
Calculated TDS	mg/L	940	1.0	0.20	5555411
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	5555404
Cation Sum	me/L	15.0	N/A	N/A	5555408
Hardness (CaCO3)	mg/L	110	1.0	1.0	5555406
Ion Balance (% Difference)	%	0.800	N/A	N/A	5555407
Langelier Index (@ 20C)	N/A	-0.592			5555409
Langelier Index (@ 4C)	N/A	-0.838			5555410
Nitrate (N)	mg/L	ND	0.050	N/A	5554534
Saturation pH (@ 20C)	N/A	7.68			5555409
Saturation pH (@ 4C)	N/A	7.93			5555410
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	190 (1)	25	N/A	5564006
Biochemical Oxygen Demand	mg/L	110	12	0.60	5556837
Dissolved Biochemical Oxygen Demand	mg/L	84	12	0.60	5556926
Dissolved Chemical Oxygen Demand	mg/L	350	20	N/A	5562120
Total Chemical Oxygen Demand	mg/L	600	20	N/A	5562118
Dissolved Chlorate (ClO3-)	mg/L	ND (2)	1.0	N/A	5565323
Dissolved Chloride (Cl)	mg/L	150	1.0	N/A	5564015
Dissolved Chlorite (CLO2-)	mg/L	ND (2)	1.0	N/A	5565323
Colour	TCU	590 (1)	100	N/A	5564019
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.0019	0.0010	N/A	5557413
Dissolved Fluoride (F-)	mg/L	ND	0.10	0.050	5563831
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	5564023
Nitrite (N)	mg/L	ND	0.010	N/A	5564030
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	N/A	5562559
Total Organic Carbon (C)	mg/L	170 (3)	5.0	N/A	5570664

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Elevated reporting limit due to sample matrix.
(2) Detection limits raised due to sample matrix.
(3) Elevated reporting limit due to turbidity.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Orthophosphate (P)	mg/L	0.14	0.010	N/A	5564022
pH	pH	7.09	N/A	N/A	5563828
Total Phosphorus	mg/L	0.60	0.050	N/A	5559052
Total Residual Chlorine	mg/L	ND	0.10	N/A	5555338
Reactive Silica (SiO2)	mg/L	6.5	0.50	N/A	5564018
Total Suspended Solids	mg/L	67	5.0	N/A	5559459
Dissolved Sulphate (SO4)	mg/L	330 (1)	40	N/A	5564016
Sulphide	mg/L	0.33	0.020	0.010	5562250
Total Kjeldahl Nitrogen	mg/L	1.8 (1)	0.25	N/A	5559255
Turbidity	NTU	54	0.10	0.10	5563858
Conductivity	uS/cm	1500	1.0	N/A	5563830
Organic Halogens					
Adsorbable Organic Halogen	mg/L	1.64	0.25	N/A	5569923
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	5561519
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	3.8	0.50	0.10	5561623
Total Oil & Grease Mineral/Synthetic	mg/L	ND	0.50	0.10	5577678

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Elevated reporting limit due to sample matrix.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

GLYCOLS BY GC-FID (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Glycols					
Ethylene Glycol	mg/L	ND	3.0	N/A	5567493
Diethylene Glycol	mg/L	ND	5.0	N/A	5567493
Triethylene Glycol	mg/L	ND	5.0	N/A	5567493
Propylene Glycol	mg/L	ND	5.0	N/A	5567493
Surrogate Recovery (%)					
Methyl sulfone	%	90			5567493

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	2000	5.0	N/A	5556751
Total Antimony (Sb)	ug/L	ND	1.0	N/A	5556751
Total Arsenic (As)	ug/L	1.2	1.0	N/A	5556751
Total Barium (Ba)	ug/L	350	1.0	N/A	5556751
Total Beryllium (Be)	ug/L	ND	1.0	N/A	5556751
Total Bismuth (Bi)	ug/L	ND	2.0	N/A	5556751
Total Boron (B)	ug/L	55	50	N/A	5556751
Total Cadmium (Cd)	ug/L	1.4	0.010	N/A	5556751
Total Calcium (Ca)	ug/L	38000	100	N/A	5556751
Total Chromium (Cr)	ug/L	2.4	1.0	N/A	5556751
Total Cobalt (Co)	ug/L	0.55	0.40	N/A	5556751
Total Copper (Cu)	ug/L	13	2.0	N/A	5556751
Total Iron (Fe)	ug/L	860	50	N/A	5556751
Total Lead (Pb)	ug/L	4.8	0.50	N/A	5556751
Total Magnesium (Mg)	ug/L	4500	100	N/A	5556751
Total Manganese (Mn)	ug/L	2500	2.0	N/A	5556751
Total Molybdenum (Mo)	ug/L	ND	2.0	N/A	5556751
Total Nickel (Ni)	ug/L	3.2	2.0	N/A	5556751
Total Phosphorus (P)	ug/L	830	100	N/A	5556751
Total Potassium (K)	ug/L	14000	100	N/A	5556751
Total Selenium (Se)	ug/L	ND	1.0	N/A	5556751
Total Silver (Ag)	ug/L	0.49	0.10	N/A	5556751
Total Sodium (Na)	ug/L	290000	100	N/A	5556751
Total Strontium (Sr)	ug/L	140	2.0	N/A	5556751
Total Thallium (Tl)	ug/L	0.20	0.10	N/A	5556751
Total Tin (Sn)	ug/L	ND	2.0	N/A	5556751
Total Titanium (Ti)	ug/L	23	2.0	N/A	5556751
Total Uranium (U)	ug/L	0.30	0.10	N/A	5556751
Total Vanadium (V)	ug/L	2.4	2.0	N/A	5556751
Total Zinc (Zn)	ug/L	160	5.0	N/A	5556751

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Semivolatile Organics					
Acenaphthene	ug/L	ND	0.80	0.20	5562200
Acenaphthylene	ug/L	ND	0.80	0.20	5562200
Anthracene	ug/L	ND	0.80	0.20	5562200
Benzo(a)anthracene	ug/L	ND	0.80	0.20	5562200
Benzo(a)pyrene	ug/L	ND	0.80	0.20	5562200
Benzo(b/j)fluoranthene	ug/L	ND	0.80	0.40	5562200
Benzo(g,h,i)perylene	ug/L	ND	0.80	0.20	5562200
Benzo(k)fluoranthene	ug/L	ND	0.80	0.20	5562200
1-Chloronaphthalene	ug/L	ND	4.0	0.40	5562200
2-Chloronaphthalene	ug/L	ND	2.0	0.20	5562200
Chrysene	ug/L	ND	0.80	0.20	5562200
Dibenz(a,h)anthracene	ug/L	ND	0.80	0.20	5562200
Fluoranthene	ug/L	ND	0.80	0.20	5562200
Fluorene	ug/L	ND	0.80	0.40	5562200
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.80	0.20	5562200
1-Methylnaphthalene	ug/L	ND	0.80	0.40	5562200
2-Methylnaphthalene	ug/L	ND	0.80	0.40	5562200
Naphthalene	ug/L	ND (1)	1.0	0.50	5562200
Perylene	ug/L	ND	0.80	0.40	5562200
Phenanthrene	ug/L	ND	0.80	0.20	5562200
Pyrene	ug/L	ND	0.80	0.20	5562200
1,2-Dichlorobenzene	ug/L	ND	2.0	0.40	5562200
1,3-Dichlorobenzene	ug/L	ND	2.0	0.40	5562200
1,4-Dichlorobenzene	ug/L	ND	2.0	0.40	5562200
Hexachlorobenzene	ug/L	ND	2.0	0.40	5562200
Pentachlorobenzene	ug/L	ND	2.0	0.40	5562200
1,2,3,5-Tetrachlorobenzene	ug/L	ND	2.0	0.40	5562200
1,2,4,5-Tetrachlorobenzene	ug/L	ND	2.0	0.40	5562200
1,2,3-Trichlorobenzene	ug/L	ND	2.0	0.40	5562200
1,2,4-Trichlorobenzene	ug/L	ND	2.0	0.40	5562200
1,3,5-Trichlorobenzene	ug/L	ND	2.0	0.40	5562200
2-Chlorophenol	ug/L	ND	1.2	0.40	5562200

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
(1) Detection limit was raised due to matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
4-Chloro-3-Methylphenol	ug/L	ND	2.0	0.40	5562200
m/p-Cresol	ug/L	ND	2.0	0.80	5562200
o-Cresol	ug/L	ND (1)	3.0	0.60	5562200
1,2,3,4-Tetrachlorobenzene	ug/L	ND	2.0	0.40	5562200
2,3-Dichlorophenol	ug/L	ND	2.0	0.40	5562200
2,4-Dichlorophenol	ug/L	ND	1.2	0.40	5562200
2,5-Dichlorophenol	ug/L	ND	2.0	1.2	5562200
2,6-Dichlorophenol	ug/L	ND	2.0	0.80	5562200
3,4-Dichlorophenol	ug/L	ND	2.0	0.40	5562200
3,5-Dichlorophenol	ug/L	ND	2.0	0.40	5562200
2,4-Dimethylphenol	ug/L	ND	2.0	0.40	5562200
2,4-Dinitrophenol	ug/L	ND (1)	25	2.5	5562200
4,6-Dinitro-2-methylphenol	ug/L	ND	8.0	2.0	5562200
2-Nitrophenol	ug/L	ND	2.0	0.40	5562200
4-Nitrophenol	ug/L	ND	5.6	0.40	5562200
Pentachlorophenol	ug/L	ND	4.0	0.80	5562200
Phenol	ug/L	11	2.0	0.40	5562200
2,3,4,5-Tetrachlorophenol	ug/L	ND	1.6	0.40	5562200
2,3,4,6-Tetrachlorophenol	ug/L	ND	2.0	0.80	5562200
2,3,5,6-Tetrachlorophenol	ug/L	ND	2.0	0.80	5562200
2,3,4-Trichlorophenol	ug/L	ND	2.0	0.40	5562200
2,3,5-Trichlorophenol	ug/L	ND	2.0	0.40	5562200
2,3,6-Trichlorophenol	ug/L	ND	2.0	0.80	5562200
2,4,5-Trichlorophenol	ug/L	ND	2.0	0.80	5562200
2,4,6-Trichlorophenol	ug/L	ND	2.0	0.40	5562200
3,4,5-Trichlorophenol	ug/L	ND	2.0	0.80	5562200
Benzyl butyl phthalate	ug/L	ND	2.0	0.40	5562200
Biphenyl	ug/L	ND	2.0	0.40	5562200
Bis(2-chloroethyl)ether	ug/L	ND	2.0	0.40	5562200
Bis(2-chloroethoxy)methane	ug/L	ND	2.0	0.40	5562200
Bis(2-chloroisopropyl)ether	ug/L	ND	2.0	0.40	5562200
Bis(2-ethylhexyl)phthalate	ug/L	14	8.0	0.40	5562200
4-Bromophenyl phenyl ether	ug/L	ND	1.2	0.40	5562200

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
(1) Detection limit was raised due to matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
p-Chloroaniline	ug/L	ND	4.0	2.0	5562200
4-Chlorophenyl phenyl ether	ug/L	ND	2.0	0.40	5562200
Di-N-butyl phthalate	ug/L	ND	8.0	0.40	5562200
di-n-octyl phthalate	ug/L	ND	3.2	0.40	5562200
2,4-Dinitrotoluene	ug/L	ND	2.0	0.40	5562200
Diethyl phthalate	ug/L	ND	4.0	0.40	5562200
3,3'-Dichlorobenzidine	ug/L	ND	2.0	1.6	5562200
Dimethyl phthalate	ug/L	ND	4.0	0.40	5562200
2,6-Dinitrotoluene	ug/L	ND	2.0	0.40	5562200
Diphenyl Ether	ug/L	ND	1.2	0.40	5562200
Hexachlorobutadiene	ug/L	ND	1.6	0.40	5562200
Hexachlorocyclopentadiene	ug/L	ND	8.0	0.40	5562200
Hexachloroethane	ug/L	ND	2.0	0.40	5562200
Isophorone	ug/L	ND	2.0	0.40	5562200
Nitrobenzene	ug/L	ND	2.0	0.40	5562200
Nitrosodiphenylamine/Diphenylamine	ug/L	ND	4.0	0.40	5562200
N-Nitroso-di-n-propylamine	ug/L	ND	2.0	0.40	5562200
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	5556874
2-Methylnaphthalene	ug/L	ND	0.050	N/A	5556874
Acenaphthene	ug/L	ND	0.010	N/A	5556874
Acenaphthylene	ug/L	ND (1)	0.030	N/A	5556874
Anthracene	ug/L	ND	0.010	N/A	5556874
Benzo(a)anthracene	ug/L	ND	0.010	N/A	5556874
Benzo(a)pyrene	ug/L	ND	0.010	N/A	5556874
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	5556874
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	5554765
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	5556874
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	5556874
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	5556874
Chrysene	ug/L	ND	0.010	N/A	5556874
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	5556874

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Fluoranthene	ug/L	ND (1)	0.22	N/A	5556874
Fluorene	ug/L	ND	0.010	N/A	5556874
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	5556874
Naphthalene	ug/L	ND	0.20	N/A	5556874
Perylene	ug/L	ND	0.010	N/A	5556874
Phenanthrene	ug/L	0.069	0.010	N/A	5556874
Pyrene	ug/L	ND (1)	0.030	N/A	5556874
Phenolics					
2-Chlorophenol	ug/L	ND	0.4	0.2	5564324
2,3,4,6-Tetrachlorophenol	ug/L	ND	0.4	0.2	5564324
2,3,5-Trichlorophenol	ug/L	ND	0.4	0.2	5564324
2,4-Dichlorophenol	ug/L	ND	0.4	0.2	5564324
2,4-Dimethylphenol	ug/L	ND	4	0.2	5564324
2,4,6-Trichlorophenol	ug/L	ND	0.4	0.2	5564324
2,6-Dichlorophenol	ug/L	ND	0.4	0.2	5564324
4-Chloro-3-Methylphenol	ug/L	ND	0.4	0.2	5564324
4-Nitrophenol	ug/L	ND	4	0.2	5564324
m/p-Cresol	ug/L	ND	2	0.2	5564324
o-Cresol	ug/L	3	2	0.2	5564324
Pentachlorophenol	ug/L	ND	0.4	0.2	5564324
Phenol	ug/L	31	2	0.2	5564324
2,3,4,5-Tetrachlorophenol	ug/L	ND	0.4	0.2	5564324
2,3,5,6-Tetrachlorophenol	ug/L	ND	0.4	0.2	5564324
2,3,4-Trichlorophenol	ug/L	ND	0.4	0.2	5564324
2,3,6-Trichlorophenol	ug/L	ND	0.4	0.2	5564324
2,4,5-Trichlorophenol	ug/L	ND	0.4	0.2	5564324
3,4,5-Trichlorophenol	ug/L	ND	0.4	0.2	5564324
2,4-Dinitrophenol	ug/L	ND	4	0.8	5564324
2,3-Dichlorophenol	ug/L	ND	0.4	0.2	5564324
2,5-Dichlorophenol	ug/L	ND	0.4	0.2	5564324
3,4-Dichlorophenol	ug/L	ND	0.4	0.2	5564324
3,5-Dichlorophenol	ug/L	ND	0.4	0.2	5564324

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
4,6-Dinitro-2-methylphenol	ug/L	ND	4	0.2	5564324
3 & 4-Chlorophenol	ug/L	ND	0.4	0.2	5564324
2-Nitrophenol	ug/L	ND	4	0.2	5564324
Surrogate Recovery (%)					
2,4,6-Tribromophenol	%	126			5562200
2-Fluorobiphenyl	%	47			5562200
2-Fluorophenol	%	28			5562200
D14-Terphenyl	%	94			5562200
D5-Nitrobenzene	%	95			5562200
D5-Phenol	%	19			5562200
2,4,6-Tribromophenol	%	95			5564324
2-Fluorophenol	%	39 (1)			5564324
D5-Phenol	%	53			5564324
D10-Anthracene	%	90			5556874
D14-Terphenyl	%	82			5556874
D8-Acenaphthylene	%	88			5556874

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
(1) Surrogate recovery was below the lower control limit due to matrix interference. This may represent a lower bias in some results.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Chlorobenzenes					
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	5556765
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	5556765
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	5556765
Chlorobenzene	ug/L	ND	1.0	N/A	5556765
Volatile Organics					
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	5556765
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	5556765
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	5556765
1,1-Dichloroethane	ug/L	ND	2.0	N/A	5556765
1,1-Dichloroethylene	ug/L	ND (1)	71	140	5556765
1,2-Dichloroethane	ug/L	ND	1.0	N/A	5556765
1,2-Dichloropropane	ug/L	ND	0.50	N/A	5556765
Benzene	ug/L	ND	1.0	N/A	5556765
Bromodichloromethane	ug/L	ND	1.0	0.20	5556765
Bromoform	ug/L	ND	1.0	0.20	5556765
Bromomethane	ug/L	ND	0.50	N/A	5556765
Carbon Tetrachloride	ug/L	ND	0.50	N/A	5556765
Chloroethane	ug/L	ND	8.0	N/A	5556765
Chloroform	ug/L	4.4	1.0	0.20	5556765
Chloromethane	ug/L	ND	8.0	N/A	5556765
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	5556765
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	5556765
Dibromochloromethane	ug/L	ND	1.0	0.20	5556765
Ethylbenzene	ug/L	ND	1.0	N/A	5556765
Ethylene Dibromide	ug/L	ND	0.20	0.50	5556765
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	5556765
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	5556765
o-Xylene	ug/L	ND	1.0	N/A	5556765
p+m-Xylene	ug/L	ND	2.0	N/A	5556765
Styrene	ug/L	ND	1.0	N/A	5556765
Tetrachloroethylene	ug/L	ND	1.0	N/A	5556765

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated VOC RDL(s) due to matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Toluene	ug/L	ND	1.0	N/A	5556765
Total Trihalomethanes	ug/L	4.4	1.0	N/A	5556765
Total Xylenes	ug/L	ND	1.0	1.0	5556765
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	5556765
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	5556765
Trichloroethylene	ug/L	ND	1.0	N/A	5556765
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	5556765
Vinyl Chloride	ug/L	ND	0.50	2.0	5556765
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	99			5556765
D4-1,2-Dichloroethane	%	95			5556765
D8-Toluene	%	93			5556765

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
BTEX & F1 Hydrocarbons					
Benzene	ug/L	ND	0.20	0.040	5562964
Toluene	ug/L	1.1	0.20	0.040	5562964
Ethylbenzene	ug/L	ND	0.20	0.040	5562964
o-Xylene	ug/L	ND	0.20	0.040	5562964
p+m-Xylene	ug/L	ND	0.40	0.080	5562964
Total Xylenes	ug/L	ND	0.40	0.080	5562964
F1 (C6-C10)	ug/L	ND	25	20	5562964
F1 (C6-C10) - BTEX	ug/L	ND	25	20	5562964
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/L	250	100	50	5567365
F3 (C16-C34 Hydrocarbons)	ug/L	1000	200	70	5567365
F4 (C34-C50 Hydrocarbons)	ug/L	ND	200	50	5567365
Reached Baseline at C50	ug/L	Yes			5567365
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	105			5562964
4-Bromofluorobenzene	%	103			5562964
D10-Ethylbenzene	%	98			5562964
D4-1,2-Dichloroethane	%	102			5562964
o-Terphenyl	%	103			5567365

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	5563985
Toluene	mg/L	ND	0.0010	N/A	5563985
Ethylbenzene	mg/L	ND	0.0010	N/A	5563985
Total Xylenes	mg/L	ND	0.0020	N/A	5563985
C6 - C10 (less BTEX)	mg/L	0.093 (1)	0.010	N/A	5563985
>C10-C16 Hydrocarbons	mg/L	0.34	0.050	N/A	5562547
>C16-C21 Hydrocarbons	mg/L	1.0	0.050	N/A	5562547
>C21-<C32 Hydrocarbons	mg/L	2.3	0.10	N/A	5562547
Modified TPH (Tier1)	mg/L	3.7	0.10	N/A	5555273
Reached Baseline at C32	mg/L	Yes	N/A	N/A	5562547
Hydrocarbon Resemblance	mg/L	COMMENT (2)	N/A	N/A	5562547
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	110			5562547
n-Dotriacontane - Extractable	%	101			5562547
Isobutylbenzene - Volatile	%	79			5563985

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Interference from Volatile Organic Compounds (VOCs) in the gasoline range.

(2) Unidentified compound(s) in fuel / lube range. One product in fuel / lube range.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

MICROBIOLOGY (WATER)

Maxxam ID		GVA104			
Sampling Date		2018/05/29 09:18			
COC Number		663334-01-01			
	UNITS	Point A	RDL	MDL	QC Batch
Microbiological					
Escherichia coli	CFU/100mL	ND	10	N/A	5555772
Fecal coliform	CFU/100mL	ND	10	N/A	5555448
Total Coliforms	CFU/100mL	ND	10	N/A	5555772

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

GENERAL COMMENTS

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

Package 1	14.3°C

Note: Average temperature upon receipt greater than 10 degrees.

Sample GVA104 [Point A] : Total Residual Chlorine: sample contained headspace.

ABN analysis: Due to the nature of the sample matrix, a smaller than usual portion of the sample was used for extraction. Detection limits were adjusted accordingly.

CPH Analysis: Due to sample matrix, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5555338	ZZH	QC Standard	Total Residual Chlorine	2018/05/30		97	%	80 - 120
5555338	ZZH	Method Blank	Total Residual Chlorine	2018/05/30	ND, RDL=0.10		mg/L	
5555338	ZZH	RPD	Total Residual Chlorine	2018/05/30	NC		%	25
5555448	KBO	Method Blank	Fecal coliform	2018/05/30	ND, RDL=1.0		CFU/100mL	
5555772	KBT	Method Blank	Escherichia coli	2018/05/30	ND, RDL=1.0		CFU/100mL	
			Total Coliforms	2018/05/30	ND, RDL=1.0		CFU/100mL	
5556751	BAN	Matrix Spike	Total Aluminum (Al)	2018/05/31		98	%	80 - 120
			Total Antimony (Sb)	2018/05/31		100	%	80 - 120
			Total Arsenic (As)	2018/05/31		97	%	80 - 120
			Total Barium (Ba)	2018/05/31		93	%	80 - 120
			Total Beryllium (Be)	2018/05/31		98	%	80 - 120
			Total Bismuth (Bi)	2018/05/31		100	%	80 - 120
			Total Boron (B)	2018/05/31		99	%	80 - 120
			Total Cadmium (Cd)	2018/05/31		97	%	80 - 120
			Total Calcium (Ca)	2018/05/31		103	%	80 - 120
			Total Chromium (Cr)	2018/05/31		95	%	80 - 120
			Total Cobalt (Co)	2018/05/31		97	%	80 - 120
			Total Copper (Cu)	2018/05/31		NC	%	80 - 120
			Total Iron (Fe)	2018/05/31		NC	%	80 - 120
			Total Lead (Pb)	2018/05/31		96	%	80 - 120
			Total Magnesium (Mg)	2018/05/31		100	%	80 - 120
			Total Manganese (Mn)	2018/05/31		97	%	80 - 120
			Total Molybdenum (Mo)	2018/05/31		99	%	80 - 120
			Total Nickel (Ni)	2018/05/31		97	%	80 - 120
			Total Phosphorus (P)	2018/05/31		103	%	80 - 120
			Total Potassium (K)	2018/05/31		100	%	80 - 120
			Total Selenium (Se)	2018/05/31		96	%	80 - 120
			Total Silver (Ag)	2018/05/31		98	%	80 - 120
			Total Sodium (Na)	2018/05/31		97	%	80 - 120
			Total Strontium (Sr)	2018/05/31		101	%	80 - 120
			Total Thallium (Tl)	2018/05/31		99	%	80 - 120
			Total Tin (Sn)	2018/05/31		105	%	80 - 120
			Total Titanium (Ti)	2018/05/31		96	%	80 - 120
			Total Uranium (U)	2018/05/31		101	%	80 - 120
			Total Vanadium (V)	2018/05/31		98	%	80 - 120
			Total Zinc (Zn)	2018/05/31		NC	%	80 - 120
5556751	BAN	Spiked Blank	Total Aluminum (Al)	2018/05/31		102	%	80 - 120
			Total Antimony (Sb)	2018/05/31		103	%	80 - 120
			Total Arsenic (As)	2018/05/31		99	%	80 - 120
			Total Barium (Ba)	2018/05/31		96	%	80 - 120
			Total Beryllium (Be)	2018/05/31		99	%	80 - 120
			Total Bismuth (Bi)	2018/05/31		104	%	80 - 120
			Total Boron (B)	2018/05/31		101	%	80 - 120
			Total Cadmium (Cd)	2018/05/31		99	%	80 - 120
			Total Calcium (Ca)	2018/05/31		103	%	80 - 120
			Total Chromium (Cr)	2018/05/31		98	%	80 - 120
			Total Cobalt (Co)	2018/05/31		100	%	80 - 120
			Total Copper (Cu)	2018/05/31		98	%	80 - 120

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Iron (Fe)	2018/05/31		104	%	80 - 120
			Total Lead (Pb)	2018/05/31		99	%	80 - 120
			Total Magnesium (Mg)	2018/05/31		102	%	80 - 120
			Total Manganese (Mn)	2018/05/31		100	%	80 - 120
			Total Molybdenum (Mo)	2018/05/31		102	%	80 - 120
			Total Nickel (Ni)	2018/05/31		100	%	80 - 120
			Total Phosphorus (P)	2018/05/31		105	%	80 - 120
			Total Potassium (K)	2018/05/31		102	%	80 - 120
			Total Selenium (Se)	2018/05/31		97	%	80 - 120
			Total Silver (Ag)	2018/05/31		98	%	80 - 120
			Total Sodium (Na)	2018/05/31		98	%	80 - 120
			Total Strontium (Sr)	2018/05/31		104	%	80 - 120
			Total Thallium (Tl)	2018/05/31		102	%	80 - 120
			Total Tin (Sn)	2018/05/31		103	%	80 - 120
			Total Titanium (Ti)	2018/05/31		104	%	80 - 120
			Total Uranium (U)	2018/05/31		104	%	80 - 120
			Total Vanadium (V)	2018/05/31		101	%	80 - 120
			Total Zinc (Zn)	2018/05/31		101	%	80 - 120
5556751	BAN	Method Blank	Total Aluminum (Al)	2018/05/31	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2018/05/31	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2018/05/31	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2018/05/31	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2018/05/31	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Boron (B)	2018/05/31	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2018/05/31	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2018/05/31	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2018/05/31	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2018/05/31	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Iron (Fe)	2018/05/31	ND, RDL=50		ug/L	
			Total Lead (Pb)	2018/05/31	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2018/05/31	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2018/05/31	ND, RDL=2.0		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2018/05/31	ND, RDL=100		ug/L	
			Total Potassium (K)	2018/05/31	ND, RDL=100		ug/L	
			Total Selenium (Se)	2018/05/31	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2018/05/31	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2018/05/31	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2018/05/31	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2018/05/31	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2018/05/31	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2018/05/31	ND, RDL=5.0		ug/L	
5556751	BAN	RPD	Total Aluminum (Al)	2018/06/01	2.3		%	20
			Total Antimony (Sb)	2018/06/01	NC		%	20
			Total Arsenic (As)	2018/06/01	2.2		%	20
			Total Barium (Ba)	2018/06/01	2.2		%	20
			Total Beryllium (Be)	2018/06/01	1.9		%	20
			Total Bismuth (Bi)	2018/06/01	NC		%	20
			Total Boron (B)	2018/06/01	NC		%	20
			Total Cadmium (Cd)	2018/06/01	4.7		%	20
			Total Calcium (Ca)	2018/06/01	2.0		%	20
			Total Chromium (Cr)	2018/06/01	NC		%	20
			Total Cobalt (Co)	2018/06/01	NC		%	20
			Total Copper (Cu)	2018/06/01	2.4		%	20
			Total Iron (Fe)	2018/06/01	1.9		%	20
			Total Lead (Pb)	2018/06/01	0.74		%	20
			Total Magnesium (Mg)	2018/06/01	1.7		%	20
			Total Manganese (Mn)	2018/06/01	8.5		%	20
			Total Molybdenum (Mo)	2018/06/01	NC		%	20
			Total Nickel (Ni)	2018/06/01	NC		%	20
			Total Phosphorus (P)	2018/06/01	NC		%	20
			Total Potassium (K)	2018/06/01	1.3		%	20
			Total Selenium (Se)	2018/06/01	NC		%	20
			Total Silver (Ag)	2018/06/01	NC		%	20
			Total Sodium (Na)	2018/06/01	3.0		%	20
			Total Strontium (Sr)	2018/06/01	1.4		%	20
			Total Thallium (Tl)	2018/06/01	NC		%	20
			Total Tin (Sn)	2018/06/01	NC		%	20

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Titanium (Ti)	2018/06/01	NC		%	20
			Total Uranium (U)	2018/06/01	2.5		%	20
			Total Vanadium (V)	2018/06/01	NC		%	20
			Total Zinc (Zn)	2018/06/01	0.012		%	20
5556765	ASL	Matrix Spike	1,2-Dichlorobenzene	2018/05/31		92	%	70 - 130
			1,3-Dichlorobenzene	2018/05/31		93	%	70 - 130
			1,4-Dichlorobenzene	2018/05/31		88	%	70 - 130
			Chlorobenzene	2018/05/31		95	%	70 - 130
			1,1,1-Trichloroethane	2018/05/31		109	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/05/31		98	%	70 - 130
			1,1,2-Trichloroethane	2018/05/31		100	%	70 - 130
			1,1-Dichloroethane	2018/05/31		108	%	70 - 130
			1,1-Dichloroethylene	2018/05/31		107	%	70 - 130
			1,2-Dichloroethane	2018/05/31		90	%	70 - 130
			1,2-Dichloropropane	2018/05/31		92	%	70 - 130
			4-Bromofluorobenzene	2018/05/31		102	%	70 - 130
			Benzene	2018/05/31		93	%	70 - 130
			Bromodichloromethane	2018/05/31		92	%	70 - 130
			Bromoform	2018/05/31		104	%	70 - 130
			Bromomethane	2018/05/31		102	%	60 - 140
			Carbon Tetrachloride	2018/05/31		106	%	70 - 130
			Chloroethane	2018/05/31		93	%	60 - 140
			Chloroform	2018/05/31		96	%	70 - 130
			Chloromethane	2018/05/31		125	%	60 - 140
			cis-1,2-Dichloroethylene	2018/05/31		113	%	70 - 130
			cis-1,3-Dichloropropene	2018/05/31		100	%	70 - 130
			D4-1,2-Dichloroethane	2018/05/31		94	%	70 - 130
			D8-Toluene	2018/05/31		92	%	70 - 130
			Dibromochloromethane	2018/05/31		101	%	70 - 130
			Ethylbenzene	2018/05/31		95	%	70 - 130
			Ethylene Dibromide	2018/05/31		101	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/05/31		105	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/05/31		109	%	70 - 130
			o-Xylene	2018/05/31		94	%	70 - 130
			p+m-Xylene	2018/05/31		94	%	70 - 130
			Styrene	2018/05/31		101	%	70 - 130
			Tetrachloroethylene	2018/05/31		102	%	70 - 130
			Toluene	2018/05/31		100	%	70 - 130
			trans-1,2-Dichloroethylene	2018/05/31		113	%	70 - 130
			trans-1,3-Dichloropropene	2018/05/31		91	%	70 - 130
			Trichloroethylene	2018/05/31		99	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/05/31		94	%	60 - 140
			Vinyl Chloride	2018/05/31		122	%	60 - 140
5556765	ASL	Spiked Blank	1,2-Dichlorobenzene	2018/05/31		94	%	70 - 130
			1,3-Dichlorobenzene	2018/05/31		95	%	70 - 130
			1,4-Dichlorobenzene	2018/05/31		91	%	70 - 130
			Chlorobenzene	2018/05/31		95	%	70 - 130
			1,1,1-Trichloroethane	2018/05/31		111	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/05/31		96	%	70 - 130
			1,1,2-Trichloroethane	2018/05/31		102	%	70 - 130
			1,1-Dichloroethane	2018/05/31		111	%	70 - 130
			1,1-Dichloroethylene	2018/05/31		110	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloroethane	2018/05/31		91	%	70 - 130
			1,2-Dichloropropane	2018/05/31		94	%	70 - 130
			4-Bromofluorobenzene	2018/05/31		100	%	70 - 130
			Benzene	2018/05/31		94	%	70 - 130
			Bromodichloromethane	2018/05/31		94	%	70 - 130
			Bromoform	2018/05/31		103	%	70 - 130
			Bromomethane	2018/05/31		101	%	60 - 140
			Carbon Tetrachloride	2018/05/31		109	%	70 - 130
			Chloroethane	2018/05/31		96	%	60 - 140
			Chloroform	2018/05/31		99	%	70 - 130
			Chloromethane	2018/05/31		75	%	60 - 140
			cis-1,2-Dichloroethylene	2018/05/31		115	%	70 - 130
			cis-1,3-Dichloropropene	2018/05/31		99	%	70 - 130
			D4-1,2-Dichloroethane	2018/05/31		94	%	70 - 130
			D8-Toluene	2018/05/31		93	%	70 - 130
			Dibromochloromethane	2018/05/31		103	%	70 - 130
			Ethylbenzene	2018/05/31		96	%	70 - 130
			Ethylene Dibromide	2018/05/31		103	%	70 - 130
			Methyl t-butyl ether (MTBE)	2018/05/31		108	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/05/31		112	%	70 - 130
			o-Xylene	2018/05/31		95	%	70 - 130
			p+m-Xylene	2018/05/31		95	%	70 - 130
			Styrene	2018/05/31		104	%	70 - 130
			Tetrachloroethylene	2018/05/31		106	%	70 - 130
			Toluene	2018/05/31		103	%	70 - 130
			trans-1,2-Dichloroethylene	2018/05/31		117	%	70 - 130
			trans-1,3-Dichloropropene	2018/05/31		87	%	70 - 130
			Trichloroethylene	2018/05/31		102	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2018/05/31		97	%	60 - 140
			Vinyl Chloride	2018/05/31		127	%	60 - 140
5556765	ASL	Method Blank	1,2-Dichlorobenzene	2018/05/31	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2018/05/31	ND, RDL=1.0		ug/L	
			1,4-Dichlorobenzene	2018/05/31	ND, RDL=1.0		ug/L	
			Chlorobenzene	2018/05/31	ND, RDL=1.0		ug/L	
			1,1,1-Trichloroethane	2018/05/31	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2018/05/31	ND, RDL=0.50		ug/L	
			1,1,2-Trichloroethane	2018/05/31	ND, RDL=1.0		ug/L	
			1,1-Dichloroethane	2018/05/31	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2018/05/31	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2018/05/31	ND, RDL=1.0		ug/L	
			1,2-Dichloropropane	2018/05/31	ND, RDL=0.50		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			4-Bromofluorobenzene	2018/05/31		98	%	70 - 130
			Benzene	2018/05/31	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2018/05/31	ND, RDL=1.0		ug/L	
			Bromoform	2018/05/31	ND, RDL=1.0		ug/L	
			Bromomethane	2018/05/31	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2018/05/31	ND, RDL=0.50		ug/L	
			Chloroethane	2018/05/31	ND, RDL=8.0		ug/L	
			Chloroform	2018/05/31	ND, RDL=1.0		ug/L	
			Chloromethane	2018/05/31	ND, RDL=8.0		ug/L	
			cis-1,2-Dichloroethylene	2018/05/31	ND, RDL=0.50		ug/L	
			cis-1,3-Dichloropropene	2018/05/31	ND, RDL=0.50		ug/L	
			D4-1,2-Dichloroethane	2018/05/31		94	%	70 - 130
			D8-Toluene	2018/05/31		95	%	70 - 130
			Dibromochloromethane	2018/05/31	ND, RDL=1.0		ug/L	
			Ethylbenzene	2018/05/31	ND, RDL=1.0		ug/L	
			Ethylene Dibromide	2018/05/31	ND, RDL=0.20		ug/L	
			Methyl t-butyl ether (MTBE)	2018/05/31	ND, RDL=2.0		ug/L	
			Methylene Chloride(Dichloromethane)	2018/05/31	ND, RDL=3.0		ug/L	
			o-Xylene	2018/05/31	ND, RDL=1.0		ug/L	
			p+m-Xylene	2018/05/31	ND, RDL=2.0		ug/L	
			Styrene	2018/05/31	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2018/05/31	ND, RDL=1.0		ug/L	
			Toluene	2018/05/31	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2018/05/31	ND, RDL=1.0		ug/L	
			Total Xylenes	2018/05/31	ND, RDL=1.0		ug/L	
			trans-1,2-Dichloroethylene	2018/05/31	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2018/05/31	ND, RDL=0.50		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Trichloroethylene	2018/05/31	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2018/05/31	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2018/05/31	ND, RDL=0.50		ug/L	
5556765	ASL	RPD [GVA104-04]	1,2-Dichlorobenzene	2018/05/31	NC		%	40
			1,3-Dichlorobenzene	2018/05/31	NC		%	40
			1,4-Dichlorobenzene	2018/05/31	NC		%	40
			Chlorobenzene	2018/05/31	NC		%	40
			1,1,1-Trichloroethane	2018/05/31	NC		%	40
			1,1,2,2-Tetrachloroethane	2018/05/31	NC		%	40
			1,1,2-Trichloroethane	2018/05/31	NC		%	40
			1,1-Dichloroethane	2018/05/31	NC		%	40
			1,1-Dichloroethylene	2018/05/31	NC (1)		%	40
			1,2-Dichloroethane	2018/05/31	NC		%	40
			1,2-Dichloropropane	2018/05/31	NC		%	40
			Benzene	2018/05/31	NC		%	40
			Bromodichloromethane	2018/05/31	NC		%	40
			Bromoform	2018/05/31	NC		%	40
			Bromomethane	2018/05/31	NC		%	40
			Carbon Tetrachloride	2018/05/31	NC		%	40
			Chloroethane	2018/05/31	NC		%	40
			Chloroform	2018/05/31	7.0		%	40
			Chloromethane	2018/05/31	NC		%	40
			cis-1,2-Dichloroethylene	2018/05/31	NC		%	40
			cis-1,3-Dichloropropene	2018/05/31	NC		%	40
			Dibromochloromethane	2018/05/31	NC		%	40
			Ethylbenzene	2018/05/31	NC		%	40
			Ethylene Dibromide	2018/05/31	NC		%	40
			Methyl t-butyl ether (MTBE)	2018/05/31	NC		%	40
			Methylene Chloride(Dichloromethane)	2018/05/31	NC		%	40
			o-Xylene	2018/05/31	NC		%	40
			p+m-Xylene	2018/05/31	NC		%	40
			Styrene	2018/05/31	NC		%	40
			Tetrachloroethylene	2018/05/31	NC		%	40
			Toluene	2018/05/31	NC		%	40
			Total Trihalomethanes	2018/05/31	7.0		%	40
			Total Xylenes	2018/05/31	NC		%	40
			trans-1,2-Dichloroethylene	2018/05/31	NC		%	40
			trans-1,3-Dichloropropene	2018/05/31	NC		%	40
			Trichloroethylene	2018/05/31	NC		%	40
			Trichlorofluoromethane (FREON 11)	2018/05/31	NC		%	40
			Vinyl Chloride	2018/05/31	NC		%	40
5556837	MLW	QC Standard	Biochemical Oxygen Demand	2018/06/05		83	%	80 - 120
5556837	MLW	Spiked Blank	Biochemical Oxygen Demand	2018/06/05		81	%	80 - 120
5556837	MLW	Method Blank	Biochemical Oxygen Demand	2018/06/05	ND, RDL=2.0		mg/L	
5556837	MLW	RPD	Biochemical Oxygen Demand	2018/06/05	3.3		%	25
5556874	LGE	Matrix Spike	D10-Anthracene	2018/05/31		84	%	50 - 130
			D14-Terphenyl	2018/05/31		86	%	50 - 130
			D8-Acenaphthylene	2018/05/31		81	%	50 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1-Methylnaphthalene	2018/05/31		73	%	50 - 130
			2-Methylnaphthalene	2018/05/31		79	%	50 - 130
			Acenaphthene	2018/05/31		80	%	50 - 130
			Acenaphthylene	2018/05/31		83	%	50 - 130
			Anthracene	2018/05/31		86	%	50 - 130
			Benzo(a)anthracene	2018/05/31		91	%	50 - 130
			Benzo(a)pyrene	2018/05/31		96	%	50 - 130
			Benzo(b)fluoranthene	2018/05/31		107	%	50 - 130
			Benzo(g,h,i)perylene	2018/05/31		100	%	50 - 130
			Benzo(j)fluoranthene	2018/05/31		96	%	50 - 130
			Benzo(k)fluoranthene	2018/05/31		108	%	50 - 130
			Chrysene	2018/05/31		89	%	50 - 130
			Dibenz(a,h)anthracene	2018/05/31		91	%	50 - 130
			Fluoranthene	2018/05/31		92	%	50 - 130
			Fluorene	2018/05/31		84	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2018/05/31		89	%	50 - 130
			Naphthalene	2018/05/31		75	%	50 - 130
			Perylene	2018/05/31		98	%	50 - 130
			Phenanthrene	2018/05/31		87	%	50 - 130
			Pyrene	2018/05/31		92	%	50 - 130
5556874	LGE	Spiked Blank	D10-Anthracene	2018/05/31		97	%	50 - 130
			D14-Terphenyl	2018/05/31		97	%	50 - 130
			D8-Acenaphthylene	2018/05/31		95	%	50 - 130
			1-Methylnaphthalene	2018/05/31		87	%	50 - 130
			2-Methylnaphthalene	2018/05/31		93	%	50 - 130
			Acenaphthene	2018/05/31		96	%	50 - 130
			Acenaphthylene	2018/05/31		99	%	50 - 130
			Anthracene	2018/05/31		103	%	50 - 130
			Benzo(a)anthracene	2018/05/31		104	%	50 - 130
			Benzo(a)pyrene	2018/05/31		109	%	50 - 130
			Benzo(b)fluoranthene	2018/05/31		122	%	50 - 130
			Benzo(g,h,i)perylene	2018/05/31		114	%	50 - 130
			Benzo(j)fluoranthene	2018/05/31		112	%	50 - 130
			Benzo(k)fluoranthene	2018/05/31		114	%	50 - 130
			Chrysene	2018/05/31		102	%	50 - 130
			Dibenz(a,h)anthracene	2018/05/31		96	%	50 - 130
			Fluoranthene	2018/05/31		104	%	50 - 130
			Fluorene	2018/05/31		98	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2018/05/31		98	%	50 - 130
			Naphthalene	2018/05/31		87	%	50 - 130
			Perylene	2018/05/31		112	%	50 - 130
			Phenanthrene	2018/05/31		102	%	50 - 130
			Pyrene	2018/05/31		104	%	50 - 130
5556874	LGE	Method Blank	D10-Anthracene	2018/05/31		88	%	50 - 130
			D14-Terphenyl	2018/05/31		94	%	50 - 130
			D8-Acenaphthylene	2018/05/31		98	%	50 - 130
			1-Methylnaphthalene	2018/05/31	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2018/05/31	ND, RDL=0.050		ug/L	
			Acenaphthene	2018/05/31	ND, RDL=0.010		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acenaphthylene	2018/05/31	ND, RDL=0.010		ug/L	
			Anthracene	2018/05/31	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2018/05/31	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2018/05/31	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2018/05/31	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2018/05/31	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2018/05/31	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2018/05/31	ND, RDL=0.010		ug/L	
			Chrysene	2018/05/31	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2018/05/31	ND, RDL=0.010		ug/L	
			Fluoranthene	2018/05/31	ND, RDL=0.010		ug/L	
			Fluorene	2018/05/31	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2018/05/31	ND, RDL=0.010		ug/L	
			Naphthalene	2018/05/31	ND, RDL=0.20		ug/L	
			Perylene	2018/05/31	ND, RDL=0.010		ug/L	
			Phenanthrene	2018/05/31	ND, RDL=0.010		ug/L	
			Pyrene	2018/05/31	ND, RDL=0.010		ug/L	
5556874	LGE	RPD	1-Methylnaphthalene	2018/05/31	NC		%	40
			2-Methylnaphthalene	2018/05/31	NC		%	40
			Acenaphthene	2018/05/31	NC		%	40
			Acenaphthylene	2018/05/31	NC		%	40
			Anthracene	2018/05/31	NC		%	40
			Benzo(a)anthracene	2018/05/31	NC		%	40
			Benzo(a)pyrene	2018/05/31	NC		%	40
			Benzo(b)fluoranthene	2018/05/31	NC		%	40
			Benzo(g,h,i)perylene	2018/05/31	NC		%	40
			Benzo(j)fluoranthene	2018/05/31	NC		%	40
			Benzo(k)fluoranthene	2018/05/31	NC		%	40
			Chrysene	2018/05/31	NC		%	40
			Dibenz(a,h)anthracene	2018/05/31	NC		%	40
			Fluoranthene	2018/05/31	NC		%	40
			Fluorene	2018/05/31	NC		%	40
			Indeno(1,2,3-cd)pyrene	2018/05/31	NC		%	40
			Naphthalene	2018/05/31	NC		%	40
			Perylene	2018/05/31	NC		%	40

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Phenanthrene	2018/05/31	NC		%	40
			Pyrene	2018/05/31	NC		%	40
5556926	MLW	QC Standard	Dissolved Biochemical Oxygen Demand	2018/06/05		83	%	80 - 120
5556926	MLW	Spiked Blank	Dissolved Biochemical Oxygen Demand	2018/06/05		81	%	80 - 120
5556926	MLW	Method Blank	Dissolved Biochemical Oxygen Demand	2018/06/05	ND, RDL=2.0		mg/L	
5557413	CRA	Matrix Spike	Strong Acid Dissoc. Cyanide (CN)	2018/05/31		106	%	80 - 120
5557413	CRA	Spiked Blank	Strong Acid Dissoc. Cyanide (CN)	2018/05/31		105	%	80 - 120
5557413	CRA	Method Blank	Strong Acid Dissoc. Cyanide (CN)	2018/05/31	ND, RDL=0.0010		mg/L	
5557413	CRA	RPD	Strong Acid Dissoc. Cyanide (CN)	2018/05/31	15		%	25
5559052	JHY	Matrix Spike	Total Phosphorus	2018/06/04		105	%	80 - 120
5559052	JHY	Spiked Blank	Total Phosphorus	2018/06/04		100	%	80 - 120
5559052	JHY	Method Blank	Total Phosphorus	2018/06/04	ND, RDL=0.020		mg/L	
5559052	JHY	RPD	Total Phosphorus	2018/06/04	NC		%	25
5559255	JHY	Matrix Spike	Total Kjeldahl Nitrogen	2018/06/04		NC	%	80 - 120
5559255	JHY	Spiked Blank	Total Kjeldahl Nitrogen	2018/06/04		104	%	80 - 120
5559255	JHY	Method Blank	Total Kjeldahl Nitrogen	2018/06/04	ND, RDL=0.10		mg/L	
5559255	JHY	RPD	Total Kjeldahl Nitrogen	2018/06/04	6.7		%	25
5559459	EMT	QC Standard	Total Suspended Solids	2018/06/07		97	%	80 - 120
5559459	EMT	Method Blank	Total Suspended Solids	2018/06/07	ND, RDL=1.0		mg/L	
5559459	EMT	RPD [GVA104-16]	Total Suspended Solids	2018/06/07	9.9		%	20
5561623	MA4	Spiked Blank	Total Oil & Grease	2018/06/03		100	%	85 - 115
5561623	MA4	RPD	Total Oil & Grease	2018/06/03	4.1		%	25
5561623	MA4	Method Blank	Total Oil & Grease	2018/06/03	ND, RDL=0.50		mg/L	
5562118	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2018/06/04		102	%	80 - 120
5562118	ZZH	QC Standard	Total Chemical Oxygen Demand	2018/06/04		97	%	N/A
5562118	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2018/06/04		102	%	80 - 120
5562118	ZZH	Method Blank	Total Chemical Oxygen Demand	2018/06/04	ND, RDL=20		mg/L	
5562118	ZZH	RPD	Total Chemical Oxygen Demand	2018/06/04	4.2		%	25
5562120	ZZH	Matrix Spike	Dissolved Chemical Oxygen Demand	2018/06/04		102	%	80 - 120
5562120	ZZH	QC Standard	Dissolved Chemical Oxygen Demand	2018/06/04		97	%	80 - 120
5562120	ZZH	Spiked Blank	Dissolved Chemical Oxygen Demand	2018/06/04		102	%	80 - 120
5562120	ZZH	Method Blank	Dissolved Chemical Oxygen Demand	2018/06/04	ND, RDL=20		mg/L	
5562120	ZZH	RPD	Dissolved Chemical Oxygen Demand	2018/06/04	1.3		%	25
5562200	ANL	Matrix Spike	2,4,6-Tribromophenol	2018/06/05		90	%	10 - 130
			2-Fluorobiphenyl	2018/06/05		66	%	30 - 130
			2-Fluorophenol	2018/06/05		48	%	10 - 130
			D14-Terphenyl	2018/06/05		95	%	30 - 130
			D5-Nitrobenzene	2018/06/05		84	%	30 - 130
			D5-Phenol	2018/06/05		34	%	10 - 130
			Acenaphthene	2018/06/05		92	%	30 - 130
			Acenaphthylene	2018/06/05		84	%	30 - 130
			Anthracene	2018/06/05		89	%	30 - 130
			Benzo(a)anthracene	2018/06/05		97	%	30 - 130
			Benzo(a)pyrene	2018/06/05		95	%	30 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(b/j)fluoranthene	2018/06/05		100	%	30 - 130
			Benzo(g,h,i)perylene	2018/06/05		75	%	30 - 130
			Benzo(k)fluoranthene	2018/06/05		106	%	30 - 130
			1-Chloronaphthalene	2018/06/05		68	%	30 - 130
			2-Chloronaphthalene	2018/06/05		86	%	30 - 130
			Chrysene	2018/06/05		100	%	30 - 130
			Dibenz(a,h)anthracene	2018/06/05		87	%	30 - 130
			Fluoranthene	2018/06/05		99	%	30 - 130
			Fluorene	2018/06/05		94	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2018/06/05		82	%	30 - 130
			1-Methylnaphthalene	2018/06/05		74	%	30 - 130
			2-Methylnaphthalene	2018/06/05		67	%	30 - 130
			Naphthalene	2018/06/05		69	%	30 - 130
			Perylene	2018/06/05		100	%	30 - 130
			Phenanthrene	2018/06/05		92	%	30 - 130
			Pyrene	2018/06/05		95	%	30 - 130
			1,2-Dichlorobenzene	2018/06/05		73	%	30 - 130
			1,3-Dichlorobenzene	2018/06/05		73	%	30 - 130
			1,4-Dichlorobenzene	2018/06/05		71	%	30 - 130
			Hexachlorobenzene	2018/06/05		93	%	30 - 130
			Pentachlorobenzene	2018/06/05		79	%	30 - 130
			1,2,3,5-Tetrachlorobenzene	2018/06/05		93	%	30 - 130
			1,2,4,5-Tetrachlorobenzene	2018/06/05		84	%	30 - 130
			1,2,3-Trichlorobenzene	2018/06/05		79	%	30 - 130
			1,2,4-Trichlorobenzene	2018/06/05		76	%	30 - 130
			1,3,5-Trichlorobenzene	2018/06/05		74	%	30 - 130
			2-Chlorophenol	2018/06/05		80	%	10 - 130
			4-Chloro-3-Methylphenol	2018/06/05		78	%	10 - 130
			m/p-Cresol	2018/06/05		65	%	10 - 130
			o-Cresol	2018/06/05		56	%	10 - 130
			1,2,3,4-Tetrachlorobenzene	2018/06/05		76	%	30 - 130
			2,3-Dichlorophenol	2018/06/05		87	%	10 - 130
			2,4-Dichlorophenol	2018/06/05		97	%	10 - 130
			2,5-Dichlorophenol	2018/06/05		88	%	10 - 130
			2,6-Dichlorophenol	2018/06/05		89	%	10 - 130
			3,4-Dichlorophenol	2018/06/05		107	%	10 - 130
			3,5-Dichlorophenol	2018/06/05		107	%	10 - 130
			2,4-Dimethylphenol	2018/06/05		17	%	10 - 130
			2,4-Dinitrophenol	2018/06/05		52	%	10 - 130
			4,6-Dinitro-2-methylphenol	2018/06/05		83	%	10 - 130
			2-Nitrophenol	2018/06/05		89	%	10 - 130
			4-Nitrophenol	2018/06/05		41	%	10 - 130
			Pentachlorophenol	2018/06/05		80	%	10 - 130
			Phenol	2018/06/05		40	%	10 - 130
			2,3,4,5-Tetrachlorophenol	2018/06/05		101	%	10 - 130
			2,3,4,6-Tetrachlorophenol	2018/06/05		105	%	10 - 130
			2,3,5,6-Tetrachlorophenol	2018/06/05		85	%	10 - 130
			2,3,4-Trichlorophenol	2018/06/05		103	%	10 - 130
			2,3,5-Trichlorophenol	2018/06/05		128	%	10 - 130
			2,3,6-Trichlorophenol	2018/06/05		96	%	10 - 130
			2,4,5-Trichlorophenol	2018/06/05		111	%	10 - 130
			2,4,6-Trichlorophenol	2018/06/05		95	%	10 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			3,4,5-Trichlorophenol	2018/06/05		109	%	10 - 130
			Benzyl butyl phthalate	2018/06/05		106	%	30 - 130
			Biphenyl	2018/06/05		84	%	30 - 130
			Bis(2-chloroethyl)ether	2018/06/05		82	%	30 - 130
			Bis(2-chloroethoxy)methane	2018/06/05		80	%	30 - 130
			Bis(2-chloroisopropyl)ether	2018/06/05		78	%	30 - 130
			Bis(2-ethylhexyl)phthalate	2018/06/05		104	%	30 - 130
			4-Bromophenyl phenyl ether	2018/06/05		93	%	30 - 130
			p-Chloroaniline	2018/06/05		22 (2)	%	30 - 130
			4-Chlorophenyl phenyl ether	2018/06/05		92	%	30 - 130
			Di-N-butyl phthalate	2018/06/05		104	%	30 - 130
			di-n-octyl phthalate	2018/06/05		115	%	30 - 130
			2,4-Dinitrotoluene	2018/06/05		103	%	30 - 130
			Diethyl phthalate	2018/06/05		92	%	30 - 130
			3,3'-Dichlorobenzidine	2018/06/05		0.00 (3)	%	30 - 130
			Dimethyl phthalate	2018/06/05		95	%	30 - 130
			2,6-Dinitrotoluene	2018/06/05		102	%	30 - 130
			Diphenyl Ether	2018/06/05		89	%	30 - 130
			Hexachlorobutadiene	2018/06/05		65	%	30 - 130
			Hexachlorocyclopentadiene	2018/06/05		40	%	30 - 130
			Hexachloroethane	2018/06/05		65	%	30 - 130
			Isophorone	2018/06/05		77	%	30 - 130
			Nitrobenzene	2018/06/05		88	%	30 - 130
			Nitrosodiphenylamine/Diphenylamine	2018/06/05		90	%	30 - 130
			N-Nitroso-di-n-propylamine	2018/06/05		86	%	30 - 130
5562200	ANL	Spiked Blank	2,4,6-Tribromophenol	2018/06/04		96	%	10 - 130
			2-Fluorobiphenyl	2018/06/04		65	%	30 - 130
			2-Fluorophenol	2018/06/04		55	%	10 - 130
			D14-Terphenyl	2018/06/04		97	%	30 - 130
			D5-Nitrobenzene	2018/06/04		90	%	30 - 130
			D5-Phenol	2018/06/04		36	%	10 - 130
			Acenaphthene	2018/06/04		94	%	30 - 130
			Acenaphthylene	2018/06/04		90	%	30 - 130
			Anthracene	2018/06/04		87	%	30 - 130
			Benzo(a)anthracene	2018/06/04		98	%	30 - 130
			Benzo(a)pyrene	2018/06/04		96	%	30 - 130
			Benzo(b/j)fluoranthene	2018/06/04		103	%	30 - 130
			Benzo(g,h,i)perylene	2018/06/04		93	%	30 - 130
			Benzo(k)fluoranthene	2018/06/04		108	%	30 - 130
			1-Chloronaphthalene	2018/06/04		58	%	30 - 130
			2-Chloronaphthalene	2018/06/04		81	%	30 - 130
			Chrysene	2018/06/04		104	%	30 - 130
			Dibenz(a,h)anthracene	2018/06/04		99	%	30 - 130
			Fluoranthene	2018/06/04		96	%	30 - 130
			Fluorene	2018/06/04		77	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2018/06/04		93	%	30 - 130
			1-Methylnaphthalene	2018/06/04		87	%	30 - 130
			2-Methylnaphthalene	2018/06/04		86	%	30 - 130
			Naphthalene	2018/06/04		84	%	30 - 130
			Perylene	2018/06/04		103	%	30 - 130
			Phenanthrene	2018/06/04		89	%	30 - 130
			Pyrene	2018/06/04		94	%	30 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichlorobenzene	2018/06/04		80	%	30 - 130
			1,3-Dichlorobenzene	2018/06/04		76	%	30 - 130
			1,4-Dichlorobenzene	2018/06/04		74	%	30 - 130
			Hexachlorobenzene	2018/06/04		90	%	30 - 130
			Pentachlorobenzene	2018/06/04		77	%	30 - 130
			1,2,3,5-Tetrachlorobenzene	2018/06/04		75	%	30 - 130
			1,2,4,5-Tetrachlorobenzene	2018/06/04		61	%	30 - 130
			1,2,3-Trichlorobenzene	2018/06/04		81	%	30 - 130
			1,2,4-Trichlorobenzene	2018/06/04		79	%	30 - 130
			1,3,5-Trichlorobenzene	2018/06/04		85	%	30 - 130
			2-Chlorophenol	2018/06/04		87	%	10 - 130
			4-Chloro-3-Methylphenol	2018/06/04		84	%	10 - 130
			m/p-Cresol	2018/06/04		82	%	10 - 130
			o-Cresol	2018/06/04		82	%	10 - 130
			1,2,3,4-Tetrachlorobenzene	2018/06/04		69	%	30 - 130
			2,3-Dichlorophenol	2018/06/04		94	%	10 - 130
			2,4-Dichlorophenol	2018/06/04		103	%	10 - 130
			2,5-Dichlorophenol	2018/06/04		89	%	10 - 130
			2,6-Dichlorophenol	2018/06/04		95	%	10 - 130
			3,4-Dichlorophenol	2018/06/04		91	%	10 - 130
			3,5-Dichlorophenol	2018/06/04		89	%	10 - 130
			2,4-Dimethylphenol	2018/06/04		79	%	10 - 130
			2,4-Dinitrophenol	2018/06/04		103	%	10 - 130
			4,6-Dinitro-2-methylphenol	2018/06/04		137 (4)	%	10 - 130
			2-Nitrophenol	2018/06/04		101	%	10 - 130
			4-Nitrophenol	2018/06/04		37	%	10 - 130
			Pentachlorophenol	2018/06/04		94	%	10 - 130
			Phenol	2018/06/04		34	%	10 - 130
			2,3,4,5-Tetrachlorophenol	2018/06/04		85	%	10 - 130
			2,3,4,6-Tetrachlorophenol	2018/06/04		103	%	10 - 130
			2,3,5,6-Tetrachlorophenol	2018/06/04		83	%	10 - 130
			2,3,4-Trichlorophenol	2018/06/04		89	%	10 - 130
			2,3,5-Trichlorophenol	2018/06/04		94	%	10 - 130
			2,3,6-Trichlorophenol	2018/06/04		86	%	10 - 130
			2,4,5-Trichlorophenol	2018/06/04		99	%	10 - 130
			2,4,6-Trichlorophenol	2018/06/04		89	%	10 - 130
			3,4,5-Trichlorophenol	2018/06/04		92	%	10 - 130
			Benzyl butyl phthalate	2018/06/04		105	%	30 - 130
			Biphenyl	2018/06/04		77	%	30 - 130
			Bis(2-chloroethyl)ether	2018/06/04		90	%	30 - 130
			Bis(2-chloroethoxy)methane	2018/06/04		85	%	30 - 130
			Bis(2-chloroisopropyl)ether	2018/06/04		86	%	30 - 130
			Bis(2-ethylhexyl)phthalate	2018/06/04		104	%	30 - 130
			4-Bromophenyl phenyl ether	2018/06/04		87	%	30 - 130
			p-Chloroaniline	2018/06/04		97	%	30 - 130
			4-Chlorophenyl phenyl ether	2018/06/04		76	%	30 - 130
			Di-N-butyl phthalate	2018/06/04		103	%	30 - 130
			di-n-octyl phthalate	2018/06/04		115	%	30 - 130
			2,4-Dinitrotoluene	2018/06/04		100	%	30 - 130
			Diethyl phthalate	2018/06/04		80	%	30 - 130
			3,3'-Dichlorobenzidine	2018/06/04		101	%	30 - 130
			Dimethyl phthalate	2018/06/04		85	%	30 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2,6-Dinitrotoluene	2018/06/04		86	%	30 - 130
			Diphenyl Ether	2018/06/04		79	%	30 - 130
			Hexachlorobutadiene	2018/06/04		66	%	30 - 130
			Hexachlorocyclopentadiene	2018/06/04		50	%	30 - 130
			Hexachloroethane	2018/06/04		72	%	30 - 130
			Isophorone	2018/06/04		86	%	30 - 130
			Nitrobenzene	2018/06/04		90	%	30 - 130
			Nitrosodiphenylamine/Diphenylamine	2018/06/04		117	%	30 - 130
			N-Nitroso-di-n-propylamine	2018/06/04		91	%	30 - 130
5562200	ANL	Method Blank	2,4,6-Tribromophenol	2018/06/04		82	%	10 - 130
			2-Fluorobiphenyl	2018/06/04		77	%	30 - 130
			2-Fluorophenol	2018/06/04		49	%	10 - 130
			D14-Terphenyl	2018/06/04		119	%	30 - 130
			D5-Nitrobenzene	2018/06/04		81	%	30 - 130
			D5-Phenol	2018/06/04		31	%	10 - 130
			Acenaphthene	2018/06/04	ND, RDL=0.20		ug/L	
			Acenaphthylene	2018/06/04	ND, RDL=0.20		ug/L	
			Anthracene	2018/06/04	ND, RDL=0.20		ug/L	
			Benzo(a)anthracene	2018/06/04	ND, RDL=0.20		ug/L	
			Benzo(a)pyrene	2018/06/04	ND, RDL=0.20		ug/L	
			Benzo(b/j)fluoranthene	2018/06/04	ND, RDL=0.20		ug/L	
			Benzo(g,h,i)perylene	2018/06/04	ND, RDL=0.20		ug/L	
			Benzo(k)fluoranthene	2018/06/04	ND, RDL=0.20		ug/L	
			1-Chloronaphthalene	2018/06/04	ND, RDL=1.0		ug/L	
			2-Chloronaphthalene	2018/06/04	ND, RDL=0.50		ug/L	
			Chrysene	2018/06/04	ND, RDL=0.20		ug/L	
			Dibenz(a,h)anthracene	2018/06/04	ND, RDL=0.20		ug/L	
			Fluoranthene	2018/06/04	ND, RDL=0.20		ug/L	
			Fluorene	2018/06/04	ND, RDL=0.20		ug/L	
			Indeno(1,2,3-cd)pyrene	2018/06/04	ND, RDL=0.20		ug/L	
			1-Methylnaphthalene	2018/06/04	ND, RDL=0.20		ug/L	
			2-Methylnaphthalene	2018/06/04	ND, RDL=0.20		ug/L	
			Naphthalene	2018/06/04	ND, RDL=0.20		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Perylene	2018/06/04	ND, RDL=0.20		ug/L	
			Phenanthrene	2018/06/04	ND, RDL=0.20		ug/L	
			Pyrene	2018/06/04	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			1,4-Dichlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			Hexachlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			Pentachlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			1,2,3,5-Tetrachlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			1,2,4,5-Tetrachlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			1,2,3-Trichlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			1,2,4-Trichlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			1,3,5-Trichlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			2-Chlorophenol	2018/06/04	ND, RDL=0.30		ug/L	
			4-Chloro-3-Methylphenol	2018/06/04	ND, RDL=0.50		ug/L	
			m/p-Cresol	2018/06/04	ND, RDL=0.50		ug/L	
			o-Cresol	2018/06/04	ND, RDL=0.50		ug/L	
			1,2,3,4-Tetrachlorobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			2,3-Dichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,4-Dichlorophenol	2018/06/04	ND, RDL=0.30		ug/L	
			2,5-Dichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,6-Dichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			3,4-Dichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			3,5-Dichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,4-Dimethylphenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,4-Dinitrophenol	2018/06/04	ND, RDL=2.0		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			4,6-Dinitro-2-methylphenol	2018/06/04	ND, RDL=2.0		ug/L	
			2-Nitrophenol	2018/06/04	ND, RDL=0.50		ug/L	
			4-Nitrophenol	2018/06/04	ND, RDL=1.4		ug/L	
			Pentachlorophenol	2018/06/04	ND, RDL=1.0		ug/L	
			Phenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2018/06/04	ND, RDL=0.40		ug/L	
			2,3,4,6-Tetrachlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,3,4-Trichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,3,5-Trichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,3,6-Trichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,4,5-Trichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			2,4,6-Trichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			3,4,5-Trichlorophenol	2018/06/04	ND, RDL=0.50		ug/L	
			Benzyl butyl phthalate	2018/06/04	ND, RDL=0.50		ug/L	
			Biphenyl	2018/06/04	ND, RDL=0.50		ug/L	
			Bis(2-chloroethyl)ether	2018/06/04	ND, RDL=0.50		ug/L	
			Bis(2-chloroethoxy)methane	2018/06/04	ND, RDL=0.50		ug/L	
			Bis(2-chloroisopropyl)ether	2018/06/04	ND, RDL=0.50		ug/L	
			Bis(2-ethylhexyl)phthalate	2018/06/04	ND, RDL=2.0		ug/L	
			4-Bromophenyl phenyl ether	2018/06/04	ND, RDL=0.30		ug/L	
			p-Chloroaniline	2018/06/04	ND, RDL=1.0		ug/L	
			4-Chlorophenyl phenyl ether	2018/06/04	ND, RDL=0.50		ug/L	
			Di-N-butyl phthalate	2018/06/04	ND, RDL=2.0		ug/L	
			di-n-octyl phthalate	2018/06/04	ND, RDL=0.80		ug/L	
			2,4-Dinitrotoluene	2018/06/04	ND, RDL=0.50		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Diethyl phthalate	2018/06/04	ND, RDL=1.0		ug/L	
			3,3'-Dichlorobenzidine	2018/06/04	ND, RDL=0.50		ug/L	
			Dimethyl phthalate	2018/06/04	ND, RDL=1.0		ug/L	
			2,6-Dinitrotoluene	2018/06/04	ND, RDL=0.50		ug/L	
			Diphenyl Ether	2018/06/04	ND, RDL=0.30		ug/L	
			Hexachlorobutadiene	2018/06/04	ND, RDL=0.40		ug/L	
			Hexachlorocyclopentadiene	2018/06/04	ND, RDL=2.0		ug/L	
			Hexachloroethane	2018/06/04	ND, RDL=0.50		ug/L	
			Isophorone	2018/06/04	ND, RDL=0.50		ug/L	
			Nitrobenzene	2018/06/04	ND, RDL=0.50		ug/L	
			Nitrosodiphenylamine/Diphenylamine	2018/06/04	ND, RDL=1.0		ug/L	
			N-Nitroso-di-n-propylamine	2018/06/04	ND, RDL=0.50		ug/L	
5562200	ANL	RPD	Bis(2-ethylhexyl)phthalate	2018/06/05	NC		%	40
			Di-N-butyl phthalate	2018/06/05	NC		%	40
5562250	GTO	Matrix Spike	Sulphide	2018/06/06		91	%	80 - 120
5562250	GTO	Spiked Blank	Sulphide	2018/06/06		94	%	80 - 120
5562250	GTO	Method Blank	Sulphide	2018/06/06	ND, RDL=0.020		mg/L	
5562250	GTO	RPD	Sulphide	2018/06/06	NC		%	20
5562547	MGN	Matrix Spike	Isobutylbenzene - Extractable	2018/06/07		98	%	70 - 130
			n-Dotriacontane - Extractable	2018/06/07		117	%	70 - 130
			>C10-C16 Hydrocarbons	2018/06/07		95	%	70 - 130
			>C16-C21 Hydrocarbons	2018/06/07		78	%	70 - 130
			>C21-<C32 Hydrocarbons	2018/06/07		87	%	70 - 130
5562547	MGN	Spiked Blank	Isobutylbenzene - Extractable	2018/06/07		108	%	70 - 130
			n-Dotriacontane - Extractable	2018/06/07		120	%	70 - 130
			>C10-C16 Hydrocarbons	2018/06/07		85	%	70 - 130
			>C16-C21 Hydrocarbons	2018/06/07		73	%	70 - 130
			>C21-<C32 Hydrocarbons	2018/06/07		80	%	70 - 130
5562547	MGN	Method Blank	Isobutylbenzene - Extractable	2018/06/06		90	%	70 - 130
			n-Dotriacontane - Extractable	2018/06/06		114	%	70 - 130
			>C10-C16 Hydrocarbons	2018/06/06	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2018/06/06	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2018/06/06	ND, RDL=0.10		mg/L	
5562547	MGN	RPD	>C10-C16 Hydrocarbons	2018/06/06	NC		%	40
			>C16-C21 Hydrocarbons	2018/06/06	NC		%	40
			>C21-<C32 Hydrocarbons	2018/06/06	NC		%	40

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5562559	JHY	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2018/06/05		101	%	80 - 120
5562559	JHY	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2018/06/04		109	%	80 - 120
5562559	JHY	Method Blank	Nitrogen (Ammonia Nitrogen)	2018/06/05	ND, RDL=0.050		mg/L	
5562559	JHY	RPD	Nitrogen (Ammonia Nitrogen)	2018/06/05	NC		%	20
5562964	GRU	Matrix Spike	1,4-Difluorobenzene	2018/06/05		101	%	70 - 130
			4-Bromofluorobenzene	2018/06/05		104	%	70 - 130
			D10-Ethylbenzene	2018/06/05		103	%	70 - 130
			D4-1,2-Dichloroethane	2018/06/05		102	%	70 - 130
			Benzene	2018/06/05		126	%	70 - 130
			Toluene	2018/06/05		105	%	70 - 130
			Ethylbenzene	2018/06/05		114	%	70 - 130
			o-Xylene	2018/06/05		125	%	70 - 130
			p+m-Xylene	2018/06/05		113	%	70 - 130
			F1 (C6-C10)	2018/06/05		86	%	70 - 130
5562964	GRU	Spiked Blank	1,4-Difluorobenzene	2018/06/05		105	%	70 - 130
			4-Bromofluorobenzene	2018/06/05		100	%	70 - 130
			D10-Ethylbenzene	2018/06/05		95	%	70 - 130
			D4-1,2-Dichloroethane	2018/06/05		100	%	70 - 130
			Benzene	2018/06/05		99	%	70 - 130
			Toluene	2018/06/05		88	%	70 - 130
			Ethylbenzene	2018/06/05		95	%	70 - 130
			o-Xylene	2018/06/05		107	%	70 - 130
			p+m-Xylene	2018/06/05		96	%	70 - 130
			F1 (C6-C10)	2018/06/05		97	%	70 - 130
5562964	GRU	Method Blank	1,4-Difluorobenzene	2018/06/05		107	%	70 - 130
			4-Bromofluorobenzene	2018/06/05		101	%	70 - 130
			D10-Ethylbenzene	2018/06/05		100	%	70 - 130
			D4-1,2-Dichloroethane	2018/06/05		101	%	70 - 130
			Benzene	2018/06/05	ND, RDL=0.20		ug/L	
			Toluene	2018/06/05	ND, RDL=0.20		ug/L	
			Ethylbenzene	2018/06/05	ND, RDL=0.20		ug/L	
			o-Xylene	2018/06/05	ND, RDL=0.20		ug/L	
			p+m-Xylene	2018/06/05	ND, RDL=0.40		ug/L	
			Total Xylenes	2018/06/05	ND, RDL=0.40		ug/L	
			F1 (C6-C10)	2018/06/05	ND, RDL=25		ug/L	
			F1 (C6-C10) - BTEX	2018/06/05	ND, RDL=25		ug/L	
5562964	GRU	RPD	F1 (C6-C10)	2018/06/05	NC		%	30
			F1 (C6-C10) - BTEX	2018/06/05	NC		%	30
5563828	JMV	QC Standard	pH	2018/06/05		101	%	97 - 103
5563828	JMV	RPD	pH	2018/06/05	1.0		%	N/A
5563830	JMV	Spiked Blank	Conductivity	2018/06/05		103	%	80 - 120
5563830	JMV	Method Blank	Conductivity	2018/06/05	1.1, RDL=1.0		uS/cm	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5563830	JMV	RPD	Conductivity	2018/06/05	0.18		%	25
5563831	JMV	Matrix Spike	Dissolved Fluoride (F-)	2018/06/05		88	%	80 - 120
5563831	JMV	Spiked Blank	Dissolved Fluoride (F-)	2018/06/05		104	%	80 - 120
5563831	JMV	Method Blank	Dissolved Fluoride (F-)	2018/06/05	ND, RDL=0.10		mg/L	
5563831	JMV	RPD	Dissolved Fluoride (F-)	2018/06/05	NC		%	25
5563858	JMV	QC Standard	Turbidity	2018/06/05		97	%	80 - 120
5563858	JMV	Spiked Blank	Turbidity	2018/06/05		93	%	80 - 120
5563858	JMV	Method Blank	Turbidity	2018/06/05	ND, RDL=0.10		NTU	
5563858	JMV	RPD	Turbidity	2018/06/05	3.9		%	20
5563985	MS3	Matrix Spike	Isobutylbenzene - Volatile	2018/06/05		101	%	70 - 130
			Benzene	2018/06/05		119	%	70 - 130
			Toluene	2018/06/05		119	%	70 - 130
			Ethylbenzene	2018/06/05		120	%	70 - 130
			Total Xylenes	2018/06/05		118	%	70 - 130
5563985	MS3	Spiked Blank	Isobutylbenzene - Volatile	2018/06/05		98	%	70 - 130
			Benzene	2018/06/05		102	%	70 - 130
			Toluene	2018/06/05		102	%	70 - 130
			Ethylbenzene	2018/06/05		100	%	70 - 130
			Total Xylenes	2018/06/05		99	%	70 - 130
5563985	MS3	Method Blank	Isobutylbenzene - Volatile	2018/06/05		98	%	70 - 130
			Benzene	2018/06/05	ND, RDL=0.0010		mg/L	
			Toluene	2018/06/05	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2018/06/05	ND, RDL=0.0010		mg/L	
			Total Xylenes	2018/06/05	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2018/06/05	ND, RDL=0.010		mg/L	
5563985	MS3	RPD	Benzene	2018/06/05	NC		%	40
			Toluene	2018/06/05	NC		%	40
			Ethylbenzene	2018/06/05	NC		%	40
			Total Xylenes	2018/06/05	NC		%	40
			C6 - C10 (less BTEX)	2018/06/05	NC		%	40
5564006	JHY	Matrix Spike	Total Alkalinity (Total as CaCO3)	2018/06/05		98	%	80 - 120
5564006	JHY	Spiked Blank	Total Alkalinity (Total as CaCO3)	2018/06/05		109	%	80 - 120
5564006	JHY	Method Blank	Total Alkalinity (Total as CaCO3)	2018/06/05	ND, RDL=5.0		mg/L	
5564006	JHY	RPD	Total Alkalinity (Total as CaCO3)	2018/06/05	NC		%	25
5564015	JHY	Matrix Spike	Dissolved Chloride (Cl)	2018/06/05		96	%	80 - 120
5564015	JHY	QC Standard	Dissolved Chloride (Cl)	2018/06/06		108	%	80 - 120
5564015	JHY	Spiked Blank	Dissolved Chloride (Cl)	2018/06/05		100	%	80 - 120
5564015	JHY	Method Blank	Dissolved Chloride (Cl)	2018/06/05	ND, RDL=1.0		mg/L	
5564015	JHY	RPD	Dissolved Chloride (Cl)	2018/06/05	NC		%	25
5564016	JHY	Matrix Spike	Dissolved Sulphate (SO4)	2018/06/05		94	%	80 - 120
5564016	JHY	Spiked Blank	Dissolved Sulphate (SO4)	2018/06/05		99	%	80 - 120
5564016	JHY	Method Blank	Dissolved Sulphate (SO4)	2018/06/05	ND, RDL=2.0		mg/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5564016	JHY	RPD	Dissolved Sulphate (SO4)	2018/06/05	NC		%	25
5564018	JHY	Matrix Spike	Reactive Silica (SiO2)	2018/06/05		101	%	80 - 120
5564018	JHY	Spiked Blank	Reactive Silica (SiO2)	2018/06/05		105	%	80 - 120
5564018	JHY	Method Blank	Reactive Silica (SiO2)	2018/06/05	ND, RDL=0.50		mg/L	
5564018	JHY	RPD	Reactive Silica (SiO2)	2018/06/05	NC		%	25
5564019	JHY	Spiked Blank	Colour	2018/06/05		94	%	80 - 120
5564019	JHY	Method Blank	Colour	2018/06/05	ND, RDL=5.0		TCU	
5564019	JHY	RPD	Colour	2018/06/05	NC		%	20
5564022	JHY	Matrix Spike	Orthophosphate (P)	2018/06/05		95	%	80 - 120
5564022	JHY	Spiked Blank	Orthophosphate (P)	2018/06/05		92	%	80 - 120
5564022	JHY	Method Blank	Orthophosphate (P)	2018/06/05	ND, RDL=0.010		mg/L	
5564022	JHY	RPD	Orthophosphate (P)	2018/06/05	NC		%	25
5564023	JHY	Matrix Spike	Nitrate + Nitrite (N)	2018/06/06		97	%	80 - 120
5564023	JHY	Spiked Blank	Nitrate + Nitrite (N)	2018/06/06		100	%	80 - 120
5564023	JHY	Method Blank	Nitrate + Nitrite (N)	2018/06/06	ND, RDL=0.050		mg/L	
5564023	JHY	RPD	Nitrate + Nitrite (N)	2018/06/06	NC		%	25
5564030	JHY	Matrix Spike	Nitrite (N)	2018/06/05		95	%	80 - 120
5564030	JHY	Spiked Blank	Nitrite (N)	2018/06/05		94	%	80 - 120
5564030	JHY	Method Blank	Nitrite (N)	2018/06/05	ND, RDL=0.010		mg/L	
5564030	JHY	RPD	Nitrite (N)	2018/06/05	NC		%	20
5564324	MYI	Matrix Spike	2,4,6-Tribromophenol	2018/06/05		82	%	50 - 130
			2-Fluorophenol	2018/06/05		32 (5)	%	50 - 130
			D5-Phenol	2018/06/05		25 (5)	%	30 - 130
			2-Chlorophenol	2018/06/05		42 (2)	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2018/06/05		70	%	10 - 130
			2,3,5-Trichlorophenol	2018/06/05		62	%	10 - 130
			2,4-Dichlorophenol	2018/06/05		53	%	50 - 130
			2,4-Dimethylphenol	2018/06/05		59	%	30 - 130
			2,4,6-Trichlorophenol	2018/06/05		58	%	10 - 130
			2,6-Dichlorophenol	2018/06/05		51	%	10 - 130
			4-Chloro-3-Methylphenol	2018/06/05		62	%	10 - 130
			4-Nitrophenol	2018/06/05		53	%	10 - 130
			m/p-Cresol	2018/06/05		46	%	10 - 130
			o-Cresol	2018/06/05		45	%	10 - 130
			Pentachlorophenol	2018/06/05		77	%	50 - 130
			Phenol	2018/06/05		25 (3)	%	30 - 130
			2,3,4,5-Tetrachlorophenol	2018/06/05		78	%	10 - 130
			2,3,5,6-Tetrachlorophenol	2018/06/05		72	%	10 - 130
			2,3,4-Trichlorophenol	2018/06/05		80	%	10 - 130
			2,3,6-Trichlorophenol	2018/06/05		61	%	30 - 130
			2,4,5-Trichlorophenol	2018/06/05		64	%	50 - 130
			3,4,5-Trichlorophenol	2018/06/05		64	%	10 - 130
			2,4-Dinitrophenol	2018/06/05		46	%	30 - 130
			2,3-Dichlorophenol	2018/06/05		54	%	10 - 130
			2,5-Dichlorophenol	2018/06/05		53	%	10 - 130
			3,4-Dichlorophenol	2018/06/05		62	%	10 - 130
			3,5-Dichlorophenol	2018/06/05		68	%	10 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			4,6-Dinitro-2-methylphenol	2018/06/05		61	%	10 - 130
			3 & 4-Chlorophenol	2018/06/05		51	%	10 - 130
			2-Nitrophenol	2018/06/05		38	%	10 - 130
5564324	MYI	Spiked Blank	2,4,6-Tribromophenol	2018/06/05		110	%	50 - 130
			2-Fluorophenol	2018/06/05		50	%	50 - 130
			D5-Phenol	2018/06/05		68	%	30 - 130
			2-Chlorophenol	2018/06/05		66	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2018/06/05		105	%	10 - 130
			2,3,5-Trichlorophenol	2018/06/05		98	%	10 - 130
			2,4-Dichlorophenol	2018/06/05		98	%	50 - 130
			2,4-Dimethylphenol	2018/06/05		106	%	30 - 130
			2,4,6-Trichlorophenol	2018/06/05		99	%	10 - 130
			2,6-Dichlorophenol	2018/06/05		99	%	10 - 130
			4-Chloro-3-Methylphenol	2018/06/05		98	%	10 - 130
			4-Nitrophenol	2018/06/05		90	%	10 - 130
			m/p-Cresol	2018/06/05		100	%	10 - 130
			o-Cresol	2018/06/05		94	%	10 - 130
			Pentachlorophenol	2018/06/05		96	%	50 - 130
			Phenol	2018/06/05		70	%	30 - 130
			2,3,4,5-Tetrachlorophenol	2018/06/05		104	%	10 - 130
			2,3,5,6-Tetrachlorophenol	2018/06/05		101	%	10 - 130
			2,3,4-Trichlorophenol	2018/06/05		104	%	10 - 130
			2,3,6-Trichlorophenol	2018/06/05		100	%	30 - 130
			2,4,5-Trichlorophenol	2018/06/05		96	%	50 - 130
			3,4,5-Trichlorophenol	2018/06/05		86	%	10 - 130
			2,4-Dinitrophenol	2018/06/05		62	%	30 - 130
			2,3-Dichlorophenol	2018/06/05		98	%	10 - 130
			2,5-Dichlorophenol	2018/06/05		99	%	10 - 130
			3,4-Dichlorophenol	2018/06/05		54	%	10 - 130
			3,5-Dichlorophenol	2018/06/05		81	%	10 - 130
			4,6-Dinitro-2-methylphenol	2018/06/05		76	%	10 - 130
			3 & 4-Chlorophenol	2018/06/05		92	%	10 - 130
			2-Nitrophenol	2018/06/05		87	%	10 - 130
5564324	MYI	Method Blank	2,4,6-Tribromophenol	2018/06/05		105	%	50 - 130
			2-Fluorophenol	2018/06/05		62	%	50 - 130
			D5-Phenol	2018/06/05		89	%	30 - 130
			2-Chlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,3,4,6-Tetrachlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,3,5-Trichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,4-Dichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,4-Dimethylphenol	2018/06/05	ND,RDL=1		ug/L	
			2,4,6-Trichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,6-Dichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			4-Chloro-3-Methylphenol	2018/06/05	ND, RDL=0.1		ug/L	
			4-Nitrophenol	2018/06/05	ND,RDL=1		ug/L	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			m/p-Cresol	2018/06/05	ND, RDL=0.5		ug/L	
			o-Cresol	2018/06/05	ND, RDL=0.5		ug/L	
			Pentachlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			Phenol	2018/06/05	ND, RDL=0.5		ug/L	
			2,3,4,5-Tetrachlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,3,5,6-Tetrachlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,3,4-Trichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,3,6-Trichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,4,5-Trichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			3,4,5-Trichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,4-Dinitrophenol	2018/06/05	ND,RDL=1		ug/L	
			2,3-Dichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2,5-Dichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			3,4-Dichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			3,5-Dichlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			4,6-Dinitro-2-methylphenol	2018/06/05	ND,RDL=1		ug/L	
			3 & 4-Chlorophenol	2018/06/05	ND, RDL=0.1		ug/L	
			2-Nitrophenol	2018/06/05	ND,RDL=1		ug/L	
5564324	MYI	RPD	2-Chlorophenol	2018/06/05	NC		%	30
			2,3,4,6-Tetrachlorophenol	2018/06/05	NC		%	40
			2,3,5-Trichlorophenol	2018/06/05	NC		%	40
			2,4-Dichlorophenol	2018/06/05	NC		%	30
			2,4-Dimethylphenol	2018/06/05	NC		%	30
			2,4,6-Trichlorophenol	2018/06/05	NC		%	30
			2,6-Dichlorophenol	2018/06/05	NC		%	40
			4-Chloro-3-Methylphenol	2018/06/05	NC		%	40
			4-Nitrophenol	2018/06/05	NC		%	40
			m/p-Cresol	2018/06/05	NC		%	40
			o-Cresol	2018/06/05	NC		%	40
			Pentachlorophenol	2018/06/05	NC		%	30
			Phenol	2018/06/05	NC		%	30
			2,3,4,5-Tetrachlorophenol	2018/06/05	NC		%	40
			2,3,5,6-Tetrachlorophenol	2018/06/05	NC		%	40
			2,3,4-Trichlorophenol	2018/06/05	NC		%	40
			2,3,6-Trichlorophenol	2018/06/05	NC		%	40
			2,4,5-Trichlorophenol	2018/06/05	NC		%	30
			3,4,5-Trichlorophenol	2018/06/05	NC		%	40

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			2,4-Dinitrophenol	2018/06/05	NC		%	30
			2,3-Dichlorophenol	2018/06/05	NC		%	40
			2,5-Dichlorophenol	2018/06/05	NC		%	40
			3,4-Dichlorophenol	2018/06/05	NC		%	40
			3,5-Dichlorophenol	2018/06/05	NC		%	40
			4,6-Dinitro-2-methylphenol	2018/06/05	NC		%	40
			3 & 4-Chlorophenol	2018/06/05	NC		%	40
			2-Nitrophenol	2018/06/05	NC		%	40
5565323	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2018/06/03		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2018/06/03		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2018/06/03		96	%	80 - 120
			Dissolved Chlorite (CLO2-)	2018/06/03		96	%	80 - 120
5565323	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2018/06/03		106	%	80 - 120
			Dissolved Chlorate (ClO3-)	2018/06/03		106	%	80 - 120
			Dissolved Chlorite (CLO2-)	2018/06/03		99	%	80 - 120
			Dissolved Chlorite (CLO2-)	2018/06/03		99	%	80 - 120
5565323	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2018/06/03	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2018/06/03	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2018/06/03	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2018/06/03	ND, RDL=0.10		mg/L	
5565323	KD9	RPD	Dissolved Chlorate (ClO3-)	2018/06/03	NC		%	20
			Dissolved Chlorite (CLO2-)	2018/06/03	NC		%	20
5567365	ZZ	Matrix Spike	o-Terphenyl	2018/06/07		108	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/06/07		NC	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2018/06/07		108	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2018/06/07		105	%	50 - 130
5567365	ZZ	Spiked Blank	o-Terphenyl	2018/06/07		108	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/06/07		85	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2018/06/07		97	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2018/06/07		96	%	60 - 130
5567365	ZZ	Method Blank	o-Terphenyl	2018/06/07		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2018/06/07	ND, RDL=100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2018/06/07	ND, RDL=200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2018/06/07	ND, RDL=200		ug/L	
5567365	ZZ	RPD	F2 (C10-C16 Hydrocarbons)	2018/06/07	0.91		%	30
			F3 (C16-C34 Hydrocarbons)	2018/06/07	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2018/06/07	NC		%	30
5567493	éAZ	Matrix Spike	Methyl sulfone	2018/06/05		90	%	70 - 130
			Ethylene Glycol	2018/06/05		90	%	60 - 140
			Diethylene Glycol	2018/06/05		91	%	60 - 140
			Triethylene Glycol	2018/06/05		85	%	60 - 140
			Propylene Glycol	2018/06/05		89	%	60 - 140
5567493	éAZ	Spiked Blank	Methyl sulfone	2018/06/05		93	%	70 - 130
			Ethylene Glycol	2018/06/05		89	%	70 - 130
			Diethylene Glycol	2018/06/05		95	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Triethylene Glycol	2018/06/05		89	%	70 - 130
			Propylene Glycol	2018/06/05		101	%	70 - 130
5567493	éAZ	Method Blank	Methyl sulfone	2018/06/05		98	%	70 - 130
			Ethylene Glycol	2018/06/05	ND, RDL=3.0		mg/L	
			Diethylene Glycol	2018/06/05	ND, RDL=5.0		mg/L	
			Triethylene Glycol	2018/06/05	ND, RDL=5.0		mg/L	
			Propylene Glycol	2018/06/05	ND, RDL=5.0		mg/L	
5567493	éAZ	RPD [GVA104-22]	Ethylene Glycol	2018/06/05	NC		%	30
			Diethylene Glycol	2018/06/05	NC		%	30
			Triethylene Glycol	2018/06/05	NC		%	30
			Propylene Glycol	2018/06/05	NC		%	30
5569923	éB3	QC Standard	Adsorbable Organic Halogen	2018/06/04		102	%	84 - 111
5569923	éB3	Method Blank	Adsorbable Organic Halogen	2018/06/04	ND, RDL=0.5		mg/L	
5570664	LMP	Matrix Spike	Total Organic Carbon (C)	2018/06/08		98	%	85 - 115
5570664	LMP	Spiked Blank	Total Organic Carbon (C)	2018/06/08		100	%	80 - 120
5570664	LMP	Method Blank	Total Organic Carbon (C)	2018/06/08	ND, RDL=0.50		mg/L	
5570664	LMP	RPD	Total Organic Carbon (C)	2018/06/08	10		%	15
5577678	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2018/06/13		96	%	85 - 115
5577678	FA	RPD	Total Oil & Grease Mineral/Synthetic	2018/06/13	2.1		%	25
5577678	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2018/06/13	ND, RDL=0.50		mg/L	

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) Elevated VOC RDL(s) due to matrix interference.

(2) The recovery was below the lower control limit. This may represent a low bias in some results for flagged analytes.

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

(4) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

(5) Surrogate recovery was below the lower control limit due to matrix interference. This may represent a lower bias in some results.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B8C8596
Report Date: 2018/06/14

Northern Pulp N.S.
Client Project #: Extra Effluent Testing
Site Location: POINT A, EFFLUENT SAMPLING
Your P.O. #: 43013552

VALIDATION SIGNATURE PAGE

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



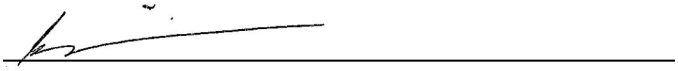
Alan Stewart, Organics Manager, Bedford



Brad Newman, Scientific Service Specialist



Dennis Ngondu, B.Sc., P.Chem., QP, Supervisor, Organics



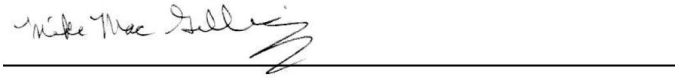
Gayle Simpson, Senior Analyst



Eric Dearman, Scientific Specialist



Jason Wang, Bedford Micro



Mike MacGillivray, Scientific Specialist (Inorganics)

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

VALIDATION SIGNATURE PAGE(CONT'D)

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

17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: DB8C8596
Site Location: EXTRA EFFLUENT TESTING
Your C.O.C. #: 1 of 1

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2018/06/07
Report #: R2566005
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842773
Received: 2018/06/01, 09:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Sulphite by IC	1	N/A	2018/06/02	AB SOP-00026 / CAL SOP-00071	SM 23 4110 B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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.

Your Project #: DB8C8596
Site Location: EXTRA EFFLUENT TESTING
Your C.O.C. #: 1 of 1

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2018/06/07
Report #: R2566005
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842773
Received: 2018/06/01, 09:00

Encryption Key

Maxxam
07 Jun 2018 12:34:29

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Omran Desouki, Junior Project Manager
Email: ODesouki@maxxam.ca
Phone# (403) 291-3077
==========
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842773
Report Date: 2018/06/07

MAXXAM ANALYTICS
Client Project #: DB8C8596
Site Location: EXTRA EFFLUENT TESTING

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		TO0484		
Sampling Date		2018/05/29 09:18		
COC Number		1 of 1		
	UNITS	**POINT A (GVA104)**	**RDL**	**QC Batch**
Anions				
Dissolved Sulphite (SO3)	mg/L	<25 (1)	25	9010453

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842773
Report Date: 2018/06/07

MAXXAM ANALYTICS
Client Project #: DB8C8596
Site Location: EXTRA EFFLUENT TESTING

GENERAL COMMENTS

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

Package 1	2.0°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842773
Report Date: 2018/06/07

QUALITY ASSURANCE REPORT

MAXXAM ANALYTICS
Client Project #: DB8C8596
Site Location: EXTRA EFFLUENT TESTING

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9010453	Dissolved Sulphite (SO3)	2018/06/02	NC	80 - 120	103	80 - 120	<0.50	mg/L	NC	20

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

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

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

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

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).

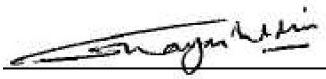
Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842773
Report Date: 2018/06/07

MAXXAM ANALYTICS
Client Project #: DB8C8596
Site Location: EXTRA EFFLUENT TESTING

VALIDATION SIGNATURE PAGE

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



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

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B62271	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B8C8596	663334
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Extra Effluent Testing	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 x Fax:	Phone	(902) 755-7178 x Fax:	Project Name		C#663334-01-01	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	Atlantic RCAp-MS Total Metals in Water	Fluoride	Atlantic VOC in Water	Fecal coliform in water (CFU/100 mL)	TC/EC Non Drinking Water CFU/100mL	PAH in Water by GC/MS (SIM)	Acid Extractables by GC/MS	ABN Compounds in Water by GC/MS	CCME Hydrocarbons in Water	RBCA Hydrocarbons in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1		Point A	May29/18	9:18 AM	W			X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			2018 MAY 30 13:20
9																			
10																			

* 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?
Mike Pidgeon	May 30/18						☐	20.7, 16	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B62271	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B8C8596	663334
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Extra Effluent Testing	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 x Fax:	Phone	(902) 755-7178 x Fax:	Project Name		C#663334-01-02	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	Animal and Vegetable Oil and Grease	Chemical Oxygen Demand (COD)	Total BOD	Nitrogen TKN - water (as N)	Total Suspended Solids	Sulphide	Sulphite in Water	Residual Chlorine, Total	Str. Acid Diss. Cyanide water	Phosphorus Total Colourimetry	# of Bottles	Comments / Hazards / Other Required Analysis
1		Point A	May 29/18	9:15AM	W			X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

2018 MAY 30 13:20

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

* 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?
Mike Pidgeon Mike Pidgeon	May 30/18							20.7,16	Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B62271	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B8C8596	663334
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Extra Effluent Testing	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 x Fax:	Phone	(902) 755-7178 x Fax:	Project Name		C#663334-01-03	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10ºC) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	Chlorate and Chlorite by IC	Gylcol in Water	Organic Halogen (Adsorbable)	Biochemical Oxygen Demand (Dissolved)	Soluble COD	# of Bottles	Comments / Hazards / Other Required Analysis
1		Point A	May 29/19	9:15 AM	W			X	X	X	X	X		
2														
3														
4														
5														
6														
7														
8														
9														
10														

2019 MAY 30 13:20

* 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 (ºC) on Receipt	Custody Seal Intact on Cooler?
Mike Pidgeon	May 30/19						☐	20.7/16	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Point C

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your C.O.C. #: 715286-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/11
Report #: R5748920
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9847
Received: 2019/05/15, 12:54

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/05/23	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/05/21	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/05/17	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/16	2019/05/21	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/05/21	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/17	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/05/21	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/05/23	2019/05/23	CAM SOP-00457	OMOE E3015 5 m
Dioxins/Furans in Water (EPS 1/RM/23) (1, 6)	1	2019/06/03	2019/06/09	BRL SOP-00406 (mod)	EPS 1/RM/23 m
Organic carbon - Diss (DOC) (7)	1	N/A	2019/05/17	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/05/23	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/05/21	2019/05/21	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/05/21		
Hardness (calculated as CaCO3)	1	N/A	2019/05/17	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/23	2019/05/23	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/16	2019/05/16	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/05/23	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/05/23	N/A	Auto Calc.
Organic Halogen (Adsorbable) (2)	1	2019/05/21	2019/05/21	PTC SOP-00056	Coulometric - Titr.
Chlorate and Chlorite by IC (3)	1	N/A	2019/05/25	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (4)	1	N/A	2019/05/22	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (3)	1	2019/05/21	2019/05/23	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/05/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/05/21	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/05/21	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/05/22	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/16	2019/05/16	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/05/17	2019/05/21	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/05/21	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (5)	1	2019/05/21	2019/05/22		
pH (8)	1	N/A	2019/05/23	ATL SOP 00003	SM 23 4500-H+ B m

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your C.O.C. #: 715286-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/11
Report #: R5748920
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9847
Received: 2019/05/15, 12:54

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Phosphorus - ortho	1	N/A	2019/05/22	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	1	N/A	2019/05/17	ATL SOP 00118	Atl. RBCA v3.1 m
Salinity (9)	1	N/A	2019/05/21		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/05/23	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/05/23	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/05/21	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/05/21	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2019/05/21	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/05/22	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/05/17	2019/05/21	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (7)	1	N/A	2019/05/17	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/05/22	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/05/16	2019/05/17	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/16	2019/05/21	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/05/23	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/16	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/05/22	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your C.O.C. #: 715286-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/11
Report #: R5748920
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9C9847
Received: 2019/05/15, 12:54

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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Edm Petrol Offsite
(3) This test was performed by Bedford to Calgary Offsite
(4) This test was performed by Bedford to Burnaby - Offsite
(5) This test was performed by Bedford to Montreal Subcontrac
(6) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(7) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(8) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(9) Non-accredited test method

Encryption Key

Neyousha Shahisavandi
Project Manager Assistant
11 Jun 2019 15:59:43

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	20.0	N/A	N/A	6122693
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	420	1.0	0.20	6122686
Calculated TDS	mg/L	1200	1.0	0.20	6122701
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.4	1.0	0.20	6122686
Cation Sum	me/L	18.8	N/A	N/A	6122693
Hardness (CaCO3)	mg/L	100	1.0	1.0	6122689
Ion Balance (% Difference)	%	3.25	N/A	N/A	6122691
Langelier Index (@ 20C)	N/A	0.149			6122697
Langelier Index (@ 4C)	N/A	-0.0960			6122699
Nitrate (N)	mg/L	ND	0.050	N/A	6122695
Saturation pH (@ 20C)	N/A	7.41			6122697
Saturation pH (@ 4C)	N/A	7.66			6122699
Sulphide (as H2S)	mg/L	1.9	0.021	0.011	6122964
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	420	25	N/A	6130625
Carbonaceous BOD	mg/L	25	17	N/A	6122932
Total Chemical Oxygen Demand	mg/L	630	20	N/A	6127143
Dissolved Chlorate (ClO3-)	mg/L	ND (1)	1.0	N/A	6154326
Dissolved Chloride (Cl-)	mg/L	160	5.0	N/A	6130627
Dissolved Chlorite (CLO2-)	mg/L	2.1 (1)	1.0	N/A	6154326
Colour	TCU	1100	250	N/A	6130899
Total Kjeldahl Nitrogen (TKN)	mg/L	4.3	1.0	0.60	6128661
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	6130632
Nitrite (N)	mg/L	ND	0.010	N/A	6130633
Nitrogen (Ammonia Nitrogen)	mg/L	0.74	0.050	N/A	6130801
Dissolved Organic Carbon (C)	mg/L	15	0.50	N/A	6127728
Total Organic Carbon (C)	mg/L	200 (2)	5.0	N/A	6127724
Orthophosphate (P)	mg/L	0.080	0.010	N/A	6130631
pH	pH	7.56	N/A	N/A	6133108

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Detection limits raised due to sample matrix.
(2) Elevated reporting limit due to turbidity.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Total Phosphorus	mg/L	1.6	0.040	N/A	6124637
Salinity	N/A	ND	2.0	N/A	6130613
Reactive Silica (SiO2)	mg/L	9.6	0.50	N/A	6130630
Total Suspended Solids	mg/L	38	10	N/A	6124744
Dissolved Sulphate (SO4)	mg/L	330	10	N/A	6130629
Sulphide	mg/L	1.8	0.020	0.010	6130992
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6137355
Turbidity	NTU	45	0.10	0.10	6135407
Volatile Suspended Solids	mg/L	40	20	N/A	6133009
Conductivity	uS/cm	1700	1.0	N/A	6133115
Nutritional Parameters					
Total Nitrogen (N)	mg/L	7.40 (1)	0.20	N/A	6136918
Organic Halogens					
Adsorbable Organic Halogen	mg/L	0.57	0.25	N/A	6132297
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6125981

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	0.013	0.013	N/A	6131192

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	1600	5.0	N/A	6124570
Total Antimony (Sb)	ug/L	ND	1.0	N/A	6124570
Total Arsenic (As)	ug/L	1.2	1.0	N/A	6124570
Total Barium (Ba)	ug/L	370	1.0	N/A	6124570
Total Beryllium (Be)	ug/L	ND	1.0	N/A	6124570
Total Bismuth (Bi)	ug/L	ND	2.0	N/A	6124570
Total Boron (B)	ug/L	66	50	N/A	6124570
Total Cadmium (Cd)	ug/L	1.4	0.010	N/A	6124570
Total Calcium (Ca)	ug/L	34000	100	N/A	6124570
Total Chromium (Cr)	ug/L	2.8	1.0	N/A	6124570
Total Cobalt (Co)	ug/L	0.53	0.40	N/A	6124570
Total Copper (Cu)	ug/L	6.4	0.50	N/A	6124570
Total Iron (Fe)	ug/L	400	50	N/A	6124570
Total Lead (Pb)	ug/L	2.2	0.50	N/A	6124570
Total Magnesium (Mg)	ug/L	4200	100	N/A	6124570
Total Manganese (Mn)	ug/L	2200	2.0	N/A	6124570
Total Molybdenum (Mo)	ug/L	ND	2.0	N/A	6124570
Total Nickel (Ni)	ug/L	2.7	2.0	N/A	6124570
Total Phosphorus (P)	ug/L	1500	100	N/A	6124570
Total Potassium (K)	ug/L	20000	100	N/A	6124570
Total Selenium (Se)	ug/L	ND	1.0	N/A	6124570
Total Silver (Ag)	ug/L	0.28	0.10	N/A	6124570
Total Sodium (Na)	ug/L	370000	100	N/A	6124570
Total Strontium (Sr)	ug/L	130	2.0	N/A	6124570
Total Thallium (Tl)	ug/L	ND	0.10	N/A	6124570
Total Tin (Sn)	ug/L	ND	2.0	N/A	6124570
Total Titanium (Ti)	ug/L	12	2.0	N/A	6124570
Total Uranium (U)	ug/L	0.29	0.10	N/A	6124570
Total Vanadium (V)	ug/L	2.9	2.0	N/A	6124570
Total Zinc (Zn)	ug/L	130	5.0	N/A	6124570

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6124966
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6124966
Acenaphthene	ug/L	ND	0.010	N/A	6124966
Acenaphthylene	ug/L	ND	0.010	N/A	6124966
Anthracene	ug/L	ND (1)	0.020	N/A	6124966
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6124966
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6124966
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6124966
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6123000
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6124966
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6124966
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6124966
Chrysene	ug/L	ND	0.010	N/A	6124966
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6124966
Fluoranthene	ug/L	0.034	0.010	N/A	6124966
Fluorene	ug/L	ND (1)	0.10	N/A	6124966
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6124966
Naphthalene	ug/L	ND	0.20	N/A	6124966
Perylene	ug/L	ND	0.010	N/A	6124966
Phenanthrene	ug/L	0.049	0.010	N/A	6124966
Pyrene	ug/L	ND (1)	0.020	N/A	6124966
Surrogate Recovery (%)					
D10-Anthracene	%	85			6124966
D14-Terphenyl	%	71			6124966
D8-Acenaphthylene	%	85			6124966

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6124567
1,1-Dichloroethylene	ug/L	ND (1)	6.6	13	6124567
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6124567
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6124567
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6124567
Ethylene Dibromide	ug/L	ND	0.20	0.50	6124567
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6124567
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6124567
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6124567
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6124567
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6124567
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6124567
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6124567
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6124567
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6124567
Benzene	ug/L	ND	1.0	N/A	6124567
Bromodichloromethane	ug/L	ND	1.0	0.20	6124567
Bromoform	ug/L	ND	1.0	0.20	6124567
Bromomethane	ug/L	ND	0.50	N/A	6124567
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6124567
Chlorobenzene	ug/L	ND	1.0	N/A	6124567
Chloroethane	ug/L	ND	8.0	N/A	6124567
Chloroform	ug/L	ND	1.0	0.20	6124567
Chloromethane	ug/L	ND	8.0	N/A	6124567
Dibromochloromethane	ug/L	ND	1.0	0.20	6124567
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6124567
Ethylbenzene	ug/L	ND	1.0	N/A	6124567
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6124567
Styrene	ug/L	ND	1.0	N/A	6124567
Tetrachloroethylene	ug/L	ND	1.0	N/A	6124567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated VOC RDL(s) due to matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Toluene	ug/L	ND	1.0	N/A	6124567
Trichloroethylene	ug/L	ND	1.0	N/A	6124567
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6124567
Vinyl Chloride	ug/L	ND	0.50	2.0	6124567
o-Xylene	ug/L	ND	1.0	N/A	6124567
p+m-Xylene	ug/L	ND	2.0	N/A	6124567
Total Xylenes	ug/L	ND	1.0	1.0	6124567
Total Trihalomethanes	ug/L	ND	1.0	N/A	6124567
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	99			6124567
D4-1,2-Dichloroethane	%	114			6124567
D8-Toluene	%	101			6124567

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6127651
Toluene	mg/L	ND	0.0010	N/A	6127651
Ethylbenzene	mg/L	ND	0.0010	N/A	6127651
Total Xylenes	mg/L	ND	0.0020	N/A	6127651
C6 - C10 (less BTEX)	mg/L	ND	0.010	N/A	6127651
>C10-C16 Hydrocarbons	mg/L	0.13	0.050	N/A	6131033
>C16-C21 Hydrocarbons	mg/L	0.13	0.050	N/A	6131033
>C21-<C32 Hydrocarbons	mg/L	0.26	0.10	N/A	6131033
Modified TPH (Tier1)	mg/L	0.53	0.10	N/A	6122285
Reached Baseline at C32	mg/L	Yes	N/A	N/A	6131033
Hydrocarbon Resemblance	mg/L	COMMENT (1)	N/A	N/A	6131033
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	78			6131033
n-Dotriacontane - Extractable	%	78 (2)			6131033
Isobutylbenzene - Volatile	%	84			6127651

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Unidentified compound(s) in fuel / lube range.
(2) TEH sample contained sediment.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6127147
Aroclor 1221	ug/L	ND	0.050	N/A	6127147
Aroclor 1232	ug/L	ND	0.050	N/A	6127147
Aroclor 1248	ug/L	ND	0.050	N/A	6127147
Aroclor 1242	ug/L	ND	0.050	N/A	6127147
Aroclor 1254	ug/L	ND	0.050	N/A	6127147
Aroclor 1260	ug/L	ND	0.050	N/A	6127147
Calculated Total PCB	ug/L	ND	0.050	N/A	6123002
Surrogate Recovery (%)					
Decachlorobiphenyl	%	16 (1)			6127147

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) PCB surrogate not within acceptance limits. Analysis was repeated with similar results.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JSK101			
Sampling Date		2019/05/14 08:20			
COC Number		715286-01-01			
	UNITS	POINT C 14-MAY	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	0.49	0.072	N/A	6154327
Total Resin Acids	mg/L	1.0	0.060	N/A	6154327
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	0.0094	0.0060	N/A	6154327
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6154327
Docosanoic acid (C22)	mg/L	0.24 (1)	0.060	N/A	6154327
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6154327
Eicosanoic acid (C20)	mg/L	0.081	0.0060	N/A	6154327
Hexadecanoic acid (C16)	mg/L	0.039	0.0060	N/A	6154327
Linoleic acid (C18:2)	mg/L	0.020	0.0060	N/A	6154327
Linolenic acid (C18:3)	mg/L	ND	0.0060	N/A	6154327
Octadecanoic acid (C18)	mg/L	0.047	0.0060	N/A	6154327
Oleic acid (C18:1)	mg/L	0.050	0.0060	N/A	6154327
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6154327
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6154327
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6154327
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6154327
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6154327
Abietic acid	mg/L	0.25 (1)	0.060	N/A	6154327
Dehydroabietic acid	mg/L	0.20 (1)	0.060	N/A	6154327
Isopimaric acid	mg/L	0.34 (1)	0.060	N/A	6154327
Neoabietic acid	mg/L	0.022	0.0060	N/A	6154327
Palustric acid	mg/L	ND	0.0060	N/A	6154327
Pimaric acid	mg/L	0.14	0.0060	N/A	6154327
Sandaracopimaric acid	mg/L	0.061	0.0060	N/A	6154327

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9C9847
Report Date: 2019/06/11

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JSK101							
Sampling Date		2019/05/14 08:20							
COC Number		715286-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	POINT C 14-MAY	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/L	ND	1.05	9.43	N/A	1.00	1.05		6164383
1,2,3,7,8-Penta CDD *	pg/L	ND	1.12	9.43	N/A	1.00	1.12		6164383
1,2,3,4,7,8-Hexa CDD *	pg/L	ND	1.17	9.43	N/A	0.100	0.117		6164383
1,2,3,6,7,8-Hexa CDD *	pg/L	ND	1.01	9.43	N/A	0.100	0.101		6164383
1,2,3,7,8,9-Hexa CDD *	pg/L	ND	0.986	9.43	N/A	0.100	0.0986		6164383
1,2,3,4,6,7,8-Hepta CDD *	pg/L	ND	1.06	9.43	N/A	0.0100	0.0106		6164383
Octa CDD *	pg/L	4.07	1.00	94.3	N/A	0.000300	0.00122		6164383
Total Tetra CDD *	pg/L	ND	1.05	9.43	N/A			0	6164383
Total Penta CDD *	pg/L	ND	1.12	9.43	N/A			0	6164383
Total Hexa CDD *	pg/L	ND	1.05	9.43	N/A			0	6164383
Total Hepta CDD *	pg/L	ND	1.06	9.43	N/A			0	6164383
2,3,7,8-Tetra CDF **	pg/L	ND	1.08	9.43	N/A	0.100	0.108		6164383
1,2,3,7,8-Penta CDF **	pg/L	ND	1.06	9.43	N/A	0.0300	0.0318		6164383
2,3,4,7,8-Penta CDF **	pg/L	ND	1.07	9.43	N/A	0.300	0.321		6164383
1,2,3,4,7,8-Hexa CDF **	pg/L	ND	1.07	9.43	N/A	0.100	0.107		6164383
1,2,3,6,7,8-Hexa CDF **	pg/L	ND	0.892	9.43	N/A	0.100	0.0892		6164383
2,3,4,6,7,8-Hexa CDF **	pg/L	ND	1.01	9.43	N/A	0.100	0.101		6164383
1,2,3,7,8,9-Hexa CDF **	pg/L	ND	1.12	9.43	N/A	0.100	0.112		6164383
1,2,3,4,6,7,8-Hepta CDF **	pg/L	ND	1.02	9.43	N/A	0.0100	0.0102		6164383
1,2,3,4,7,8,9-Hepta CDF **	pg/L	ND	1.15	9.43	N/A	0.0100	0.0115		6164383
Octa CDF **	pg/L	ND	0.998	94.3	N/A	0.000300	0.000299		6164383
Total Tetra CDF **	pg/L	ND	1.08	9.43	N/A			0	6164383
Total Penta CDF **	pg/L	ND	1.06	9.43	N/A			0	6164383
Total Hexa CDF **	pg/L	ND	1.02	9.43	N/A			0	6164383

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JSK101							
Sampling Date		2019/05/14 08:20							
COC Number		715286-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	POINT C 14-MAY	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Total Hepta CDF **	pg/L	ND	1.08	9.43	N/A			0	6164383
TOTAL TOXIC EQUIVALENCY	pg/L						3.39		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	44							6164383
C13-1234678 HeptaCDF **	%	41							6164383
C13-123678 HexaCDD *	%	61							6164383
C13-123678 HexaCDF **	%	41							6164383
C13-12378 PentaCDD *	%	50							6164383
C13-12378 PentaCDF **	%	40							6164383
C13-2378 TetraCDD *	%	57							6164383
C13-2378 TetraCDF **	%	40							6164383
C13-OCDD *	%	47							6164383

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin

GENERAL COMMENTS

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

Package 1	3.7°C

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6122932	MLW	QC Standard	Carbonaceous BOD	2019/05/21		105	%	80 - 120
6122932	MLW	Spiked Blank	Carbonaceous BOD	2019/05/21		110	%	80 - 120
6122932	MLW	Method Blank	Carbonaceous BOD	2019/05/21	ND, RDL=2.0		mg/L	
6122932	MLW	RPD	Carbonaceous BOD	2019/05/21	4.6		%	25
			Carbonaceous BOD	2019/05/21	5.4		%	25
6124567	ASL	Matrix Spike [JSK101-10]	4-Bromofluorobenzene	2019/05/16		102	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		114	%	70 - 130
			D8-Toluene	2019/05/16		96	%	70 - 130
			1,1-Dichloroethane	2019/05/16		104	%	70 - 130
			1,1-Dichloroethylene	2019/05/16		107	%	70 - 130
			1,1,1-Trichloroethane	2019/05/16		106	%	70 - 130
			1,1,2-Trichloroethane	2019/05/16		104	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/16		108	%	70 - 130
			Ethylene Dibromide	2019/05/16		106	%	70 - 130
			1,2-Dichlorobenzene	2019/05/16		91	%	70 - 130
			1,2-Dichloroethane	2019/05/16		107	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/16		97	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/16		103	%	70 - 130
			1,2-Dichloropropane	2019/05/16		102	%	70 - 130
			1,3-Dichlorobenzene	2019/05/16		88	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/16		101	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/16		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/16		86	%	70 - 130
			Benzene	2019/05/16		92	%	70 - 130
			Bromodichloromethane	2019/05/16		98	%	70 - 130
			Bromoform	2019/05/16		101	%	70 - 130
			Bromomethane	2019/05/16		99	%	60 - 140
			Carbon Tetrachloride	2019/05/16		101	%	70 - 130
			Chlorobenzene	2019/05/16		97	%	70 - 130
			Chloroethane	2019/05/16		90	%	60 - 140
			Chloroform	2019/05/16		97	%	70 - 130
			Chloromethane	2019/05/16		101	%	60 - 140
			Dibromochloromethane	2019/05/16		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/16		100	%	70 - 130
			Ethylbenzene	2019/05/16		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/16		99	%	70 - 130
			Styrene	2019/05/16		101	%	70 - 130
			Tetrachloroethylene	2019/05/16		93	%	70 - 130
			Toluene	2019/05/16		97	%	70 - 130
			Trichloroethylene	2019/05/16		96	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/16		92	%	60 - 140
			Vinyl Chloride	2019/05/16		95	%	60 - 140
			o-Xylene	2019/05/16		97	%	70 - 130
			p+m-Xylene	2019/05/16		95	%	70 - 130
6124567	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/16		100	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		106	%	70 - 130
			D8-Toluene	2019/05/16		98	%	70 - 130
			1,1-Dichloroethane	2019/05/16		103	%	70 - 130
			1,1-Dichloroethylene	2019/05/16		109	%	70 - 130
			1,1,1-Trichloroethane	2019/05/16		106	%	70 - 130
			1,1,2-Trichloroethane	2019/05/16		99	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/16		99	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethylene Dibromide	2019/05/16		100	%	70 - 130
			1,2-Dichlorobenzene	2019/05/16		92	%	70 - 130
			1,2-Dichloroethane	2019/05/16		100	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/16		95	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/16		105	%	70 - 130
			1,2-Dichloropropane	2019/05/16		101	%	70 - 130
			1,3-Dichlorobenzene	2019/05/16		90	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/16		100	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/16		104	%	70 - 130
			1,4-Dichlorobenzene	2019/05/16		89	%	70 - 130
			Benzene	2019/05/16		91	%	70 - 130
			Bromodichloromethane	2019/05/16		96	%	70 - 130
			Bromoform	2019/05/16		94	%	70 - 130
			Bromomethane	2019/05/16		95	%	60 - 140
			Carbon Tetrachloride	2019/05/16		102	%	70 - 130
			Chlorobenzene	2019/05/16		94	%	70 - 130
			Chloroethane	2019/05/16		89	%	60 - 140
			Chloroform	2019/05/16		95	%	70 - 130
			Chloromethane	2019/05/16		99	%	60 - 140
			Dibromochloromethane	2019/05/16		99	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/16		96	%	70 - 130
			Ethylbenzene	2019/05/16		98	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/16		97	%	70 - 130
			Styrene	2019/05/16		103	%	70 - 130
			Tetrachloroethylene	2019/05/16		98	%	70 - 130
			Toluene	2019/05/16		98	%	70 - 130
			Trichloroethylene	2019/05/16		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/16		94	%	60 - 140
			Vinyl Chloride	2019/05/16		95	%	60 - 140
			o-Xylene	2019/05/16		98	%	70 - 130
			p+m-Xylene	2019/05/16		96	%	70 - 130
6124567	ASL	Method Blank	4-Bromofluorobenzene	2019/05/16		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/16		108	%	70 - 130
			D8-Toluene	2019/05/16		100	%	70 - 130
			1,1-Dichloroethane	2019/05/16	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/16	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/16	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/16	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/16	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,2-Dichloroethylene	2019/05/16	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/16	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/16	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/16	ND, RDL=0.50		ug/L	
			1,4-Dichlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Benzene	2019/05/16	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/16	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/16	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/16	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/16	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/16	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/16	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/16	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/16	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/16	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/16	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/16	ND, RDL=2.0		ug/L	
			Styrene	2019/05/16	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/16	ND, RDL=1.0		ug/L	
			Toluene	2019/05/16	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/16	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/16	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/16	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/16	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/16	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Xylenes	2019/05/16	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/16	ND, RDL=1.0		ug/L	
6124567	ASL	RPD	1,1-Dichloroethane	2019/05/16	NC		%	40
			1,1-Dichloroethylene	2019/05/16	NC		%	40
			1,1,1-Trichloroethane	2019/05/16	NC		%	40
			1,1,2-Trichloroethane	2019/05/16	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/16	NC		%	40
			Ethylene Dibromide	2019/05/16	NC		%	40
			1,2-Dichlorobenzene	2019/05/16	NC		%	40
			1,2-Dichloroethane	2019/05/16	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/16	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/16	NC		%	40
			1,2-Dichloropropane	2019/05/16	NC		%	40
			1,3-Dichlorobenzene	2019/05/16	NC		%	40
			cis-1,3-Dichloropropene	2019/05/16	NC		%	40
			trans-1,3-Dichloropropene	2019/05/16	NC		%	40
			1,4-Dichlorobenzene	2019/05/16	NC		%	40
			Benzene	2019/05/16	NC		%	40
			Bromodichloromethane	2019/05/16	NC		%	40
			Bromoform	2019/05/16	NC		%	40
			Bromomethane	2019/05/16	NC		%	40
			Carbon Tetrachloride	2019/05/16	NC		%	40
			Chlorobenzene	2019/05/16	NC		%	40
			Chloroethane	2019/05/16	NC		%	40
			Chloroform	2019/05/16	1.4		%	40
			Chloromethane	2019/05/16	NC		%	40
			Dibromochloromethane	2019/05/16	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/16	NC		%	40
			Ethylbenzene	2019/05/16	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/16	NC		%	40
			Styrene	2019/05/16	NC		%	40
			Tetrachloroethylene	2019/05/16	NC		%	40
			Toluene	2019/05/16	NC		%	40
			Trichloroethylene	2019/05/16	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/16	NC		%	40
			Vinyl Chloride	2019/05/16	NC		%	40
			o-Xylene	2019/05/16	NC		%	40
			p+m-Xylene	2019/05/16	NC		%	40
			Total Xylenes	2019/05/16	NC		%	40
			Total Trihalomethanes	2019/05/16	1.4		%	40
6124570	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/16		98	%	80 - 120
			Total Antimony (Sb)	2019/05/16		101	%	80 - 120
			Total Arsenic (As)	2019/05/16		98	%	80 - 120
			Total Barium (Ba)	2019/05/16		97	%	80 - 120
			Total Beryllium (Be)	2019/05/16		98	%	80 - 120
			Total Bismuth (Bi)	2019/05/16		96	%	80 - 120
			Total Boron (B)	2019/05/16		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/16		97	%	80 - 120
			Total Calcium (Ca)	2019/05/16		101	%	80 - 120
			Total Chromium (Cr)	2019/05/16		99	%	80 - 120
			Total Cobalt (Co)	2019/05/16		103	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Copper (Cu)	2019/05/16		96	%	80 - 120
			Total Iron (Fe)	2019/05/16		104	%	80 - 120
			Total Lead (Pb)	2019/05/16		99	%	80 - 120
			Total Magnesium (Mg)	2019/05/16		102	%	80 - 120
			Total Manganese (Mn)	2019/05/16		98	%	80 - 120
			Total Molybdenum (Mo)	2019/05/16		99	%	80 - 120
			Total Nickel (Ni)	2019/05/16		100	%	80 - 120
			Total Phosphorus (P)	2019/05/16		103	%	80 - 120
			Total Potassium (K)	2019/05/16		103	%	80 - 120
			Total Selenium (Se)	2019/05/16		98	%	80 - 120
			Total Silver (Ag)	2019/05/16		98	%	80 - 120
			Total Sodium (Na)	2019/05/16		98	%	80 - 120
			Total Strontium (Sr)	2019/05/16		98	%	80 - 120
			Total Thallium (Tl)	2019/05/16		100	%	80 - 120
			Total Tin (Sn)	2019/05/16		101	%	80 - 120
			Total Titanium (Ti)	2019/05/16		100	%	80 - 120
			Total Uranium (U)	2019/05/16		103	%	80 - 120
			Total Vanadium (V)	2019/05/16		98	%	80 - 120
			Total Zinc (Zn)	2019/05/16		97	%	80 - 120
6124570	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/16		99	%	80 - 120
			Total Antimony (Sb)	2019/05/16		100	%	80 - 120
			Total Arsenic (As)	2019/05/16		97	%	80 - 120
			Total Barium (Ba)	2019/05/16		98	%	80 - 120
			Total Beryllium (Be)	2019/05/16		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/16		98	%	80 - 120
			Total Boron (B)	2019/05/16		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/16		96	%	80 - 120
			Total Calcium (Ca)	2019/05/16		104	%	80 - 120
			Total Chromium (Cr)	2019/05/16		100	%	80 - 120
			Total Cobalt (Co)	2019/05/16		104	%	80 - 120
			Total Copper (Cu)	2019/05/16		100	%	80 - 120
			Total Iron (Fe)	2019/05/16		104	%	80 - 120
			Total Lead (Pb)	2019/05/16		99	%	80 - 120
			Total Magnesium (Mg)	2019/05/16		104	%	80 - 120
			Total Manganese (Mn)	2019/05/16		100	%	80 - 120
			Total Molybdenum (Mo)	2019/05/16		100	%	80 - 120
			Total Nickel (Ni)	2019/05/16		101	%	80 - 120
			Total Phosphorus (P)	2019/05/16		103	%	80 - 120
			Total Potassium (K)	2019/05/16		102	%	80 - 120
			Total Selenium (Se)	2019/05/16		97	%	80 - 120
			Total Silver (Ag)	2019/05/16		96	%	80 - 120
			Total Sodium (Na)	2019/05/16		100	%	80 - 120
			Total Strontium (Sr)	2019/05/16		101	%	80 - 120
			Total Thallium (Tl)	2019/05/16		100	%	80 - 120
			Total Tin (Sn)	2019/05/16		98	%	80 - 120
			Total Titanium (Ti)	2019/05/16		101	%	80 - 120
			Total Uranium (U)	2019/05/16		103	%	80 - 120
			Total Vanadium (V)	2019/05/16		99	%	80 - 120
			Total Zinc (Zn)	2019/05/16		98	%	80 - 120
6124570	BAN	Method Blank	Total Aluminum (Al)	2019/05/16	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/16	ND, RDL=1.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Arsenic (As)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/16	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/16	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/16	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/16	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/16	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/16	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/16	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/16	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/16	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/16	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/05/16	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/16	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/16	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/05/16	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/16	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Zinc (Zn)	2019/05/16	ND, RDL=5.0		ug/L	
6124570	BAN	RPD	Total Aluminum (Al)	2019/05/16	NC		%	20
			Total Antimony (Sb)	2019/05/16	NC		%	20
			Total Arsenic (As)	2019/05/16	NC		%	20
			Total Barium (Ba)	2019/05/16	2.3		%	20
			Total Beryllium (Be)	2019/05/16	NC		%	20
			Total Bismuth (Bi)	2019/05/16	NC		%	20
			Total Boron (B)	2019/05/16	NC		%	20
			Total Cadmium (Cd)	2019/05/16	NC		%	20
			Total Calcium (Ca)	2019/05/16	3.3		%	20
			Total Chromium (Cr)	2019/05/16	NC		%	20
			Total Cobalt (Co)	2019/05/16	1.7		%	20
			Total Copper (Cu)	2019/05/16	3.0		%	20
			Total Iron (Fe)	2019/05/16	2.0		%	20
			Total Lead (Pb)	2019/05/16	NC		%	20
			Total Magnesium (Mg)	2019/05/16	4.2		%	20
			Total Manganese (Mn)	2019/05/16	2.7		%	20
			Total Molybdenum (Mo)	2019/05/16	NC		%	20
			Total Nickel (Ni)	2019/05/16	NC		%	20
			Total Phosphorus (P)	2019/05/16	10		%	20
			Total Potassium (K)	2019/05/16	7.2		%	20
			Total Selenium (Se)	2019/05/16	NC		%	20
			Total Silver (Ag)	2019/05/16	NC		%	20
			Total Sodium (Na)	2019/05/16	2.1		%	20
			Total Strontium (Sr)	2019/05/16	3.3		%	20
			Total Thallium (Tl)	2019/05/16	NC		%	20
			Total Tin (Sn)	2019/05/16	NC		%	20
			Total Titanium (Ti)	2019/05/16	NC		%	20
			Total Uranium (U)	2019/05/16	NC		%	20
			Total Vanadium (V)	2019/05/16	NC		%	20
			Total Zinc (Zn)	2019/05/16	0.77		%	20
6124637	MCN	Matrix Spike	Total Phosphorus	2019/05/17		117	%	80 - 120
6124637	MCN	Spiked Blank	Total Phosphorus	2019/05/17		94	%	80 - 120
6124637	MCN	Method Blank	Total Phosphorus	2019/05/17	ND, RDL=0.020		mg/L	
6124637	MCN	RPD	Total Phosphorus	2019/05/17	NC		%	25
6124744	AM6	QC Standard	Total Suspended Solids	2019/05/21		97	%	80 - 120
6124744	AM6	Method Blank	Total Suspended Solids	2019/05/21	ND, RDL=1.0		mg/L	
6124744	AM6	RPD	Total Suspended Solids	2019/05/21	19		%	20
6124966	KKE	Matrix Spike	D10-Anthracene	2019/05/16		97	%	50 - 130
			D14-Terphenyl	2019/05/16		98	%	50 - 130
			D8-Acenaphthylene	2019/05/16		93	%	50 - 130
			1-Methylnaphthalene	2019/05/16		82	%	50 - 130
			2-Methylnaphthalene	2019/05/16		84	%	50 - 130
			Acenaphthene	2019/05/16		95	%	50 - 130
			Acenaphthylene	2019/05/16		95	%	50 - 130
			Anthracene	2019/05/16		95	%	50 - 130
			Benzo(a)anthracene	2019/05/16		90	%	50 - 130
			Benzo(a)pyrene	2019/05/16		81	%	50 - 130
			Benzo(b)fluoranthene	2019/05/16		89	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/16		86	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(j)fluoranthene	2019/05/16		79	%	50 - 130
			Benzo(k)fluoranthene	2019/05/16		77	%	50 - 130
			Chrysene	2019/05/16		108	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/16		80	%	50 - 130
			Fluoranthene	2019/05/16		98	%	50 - 130
			Fluorene	2019/05/16		99	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/16		81	%	50 - 130
			Naphthalene	2019/05/16		86	%	50 - 130
			Perylene	2019/05/16		76	%	50 - 130
			Phenanthrene	2019/05/16		101	%	50 - 130
			Pyrene	2019/05/16		96	%	50 - 130
6124966	KKE	Spiked Blank	D10-Anthracene	2019/05/16		103	%	50 - 130
			D14-Terphenyl	2019/05/16		102	%	50 - 130
			D8-Acenaphthylene	2019/05/16		101	%	50 - 130
			1-Methylnaphthalene	2019/05/16		88	%	50 - 130
			2-Methylnaphthalene	2019/05/16		90	%	50 - 130
			Acenaphthene	2019/05/16		102	%	50 - 130
			Acenaphthylene	2019/05/16		103	%	50 - 130
			Anthracene	2019/05/16		100	%	50 - 130
			Benzo(a)anthracene	2019/05/16		92	%	50 - 130
			Benzo(a)pyrene	2019/05/16		84	%	50 - 130
			Benzo(b)fluoranthene	2019/05/16		90	%	50 - 130
			Benzo(g,h,i)perylene	2019/05/16		89	%	50 - 130
			Benzo(j)fluoranthene	2019/05/16		83	%	50 - 130
			Benzo(k)fluoranthene	2019/05/16		84	%	50 - 130
			Chrysene	2019/05/16		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/05/16		82	%	50 - 130
			Fluoranthene	2019/05/16		103	%	50 - 130
			Fluorene	2019/05/16		108	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/05/16		85	%	50 - 130
			Naphthalene	2019/05/16		92	%	50 - 130
			Perylene	2019/05/16		79	%	50 - 130
			Phenanthrene	2019/05/16		107	%	50 - 130
			Pyrene	2019/05/16		101	%	50 - 130
6124966	KKE	Method Blank	D10-Anthracene	2019/05/16		103	%	50 - 130
			D14-Terphenyl	2019/05/16		103	%	50 - 130
			D8-Acenaphthylene	2019/05/16		99	%	50 - 130
			1-Methylnaphthalene	2019/05/16	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/05/16	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/05/16	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/05/16	ND, RDL=0.010		ug/L	
			Anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(g,h,i)perylene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Chrysene	2019/05/16	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/05/16	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/05/16	ND, RDL=0.010		ug/L	
			Fluorene	2019/05/16	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/05/16	ND, RDL=0.010		ug/L	
			Naphthalene	2019/05/16	ND, RDL=0.20		ug/L	
			Perylene	2019/05/16	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/05/16	ND, RDL=0.010		ug/L	
			Pyrene	2019/05/16	ND, RDL=0.010		ug/L	
6124966	KKE	RPD	1-Methylnaphthalene	2019/05/16	NC		%	40
			2-Methylnaphthalene	2019/05/16	NC		%	40
			Acenaphthene	2019/05/16	NC		%	40
			Acenaphthylene	2019/05/16	NC		%	40
			Anthracene	2019/05/16	NC		%	40
			Benzo(a)anthracene	2019/05/16	NC		%	40
			Benzo(a)pyrene	2019/05/16	NC		%	40
			Benzo(b)fluoranthene	2019/05/16	NC		%	40
			Benzo(g,h,i)perylene	2019/05/16	NC		%	40
			Benzo(j)fluoranthene	2019/05/16	NC		%	40
			Benzo(k)fluoranthene	2019/05/16	NC		%	40
			Chrysene	2019/05/16	NC		%	40
			Dibenz(a,h)anthracene	2019/05/16	NC		%	40
			Fluoranthene	2019/05/16	NC		%	40
			Fluorene	2019/05/16	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/05/16	NC		%	40
			Naphthalene	2019/05/16	NC		%	40
			Perylene	2019/05/16	NC		%	40
			Phenanthrene	2019/05/16	NC		%	40
			Pyrene	2019/05/16	NC		%	40
6127143	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/05/17		99	%	80 - 120
6127143	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/17		101	%	80 - 120
6127143	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/17		101	%	80 - 120
6127143	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/17	ND, RDL=20		mg/L	
6127143	ZZH	RPD	Total Chemical Oxygen Demand	2019/05/17	4.4		%	25
6127147	RGE	Spiked Blank	Decachlorobiphenyl	2019/05/17		87	%	30 - 130
			Aroclor 1254	2019/05/17		90	%	70 - 130
6127147	RGE	Method Blank	Decachlorobiphenyl	2019/05/17		80	%	30 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Aroclor 1016	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/05/17	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/05/17	ND, RDL=0.050		ug/L	
6127147	RGE	RPD	Aroclor 1016	2019/05/17	NC		%	40
			Aroclor 1221	2019/05/17	NC		%	40
			Aroclor 1232	2019/05/17	NC		%	40
			Aroclor 1248	2019/05/17	NC		%	40
			Aroclor 1242	2019/05/17	NC		%	40
			Aroclor 1254	2019/05/17	NC		%	40
			Aroclor 1260	2019/05/17	NC		%	40
6127651	THL	Matrix Spike	Isobutylbenzene - Volatile	2019/05/17		101	%	70 - 130
			Benzene	2019/05/17		116	%	70 - 130
			Toluene	2019/05/17		116	%	70 - 130
			Ethylbenzene	2019/05/17		117	%	70 - 130
			Total Xylenes	2019/05/17		116	%	70 - 130
6127651	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/05/17		103	%	70 - 130
			Benzene	2019/05/17		102	%	70 - 130
			Toluene	2019/05/17		104	%	70 - 130
			Ethylbenzene	2019/05/17		103	%	70 - 130
			Total Xylenes	2019/05/17		104	%	70 - 130
6127651	THL	Method Blank	Isobutylbenzene - Volatile	2019/05/17		102	%	70 - 130
			Benzene	2019/05/17	ND, RDL=0.0010		mg/L	
			Toluene	2019/05/17	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/05/17	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/05/17	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/05/17	ND, RDL=0.010		mg/L	
6127651	THL	RPD	Benzene	2019/05/17	NC		%	40
			Toluene	2019/05/17	NC		%	40
			Ethylbenzene	2019/05/17	NC		%	40
			Total Xylenes	2019/05/17	NC		%	40
			C6 - C10 (less BTEX)	2019/05/17	NC		%	40
6127724	SSI	Matrix Spike	Total Organic Carbon (C)	2019/05/17		98	%	85 - 115
6127724	SSI	Spiked Blank	Total Organic Carbon (C)	2019/05/17		101	%	80 - 120
6127724	SSI	Method Blank	Total Organic Carbon (C)	2019/05/17	ND, RDL=0.50		mg/L	
6127724	SSI	RPD	Total Organic Carbon (C)	2019/05/17	NC (1)		%	15
6127728	SSI	Matrix Spike [JSK101-06]	Dissolved Organic Carbon (C)	2019/05/17		98	%	85 - 115

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6127728	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/05/17		100	%	80 - 120
6127728	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/05/17	ND, RDL=0.50		mg/L	
6127728	SSI	RPD [JSK101-06]	Dissolved Organic Carbon (C)	2019/05/17	1.3		%	15
6128661	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2019/05/22		85	%	80 - 120
6128661	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/05/21		102	%	80 - 120
6128661	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/05/21		104	%	80 - 120
6128661	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/05/21	ND, RDL=0.10		mg/L	
6128661	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2019/05/22	NC (2)		%	20
6130613	BBD	QC Standard	Salinity	2019/05/21		101	%	80 - 120
6130613	BBD	Method Blank	Salinity	2019/05/21	ND, RDL=2.0		N/A	
6130613	BBD	RPD	Salinity	2019/05/21	NC		%	25
6130625	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/21		NC	%	80 - 120
6130625	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/21		113	%	80 - 120
6130625	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/21	ND, RDL=5.0		mg/L	
6130625	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/05/21	4.7		%	25
6130627	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/21		NC	%	80 - 120
6130627	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/21		103	%	80 - 120
6130627	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/05/21	ND, RDL=1.0		mg/L	
6130627	SRM	RPD	Dissolved Chloride (Cl-)	2019/05/21	0.26		%	25
6130629	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/21		101	%	80 - 120
6130629	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/21		104	%	80 - 120
6130629	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/05/21	ND, RDL=2.0		mg/L	
6130629	SRM	RPD	Dissolved Sulphate (SO4)	2019/05/21	1.5		%	25
6130630	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/05/21		97	%	80 - 120
6130630	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/05/21		106	%	80 - 120
6130630	SRM	Method Blank	Reactive Silica (SiO2)	2019/05/21	ND, RDL=0.50		mg/L	
6130630	SRM	RPD	Reactive Silica (SiO2)	2019/05/21	1.4		%	25
6130631	SRM	Matrix Spike	Orthophosphate (P)	2019/05/22		101	%	80 - 120
6130631	SRM	Spiked Blank	Orthophosphate (P)	2019/05/22		106	%	80 - 120
6130631	SRM	Method Blank	Orthophosphate (P)	2019/05/22	ND, RDL=0.010		mg/L	
6130631	SRM	RPD	Orthophosphate (P)	2019/05/22	NC		%	25
6130632	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/05/21		100	%	80 - 120
6130632	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/05/21		104	%	80 - 120
6130632	SRM	Method Blank	Nitrate + Nitrite (N)	2019/05/21	ND, RDL=0.050		mg/L	
6130632	SRM	RPD	Nitrate + Nitrite (N)	2019/05/21	17		%	25
6130633	SRM	Matrix Spike	Nitrite (N)	2019/05/21		14 (3)	%	80 - 120
6130633	SRM	Spiked Blank	Nitrite (N)	2019/05/21		104	%	80 - 120
6130633	SRM	Method Blank	Nitrite (N)	2019/05/21	ND, RDL=0.010		mg/L	
6130633	SRM	RPD	Nitrite (N)	2019/05/21	NC		%	20
6130801	NRG	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/05/21		NC	%	80 - 120
6130801	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/21		98	%	80 - 120
6130801	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/21	ND, RDL=0.050		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6130801	NRG	RPD	Nitrogen (Ammonia Nitrogen)	2019/05/21	0.50		%	20
6130899	NRG	Spiked Blank	Colour	2019/05/21		99	%	80 - 120
6130899	NRG	Method Blank	Colour	2019/05/21	ND, RDL=5.0		TCU	
6130899	NRG	RPD	Colour	2019/05/21	NC		%	20
6130992	GTO	Matrix Spike	Sulphide	2019/05/21		87	%	80 - 120
6130992	GTO	Spiked Blank	Sulphide	2019/05/21		94	%	80 - 120
6130992	GTO	Method Blank	Sulphide	2019/05/21	ND, RDL=0.020		mg/L	
6130992	GTO	RPD	Sulphide	2019/05/21	NC		%	20
6131033	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/21		99	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/21		111	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/21		89	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/21		82	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/21		97	%	70 - 130
6131033	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/21		95	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/21		109	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/21		99	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/21		94	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/21		111	%	70 - 130
6131033	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/21		97	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/21		99	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/21	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/21	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/21	ND, RDL=0.10		mg/L	
6131033	BCD	RPD	>C10-C16 Hydrocarbons	2019/05/21	NC		%	40
			>C16-C21 Hydrocarbons	2019/05/21	NC		%	40
			>C21-<C32 Hydrocarbons	2019/05/21	NC		%	40
6131192	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/23		101	%	80 - 120
6131192	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/23		99	%	80 - 120
6131192	CCR	Method Blank	Total Mercury (Hg)	2019/05/23	ND, RDL=0.013		ug/L	
6131192	CCR	RPD	Total Mercury (Hg)	2019/05/23	NC		%	20
6132297	éAX	QC Standard	Adsorbable Organic Halogen			96	%	84 - 111
			Adsorbable Organic Halogen			96	%	84 - 111
6132297	éAX	Method Blank	Adsorbable Organic Halogen		ND, RDL=0.5		mg/L	
			Adsorbable Organic Halogen		ND, RDL=0.5		mg/L	
6133009	AM6	QC Standard	Volatile Suspended Solids	2019/05/22		95	%	80 - 120
6133009	AM6	Method Blank	Volatile Suspended Solids	2019/05/22	ND, RDL=2.0		mg/L	
6133009	AM6	RPD	Volatile Suspended Solids	2019/05/22	0		%	25
6133108	EMT	QC Standard	pH	2019/05/22		101	%	97 - 103
6133108	EMT	RPD	pH	2019/05/22	0.38		%	N/A
6133115	EMT	Spiked Blank	Conductivity	2019/05/23		102	%	80 - 120
6133115	EMT	Method Blank	Conductivity	2019/05/23	1.3, RDL=1.0		uS/cm	
6133115	EMT	RPD	Conductivity	2019/05/23	0.83		%	10
6135407	EMT	QC Standard	Turbidity	2019/05/23		111	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6135407	EMT	Spiked Blank	Turbidity	2019/05/23		101	%	80 - 120
6135407	EMT	Method Blank	Turbidity	2019/05/23	ND, RDL=0.10		NTU	
6135407	EMT	RPD	Turbidity	2019/05/23	3.0		%	20
6136918	IC4	Spiked Blank	Total Nitrogen (N)	2019/05/22		98	%	80 - 120
6136918	IC4	Method Blank	Total Nitrogen (N)	2019/05/22	ND, RDL=0.020		mg/L	
6137355	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/23		96	%	80 - 120
6137355	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/23		101	%	80 - 120
6137355	BKE	Method Blank	Total Cyanide (CN)	2019/05/23	ND, RDL=0.0050		mg/L	
6137355	BKE	RPD	Total Cyanide (CN)	2019/05/23	NC		%	20
6154326	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/23		NC	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/23		NC	%	80 - 120
6154326	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/19		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/19		92	%	80 - 120
6154326	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/19	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/19	ND, RDL=0.10		mg/L	
6154327	SJ1	Matrix Spike	9,10-Dichlorostearic acid	2019/05/22		95	%	50 - 130
			Decanoic Acid (C10)	2019/05/22		93	%	50 - 130
			Docosanoic acid (C22)	2019/05/22		92	%	50 - 130
			Dodecanoic acid (C12)	2019/05/22		91	%	50 - 130
			Eicosanoic acid (C20)	2019/05/22		101	%	50 - 130
			Hexadecanoic acid (C16)	2019/05/22		93	%	50 - 130
			Linoleic acid (C18:2)	2019/05/22		90	%	50 - 130
			Linolenic acid (C18:3)	2019/05/22		88	%	50 - 130
			Octadecanoic acid (C18)	2019/05/22		100	%	50 - 130
			Oleic acid (C18:1)	2019/05/22		98	%	50 - 130
			Tetradecanoic acid (C14)	2019/05/22		92	%	50 - 130
			Undecanoic acid (C11)	2019/05/22		103	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/05/22		89	%	50 - 130
			12-Chlorodehydroabietic acid	2019/05/22		84	%	50 - 130
			14-Chlorodehydroabietic acid	2019/05/22		88	%	50 - 130
			Abietic acid	2019/05/22		78	%	50 - 130
			Dehydroabietic acid	2019/05/22		99	%	50 - 130
			Isopimaric acid	2019/05/22		90	%	50 - 130
			Neoabietic acid	2019/05/22		59	%	50 - 130
			Palustric acid	2019/05/22		58	%	50 - 130
			Pimaric acid	2019/05/22		95	%	50 - 130
			Sandaracopimaric acid	2019/05/22		91	%	50 - 130
6154327	SJ1	Spiked Blank	9,10-Dichlorostearic acid	2019/05/22		97	%	50 - 130
			Decanoic Acid (C10)	2019/05/22		91	%	50 - 130
			Docosanoic acid (C22)	2019/05/22		95	%	50 - 130
			Dodecanoic acid (C12)	2019/05/22		91	%	50 - 130
			Eicosanoic acid (C20)	2019/05/22		101	%	50 - 130
			Hexadecanoic acid (C16)	2019/05/22		98	%	50 - 130
			Linoleic acid (C18:2)	2019/05/22		91	%	50 - 130
			Linolenic acid (C18:3)	2019/05/22		87	%	50 - 130
			Octadecanoic acid (C18)	2019/05/22		108	%	50 - 130
			Oleic acid (C18:1)	2019/05/22		104	%	50 - 130
			Tetradecanoic acid (C14)	2019/05/22		91	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Undecanoic acid (C11)	2019/05/22		100	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/05/22		87	%	50 - 130
			12-Chlorodehydroabietic acid	2019/05/22		83	%	50 - 130
			14-Chlorodehydroabietic acid	2019/05/22		86	%	50 - 130
			Abietic acid	2019/05/22		74	%	50 - 130
			Dehydroabietic acid	2019/05/22		96	%	50 - 130
			Isopimaric acid	2019/05/22		91	%	50 - 130
			Neoabietic acid	2019/05/22		62	%	50 - 130
			Palustric acid	2019/05/22		63	%	50 - 130
			Pimaric acid	2019/05/22		92	%	50 - 130
			Sandaracopimaric acid	2019/05/22		90	%	50 - 130
6154327	SJ1	Method Blank	Total Fatty Acids	2019/05/22	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/05/22	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/05/22	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/05/22	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/05/22	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/05/22	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/05/22	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/05/22	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/05/22	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/05/22	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/05/22	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/05/22	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/05/22	ND, RDL=0.0060		mg/L	
			12,14-Dichlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/05/22	ND, RDL=0.0060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Palustric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/05/22	ND, RDL=0.0060		mg/L	
6164383	OBC	Spiked Blank	C13-1234678 HeptaCDD	2019/06/09		86	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/09		72	%	30 - 130
			C13-123678 HexaCDD	2019/06/09		110	%	30 - 130
			C13-123678 HexaCDF	2019/06/09		73	%	30 - 130
			C13-12378 PentaCDD	2019/06/09		71	%	30 - 130
			C13-12378 PentaCDF	2019/06/09		49	%	30 - 130
			C13-2378 TetraCDD	2019/06/09		76	%	30 - 130
			C13-2378 TetraCDF	2019/06/09		61	%	30 - 130
			C13-OCDD	2019/06/09		92	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/09		92	%	80 - 140
			1,2,3,7,8-Penta CDD	2019/06/09		109	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2019/06/09		88	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2019/06/09		98	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2019/06/09		85	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2019/06/09		112	%	80 - 140
			Octa CDD	2019/06/09		80	%	80 - 140
			2,3,7,8-Tetra CDF	2019/06/09		111	%	80 - 140
			1,2,3,7,8-Penta CDF	2019/06/09		125	%	80 - 140
			2,3,4,7,8-Penta CDF	2019/06/09		115	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2019/06/09		122	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2019/06/09		130	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2019/06/09		135	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2019/06/09		139	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2019/06/09		113	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2019/06/09		113	%	80 - 140
			Octa CDF	2019/06/09		87	%	80 - 140
6164383	OBC	RPD	2,3,7,8-Tetra CDD	2019/06/09	11		%	35
			1,2,3,7,8-Penta CDD	2019/06/09	0.92		%	35
			1,2,3,4,7,8-Hexa CDD	2019/06/09	2.3		%	35
			1,2,3,6,7,8-Hexa CDD	2019/06/09	6.9		%	35
			1,2,3,7,8,9-Hexa CDD	2019/06/09	13		%	35
			1,2,3,4,6,7,8-Hepta CDD	2019/06/09	0		%	35
			Octa CDD	2019/06/09	0		%	35
			2,3,7,8-Tetra CDF	2019/06/09	7.5		%	35
			1,2,3,7,8-Penta CDF	2019/06/09	4.1		%	35
			2,3,4,7,8-Penta CDF	2019/06/09	4.4		%	35
			1,2,3,4,7,8-Hexa CDF	2019/06/09	10		%	35
			1,2,3,6,7,8-Hexa CDF	2019/06/09	6.3		%	35
			2,3,4,6,7,8-Hexa CDF	2019/06/09	3.8		%	35
			1,2,3,7,8,9-Hexa CDF	2019/06/09	5.2		%	35
			1,2,3,4,6,7,8-Hepta CDF	2019/06/09	4.5		%	35
			1,2,3,4,7,8,9-Hepta CDF	2019/06/09	5.5		%	35
			Octa CDF	2019/06/09	0		%	35
6164383	OBC	Method Blank	C13-1234678 HeptaCDD	2019/06/09		88	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/09		82	%	30 - 130
			C13-123678 HexaCDD	2019/06/09		99	%	30 - 130
			C13-123678 HexaCDF	2019/06/09		66	%	30 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			C13-12378 PentaCDD	2019/06/09		70	%	30 - 130
			C13-12378 PentaCDF	2019/06/09		55	%	30 - 130
			C13-2378 TetraCDD	2019/06/09		83	%	30 - 130
			C13-2378 TetraCDF	2019/06/09		62	%	30 - 130
			C13-OCDD	2019/06/09		86	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/09	ND, EDL=1.19		pg/L	
			1,2,3,7,8-Penta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			1,2,3,4,7,8-Hexa CDD	2019/06/09	ND, EDL=1.23		pg/L	
			1,2,3,6,7,8-Hexa CDD	2019/06/09	ND, EDL=1.07		pg/L	
			1,2,3,7,8,9-Hexa CDD	2019/06/09	ND, EDL=1.04		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			Octa CDD	2019/06/09	1.27, EDL=1.17		pg/L	
			Total Tetra CDD	2019/06/09	ND, EDL=1.19		pg/L	
			Total Penta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			Total Hexa CDD	2019/06/09	ND, EDL=1.11		pg/L	
			Total Hepta CDD	2019/06/09	ND, EDL=1.14		pg/L	
			2,3,7,8-Tetra CDF	2019/06/09	ND, EDL=1.14		pg/L	
			1,2,3,7,8-Penta CDF	2019/06/09	ND, EDL=1.17		pg/L	
			2,3,4,7,8-Penta CDF	2019/06/09	ND, EDL=1.18		pg/L	
			1,2,3,4,7,8-Hexa CDF	2019/06/09	ND, EDL=1.14		pg/L	
			1,2,3,6,7,8-Hexa CDF	2019/06/09	ND, EDL=0.953		pg/L	
			2,3,4,6,7,8-Hexa CDF	2019/06/09	ND, EDL=1.08		pg/L	
			1,2,3,7,8,9-Hexa CDF	2019/06/09	ND, EDL=1.20		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2019/06/09	ND, EDL=0.997		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2019/06/09	ND, EDL=1.13		pg/L	
			Octa CDF	2019/06/09	ND, EDL=1.19		pg/L	
			Total Tetra CDF	2019/06/09	ND, EDL=1.14		pg/L	
			Total Penta CDF	2019/06/09	ND, EDL=1.18		pg/L	
			Total Hexa CDF	2019/06/09	ND, EDL=1.09		pg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Hepta CDF	2019/06/09	ND, EDL=1.06		pg/L	

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) Elevated reporting limit due to turbidity.

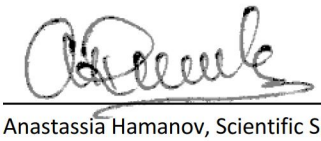
(2) Due to a high concentration of NOx, the sample required dilution. The detection limit was adjusted accordingly.

(3) Poor spike recovery due to sample matrix.

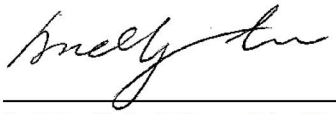
Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE

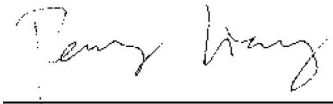
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



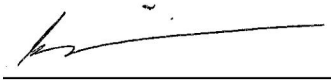
Anastassia Hamanov, Scientific Specialist



Andy Lu, Ph.D., P.Chem., Scientific Specialist



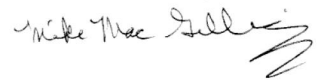
Harry (Peng) Liang, Senior Analyst



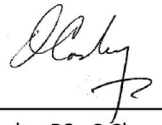
Gayle Simpson, Senior Analyst



Eric Dearman, Scientific Specialist



Mike MacGillivray, Scientific Specialist (Inorganics)



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE(CONT'D)

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

Rosemarie MacDonald, Scientific Specialist (Organics)

Jingyuan Song, QP, Organics – Senior Analyst

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Maxxam
A Bureau Veritas Group Company

Your Project #: BEDENV JOB# B9C9847
Your C.O.C. #: N-A

Attention: Maryann Comeau

Maxxam Analytics
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/05/22
Report #: R2441470
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917734
Received: 2019/05/17, 08:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/05/21	2019/05/22	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam 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 Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing. Maxxam 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 Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Your Project #: BEDENV JOB# B9C9847
Your C.O.C. #: N-A

Attention: Maryann Comeau

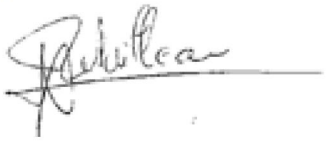
Maxxam Analytics
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/05/22
Report #: R2441470
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B917734
Received: 2019/05/17, 08:45

Encryption Key



Sophie Retailleau
Project Manager
23 May 2019 12:08:13

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: SRetailleau@maxxam.ca
Phone# (514)448-9001 Ext:7066232

==========

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

PHENOLS BY GCMS (WATER)

Maxxam ID		GL0785		
Sampling Date		2019/05/14 08:20		
COC Number		N-A		
	Units	**JSK101-13R\POINT C 14-MAY**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	9.2	5.6	1990581
Phenol	ug/L	0.96	0.50	1990581
2-Chlorophenol	ug/L	<0.50	0.50	1990581
3-Chlorophenol	ug/L	<0.50	0.50	1990581
4-Chlorophenol	ug/L	<0.50	0.50	1990581
o-Cresol	ug/L	0.85	0.50	1990581
m-Cresol	ug/L	<0.50	0.50	1990581
p-Cresol	ug/L	0.71	0.50	1990581
Guaiacol	ug/L	1.2	0.50	1990581
Catechol	ug/L	3.7	0.50	1990581
Eugenol	ug/L	<0.50	0.50	1990581
Isoeugenol	ug/L	<0.50	0.50	1990581
6-Chlorovanillin	ug/L	0.75	0.50	1990581
5,6-Dichlorovanillin	ug/L	<0.50	0.50	1990581
3,4,5-Trichlorosyringol	ug/L	<0.50	0.50	1990581
2,4-Dimethylphenol	ug/L	1.1	0.50	1990581
2,6-Dichlorophenol	ug/L	<0.50	0.50	1990581
3,5-Dichlorophenol	ug/L	<0.50	0.50	1990581
2,3-Dichlorophenol	ug/L	<0.50	0.50	1990581
3,4-Dichlorophenol	ug/L	<0.50	0.50	1990581
2,4 + 2,5-Dichlorophenol	ug/L	<0.50	0.50	1990581
2-Nitrophenol	ug/L	<1.0	1.0	1990581
4-Nitrophenol	ug/L	<5.0	5.0	1990581
2,4,6-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,3,5-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,3,6-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,4,5-Trichlorophenol	ug/L	<0.50	0.50	1990581
2,3,4-Trichlorophenol	ug/L	<0.50	0.50	1990581
3,4,5-Trichlorophenol	ug/L	<1.2 (1)	1.2	1990581
4-Chloroguaiacol	ug/L	<0.50	0.50	1990581
4,5-Dichloroguaiacol	ug/L	<0.50	0.50	1990581
4,6-Dichloroguaiacol	ug/L	<5.6 (1)	5.6	1990581
2,3,5,6-Tetrachlorophenol	ug/L	<0.50	0.50	1990581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
(1) Detection limit raised due to matrix interference.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

PHENOLS BY GCMS (WATER)

Maxxam ID		GL0785		
Sampling Date		2019/05/14 08:20		
COC Number		N-A		
	Units	**JSK101-13R\POINT C 14-MAY**	**RDL**	**QC Batch**
2,3,4,6-Tetrachlorophenol	ug/L	<0.50	0.50	1990581
2,3,4,5-Tetrachlorophenol	ug/L	<0.50	0.50	1990581
4-Chlorocatechol	ug/L	<0.55 (1)	0.55	1990581
3,5-Dichlorocatechol	ug/L	<0.50	0.50	1990581
4,5-Dichlorocatechol	ug/L	<0.72 (1)	0.72	1990581
3,4,5-Trichloroguaiacol	ug/L	<0.50	0.50	1990581
4,5,6-Trichloroguaiacol	ug/L	<0.50	0.50	1990581
Pentachlorophenol	ug/L	<0.50	0.50	1990581
3,4,5-Trichlorocatechol	ug/L	<0.50	0.50	1990581
Tetrachlorocatechol	ug/L	<0.50	0.50	1990581
Tetrachloroguaiacol	ug/L	<0.50	0.50	1990581
4,5-Dichloroveratrol	ug/L	<0.50	0.50	1990581
3,4,5-Trichloroveratrol	ug/L	<0.50	0.50	1990581
3,4,5,6-Tetrachloroveratrol	ug/L	<0.50	0.50	1990581
Surrogate Recovery (%)				
D6-Phenol	%	104	N/A	1990581
Tribromophenol-2,4,6	%	90	N/A	1990581
Trifluoro-m-cresol	%	103	N/A	1990581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Detection limit raised due to matrix interference.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

GENERAL COMMENTS

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

Package 1	2.7°C

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total Regl. P&P Phenols calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1990581	MA1	Spiked Blank	D6-Phenol	2019/05/22		116	%	50 - 130
			Tribromophenol-2,4,6	2019/05/22		95	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		116	%	50 - 130
			Phenol	2019/05/22		117	%	50 - 130
			2-Chlorophenol	2019/05/22		111	%	50 - 130
			3-Chlorophenol	2019/05/22		114	%	50 - 130
			4-Chlorophenol	2019/05/22		111	%	50 - 130
			o-Cresol	2019/05/22		120	%	50 - 130
			m-Cresol	2019/05/22		120	%	50 - 130
			p-Cresol	2019/05/22		117	%	50 - 130
			2,4-Dimethylphenol	2019/05/22		108	%	50 - 130
			2,6-Dichlorophenol	2019/05/22		116	%	50 - 130
			3,5-Dichlorophenol	2019/05/22		105	%	50 - 130
			2,3-Dichlorophenol	2019/05/22		109	%	50 - 130
			3,4-Dichlorophenol	2019/05/22		110	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/05/22		111	%	50 - 130
			2-Nitrophenol	2019/05/22		109	%	50 - 130
			4-Nitrophenol	2019/05/22		107	%	50 - 130
			2,4,6-Trichlorophenol	2019/05/22		110	%	50 - 130
			2,3,5-Trichlorophenol	2019/05/22		102	%	50 - 130
			2,3,6-Trichlorophenol	2019/05/22		117	%	50 - 130
			2,4,5-Trichlorophenol	2019/05/22		113	%	50 - 130
			2,3,4-Trichlorophenol	2019/05/22		110	%	50 - 130
			3,4,5-Trichlorophenol	2019/05/22		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/05/22		103	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/05/22		110	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/05/22		102	%	50 - 130
			Pentachlorophenol	2019/05/22		94	%	50 - 130
1990581	MA1	Spiked Blank DUP	D6-Phenol	2019/05/22		112	%	50 - 130
			Tribromophenol-2,4,6	2019/05/22		92	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		110	%	50 - 130
			Phenol	2019/05/22		115	%	50 - 130
			2-Chlorophenol	2019/05/22		108	%	50 - 130
			3-Chlorophenol	2019/05/22		111	%	50 - 130
			4-Chlorophenol	2019/05/22		108	%	50 - 130
			o-Cresol	2019/05/22		119	%	50 - 130
			m-Cresol	2019/05/22		119	%	50 - 130
			p-Cresol	2019/05/22		113	%	50 - 130
			2,4-Dimethylphenol	2019/05/22		106	%	50 - 130
			2,6-Dichlorophenol	2019/05/22		113	%	50 - 130
			3,5-Dichlorophenol	2019/05/22		104	%	50 - 130
			2,3-Dichlorophenol	2019/05/22		108	%	50 - 130
			3,4-Dichlorophenol	2019/05/22		109	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/05/22		108	%	50 - 130
			2-Nitrophenol	2019/05/22		108	%	50 - 130
			4-Nitrophenol	2019/05/22		106	%	50 - 130
			2,4,6-Trichlorophenol	2019/05/22		109	%	50 - 130
			2,3,5-Trichlorophenol	2019/05/22		101	%	50 - 130
			2,3,6-Trichlorophenol	2019/05/22		115	%	50 - 130
			2,4,5-Trichlorophenol	2019/05/22		113	%	50 - 130
			2,3,4-Trichlorophenol	2019/05/22		109	%	50 - 130
			3,4,5-Trichlorophenol	2019/05/22		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/05/22		102	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/05/22		109	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/05/22		102	%	50 - 130
			Pentachlorophenol	2019/05/22		92	%	50 - 130
1990581	MA1	Method Blank	D6-Phenol	2019/05/22		108	%	50 - 130
			Total of Regl. P&P Phenols	2019/05/22	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/05/22		89	%	50 - 130
			Trifluoro-m-cresol	2019/05/22		105	%	50 - 130
			Phenol	2019/05/22	<0.50		ug/L	
			2-Chlorophenol	2019/05/22	<0.50		ug/L	
			3-Chlorophenol	2019/05/22	<0.50		ug/L	
			4-Chlorophenol	2019/05/22	<0.50		ug/L	
			o-Cresol	2019/05/22	<0.50		ug/L	
			m-Cresol	2019/05/22	<0.50		ug/L	
			p-Cresol	2019/05/22	<0.50		ug/L	
			Guaiacol	2019/05/22	<0.50		ug/L	
			Catechol	2019/05/22	<0.50		ug/L	
			Eugenol	2019/05/22	<0.50		ug/L	
			Isoeugenol	2019/05/22	<0.50		ug/L	
			6-Chlorovanillin	2019/05/22	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/05/22	<0.50		ug/L	
			2,4-Dimethylphenol	2019/05/22	<0.50		ug/L	
			2,6-Dichlorophenol	2019/05/22	<0.50		ug/L	
			3,5-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2,3-Dichlorophenol	2019/05/22	<0.50		ug/L	
			3,4-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/05/22	<0.50		ug/L	
			2-Nitrophenol	2019/05/22	<1.0		ug/L	
			4-Nitrophenol	2019/05/22	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/05/22	<0.50		ug/L	
			4-Chloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/05/22	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/05/22	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/05/22	<0.50		ug/L	
			4-Chlorocatechol	2019/05/22	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/05/22	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/05/22	<0.50		ug/L	
			Pentachlorophenol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/05/22	<0.50		ug/L	
			Tetrachlorocatechol	2019/05/22	<0.50		ug/L	
			Tetrachloroguaiacol	2019/05/22	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/05/22	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/05/22	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/05/22	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

MAXXAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Maxxam
A Bureau Veritas Group Company

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac

Job# B9C9847

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JSK101-13R\POINT C 14-MAY	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/14 08:20	2019/05/22

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	2	3	3	Custody Seal Present	YES	(NO)
				Custody Seal Intact	YES	(NO)
				Ice Present Upon Receipt	(YES)	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) Eden Burke (print) EDEN BURKE Date and Time 2019/05/15 15:52

Received by (Sign) _____ (print) TRONG-LUAN NGUYEN Date and Time 2019-05-17 08:45

UPS WT534

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:

National: N001

Regional:

17-May-19 08:45
Sophie Retailleau
B917734

TLN

B917734_COC

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☐ COC Must be Attached

Sender (Print) EDEN BURKE Initial EB

Shipping Department Checklist

☑ Correct Shipping location
☐ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler, Ice, Tape-custody seal, Date&Sign

Date Shipped May 16/19 Number of coolers 1
Shipper (Print) _____ Initial _____

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9C9847	715286
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Project Name		C#715286-01-01	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	TSS/VSS	Carbonaceous BOD	Chemical Oxygen Demand (COD)	Organic Halogen (Adsorbable)	Total Kjeldahl Nitrogen in Water	Phosphorus Total Colourimetry	Salinity	Dioxins/Furans in Water (EPS 1/RM/23)	PAH and PCB	Atlantic VOC in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1	SID#442691	Point C	May 14/19	8:20 AM				X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

* 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?
Mike Pidgeon	19/5/15							2.4,5	Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

2019 MAY 15 12:54

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9C9847	715286
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Project Name		C#715286-01-02	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	RBCA Hydrocarbons in Water	Phenols in Pulp and Paper Mill Effluents	Atlantic RCAp-MS (Includes Sodium)	Mercury - Total (CVAA,LL)	Sulphide (H2S)	Chlorate and Chlorite by IC	Total Cyanide	Resin and Fatty Acids			# of Bottles	Comments / Hazards / Other Required Analysis
1	SID#442691	Point C	May 14/19	8:20 am				X	X	X	X	X	X	X	X				
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

* 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?
Mike Pidgeon	19/5/15							2, 4, 5	Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

2019 MAY 15 12:54

Your Project #: DB8C8821
Site Location: EXTRA EFFLUENT TESTING
Your C.O.C. #: 1 of 1

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2018/06/07
Report #: R2566003
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842771
Received: 2018/06/01, 09:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Sulphite by IC	1	N/A	2018/06/02	AB SOP-00026 / CAL SOP-00071	SM 23 4110 B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam 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.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam 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 Maxxam, unless otherwise agreed in writing.

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.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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.

Your Project #: DB8C8821
Site Location: EXTRA EFFLUENT TESTING
Your C.O.C. #: 1 of 1

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2018/06/07
Report #: R2566003
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B842771
Received: 2018/06/01, 09:00

Encryption Key

Maxxam
07 Jun 2018 12:34:09

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Omran Desouki, Junior Project Manager
Email: ODesouki@maxxam.ca
Phone# (403) 291-3077
==========
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842771
Report Date: 2018/06/07

MAXXAM ANALYTICS
Client Project #: DB8C8821
Site Location: EXTRA EFFLUENT TESTING

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		TO0481	TO0481		
Sampling Date		2018/05/29 13:04	2018/05/29 13:04		
COC Number		1 of 1	1 of 1		
	UNITS	POINT C (GVB582)	POINT C (GVB582) Lab-Dup	RDL	QC Batch
Anions					
Dissolved Sulphite (SO3)	mg/L	<25 (1)	<25	25	9010453

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Detection limits raised due to matrix interference.

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842771
Report Date: 2018/06/07

MAXXAM ANALYTICS
Client Project #: DB8C8821
Site Location: EXTRA EFFLUENT TESTING

GENERAL COMMENTS

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

Package 1	2.0°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842771
Report Date: 2018/06/07

QUALITY ASSURANCE REPORT

MAXXAM ANALYTICS
Client Project #: DB8C8821
Site Location: EXTRA EFFLUENT TESTING

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9010453	Dissolved Sulphite (SO3)	2018/06/02	NC	80 - 120	103	80 - 120	<0.50	mg/L	NC	20

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

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

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

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

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).

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B842771
Report Date: 2018/06/07

MAXXAM ANALYTICS
Client Project #: DB8C8821
Site Location: EXTRA EFFLUENT TESTING

VALIDATION SIGNATURE PAGE

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



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

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B62271	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B8C8821	663335
Address	PO Box 549 Station Main	Address	340 Simpson Lane	Project #	Extra Effluent Testing	Chain Of Custody Record	Project Manager
	New Glasgow NS B2H 5E8		Pictou NS B0K 1X2	Project Name		C#663335-01-01	Maryann Comeau
Phone	(902) 755-7178 x Fax:	Phone	(902) 755-7178 x Fax:	Site #			
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	Atlantic RCAp-MS Total Metals in Water	Fluoride	Atlantic VOC in Water	Fecal coliform in water (CFU/100 mL)	TC/EC Non Drinking Water CFU/100mL	PAH in Water by GC/MS (SIM)	Acid Extractables by GC/MS	ABN Compounds in Water by GC/MS	CCME Hydrocarbons in Water	RBCA Hydrocarbons in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1		Point C	May29/18	11:45AM	W			X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

2018 MAY 30 13:17

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:

* 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?
M.McPidgeon	May30/18						☐	11, 13, 12	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B62271	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B8C8821	663335
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Extra Effluent Testing	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 x Fax:	Phone	(902) 755-7178 x Fax:	Project Name		C#663335-01-02	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	Animal and Vegetable Oil and Grease	Chemical Oxygen Demand (COD)	Total BOD	Nitrogen TKN - water (as N)	Total Suspended Solids	Sulphide	Sulphite in Water	Residual Chlorine, Total	Str. Acid Diss. Cyanide water	Phosphorus Total Colourimetry	# of Bottles	Comments / Hazards / Other Required Analysis
1		Point C	May 29/13	1:04PM	W			X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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: ☐

2013 MAY 30 13:17

* 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?
Mike Pidgeon	May 30/13						☐	11, 13, 12	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam
A Bureau Veritas Group Company

Maxxam Analytics International Corporation o/a Maxxam Analytics
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B62271	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B8C9521	663335
Address	PO Box 549 Station Main New Glasgow NS B2H 5E8	Address	340 Simpson Lane Pictou NS B0K 1X2	Project #	Extra Effluent Testing	Chain Of Custody Record	Project Manager
Phone	(902) 755-7178 x Fax:	Phone	(902) 755-7178 x Fax:	Project Name		C#663335-01-03	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Site #			
				Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10ºC) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	Chlorate and Chlorite by IC	Gylcol in Water	Soluble COD	Biochemical Oxygen Demand (Dissolved)	Organic Halogen (Adsorbable)						# of Bottles	Comments / Hazards / Other Required Analysis
1		Point C	May 29/13	1:04pm	W			X	X	X	X	X							
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

2013 MAY 30 13:17

* 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 (ºC) on Receipt	Custody Seal Intact on Cooler?
Mike Pidgeon	May 30/13						☐	11, 13, 12	☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'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.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Your Project #: B9J7249
Your C.O.C. #: n/a

Attention: Maryann Comeau

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/07/25
Report #: R2459078
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B932382
Received: 2019/07/19, 09:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/07/22	2019/07/24	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Your Project #: B9J7249
Your C.O.C. #: n/a

Attention: Maryann Comeau

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/07/25
Report #: R2459078
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B932382
Received: 2019/07/19, 09:00

Encryption Key

Sophie Retailleau
Project Manager
26 Jul 2019 08:57:39

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: Sophie.RETAILLEAU@bvlabs.com
Phone# (514)448-9001 Ext:7066232

==========

This report has been generated and distributed using a secure automated process.
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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GS4463		
Sampling Date		2019/07/17		
COC Number		n/a		
	Units	**KHI008-13R/POINT C17-JUL**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	6.8	5.0	2010808
Phenol	ug/L	0.99	0.50	2010808
2-Chlorophenol	ug/L	<0.50	0.50	2010808
3-Chlorophenol	ug/L	<0.50	0.50	2010808
4-Chlorophenol	ug/L	<0.50	0.50	2010808
o-Cresol	ug/L	0.70	0.50	2010808
m-Cresol	ug/L	<0.50	0.50	2010808
p-Cresol	ug/L	1.2	0.50	2010808
Guaiacol	ug/L	1.3	0.50	2010808
Catechol	ug/L	1.8	0.50	2010808
Eugenol	ug/L	<0.50	0.50	2010808
Isoeugenol	ug/L	<0.50	0.50	2010808
6-Chlorovanillin	ug/L	<0.50	0.50	2010808
5,6-Dichlorovanillin	ug/L	<0.50	0.50	2010808
3,4,5-Trichlorosyringol	ug/L	<0.50	0.50	2010808
2,4-Dimethylphenol	ug/L	0.85	0.50	2010808
2,6-Dichlorophenol	ug/L	<0.50	0.50	2010808
3,5-Dichlorophenol	ug/L	<1.8 (1)	1.8	2010808
2,3-Dichlorophenol	ug/L	<0.50	0.50	2010808
3,4-Dichlorophenol	ug/L	<0.50	0.50	2010808
2,4 + 2,5-Dichlorophenol	ug/L	<1.3 (2)	1.3	2010808
2-Nitrophenol	ug/L	<1.0	1.0	2010808
4-Nitrophenol	ug/L	<5.0	5.0	2010808
2,4,6-Trichlorophenol	ug/L	<0.50	0.50	2010808
2,3,5-Trichlorophenol	ug/L	<0.50	0.50	2010808
2,3,6-Trichlorophenol	ug/L	<0.50	0.50	2010808
2,4,5-Trichlorophenol	ug/L	<0.50	0.50	2010808
2,3,4-Trichlorophenol	ug/L	<0.50	0.50	2010808
3,4,5-Trichlorophenol	ug/L	<0.50	0.50	2010808
4-Chloroguaiacol	ug/L	<0.50	0.50	2010808
4,5-Dichloroguaiacol	ug/L	<0.50	0.50	2010808
4,6-Dichloroguaiacol	ug/L	<0.50	0.50	2010808
2,3,5,6-Tetrachlorophenol	ug/L	<0.50	0.50	2010808

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
(1) Detection limit raised due to matrix interference.
(2) Dû à l'interférence de la matrice, la limite de détection a été augmentée.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GS4463		
Sampling Date		2019/07/17		
COC Number		n/a		
	Units	**KHI008-13R/POINT C17-JUL**	**RDL**	**QC Batch**
2,3,4,6-Tetrachlorophenol	ug/L	<0.50	0.50	2010808
2,3,4,5-Tetrachlorophenol	ug/L	<0.50	0.50	2010808
4-Chlorocatechol	ug/L	<0.50	0.50	2010808
3,5-Dichlorocatechol	ug/L	<0.50	0.50	2010808
4,5-Dichlorocatechol	ug/L	<0.50	0.50	2010808
3,4,5-Trichloroguaiacol	ug/L	<0.50	0.50	2010808
4,5,6-Trichloroguaiacol	ug/L	<0.50	0.50	2010808
Pentachlorophenol	ug/L	<0.50	0.50	2010808
3,4,5-Trichlorocatechol	ug/L	<0.50	0.50	2010808
Tetrachlorocatechol	ug/L	<0.50	0.50	2010808
Tetrachloroguaiacol	ug/L	<0.50	0.50	2010808
4,5-Dichloroveratrol	ug/L	<0.50	0.50	2010808
3,4,5-Trichloroveratrol	ug/L	<0.50	0.50	2010808
3,4,5,6-Tetrachloroveratrol	ug/L	<0.50	0.50	2010808
Surrogate Recovery (%)				
D6-Phenol	%	86	N/A	2010808
Tribromophenol-2,4,6	%	98	N/A	2010808
Trifluoro-m-cresol	%	91	N/A	2010808

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

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

Package 1	4.0°C

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total "Total Phenols (RFPP) " calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
2010808	MA1	Spiked Blank	D6-Phenol	2019/07/23		102	%	50 - 130
			Tribromophenol-2,4,6	2019/07/23		105	%	50 - 130
			Trifluoro-m-cresol	2019/07/23		102	%	50 - 130
			Phenol	2019/07/23		90	%	50 - 130
			2-Chlorophenol	2019/07/23		88	%	50 - 130
			3-Chlorophenol	2019/07/23		87	%	50 - 130
			4-Chlorophenol	2019/07/23		86	%	50 - 130
			o-Cresol	2019/07/23		98	%	50 - 130
			m-Cresol	2019/07/23		95	%	50 - 130
			p-Cresol	2019/07/23		93	%	50 - 130
			2,4-Dimethylphenol	2019/07/23		88	%	50 - 130
			2,6-Dichlorophenol	2019/07/23		95	%	50 - 130
			3,5-Dichlorophenol	2019/07/23		86	%	50 - 130
			2,3-Dichlorophenol	2019/07/23		90	%	50 - 130
			3,4-Dichlorophenol	2019/07/23		90	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/07/23		91	%	50 - 130
			2-Nitrophenol	2019/07/23		86	%	50 - 130
			4-Nitrophenol	2019/07/23		83	%	50 - 130
			2,4,6-Trichlorophenol	2019/07/23		92	%	50 - 130
			2,3,5-Trichlorophenol	2019/07/23		85	%	50 - 130
			2,3,6-Trichlorophenol	2019/07/23		96	%	50 - 130
			2,4,5-Trichlorophenol	2019/07/23		95	%	50 - 130
			2,3,4-Trichlorophenol	2019/07/23		93	%	50 - 130
			3,4,5-Trichlorophenol	2019/07/23		91	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/07/23		92	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/07/23		92	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/07/23		87	%	50 - 130
			Pentachlorophenol	2019/07/23		83	%	50 - 130
2010808	MA1	Spiked Blank DUP	D6-Phenol	2019/07/23		106	%	50 - 130
			Tribromophenol-2,4,6	2019/07/23		103	%	50 - 130
			Trifluoro-m-cresol	2019/07/23		103	%	50 - 130
			Phenol	2019/07/23		102	%	50 - 130
			2-Chlorophenol	2019/07/23		97	%	50 - 130
			3-Chlorophenol	2019/07/23		98	%	50 - 130
			4-Chlorophenol	2019/07/23		96	%	50 - 130
			o-Cresol	2019/07/23		108	%	50 - 130
			m-Cresol	2019/07/23		107	%	50 - 130
			p-Cresol	2019/07/23		101	%	50 - 130
			2,4-Dimethylphenol	2019/07/23		95	%	50 - 130
			2,6-Dichlorophenol	2019/07/23		102	%	50 - 130
			3,5-Dichlorophenol	2019/07/23		93	%	50 - 130
			2,3-Dichlorophenol	2019/07/23		97	%	50 - 130
			3,4-Dichlorophenol	2019/07/23		97	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/07/23		98	%	50 - 130
			2-Nitrophenol	2019/07/23		93	%	50 - 130
			4-Nitrophenol	2019/07/23		89	%	50 - 130
			2,4,6-Trichlorophenol	2019/07/23		99	%	50 - 130
			2,3,5-Trichlorophenol	2019/07/23		91	%	50 - 130
			2,3,6-Trichlorophenol	2019/07/23		103	%	50 - 130
			2,4,5-Trichlorophenol	2019/07/23		103	%	50 - 130
			2,3,4-Trichlorophenol	2019/07/23		98	%	50 - 130
			3,4,5-Trichlorophenol	2019/07/23		95	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/07/23		100	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/07/23		99	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/07/23		93	%	50 - 130
			Pentachlorophenol	2019/07/23		88	%	50 - 130
2010808	MA1	Method Blank	D6-Phenol	2019/07/23		97	%	50 - 130
			Total of Regl. P&P Phenols	2019/07/23	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/07/23		99	%	50 - 130
			Trifluoro-m-cresol	2019/07/23		95	%	50 - 130
			Phenol	2019/07/23	<0.50		ug/L	
			2-Chlorophenol	2019/07/23	<0.50		ug/L	
			3-Chlorophenol	2019/07/23	<0.50		ug/L	
			4-Chlorophenol	2019/07/23	<0.50		ug/L	
			o-Cresol	2019/07/23	<0.50		ug/L	
			m-Cresol	2019/07/23	<0.50		ug/L	
			p-Cresol	2019/07/23	<0.50		ug/L	
			Guaiacol	2019/07/23	<0.50		ug/L	
			Catechol	2019/07/23	<0.50		ug/L	
			Eugenol	2019/07/23	<0.50		ug/L	
			Isoeugenol	2019/07/23	<0.50		ug/L	
			6-Chlorovanillin	2019/07/23	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/07/23	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/07/23	<0.50		ug/L	
			2,4-Dimethylphenol	2019/07/23	<0.50		ug/L	
			2,6-Dichlorophenol	2019/07/23	<0.50		ug/L	
			3,5-Dichlorophenol	2019/07/23	<0.50		ug/L	
			2,3-Dichlorophenol	2019/07/23	<0.50		ug/L	
			3,4-Dichlorophenol	2019/07/23	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/07/23	<0.50		ug/L	
			2-Nitrophenol	2019/07/23	<1.0		ug/L	
			4-Nitrophenol	2019/07/23	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/07/23	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/07/23	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/07/23	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/07/23	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/07/23	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/07/23	<0.50		ug/L	
			4-Chloroguaiacol	2019/07/23	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/07/23	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/07/23	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/07/23	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/07/23	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/07/23	<0.50		ug/L	
			4-Chlorocatechol	2019/07/23	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/07/23	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/07/23	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/07/23	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/07/23	<0.50		ug/L	
			Pentachlorophenol	2019/07/23	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/07/23	<0.50		ug/L	
			Tetrachlorocatechol	2019/07/23	<0.50		ug/L	
			Tetrachloroguaiacol	2019/07/23	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/07/23	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/07/23	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/07/23	<0.50		ug/L	

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.

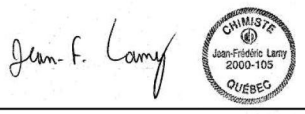
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

VALIDATION SIGNATURE PAGE

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



Jean-Frederic Lamy, B.Sc., Chemist, Scientific Service Specialist

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Bureau.Veritas Laboratories
~~500~~ Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

19-Jul-19 09:00
Sophie Retailleau
B932382

DV MTL-001

B932382_COC

Northern Pulp N.S.
BV Labs PM : Maryann Comeau

To: Bedford to Montreal Subcontrac

Job# B9J7249

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
KHI008-13R\Point C 17-JUL	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/07/17	2019/07/25

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	4	4	4	Custody Seal Present	YES	NO ✓
				Custody Seal Intact	YES	NO ✓
				Ice Present Upon Receipt	YES ✓	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) Blake Curry (print) BLAKE CURRY Date and Time 2019/07/18 12:30

Received by (Sign) _____ (print) GYUSHEN JDETZ Date and Time 2019/07/19 09:00

Subcontract Comments:

[redacted]

Autoclaver, UST534

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@bvlabs.com** and to **Maryann.COMEAU@bvlabs.com**

Reporting Requirements:

National: N001

Regional:

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☐ COC Must be Attached

Sender (Print) BLAKE Initial BC

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler, Ice, Tape-custody seal, Date&Sign
Date Shipped July 18/19 Number of coolers ____
Shipper (Print) _____ Initial _____

Page 1 of 2

Bureau Veritas Laboratories
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel (902) 420-0203 Toll-free 800-563-5266 Fax (902) 420-8612 www.bvlabs.com

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B66064	BV Labs Job #	Bottle Order #
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9J7249	725413
Address	PO Box 549 Station Main	Address	340 Simpson Lane	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
	New Glasgow NS B2H 5E8		Pictou NS B0K 1X2	Project Name			
Phone	(902) 755-7178 Fax	Phone	(902) 755-7178 Fax	Site #		CA725413-01-01	Maryann Comeau
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Sampled By			

Regulatory Criteria

Special Instructions

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

	Sample Barcode Label	Sample Location/Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	TSS/VSS	Carbonaceous BOD	Chemical Oxygen Demand (COD)	Organic Halogen (Adsorbable)	Total Kjeldahl Nitrogen in Water	Phosphorus Total Colourimetry	Salinity	Dioxins/Furans in Water (EPS 1/RM/23)	PAH and PCB	Atlantic VOC in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1	SIDN442573	Point C						X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

* 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		
Michael Pidgeon	18/03/17	9:45 AM	[signature]				Time Sensitive ☐	Temperature (°C) on Receipt 6, 2, 6	Custody Seal Intact on Cooler? ☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Laboratories
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel (902) 420-0203 Toll-free 800-563-6266 Fax (902) 420-8612 www.bvlabs.com

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	BV Labs Job #	Bottle Order #
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B957249	725413
Address	PO Box 549 Station Main	Address	340 Simpson Lane	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
	New Glasgow NS B2H 5E8		Pictou NS B0K 1X2	Project Name		CY725413-01-02	Maryann Conrad
Phone	(902) 755-7178 Fax	Phone	(902) 755-7178 Fax	Site #			
Email	AP@northernpulp.com	Email	boat.harbour@tnoweb.ca	Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tap water/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	RBCA Hydrocarbons in Water	Phenols in Pulp and Paper Mill Effluents	Atlantic RCAp-MS (Includes Sodium)	Mercury - Total (CVAA,LL)	Sulphide (H2S)	Chlorate and Chlorite by IC	Total Cyanide	Resin and Fatty Acids			# of Bottles	Comments / Hazards / Other Required Analysis
1	S/C#442673	Point C						X	X	X	X	X	X	X	X				
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

* 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		
[signature] Mike Pidgeon	19/02/17	5:45 AM	[signature]				Time Sensitive ☐	Temperature (°C) on Receipt 6.26	Custody Seal Intact on Cooler? ☐ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: BV Labs Yellow: Client

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your C.O.C. #: 725413-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/08/15
Report #: R5840663
Version: 5 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: B9J7249
Received: 2019/07/17, 12:43

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/07/22	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/07/23	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/07/22	N/A	Auto Calc.
Carbonaceous BOD	1	2019/07/18	2019/07/23	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/07/23	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/07/18	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/07/23	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/07/19	2019/07/19	CAM SOP-00457	OMOE E3015 5 m
Conductance - water	1	N/A	2019/07/22	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/07/29	2019/07/29	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/07/23		
Hardness (calculated as CaCO3)	1	N/A	2019/07/23	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/07/18	2019/07/19	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/07/19	2019/07/22	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/07/24	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/07/23	N/A	Auto Calc.
Organic Halogen (Adsorbable) (2)	1	2019/07/22	2019/07/22	PTC SOP-00056	Coulometric - Titr.
Chlorate and Chlorite by IC (3)	1	N/A	2019/07/25	CAL SOP-00040	SM 23 4110D m
Resin and Fatty Acids (3)	1	2019/07/21	2019/07/22	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/07/22	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/07/23	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/07/23	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/07/24	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/07/19	2019/07/19	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/07/22	2019/07/23	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/07/23	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (4)	1	2019/07/23	2019/07/24		
pH (5)	1	N/A	2019/07/22	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	1	N/A	2019/07/24	ATL SOP 00021	SM 23 4500-P E m
Salinity (6)	1	N/A	2019/07/18		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/07/24	ATL SOP 00049	Auto Calc.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs - Partial Result

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your C.O.C. #: 725413-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/08/15
Report #: R5840663
Version: 5 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: B9J7249
Received: 2019/07/17, 12:43

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/07/24	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/07/23	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/07/24	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2019/07/22	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/07/24	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/07/20	2019/07/22	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (7)	1	N/A	2019/07/23	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/07/29	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/07/18	2019/07/22	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/07/19	2019/07/19	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/07/23	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/07/18	ATL SOP 00133	EPA 8260D R4 m
VPH in Water (PIRI)	1	N/A	2019/07/18	ATL SOP 00130	Atl. RBCA v3.1 m
Volatile Suspended Solids	1	N/A	2019/07/24	ATL SOP 00008	EPA 160.4 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

BV Labs - Partial Result

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your C.O.C. #: 725413-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/08/15
Report #: R5840663
Version: 5 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BV LABS JOB #: B9J7249
Received: 2019/07/17, 12:43

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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 Laboratories Mississauga
(2) This test was performed by Bedford to Edm Petrol Offsite
(3) This test was performed by Bedford to Calgary Offsite
(4) This test was performed by Bedford to Montreal Subcontrac
(5) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(6) Non-accredited test method
(7) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Neyousha Shahisavandi
Project Manager Assistant
15 Aug 2019 17:30:43

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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.

BV Labs - Partial Result

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	16.0	N/A	N/A	6234206
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	310	1.0	0.20	6234203
Calculated TDS	mg/L	950	1.0	0.20	6234210
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.4	1.0	0.20	6234203
Cation Sum	me/L	14.9	N/A	N/A	6234206
Hardness (CaCO3)	mg/L	100	1.0	1.0	6234204
Ion Balance (% Difference)	%	3.66	N/A	N/A	6234205
Langelier Index (@ 20C)	N/A	0.141			6234208
Langelier Index (@ 4C)	N/A	-0.105			6234209
Nitrate (N)	mg/L	ND	0.050	N/A	6234207
Saturation pH (@ 20C)	N/A	7.54			6234208
Saturation pH (@ 4C)	N/A	7.79			6234209
Sulphide (as H2S)	mg/L	1.7	0.021	0.011	6234421
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	310	25	N/A	6241631
Carbonaceous BOD	mg/L	22	7.4	N/A	6234155
Total Chemical Oxygen Demand	mg/L	490	20	N/A	6234153
Dissolved Chlorate (ClO3-)	mg/L	ND	0.10	N/A	6253454
Dissolved Chloride (Cl-)	mg/L	170	5.0	N/A	6241634
Dissolved Chlorite (CLO2-)	mg/L	ND	0.10	N/A	6253454
Colour	TCU	870	250	N/A	6241637
Total Kjeldahl Nitrogen (TKN)	mg/L	3.0	1.0	0.60	6239143
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	6241639
Nitrite (N)	mg/L	ND	0.010	N/A	6241640
Nitrogen (Ammonia Nitrogen)	mg/L	1.1	0.050	N/A	6236999
Total Organic Carbon (C)	mg/L	160 (1)	5.0	N/A	6241755
Orthophosphate (P)	mg/L	0.17	0.010	N/A	6241638
pH	pH	7.68	N/A	N/A	6237212
Total Phosphorus	mg/L	1.1	0.040	N/A	6235069

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Elevated reporting limit due to turbidity.

BV Labs - Partial Result

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	**Point C 17-JUL**	**RDL**	**MDL**	**QC Batch**
Salinity	N/A	ND	2.0	N/A	6234708
Reactive Silica (SiO2)	mg/L	9.1	0.50	N/A	6241636
Total Suspended Solids	mg/L	35	5.0	N/A	6236491
Dissolved Sulphate (SO4)	mg/L	240	10	N/A	6241635
Sulphide	mg/L	1.6	0.020	0.010	6240740
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6237819
Turbidity	NTU	27	0.10	0.10	6241629
Volatile Suspended Solids	mg/L	33	10	N/A	6244973
Conductivity	uS/cm	1500	1.0	N/A	6237312
Organic Halogens					
Adsorbable Organic Halogen	mg/L	1.15	0.25	N/A	6242775
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6242834

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

BV Labs - Partial Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	**Point C 17-JUL**	**RDL**	**MDL**	**QC Batch**
Metals					
Total Mercury (Hg)	ug/L	0.027	0.013	N/A	6234908

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

BV Labs - Partial Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	1300	5.0	N/A	6237086
Total Antimony (Sb)	ug/L	ND	1.0	N/A	6237086
Total Arsenic (As)	ug/L	1.1	1.0	N/A	6237086
Total Barium (Ba)	ug/L	330	1.0	N/A	6237086
Total Beryllium (Be)	ug/L	ND	1.0	N/A	6237086
Total Bismuth (Bi)	ug/L	ND	2.0	N/A	6237086
Total Boron (B)	ug/L	56	50	N/A	6237086
Total Cadmium (Cd)	ug/L	0.73	0.010	N/A	6237086
Total Calcium (Ca)	ug/L	32000	100	N/A	6237086
Total Chromium (Cr)	ug/L	2.3	1.0	N/A	6237086
Total Cobalt (Co)	ug/L	0.45	0.40	N/A	6237086
Total Copper (Cu)	ug/L	5.7	0.50	N/A	6237086
Total Iron (Fe)	ug/L	380	50	N/A	6237086
Total Lead (Pb)	ug/L	1.9	0.50	N/A	6237086
Total Magnesium (Mg)	ug/L	4500	100	N/A	6237086
Total Manganese (Mn)	ug/L	2200	2.0	N/A	6237086
Total Molybdenum (Mo)	ug/L	ND	2.0	N/A	6237086
Total Nickel (Ni)	ug/L	2.3	2.0	N/A	6237086
Total Phosphorus (P)	ug/L	1100	100	N/A	6237086
Total Potassium (K)	ug/L	13000	100	N/A	6237086
Total Selenium (Se)	ug/L	ND	1.0	N/A	6237086
Total Silver (Ag)	ug/L	0.28	0.10	N/A	6237086
Total Sodium (Na)	ug/L	290000	100	N/A	6237086
Total Strontium (Sr)	ug/L	130	2.0	N/A	6237086
Total Thallium (Tl)	ug/L	ND	0.10	N/A	6237086
Total Tin (Sn)	ug/L	ND	2.0	N/A	6237086
Total Titanium (Ti)	ug/L	8.7	2.0	N/A	6237086
Total Uranium (U)	ug/L	0.31	0.10	N/A	6237086
Total Vanadium (V)	ug/L	2.3	2.0	N/A	6237086
Total Zinc (Zn)	ug/L	91	5.0	N/A	6237086

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6236588
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6236588
Acenaphthene	ug/L	ND	0.010	N/A	6236588
Acenaphthylene	ug/L	ND	0.010	N/A	6236588
Anthracene	ug/L	ND	0.010	N/A	6236588
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6236588
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6236588
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6236588
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6234426
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6236588
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6236588
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6236588
Chrysene	ug/L	ND	0.010	N/A	6236588
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6236588
Fluoranthene	ug/L	0.050	0.010	N/A	6236588
Fluorene	ug/L	ND (1)	0.090	N/A	6236588
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6236588
Naphthalene	ug/L	ND	0.20	N/A	6236588
Perylene	ug/L	ND	0.010	N/A	6236588
Phenanthrene	ug/L	0.048	0.010	N/A	6236588
Pyrene	ug/L	ND (1)	0.020	N/A	6236588
Surrogate Recovery (%)					
D10-Anthracene	%	85			6236588
D14-Terphenyl	%	79			6236588
D8-Acenaphthylene	%	85			6236588

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated PAH RDL(s) due to matrix / co-extractive interference.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6234863
1,1-Dichloroethylene	ug/L	ND (1)	4.8	9.6	6234863
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6234863
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6234863
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6234863
Ethylene Dibromide	ug/L	ND	0.20	0.50	6234863
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6234863
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6234863
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6234863
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6234863
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6234863
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6234863
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6234863
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6234863
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6234863
Benzene	ug/L	ND	1.0	N/A	6234863
Bromodichloromethane	ug/L	ND	1.0	0.20	6234863
Bromoform	ug/L	ND	1.0	0.20	6234863
Bromomethane	ug/L	ND	0.50	N/A	6234863
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6234863
Chlorobenzene	ug/L	ND	1.0	N/A	6234863
Chloroethane	ug/L	ND	8.0	N/A	6234863
Chloroform	ug/L	ND	1.0	0.20	6234863
Chloromethane	ug/L	ND	8.0	N/A	6234863
Dibromochloromethane	ug/L	ND	1.0	0.20	6234863
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6234863
Ethylbenzene	ug/L	ND	1.0	N/A	6234863
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6234863
Styrene	ug/L	ND	1.0	N/A	6234863

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated VOC RDL(s) due to matrix interference.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
Tetrachloroethylene	ug/L	ND	1.0	N/A	6234863
Toluene	ug/L	ND	1.0	N/A	6234863
Trichloroethylene	ug/L	ND	1.0	N/A	6234863
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6234863
Vinyl Chloride	ug/L	ND	0.50	2.0	6234863
o-Xylene	ug/L	ND	1.0	N/A	6234863
p+m-Xylene	ug/L	ND	2.0	N/A	6234863
Total Xylenes	ug/L	ND	1.0	1.0	6234863
Total Trihalomethanes	ug/L	ND	1.0	N/A	6234863
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	97			6234863
D4-1,2-Dichloroethane	%	103			6234863
D8-Toluene	%	100			6234863

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6234163
Toluene	mg/L	ND	0.0010	N/A	6234163
Ethylbenzene	mg/L	ND	0.0010	N/A	6234163
Total Xylenes	mg/L	ND	0.0020	N/A	6234163
C6 - C10 (less BTEX)	mg/L	ND	0.10	N/A	6234163
>C10-C16 Hydrocarbons	mg/L	0.063	0.050	N/A	6252046
>C16-C21 Hydrocarbons	mg/L	0.083	0.050	N/A	6252046
>C21-<C32 Hydrocarbons	mg/L	0.16	0.10	N/A	6252046
Modified TPH (Tier1)	mg/L	0.31	0.10	N/A	6246481
Reached Baseline at C32	mg/L	Yes	N/A	N/A	6252046
Hydrocarbon Resemblance	mg/L	COMMENT (1)	N/A	N/A	6252046
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	84			6252046
n-Dotriacontane - Extractable	%	74 (2)			6252046
Isobutylbenzene - Volatile	%	91			6234163

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) One product in fuel / lube range.
(2) Silica gel clean-up performed prior to analysis as per client request.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6239717
Aroclor 1221	ug/L	ND	0.050	N/A	6239717
Aroclor 1232	ug/L	ND	0.050	N/A	6239717
Aroclor 1248	ug/L	ND	0.050	N/A	6239717
Aroclor 1242	ug/L	ND	0.050	N/A	6239717
Aroclor 1254	ug/L	ND	0.050	N/A	6239717
Aroclor 1260	ug/L	ND	0.050	N/A	6239717
Calculated Total PCB	ug/L	ND	0.050	N/A	6234427
Surrogate Recovery (%)					
Decachlorobiphenyl	%	16 (1)			6239717

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) PCB surrogate not within acceptance limits. Insufficient sample to repeat.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		KHI008			
Sampling Date		2019/07/17			
COC Number		725413-01-01			
Sample #		POINT C 17-JUL			
	UNITS	Point C 17-JUL	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	0.18	0.072	N/A	6253457
Total Resin Acids	mg/L	0.14	0.060	N/A	6253457
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND	0.0060	N/A	6253457
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6253457
Docosanoic acid (C22)	mg/L	0.12	0.0060	N/A	6253457
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6253457
Eicosanoic acid (C20)	mg/L	0.027	0.0060	N/A	6253457
Hexadecanoic acid (C16)	mg/L	0.014	0.0060	N/A	6253457
Linoleic acid (C18:2)	mg/L	ND	0.0060	N/A	6253457
Linolenic acid (C18:3)	mg/L	ND (1)	0.0060	N/A	6253457
Octadecanoic acid (C18)	mg/L	0.011	0.0060	N/A	6253457
Oleic acid (C18:1)	mg/L	0.010	0.0060	N/A	6253457
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6253457
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6253457
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6253457
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6253457
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6253457
Abietic acid	mg/L	0.025	0.0060	N/A	6253457
Dehydroabietic acid	mg/L	0.035 (1)	0.0060	N/A	6253457
Isopimaric acid	mg/L	0.042	0.0060	N/A	6253457
Neoabietic acid	mg/L	ND (1)	0.0060	N/A	6253457
Palustric acid	mg/L	ND (1)	0.0060	N/A	6253457
Pimaric acid	mg/L	0.025	0.0060	N/A	6253457
Sandaracopimaric acid	mg/L	0.0096	0.0060	N/A	6253457

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Matrix spike exceeds acceptance limits due to probable matrix interference.

BV Labs - Partial Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs - Partial/Rush Results

GENERAL COMMENTS

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

Package 1	4.7°C

Note: Sample is not Seawater

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6234153	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/07/18		99	%	80 - 120
6234153	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/07/18		99	%	80 - 120
6234153	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/07/18		102	%	80 - 120
6234153	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/07/18	ND, RDL=20		mg/L	
6234153	ZZH	RPD	Total Chemical Oxygen Demand	2019/07/18	NC		%	25
6234155	EBR	QC Standard	Carbonaceous BOD	2019/07/23		142 (1)	%	80 - 120
6234155	EBR	Spiked Blank	Carbonaceous BOD	2019/07/23		145 (2)	%	80 - 120
6234155	EBR	Method Blank	Carbonaceous BOD	2019/07/23	ND, RDL=5.0		mg/L	
6234155	EBR	RPD	Carbonaceous BOD	2019/07/23	0.18		%	25
6234163	THL	Matrix Spike	Isobutylbenzene - Volatile	2019/07/18		101	%	70 - 130
			Benzene	2019/07/18		103	%	70 - 130
			Toluene	2019/07/18		106	%	70 - 130
			Ethylbenzene	2019/07/18		107	%	70 - 130
			Total Xylenes	2019/07/18		102	%	70 - 130
6234163	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/07/18		102	%	70 - 130
			Benzene	2019/07/18		106	%	70 - 130
			Toluene	2019/07/18		108	%	70 - 130
			Ethylbenzene	2019/07/18		107	%	70 - 130
			Total Xylenes	2019/07/18		104	%	70 - 130
6234163	THL	Method Blank	Isobutylbenzene - Volatile	2019/07/18		102	%	70 - 130
			Benzene	2019/07/18	ND, RDL=0.0010		mg/L	
			Toluene	2019/07/18	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/07/18	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/07/18	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/07/18	ND, RDL=0.10		mg/L	
6234163	THL	RPD	Benzene	2019/07/18	NC		%	40
			Toluene	2019/07/18	NC		%	40
			Ethylbenzene	2019/07/18	NC		%	40
			Total Xylenes	2019/07/18	NC		%	40
			C6 - C10 (less BTEX)	2019/07/18	NC		%	40
6234708	BBD	QC Standard	Salinity	2019/07/18		99	%	80 - 120
6234708	BBD	Method Blank	Salinity	2019/07/18	ND, RDL=2.0		N/A	
6234708	BBD	RPD [KHI008-06]	Salinity	2019/07/18	NC		%	25
6234863	ASL	Matrix Spike	4-Bromofluorobenzene	2019/07/18		99 (3)	%	70 - 130
			D4-1,2-Dichloroethane	2019/07/18		107	%	70 - 130
			D8-Toluene	2019/07/18		95	%	70 - 130
			1,1-Dichloroethane	2019/07/18		105	%	70 - 130
			1,1-Dichloroethylene	2019/07/18		101	%	70 - 130
			1,1,1-Trichloroethane	2019/07/18		102	%	70 - 130
			1,1,2-Trichloroethane	2019/07/18		110	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/07/18		110	%	70 - 130
			Ethylene Dibromide	2019/07/18		113	%	70 - 130
			1,2-Dichlorobenzene	2019/07/18		97	%	70 - 130
			1,2-Dichloroethane	2019/07/18		102	%	70 - 130
			cis-1,2-Dichloroethylene	2019/07/18		101	%	70 - 130

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

BV Labs - Partial/Rush Results

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			trans-1,2-Dichloroethylene	2019/07/18		106	%	70 - 130
			1,2-Dichloropropane	2019/07/18		106	%	70 - 130
			1,3-Dichlorobenzene	2019/07/18		93	%	70 - 130
			cis-1,3-Dichloropropene	2019/07/18		114	%	70 - 130
			trans-1,3-Dichloropropene	2019/07/18		121	%	70 - 130
			1,4-Dichlorobenzene	2019/07/18		94	%	70 - 130
			Benzene	2019/07/18		95	%	70 - 130
			Bromodichloromethane	2019/07/18		98	%	70 - 130
			Bromoform	2019/07/18		103	%	70 - 130
			Bromomethane	2019/07/18		93	%	60 - 140
			Carbon Tetrachloride	2019/07/18		97	%	70 - 130
			Chlorobenzene	2019/07/18		99	%	70 - 130
			Chloroethane	2019/07/18		87	%	60 - 140
			Chloroform	2019/07/18		97	%	70 - 130
			Chloromethane	2019/07/18		73	%	60 - 140
			Dibromochloromethane	2019/07/18		106	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/07/18		107	%	70 - 130
			Ethylbenzene	2019/07/18		101	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/07/18		101	%	70 - 130
			Styrene	2019/07/18		110	%	70 - 130
			Tetrachloroethylene	2019/07/18		97	%	70 - 130
			Toluene	2019/07/18		100	%	70 - 130
			Trichloroethylene	2019/07/18		97	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/07/18		83	%	60 - 140
			Vinyl Chloride	2019/07/18		64	%	60 - 140
			o-Xylene	2019/07/18		99	%	70 - 130
			p+m-Xylene	2019/07/18		97	%	70 - 130
6234863	ASL	Spiked Blank	4-Bromofluorobenzene	2019/07/18		101	%	70 - 130
			D4-1,2-Dichloroethane	2019/07/18		100	%	70 - 130
			D8-Toluene	2019/07/18		98	%	70 - 130
			1,1-Dichloroethane	2019/07/18		104	%	70 - 130
			1,1-Dichloroethylene	2019/07/18		102	%	70 - 130
			1,1,1-Trichloroethane	2019/07/18		104	%	70 - 130
			1,1,2-Trichloroethane	2019/07/18		105	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/07/18		102	%	70 - 130
			Ethylene Dibromide	2019/07/18		106	%	70 - 130
			1,2-Dichlorobenzene	2019/07/18		97	%	70 - 130
			1,2-Dichloroethane	2019/07/18		96	%	70 - 130
			cis-1,2-Dichloroethylene	2019/07/18		99	%	70 - 130
			trans-1,2-Dichloroethylene	2019/07/18		106	%	70 - 130
			1,2-Dichloropropane	2019/07/18		105	%	70 - 130
			1,3-Dichlorobenzene	2019/07/18		95	%	70 - 130
			cis-1,3-Dichloropropene	2019/07/18		106	%	70 - 130
			trans-1,3-Dichloropropene	2019/07/18		106	%	70 - 130
			1,4-Dichlorobenzene	2019/07/18		95	%	70 - 130
			Benzene	2019/07/18		95	%	70 - 130
			Bromodichloromethane	2019/07/18		96	%	70 - 130
			Bromoform	2019/07/18		97	%	70 - 130
			Bromomethane	2019/07/18		88	%	60 - 140
			Carbon Tetrachloride	2019/07/18		99	%	70 - 130
			Chlorobenzene	2019/07/18		99	%	70 - 130
			Chloroethane	2019/07/18		87	%	60 - 140
			Chloroform	2019/07/18		96	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chloromethane	2019/07/18		71	%	60 - 140
			Dibromochloromethane	2019/07/18		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/07/18		102	%	70 - 130
			Ethylbenzene	2019/07/18		104	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/07/18		99	%	70 - 130
			Styrene	2019/07/18		111	%	70 - 130
			Tetrachloroethylene	2019/07/18		101	%	70 - 130
			Toluene	2019/07/18		102	%	70 - 130
			Trichloroethylene	2019/07/18		99	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/07/18		85	%	60 - 140
			Vinyl Chloride	2019/07/18		63	%	60 - 140
			o-Xylene	2019/07/18		101	%	70 - 130
			p+m-Xylene	2019/07/18		99	%	70 - 130
6234863	ASL	Method Blank	4-Bromofluorobenzene	2019/07/18		97	%	70 - 130
			D4-1,2-Dichloroethane	2019/07/18		100	%	70 - 130
			D8-Toluene	2019/07/18		101	%	70 - 130
			1,1-Dichloroethane	2019/07/18	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/07/18	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/07/18	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/07/18	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/07/18	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/07/18	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/07/18	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/07/18	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/07/18	ND, RDL=0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/07/18	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/07/18	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/07/18	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/07/18	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/07/18	ND, RDL=0.50		ug/L	
			1,4-Dichlorobenzene	2019/07/18	ND, RDL=1.0		ug/L	
			Benzene	2019/07/18	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/07/18	ND, RDL=1.0		ug/L	
			Bromoform	2019/07/18	ND, RDL=1.0		ug/L	
			Bromomethane	2019/07/18	ND, RDL=0.50		ug/L	

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbon Tetrachloride	2019/07/18	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/07/18	ND, RDL=1.0		ug/L	
			Chloroethane	2019/07/18	ND, RDL=8.0		ug/L	
			Chloroform	2019/07/18	ND, RDL=1.0		ug/L	
			Chloromethane	2019/07/18	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/07/18	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/07/18	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/07/18	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/07/18	ND, RDL=2.0		ug/L	
			Styrene	2019/07/18	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/07/18	ND, RDL=1.0		ug/L	
			Toluene	2019/07/18	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/07/18	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/07/18	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/07/18	ND, RDL=0.50		ug/L	
			o-Xylene	2019/07/18	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/07/18	ND, RDL=2.0		ug/L	
			Total Xylenes	2019/07/18	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/07/18	ND, RDL=1.0		ug/L	
6234863	ASL	RPD	1,1-Dichloroethane	2019/07/18	NC		%	40
			1,1-Dichloroethylene	2019/07/18	NC		%	40
			1,1,1-Trichloroethane	2019/07/18	NC		%	40
			1,1,2-Trichloroethane	2019/07/18	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/07/18	NC		%	40
			Ethylene Dibromide	2019/07/18	NC		%	40
			1,2-Dichlorobenzene	2019/07/18	NC		%	40
			1,2-Dichloroethane	2019/07/18	NC		%	40
			cis-1,2-Dichloroethylene	2019/07/18	NC		%	40
			trans-1,2-Dichloroethylene	2019/07/18	NC		%	40
			1,2-Dichloropropane	2019/07/18	NC		%	40
			1,3-Dichlorobenzene	2019/07/18	NC		%	40
			cis-1,3-Dichloropropene	2019/07/18	NC		%	40
			trans-1,3-Dichloropropene	2019/07/18	NC		%	40
			1,4-Dichlorobenzene	2019/07/18	NC		%	40
			Benzene	2019/07/18	NC		%	40

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

BV Labs - Partial/Rush Results

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Bromodichloromethane	2019/07/18	NC		%	40
			Bromoform	2019/07/18	NC		%	40
			Bromomethane	2019/07/18	NC		%	40
			Carbon Tetrachloride	2019/07/18	NC		%	40
			Chlorobenzene	2019/07/18	NC		%	40
			Chloroethane	2019/07/18	NC		%	40
			Chloroform	2019/07/18	6.2		%	40
			Chloromethane	2019/07/18	NC		%	40
			Dibromochloromethane	2019/07/18	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/07/18	NC		%	40
			Ethylbenzene	2019/07/18	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/07/18	NC		%	40
			Styrene	2019/07/18	NC		%	40
			Tetrachloroethylene	2019/07/18	NC		%	40
			Toluene	2019/07/18	2.1		%	40
			Trichloroethylene	2019/07/18	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/07/18	NC		%	40
			Vinyl Chloride	2019/07/18	NC		%	40
			o-Xylene	2019/07/18	NC		%	40
			p+m-Xylene	2019/07/18	NC		%	40
			Total Xylenes	2019/07/18	NC		%	40
			Total Trihalomethanes	2019/07/18	6.2		%	40
6234908	AYN	Matrix Spike	Total Mercury (Hg)	2019/07/19		103	%	80 - 120
6234908	AYN	Spiked Blank	Total Mercury (Hg)	2019/07/19		101	%	80 - 120
6234908	AYN	Method Blank	Total Mercury (Hg)	2019/07/19	ND, RDL=0.013		ug/L	
6234908	AYN	RPD	Total Mercury (Hg)	2019/07/19	NC		%	20
6235069	MCN	Matrix Spike	Total Phosphorus	2019/07/22		113	%	80 - 120
6235069	MCN	Spiked Blank	Total Phosphorus	2019/07/22		107	%	80 - 120
6235069	MCN	Method Blank	Total Phosphorus	2019/07/22	ND, RDL=0.020		mg/L	
6235069	MCN	RPD	Total Phosphorus	2019/07/22	5.0		%	25
6236491	AM6	QC Standard	Total Suspended Solids	2019/07/19		99	%	80 - 120
6236491	AM6	Method Blank	Total Suspended Solids	2019/07/19	ND, RDL=1.0		mg/L	
6236491	AM6	RPD [KHI008-01]	Total Suspended Solids	2019/07/19	9.0		%	20
6236588	KKE	Matrix Spike	D10-Anthracene	2019/07/19		82	%	50 - 130
			D14-Terphenyl	2019/07/19		81	%	50 - 130
			D8-Acenaphthylene	2019/07/19		84	%	50 - 130
			1-Methylnaphthalene	2019/07/19		82	%	50 - 130
			2-Methylnaphthalene	2019/07/19		84	%	50 - 130
			Acenaphthene	2019/07/19		83	%	50 - 130
			Acenaphthylene	2019/07/19		94	%	50 - 130
			Anthracene	2019/07/19		85	%	50 - 130
			Benzo(a)anthracene	2019/07/19		88	%	50 - 130
			Benzo(a)pyrene	2019/07/19		80	%	50 - 130
			Benzo(b)fluoranthene	2019/07/19		85	%	50 - 130
			Benzo(g,h,i)perylene	2019/07/19		74	%	50 - 130
			Benzo(j)fluoranthene	2019/07/19		79	%	50 - 130
			Benzo(k)fluoranthene	2019/07/19		75	%	50 - 130
			Chrysene	2019/07/19		95	%	50 - 130
			Dibenz(a,h)anthracene	2019/07/19		73	%	50 - 130
			Fluoranthene	2019/07/19		93	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs - Partial/Rush Results

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Fluorene	2019/07/19		92	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/07/19		73	%	50 - 130
			Naphthalene	2019/07/19		87	%	50 - 130
			Perylene	2019/07/19		78	%	50 - 130
			Phenanthrene	2019/07/19		91	%	50 - 130
			Pyrene	2019/07/19		91	%	50 - 130
6236588	KKE	Spiked Blank	D10-Anthracene	2019/07/19		85	%	50 - 130
			D14-Terphenyl	2019/07/19		87	%	50 - 130
			D8-Acenaphthylene	2019/07/19		83	%	50 - 130
			1-Methylnaphthalene	2019/07/19		96	%	50 - 130
			2-Methylnaphthalene	2019/07/19		99	%	50 - 130
			Acenaphthene	2019/07/19		100	%	50 - 130
			Acenaphthylene	2019/07/19		101	%	50 - 130
			Anthracene	2019/07/19		94	%	50 - 130
			Benzo(a)anthracene	2019/07/19		90	%	50 - 130
			Benzo(a)pyrene	2019/07/19		92	%	50 - 130
			Benzo(b)fluoranthene	2019/07/19		98	%	50 - 130
			Benzo(g,h,i)perylene	2019/07/19		93	%	50 - 130
			Benzo(j)fluoranthene	2019/07/19		91	%	50 - 130
			Benzo(k)fluoranthene	2019/07/19		86	%	50 - 130
			Chrysene	2019/07/19		103	%	50 - 130
			Dibenz(a,h)anthracene	2019/07/19		75	%	50 - 130
			Fluoranthene	2019/07/19		100	%	50 - 130
			Fluorene	2019/07/19		105	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/07/19		88	%	50 - 130
			Naphthalene	2019/07/19		103	%	50 - 130
			Perylene	2019/07/19		90	%	50 - 130
			Phenanthrene	2019/07/19		109	%	50 - 130
			Pyrene	2019/07/19		100	%	50 - 130
6236588	KKE	Method Blank	D10-Anthracene	2019/07/19		92	%	50 - 130
			D14-Terphenyl	2019/07/19		93	%	50 - 130
			D8-Acenaphthylene	2019/07/19		89	%	50 - 130
			1-Methylnaphthalene	2019/07/19	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/07/19	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/07/19	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/07/19	ND, RDL=0.010		ug/L	
			Anthracene	2019/07/19	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/07/19	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/07/19	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/07/19	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2019/07/19	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/07/19	ND, RDL=0.010		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(k)fluoranthene	2019/07/19	ND, RDL=0.010		ug/L	
			Chrysene	2019/07/19	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/07/19	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/07/19	ND, RDL=0.010		ug/L	
			Fluorene	2019/07/19	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/07/19	ND, RDL=0.010		ug/L	
			Naphthalene	2019/07/19	ND, RDL=0.20		ug/L	
			Perylene	2019/07/19	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/07/19	ND, RDL=0.010		ug/L	
			Pyrene	2019/07/19	ND, RDL=0.010		ug/L	
6236588	KKE	RPD [KHI008-08]	1-Methylnaphthalene	2019/07/19	NC		%	40
			2-Methylnaphthalene	2019/07/19	NC		%	40
			Acenaphthene	2019/07/19	NC		%	40
			Acenaphthylene	2019/07/19	NC		%	40
			Anthracene	2019/07/19	NC		%	40
			Benzo(a)anthracene	2019/07/19	NC		%	40
			Benzo(a)pyrene	2019/07/19	NC		%	40
			Benzo(b)fluoranthene	2019/07/19	NC		%	40
			Benzo(g,h,i)perylene	2019/07/19	NC		%	40
			Benzo(j)fluoranthene	2019/07/19	NC		%	40
			Benzo(k)fluoranthene	2019/07/19	NC		%	40
			Chrysene	2019/07/19	NC		%	40
			Dibenz(a,h)anthracene	2019/07/19	NC		%	40
			Fluoranthene	2019/07/19	3.1		%	40
			Fluorene	2019/07/19	NC (4)		%	40
			Indeno(1,2,3-cd)pyrene	2019/07/19	NC		%	40
			Naphthalene	2019/07/19	NC		%	40
			Perylene	2019/07/19	NC		%	40
			Phenanthrene	2019/07/19	0.21		%	40
			Pyrene	2019/07/19	NC (4)		%	40
6236999	MCN	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/07/22		94	%	80 - 120
6236999	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/07/22		96	%	80 - 120
6236999	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/07/22	ND, RDL=0.050		mg/L	
6236999	MCN	RPD	Nitrogen (Ammonia Nitrogen)	2019/07/22	NC		%	20
6237086	BAN	Matrix Spike	Total Aluminum (Al)	2019/07/22		102	%	80 - 120
			Total Antimony (Sb)	2019/07/22		104	%	80 - 120
			Total Arsenic (As)	2019/07/22		100	%	80 - 120
			Total Barium (Ba)	2019/07/22		NC	%	80 - 120
			Total Beryllium (Be)	2019/07/22		103	%	80 - 120
			Total Bismuth (Bi)	2019/07/22		102	%	80 - 120
			Total Boron (B)	2019/07/22		106	%	80 - 120
			Total Cadmium (Cd)	2019/07/22		102	%	80 - 120

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Calcium (Ca)	2019/07/22		NC	%	80 - 120
			Total Chromium (Cr)	2019/07/22		99	%	80 - 120
			Total Cobalt (Co)	2019/07/22		100	%	80 - 120
			Total Copper (Cu)	2019/07/22		99	%	80 - 120
			Total Iron (Fe)	2019/07/22		106	%	80 - 120
			Total Lead (Pb)	2019/07/22		103	%	80 - 120
			Total Magnesium (Mg)	2019/07/22		102	%	80 - 120
			Total Manganese (Mn)	2019/07/22		NC	%	80 - 120
			Total Molybdenum (Mo)	2019/07/22		104	%	80 - 120
			Total Nickel (Ni)	2019/07/22		101	%	80 - 120
			Total Phosphorus (P)	2019/07/22		108	%	80 - 120
			Total Potassium (K)	2019/07/22		107	%	80 - 120
			Total Selenium (Se)	2019/07/22		101	%	80 - 120
			Total Silver (Ag)	2019/07/22		102	%	80 - 120
			Total Sodium (Na)	2019/07/22		101	%	80 - 120
			Total Strontium (Sr)	2019/07/22		NC	%	80 - 120
			Total Thallium (Tl)	2019/07/22		104	%	80 - 120
			Total Tin (Sn)	2019/07/22		104	%	80 - 120
			Total Titanium (Ti)	2019/07/22		102	%	80 - 120
			Total Uranium (U)	2019/07/22		108	%	80 - 120
			Total Vanadium (V)	2019/07/22		100	%	80 - 120
			Total Zinc (Zn)	2019/07/22		99	%	80 - 120
6237086	BAN	Spiked Blank	Total Aluminum (Al)	2019/07/22		105	%	80 - 120
			Total Antimony (Sb)	2019/07/22		104	%	80 - 120
			Total Arsenic (As)	2019/07/22		99	%	80 - 120
			Total Barium (Ba)	2019/07/22		101	%	80 - 120
			Total Beryllium (Be)	2019/07/22		102	%	80 - 120
			Total Bismuth (Bi)	2019/07/22		101	%	80 - 120
			Total Boron (B)	2019/07/22		111	%	80 - 120
			Total Cadmium (Cd)	2019/07/22		98	%	80 - 120
			Total Calcium (Ca)	2019/07/22		107	%	80 - 120
			Total Chromium (Cr)	2019/07/22		99	%	80 - 120
			Total Cobalt (Co)	2019/07/22		100	%	80 - 120
			Total Copper (Cu)	2019/07/22		100	%	80 - 120
			Total Iron (Fe)	2019/07/22		106	%	80 - 120
			Total Lead (Pb)	2019/07/22		102	%	80 - 120
			Total Magnesium (Mg)	2019/07/22		105	%	80 - 120
			Total Manganese (Mn)	2019/07/22		102	%	80 - 120
			Total Molybdenum (Mo)	2019/07/22		104	%	80 - 120
			Total Nickel (Ni)	2019/07/22		102	%	80 - 120
			Total Phosphorus (P)	2019/07/22		105	%	80 - 120
			Total Potassium (K)	2019/07/22		106	%	80 - 120
			Total Selenium (Se)	2019/07/22		100	%	80 - 120
			Total Silver (Ag)	2019/07/22		101	%	80 - 120
			Total Sodium (Na)	2019/07/22		102	%	80 - 120
			Total Strontium (Sr)	2019/07/22		99	%	80 - 120
			Total Thallium (Tl)	2019/07/22		104	%	80 - 120
			Total Tin (Sn)	2019/07/22		104	%	80 - 120
			Total Titanium (Ti)	2019/07/22		101	%	80 - 120
			Total Uranium (U)	2019/07/22		107	%	80 - 120
			Total Vanadium (V)	2019/07/22		100	%	80 - 120
			Total Zinc (Zn)	2019/07/22		99	%	80 - 120

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs - Partial/Rush Results

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6237086	BAN	Method Blank	Total Aluminum (Al)	2019/07/22	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/07/22	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/07/22	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/07/22	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/07/22	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/07/22	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/07/22	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/07/22	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/07/22	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/07/22	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/07/22	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/07/22	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/07/22	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/07/22	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/07/22	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/07/22	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/07/22	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/07/22	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/07/22	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/07/22	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/07/22	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/07/22	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/07/22	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/07/22	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/07/22	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/07/22	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/07/22	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs - Partial/Rush Results

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Uranium (U)	2019/07/22	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/07/22	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/07/22	ND, RDL=5.0		ug/L	
6237086	BAN	RPD	Total Aluminum (Al)	2019/07/22	6.9		%	20
			Total Antimony (Sb)	2019/07/22	NC		%	20
			Total Arsenic (As)	2019/07/22	2.2		%	20
			Total Barium (Ba)	2019/07/22	2.6		%	20
			Total Boron (B)	2019/07/22	NC		%	20
			Total Cadmium (Cd)	2019/07/22	NC		%	20
			Total Chromium (Cr)	2019/07/22	16		%	20
			Total Iron (Fe)	2019/07/22	0.52		%	20
			Total Lead (Pb)	2019/07/22	NC		%	20
			Total Manganese (Mn)	2019/07/22	0.60		%	20
			Total Selenium (Se)	2019/07/22	NC		%	20
			Total Sodium (Na)	2019/07/22	0.44		%	20
			Total Uranium (U)	2019/07/22	NC		%	20
			Total Zinc (Zn)	2019/07/22	16		%	20
6237212	EMT	QC Standard	pH	2019/07/22		100	%	97 - 103
6237212	EMT	RPD	pH	2019/07/22	0.57		%	N/A
6237312	EMT	Spiked Blank	Conductivity	2019/07/22		103	%	80 - 120
6237312	EMT	Method Blank	Conductivity	2019/07/22	ND, RDL=1.0		uS/cm	
6237312	EMT	RPD	Conductivity	2019/07/22	1.2		%	10
6237819	GTO	Matrix Spike	Total Cyanide (CN)	2019/07/19		97	%	80 - 120
6237819	GTO	Spiked Blank	Total Cyanide (CN)	2019/07/19		98	%	80 - 120
6237819	GTO	Method Blank	Total Cyanide (CN)	2019/07/19	ND, RDL=0.0050		mg/L	
6237819	GTO	RPD	Total Cyanide (CN)	2019/07/19	NC		%	20
6239143	SSV	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2019/07/22		104	%	80 - 120
6239143	SSV	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/07/22		105	%	80 - 120
6239143	SSV	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/07/22		100	%	80 - 120
6239143	SSV	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/07/22	ND, RDL=0.10		mg/L	
6239143	SSV	RPD	Total Kjeldahl Nitrogen (TKN)	2019/07/22	2.2		%	20
6239717	RGE	Spiked Blank	Decachlorobiphenyl	2019/07/23		63	%	30 - 130
			Aroclor 1254	2019/07/23		88	%	70 - 130
6239717	RGE	Method Blank	Decachlorobiphenyl	2019/07/23		91	%	30 - 130
			Aroclor 1016	2019/07/23	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/07/23	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/07/23	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/07/23	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/07/23	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/07/23	ND, RDL=0.050		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

BV Labs - Partial/Rush Results

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Aroclor 1260	2019/07/23	ND, RDL=0.050		ug/L	
6239717	RGE	RPD [KHI008-09]	Aroclor 1016	2019/07/23	NC		%	40
			Aroclor 1221	2019/07/23	NC		%	40
			Aroclor 1232	2019/07/23	NC		%	40
			Aroclor 1248	2019/07/23	NC		%	40
			Aroclor 1242	2019/07/23	NC		%	40
			Aroclor 1254	2019/07/23	NC		%	40
			Aroclor 1260	2019/07/23	NC		%	40
6240740	NYS	Matrix Spike	Sulphide	2019/07/22		89	%	80 - 120
6240740	NYS	Spiked Blank	Sulphide	2019/07/22		96	%	80 - 120
6240740	NYS	Method Blank	Sulphide	2019/07/22	ND, RDL=0.020		mg/L	
6240740	NYS	RPD	Sulphide	2019/07/22	NC		%	20
6241629	EMT	QC Standard	Turbidity	2019/07/23		104	%	80 - 120
6241629	EMT	Spiked Blank	Turbidity	2019/07/23		102	%	80 - 120
6241629	EMT	Method Blank	Turbidity	2019/07/23	ND, RDL=0.10		NTU	
6241629	EMT	RPD	Turbidity	2019/07/23	NC		%	20
6241631	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/07/23		97	%	80 - 120
6241631	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/07/23		110	%	80 - 120
6241631	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/07/23	ND, RDL=5.0		mg/L	
6241631	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/07/23	9.1		%	25
6241634	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/07/23		99	%	80 - 120
6241634	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/07/23		100	%	80 - 120
6241634	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/07/23	ND, RDL=1.0		mg/L	
6241634	SRM	RPD	Dissolved Chloride (Cl-)	2019/07/23	0.25		%	25
6241635	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/07/23		NC	%	80 - 120
6241635	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/07/23		99	%	80 - 120
6241635	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/07/23	ND, RDL=2.0		mg/L	
6241635	SRM	RPD	Dissolved Sulphate (SO4)	2019/07/23	0.94		%	25
6241636	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/07/23		94	%	80 - 120
6241636	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/07/23		99	%	80 - 120
6241636	SRM	Method Blank	Reactive Silica (SiO2)	2019/07/23	ND, RDL=0.50		mg/L	
6241636	SRM	RPD	Reactive Silica (SiO2)	2019/07/23	1.1		%	25
6241637	SRM	Spiked Blank	Colour	2019/07/23		104	%	80 - 120
6241637	SRM	Method Blank	Colour	2019/07/23	ND, RDL=5.0		TCU	
6241637	SRM	RPD	Colour	2019/07/23	3.4		%	20
6241638	SRM	Matrix Spike	Orthophosphate (P)	2019/07/24		88	%	80 - 120
6241638	SRM	Spiked Blank	Orthophosphate (P)	2019/07/24		94	%	80 - 120
6241638	SRM	Method Blank	Orthophosphate (P)	2019/07/24	ND, RDL=0.010		mg/L	
6241638	SRM	RPD	Orthophosphate (P)	2019/07/24	NC		%	25
6241639	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/07/23		86	%	80 - 120
6241639	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/07/23		88	%	80 - 120
6241639	SRM	Method Blank	Nitrate + Nitrite (N)	2019/07/23	ND, RDL=0.050		mg/L	
6241639	SRM	RPD	Nitrate + Nitrite (N)	2019/07/23	NC		%	25

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6241640	SRM	Matrix Spike	Nitrite (N)	2019/07/23		91	%	80 - 120
6241640	SRM	Spiked Blank	Nitrite (N)	2019/07/23		98	%	80 - 120
6241640	SRM	Method Blank	Nitrite (N)	2019/07/23	ND, RDL=0.010		mg/L	
6241640	SRM	RPD	Nitrite (N)	2019/07/23	NC		%	20
6241755	SSI	Matrix Spike	Total Organic Carbon (C)	2019/07/23		102	%	85 - 115
6241755	SSI	Spiked Blank	Total Organic Carbon (C)	2019/07/23		102	%	80 - 120
6241755	SSI	Method Blank	Total Organic Carbon (C)	2019/07/23	ND, RDL=0.50		mg/L	
6241755	SSI	RPD	Total Organic Carbon (C)	2019/07/23	NC		%	15
6244973	AM6	QC Standard	Volatile Suspended Solids	2019/07/24		87	%	80 - 120
6244973	AM6	Method Blank	Volatile Suspended Solids	2019/07/24	ND, RDL=2.0		mg/L	
6244973	AM6	RPD [KHI008-01]	Volatile Suspended Solids	2019/07/24	3.0		%	25
6252046	MGN	Spiked Blank	Isobutylbenzene - Extractable	2019/07/29		86	%	70 - 130
			n-Dotriacontane - Extractable	2019/07/29		84	%	70 - 130
			>C10-C16 Hydrocarbons	2019/07/29		99	%	70 - 130
			>C16-C21 Hydrocarbons	2019/07/29		88	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/07/29		103	%	70 - 130
6252046	MGN	Method Blank	Isobutylbenzene - Extractable	2019/07/29		79	%	70 - 130
			n-Dotriacontane - Extractable	2019/07/29		71	%	70 - 130
			>C10-C16 Hydrocarbons	2019/07/29	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/07/29	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/07/29	ND, RDL=0.10		mg/L	
6253454	PR6	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/07/25		110	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/07/25		107	%	80 - 120
6253454	PR6	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/07/25		100	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/07/25		99	%	80 - 120
6253454	PR6	Method Blank	Dissolved Chlorate (ClO3-)	2019/07/25	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/07/25	ND, RDL=0.10		mg/L	
6253454	PR6	RPD	Dissolved Chlorate (ClO3-)	2019/07/25	NC		%	20
			Dissolved Chlorite (CLO2-)	2019/07/25	NC		%	20
6253457	SJ1	Matrix Spike [KHI008-21]	9,10-Dichlorostearic acid	2019/07/22		98	%	50 - 130
			Decanoic Acid (C10)	2019/07/22		81	%	50 - 130
			Docosanoic acid (C22)	2019/07/22		NC	%	50 - 130
			Dodecanoic acid (C12)	2019/07/22		85	%	50 - 130
			Eicosanoic acid (C20)	2019/07/22		90	%	50 - 130
			Hexadecanoic acid (C16)	2019/07/22		86	%	50 - 130
			Linoleic acid (C18:2)	2019/07/22		57	%	50 - 130
			Linolenic acid (C18:3)	2019/07/22		44 (2)	%	50 - 130
			Octadecanoic acid (C18)	2019/07/22		87	%	50 - 130
			Oleic acid (C18:1)	2019/07/22		77	%	50 - 130
			Tetradecanoic acid (C14)	2019/07/22		85	%	50 - 130
			Undecanoic acid (C11)	2019/07/22		91	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/07/22		104	%	50 - 130
			12-Chlorodehydroabietic acid	2019/07/22		99	%	50 - 130
			14-Chlorodehydroabietic acid	2019/07/22		102	%	50 - 130
			Abietic acid	2019/07/22		71	%	50 - 130

BV Labs - Partial Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dehydroabietic acid	2019/07/22		140 (2)	%	50 - 130
			Isopimaric acid	2019/07/22		86	%	50 - 130
			Neoabietic acid	2019/07/22		26 (2)	%	50 - 130
			Palustric acid	2019/07/22		0.16 (2)	%	50 - 130
			Pimaric acid	2019/07/22		91	%	50 - 130
			Sandaracopimaric acid	2019/07/22		85	%	50 - 130
6253457	SJ1	Spiked Blank	9,10-Dichlorostearic acid	2019/07/22		93	%	50 - 130
			Decanoic Acid (C10)	2019/07/22		84	%	50 - 130
			Docosanoic acid (C22)	2019/07/22		87	%	50 - 130
			Dodecanoic acid (C12)	2019/07/22		85	%	50 - 130
			Eicosanoic acid (C20)	2019/07/22		91	%	50 - 130
			Hexadecanoic acid (C16)	2019/07/22		91	%	50 - 130
			Linoleic acid (C18:2)	2019/07/22		87	%	50 - 130
			Linolenic acid (C18:3)	2019/07/22		84	%	50 - 130
			Octadecanoic acid (C18)	2019/07/22		98	%	50 - 130
			Oleic acid (C18:1)	2019/07/22		93	%	50 - 130
			Tetradecanoic acid (C14)	2019/07/22		85	%	50 - 130
			Undecanoic acid (C11)	2019/07/22		93	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/07/22		99	%	50 - 130
			12-Chlorodehydroabietic acid	2019/07/22		94	%	50 - 130
			14-Chlorodehydroabietic acid	2019/07/22		98	%	50 - 130
			Abietic acid	2019/07/22		82	%	50 - 130
			Dehydroabietic acid	2019/07/22		112	%	50 - 130
			Isopimaric acid	2019/07/22		102	%	50 - 130
			Neoabietic acid	2019/07/22		63	%	50 - 130
			Palustric acid	2019/07/22		81	%	50 - 130
			Pimaric acid	2019/07/22		94	%	50 - 130
			Sandaracopimaric acid	2019/07/22		91	%	50 - 130
6253457	SJ1	Method Blank	Total Fatty Acids	2019/07/22	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/07/22	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/07/22	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/07/22	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/07/22	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/07/22	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/07/22	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/07/22	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/07/22	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/07/22	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/07/22	ND, RDL=0.0060		mg/L	

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Tetradecanoic acid (C14)	2019/07/22	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/07/22	ND, RDL=0.0060		mg/L	
			12,14-Dichlorodehydroabietic acid	2019/07/22	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/07/22	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/07/22	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/07/22	ND, RDL=0.0060		mg/L	
6253457	SJ1	RPD [KHI008-21]	Total Fatty Acids	2019/07/22	2.2		%	30
			Total Resin Acids	2019/07/22	0.51		%	30
			9,10-Dichlorostearic acid	2019/07/22	NC		%	30
			Decanoic Acid (C10)	2019/07/22	NC		%	30
			Docosanoic acid (C22)	2019/07/22	3.3		%	30
			Dodecanoic acid (C12)	2019/07/22	NC		%	30
			Eicosanoic acid (C20)	2019/07/22	2.6		%	30
			Hexadecanoic acid (C16)	2019/07/22	3.7		%	30
			Linoleic acid (C18:2)	2019/07/22	NC		%	30
			Linolenic acid (C18:3)	2019/07/22	NC		%	30
			Octadecanoic acid (C18)	2019/07/22	0		%	30
			Oleic acid (C18:1)	2019/07/22	0.97		%	30
			Tetradecanoic acid (C14)	2019/07/22	NC		%	30
			Undecanoic acid (C11)	2019/07/22	NC		%	30
			12,14-Dichlorodehydroabietic acid	2019/07/22	NC		%	30
			12-Chlorodehydroabietic acid	2019/07/22	NC		%	30
			14-Chlorodehydroabietic acid	2019/07/22	NC		%	30
			Abietic acid	2019/07/22	2.4		%	30
			Dehydroabietic acid	2019/07/22	0.28		%	30
			Isopimaric acid	2019/07/22	0.48		%	30
			Neoabietic acid	2019/07/22	NC		%	30
			Palustric acid	2019/07/22	NC		%	30
			Pimaric acid	2019/07/22	0.41		%	30

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Sandaracopimaric acid	2019/07/22	1.0		%	30

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) BOD Analysis: Reference Material and Second source QC recoveries were high which may indicate a high bias in results.

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

(3) VOC sample contained sediment.

(4) Elevated PAH RDL(s) due to matrix / co-extractive interference.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9J7249
Report Date: 2019/08/15

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Site Location: POINT C, EFFLUENT SAMPLING
Your P.O. #: 43013552

VALIDATION SIGNATURE PAGE

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

Brad Newman, Scientific Service Specialist

Harry (Peng) Liang, Senior Analyst

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Gayle Simpson, Senior Analyst

Eric Dearman, Scientific Specialist

Mike MacGillivray, Scientific Specialist (Inorganics)

Rosemarie MacDonald, Scientific Specialist (Organics)

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.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs - Partial/Rush Results

VALIDATION SIGNATURE PAGE(CONT'D)

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

For Service Group specific validation please refer to the Validation Signature Page.

BV Labs - Partial/Rush Results

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Bureau Veritas Laboratories
200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.bvlabs.com

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	BV Labs Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B9J7249	725413
Address	PO Box 549 Station Main	Address	340 Simpson Lane	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
	New Glasgow NS B2H 5E8		Pictou NS B0K 1X2	Project Name		C#725413-01-01	Maryann Comeau
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Site #			
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	TSS/VSS	Carbonaceous BOD	Chemical Oxygen Demand (COD)	Organic Halogen (Adsorbable)	Total Kjeldahl Nitrogen in Water	Phosphorus Total Colourimetry	Salinity	Dioxins/Furans in Water (EPS 1/RM/23)	PAH and PCB	Atlantic VOC in Water	# of Bottles	Comments / Hazards / Other Required Analysis
1	SID#442673	Point C						X	X	X	X	X	X	X	X	X	X		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

2019 JUN 17 12:45

* 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?
Mike Pidgeon	19/07/17	9:45 AM						6, 2, 6	Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: BV Labs Yellow: Client

Bureau Veritas Laboratories
200 Bluewater Road, Bedford. Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-free:800-563-6266 Fax:(902) 420-8612 www.bvlabs.com

Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#22435 Northern Pulp N.S.	Company Name	#11067 Northern Pulp N.S.	Quotation #	B86064	BV Labs Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Michael Pidgeon	P.O. #		B957249	725413
Address	PO Box 549 Station Main	Address	340 Simpson Lane	Project #	Effluent Treatment Plant	Chain Of Custody Record	Project Manager
	New Glasgow NS B2H 5E8		Pictou NS B0K 1X2	Project Name		C#725413-01-02	Maryann Comeau
Phone	(902) 755-7178 Fax:	Phone	(902) 755-7178 Fax:	Site #			
Email	AP@northernpulp.com	Email	boat.harbour@tncweb.ca	Sampled By			

Regulatory Criteria:

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	RBCA Hydrocarbons in Water	Phenols in Pulp and Paper Mill Effluents	Atlantic RCAp-MS (Includes Sodium)	Mercury - Total (CVAA,LL)	Sulphide (H2S)	Chlorate and Chlorite by IC	Total Cyanide	Resin and Fatty Acids			# of Bottles	Comments / Hazards / Other Required Analysis
1	SID#442673	Point C						X	X	X	X	X	X	X	X				
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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:

2019 JUL 17 12:47

* 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?
Mike Pidgeon	19/07/17	9:45 AM						6.2.6	Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: BV Labs Yellow: Client

Caribou Seawater

Northern Pulp Nova Scotia Corporation
Focus Report
October 2019 | 17-6461

DILLON CONSULTING

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715282-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/27
Report #: R5774605
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4451
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/06/20	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/06/18	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/06/03	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/30	2019/06/04	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/06/19	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/30	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/06/18	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/06/05	2019/06/07	CAM SOP-00457	OMOE E3015 5 m
Dioxins/Furans in Water (EPS 1/RM/23) (1, 5)	1	2019/06/06	2019/06/12	BRL SOP-00406 (mod)	EPS 1/RM/23 m
Organic carbon - Diss (DOC) (6)	1	N/A	2019/06/05	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/06/19	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/05/30	2019/05/30	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/06/03		
Hardness (calculated as CaCO3)	1	N/A	2019/05/31	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/31	2019/05/31	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/30	2019/05/31	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/06/20	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/06/20	N/A	Auto Calc.
Chlorate and Chlorite by IC (2)	1	N/A	2019/06/06	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (3)	1	N/A	2019/06/03	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (2)	1	2019/05/31	2019/06/01	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/06/06	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/06/18	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/06/18	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/06/19	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/31	2019/06/01	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/06/04	2019/06/05	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/06/05	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (4)	1	2019/06/01	2019/06/05		
pH (7)	1	N/A	2019/06/19	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	1	N/A	2019/06/18	ATL SOP 00021	SM 23 4500-P E m

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715282-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/27
Report #: R5774605
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4451
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VPH in Water (PIRI)	1	N/A	2019/06/02	ATL SOP 00118	Atl. RBCA v3.1 m
Salinity (8)	1	N/A	2019/06/18		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/06/20	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/06/20	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/06/19	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/06/19	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2019/06/03	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/06/19	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/06/01	2019/06/04	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (6)	1	N/A	2019/06/07	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/06/03	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/06/05	2019/06/06	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/31	2019/06/03	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/06/19	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/30	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/06/04	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715282-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/27
Report #: R5774605
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4451
Received: 2019/05/29, 12:45

dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Calgary Offsite
(3) This test was performed by Bedford to Burnaby - Offsite
(4) This test was performed by Bedford to Montreal Subcontrac
(5) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(6) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(7) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(8) Non-accredited test method

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9E4451
Report Date: 2019/06/27

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	480	N/A	N/A	6147444
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	89	1.0	0.20	6147433
Calculated TDS	mg/L	27000	1.0	0.20	6147453
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	6147433
Cation Sum	me/L	465	N/A	N/A	6147444
Hardness (CaCO3)	mg/L	5000	1.0	1.0	6147440
Ion Balance (% Difference)	%	1.62	N/A	N/A	6147442
Langelier Index (@ 20C)	N/A	0.162			6147449
Langelier Index (@ 4C)	N/A	-0.0760			6147451
Nitrate (N)	mg/L	ND	0.050	N/A	6147446
Saturation pH (@ 20C)	N/A	7.39			6147449
Saturation pH (@ 4C)	N/A	7.63			6147451
Sulphide (as H2S)	mg/L	ND	0.021	0.011	6147649
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	90	5.0	N/A	6182160
Carbonaceous BOD	mg/L	ND (1)	10	N/A	6148701
Total Chemical Oxygen Demand	mg/L	1500	200	N/A	6148620
Dissolved Chlorate (ClO3-)	mg/L	ND (2)	5.0	N/A	6165901
Dissolved Chloride (Cl-)	mg/L	16000	500	N/A	6182167
Dissolved Chlorite (CLO2-)	mg/L	ND (2)	5.0	N/A	6165901
Colour	TCU	7.6	5.0	N/A	6182170
Total Kjeldahl Nitrogen (TKN)	mg/L	0.19	0.10	0.060	6153709
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	6182172
Nitrite (N)	mg/L	ND	0.010	N/A	6182173
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	N/A	6159706
Dissolved Organic Carbon (C)	mg/L	2.3	0.50	N/A	6158927
Total Organic Carbon (C)	mg/L	2.5	0.50	N/A	6163938
Orthophosphate (P)	mg/L	ND	0.010	N/A	6182171
pH	pH	7.56	N/A	N/A	6184783

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Sample integrity may have been compromised, the sample exceeded it's hold time prior to being analyzed.
(2) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4451
Report Date: 2019/06/27

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Total Phosphorus	mg/L	ND	0.020	N/A	6158894
Salinity	N/A	29	2.0	N/A	6181990
Reactive Silica (SiO2)	mg/L	ND	0.50	N/A	6182169
Total Suspended Solids	mg/L	1.8	1.0	N/A	6151063
Dissolved Sulphate (SO4)	mg/L	1900	40	N/A	6182168
Sulphide	mg/L	ND	0.020	0.010	6154726
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6159669
Turbidity	NTU	1.2	0.10	0.10	6184399
Volatile Suspended Solids	mg/L	ND	2.0	N/A	6157072
Conductivity	uS/cm	42000	1.0	N/A	6184788
Nutritional Parameters					
Total Nitrogen (N)	mg/L	0.158	0.020	N/A	6157791
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6153390

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	ND	0.013	N/A	6149403

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	ND	50	N/A	6148971
Total Antimony (Sb)	ug/L	ND	10	N/A	6148971
Total Arsenic (As)	ug/L	ND	10	N/A	6148971
Total Barium (Ba)	ug/L	13	10	N/A	6148971
Total Beryllium (Be)	ug/L	ND	10	N/A	6148971
Total Bismuth (Bi)	ug/L	ND	20	N/A	6148971
Total Boron (B)	ug/L	3500	500	N/A	6148971
Total Cadmium (Cd)	ug/L	ND	0.10	N/A	6148971
Total Calcium (Ca)	ug/L	320000	1000	N/A	6148971
Total Chromium (Cr)	ug/L	ND	10	N/A	6148971
Total Cobalt (Co)	ug/L	ND	4.0	N/A	6148971
Total Copper (Cu)	ug/L	ND	5.0	N/A	6148971
Total Iron (Fe)	ug/L	ND	500	N/A	6148971
Total Lead (Pb)	ug/L	ND	5.0	N/A	6148971
Total Magnesium (Mg)	ug/L	1000000	1000	N/A	6148971
Total Manganese (Mn)	ug/L	ND	20	N/A	6148971
Total Molybdenum (Mo)	ug/L	ND	20	N/A	6148971
Total Nickel (Ni)	ug/L	ND	20	N/A	6148971
Total Phosphorus (P)	ug/L	ND	1000	N/A	6148971
Total Potassium (K)	ug/L	300000	1000	N/A	6148971
Total Selenium (Se)	ug/L	ND	10	N/A	6148971
Total Silver (Ag)	ug/L	ND	1.0	N/A	6148971
Total Sodium (Na)	ug/L	8200000	1000	N/A	6148971
Total Strontium (Sr)	ug/L	6000	20	N/A	6148971
Total Thallium (Tl)	ug/L	ND	1.0	N/A	6148971
Total Tin (Sn)	ug/L	ND	20	N/A	6148971
Total Titanium (Ti)	ug/L	ND	20	N/A	6148971
Total Uranium (U)	ug/L	2.7	1.0	N/A	6148971
Total Vanadium (V)	ug/L	ND	20	N/A	6148971
Total Zinc (Zn)	ug/L	ND	50	N/A	6148971

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
Acenaphthene	ug/L	ND	0.010	N/A	6151065
Acenaphthylene	ug/L	ND	0.010	N/A	6151065
Anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6151065
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6146340
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6151065
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6151065
Chrysene	ug/L	ND	0.010	N/A	6151065
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6151065
Fluoranthene	ug/L	ND	0.010	N/A	6151065
Fluorene	ug/L	ND	0.010	N/A	6151065
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6151065
Naphthalene	ug/L	ND	0.20	N/A	6151065
Perylene	ug/L	ND	0.010	N/A	6151065
Phenanthrene	ug/L	ND	0.010	N/A	6151065
Pyrene	ug/L	ND	0.010	N/A	6151065
Surrogate Recovery (%)					
D10-Anthracene	%	93			6151065
D14-Terphenyl	%	99			6151065
D8-Acenaphthylene	%	87			6151065

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6148613
1,1-Dichloroethylene	ug/L	ND	0.50	1.0	6148613
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6148613
Ethylene Dibromide	ug/L	ND	0.20	0.50	6148613
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6148613
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6148613
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
Benzene	ug/L	ND	1.0	N/A	6148613
Bromodichloromethane	ug/L	ND	1.0	0.20	6148613
Bromoform	ug/L	ND	1.0	0.20	6148613
Bromomethane	ug/L	ND	0.50	N/A	6148613
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6148613
Chlorobenzene	ug/L	ND	1.0	N/A	6148613
Chloroethane	ug/L	ND	8.0	N/A	6148613
Chloroform	ug/L	ND	1.0	0.20	6148613
Chloromethane	ug/L	ND	8.0	N/A	6148613
Dibromochloromethane	ug/L	ND	1.0	0.20	6148613
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6148613
Ethylbenzene	ug/L	ND	1.0	N/A	6148613
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6148613
Styrene	ug/L	ND	1.0	N/A	6148613
Tetrachloroethylene	ug/L	ND	1.0	N/A	6148613
Toluene	ug/L	ND	1.0	N/A	6148613
Trichloroethylene	ug/L	ND	1.0	N/A	6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6148613
Vinyl Chloride	ug/L	ND	0.50	2.0	6148613
o-Xylene	ug/L	ND	1.0	N/A	6148613
p+m-Xylene	ug/L	ND	2.0	N/A	6148613
Total Xylenes	ug/L	ND	1.0	1.0	6148613
Total Trihalomethanes	ug/L	ND	1.0	N/A	6148613
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	98			6148613
D4-1,2-Dichloroethane	%	116			6148613
D8-Toluene	%	100			6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6153412
Toluene	mg/L	ND	0.0010	N/A	6153412
Ethylbenzene	mg/L	ND	0.0010	N/A	6153412
Total Xylenes	mg/L	ND	0.0020	N/A	6153412
C6 - C10 (less BTEX)	mg/L	ND	0.010	N/A	6153412
>C10-C16 Hydrocarbons	mg/L	ND	0.050	N/A	6148915
>C16-C21 Hydrocarbons	mg/L	ND	0.050	N/A	6148915
>C21-<C32 Hydrocarbons	mg/L	ND	0.10	N/A	6148915
Modified TPH (Tier1)	mg/L	ND	0.10	N/A	6146630
Reached Baseline at C32	mg/L	NA	N/A	N/A	6148915
Hydrocarbon Resemblance	mg/L	NA	N/A	N/A	6148915
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	89			6148915
n-Dotriacontane - Extractable	%	104			6148915
Isobutylbenzene - Volatile	%	95			6153412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6156517
Aroclor 1221	ug/L	ND	0.050	N/A	6156517
Aroclor 1232	ug/L	ND	0.050	N/A	6156517
Aroclor 1248	ug/L	ND	0.050	N/A	6156517
Aroclor 1242	ug/L	ND	0.050	N/A	6156517
Aroclor 1254	ug/L	ND	0.050	N/A	6156517
Aroclor 1260	ug/L	ND	0.050	N/A	6156517
Calculated Total PCB	ug/L	ND	0.050	N/A	6146342
Surrogate Recovery (%)					
Decachlorobiphenyl	%	87			6156517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JVR046			
Sampling Date		2019/05/25 17:00			
COC Number		715282-01-01			
	UNITS	CARIBOU SEA WATER 1	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	ND	0.072	N/A	6172547
Total Resin Acids	mg/L	ND	0.060	N/A	6172547
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND	0.0060	N/A	6172547
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6172547
Docosanoic acid (C22)	mg/L	ND	0.0060	N/A	6172547
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6172547
Eicosanoic acid (C20)	mg/L	ND	0.0060	N/A	6172547
Hexadecanoic acid (C16)	mg/L	ND	0.0060	N/A	6172547
Linoleic acid (C18:2)	mg/L	ND	0.0060	N/A	6172547
Linolenic acid (C18:3)	mg/L	ND	0.0060	N/A	6172547
Octadecanoic acid (C18)	mg/L	ND	0.0060	N/A	6172547
Oleic acid (C18:1)	mg/L	ND	0.0060	N/A	6172547
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6172547
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6172547
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Abietic acid	mg/L	ND	0.0060	N/A	6172547
Dehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Isopimaric acid	mg/L	ND	0.0060	N/A	6172547
Neoabietic acid	mg/L	ND	0.0060	N/A	6172547
Palustric acid	mg/L	ND	0.0060	N/A	6172547
Pimaric acid	mg/L	ND	0.0060	N/A	6172547
Sandaracopimaric acid	mg/L	ND	0.0060	N/A	6172547

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVR046							
Sampling Date		2019/05/25 17:00							
COC Number		715282-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER 1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/L	ND	1.02	9.48	N/A	1.00	1.02		6170521
1,2,3,7,8-Penta CDD *	pg/L	ND	0.997	9.48	N/A	1.00	0.997		6170521
1,2,3,4,7,8-Hexa CDD *	pg/L	ND	1.12	9.48	N/A	0.100	0.112		6170521
1,2,3,6,7,8-Hexa CDD *	pg/L	ND	0.974	9.48	N/A	0.100	0.0974		6170521
1,2,3,7,8,9-Hexa CDD *	pg/L	ND	0.947	9.48	N/A	0.100	0.0947		6170521
1,2,3,4,6,7,8-Hepta CDD *	pg/L	ND	1.06	9.48	N/A	0.0100	0.0106		6170521
Octa CDD *	pg/L	ND (1)	1.08	94.8	N/A	0.000300	0.000324		6170521
Total Tetra CDD *	pg/L	ND	1.02	9.48	N/A			0	6170521
Total Penta CDD *	pg/L	ND	0.997	9.48	N/A			0	6170521
Total Hexa CDD *	pg/L	ND	1.01	9.48	N/A			0	6170521
Total Hepta CDD *	pg/L	ND	1.06	9.48	N/A			0	6170521
2,3,7,8-Tetra CDF **	pg/L	ND	1.13	9.48	N/A	0.100	0.113		6170521
1,2,3,7,8-Penta CDF **	pg/L	ND	1.11	9.48	N/A	0.0300	0.0333		6170521
2,3,4,7,8-Penta CDF **	pg/L	ND	1.11	9.48	N/A	0.300	0.333		6170521
1,2,3,4,7,8-Hexa CDF **	pg/L	ND	0.806	9.48	N/A	0.100	0.0806		6170521
1,2,3,6,7,8-Hexa CDF **	pg/L	ND	0.672	9.48	N/A	0.100	0.0672		6170521
2,3,4,6,7,8-Hexa CDF **	pg/L	ND	0.760	9.48	N/A	0.100	0.0760		6170521
1,2,3,7,8,9-Hexa CDF **	pg/L	ND	0.842	9.48	N/A	0.100	0.0842		6170521
1,2,3,4,6,7,8-Hepta CDF **	pg/L	ND	0.959	9.48	N/A	0.0100	0.00959		6170521
1,2,3,4,7,8,9-Hepta CDF **	pg/L	ND	1.09	9.48	N/A	0.0100	0.0109		6170521
Octa CDF **	pg/L	ND	1.01	94.8	N/A	0.000300	0.000303		6170521
Total Tetra CDF **	pg/L	ND	1.13	9.48	N/A			0	6170521
Total Penta CDF **	pg/L	ND	1.11	9.48	N/A			0	6170521
Total Hexa CDF **	pg/L	ND	0.765	9.48	N/A			0	6170521

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVR046							
Sampling Date		2019/05/25 17:00							
COC Number		715282-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER 1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Total Hepta CDF **	pg/L	ND	1.02	9.48	N/A			0	6170521
TOTAL TOXIC EQUIVALENCY	pg/L						3.14		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	101							6170521
C13-1234678 HeptaCDF **	%	99							6170521
C13-123678 HexaCDD *	%	130							6170521
C13-123678 HexaCDF **	%	95							6170521
C13-12378 PentaCDD *	%	78							6170521
C13-12378 PentaCDF **	%	61							6170521
C13-2378 TetraCDD *	%	84							6170521
C13-2378 TetraCDF **	%	65							6170521
C13-OCDD *	%	103							6170521

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

** CDF = Chloro Dibenzo-p-Furan

ND = Not detected

N/A = Not Applicable

* CDD = Chloro Dibenzo-p-Dioxin

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

GENERAL COMMENTS

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

Package 1	8.7°C

Sample received past the recommended holding time for BOD testing.
Sample VT5932 [JVR264-04R\CARIBOU SEA WATER 1] : Sample matrix (Sea Water) is not suitable for Adsorbable Organic Halogens analysis and is beyond the scope of the method.

Sample JVR046 [CARIBOU SEA WATER 1] : Elevated reporting limits for trace metals due to sample matrix.

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6148613	ASL	Matrix Spike	4-Bromofluorobenzene	2019/05/30		99	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		120	%	70 - 130
			D8-Toluene	2019/05/30		96	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		110	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		109	%	70 - 130
			Ethylene Dibromide	2019/05/30		112	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		91	%	70 - 130
			1,2-Dichloroethane	2019/05/30		112	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		102	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		108	%	70 - 130
			1,2-Dichloropropane	2019/05/30		106	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		87	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/30		111	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		121	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		87	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		102	%	70 - 130
			Bromoform	2019/05/30		104	%	70 - 130
			Bromomethane	2019/05/30		100	%	60 - 140
			Carbon Tetrachloride	2019/05/30		105	%	70 - 130
			Chlorobenzene	2019/05/30		92	%	70 - 130
			Chloroethane	2019/05/30		90	%	60 - 140
			Chloroform	2019/05/30		102	%	70 - 130
			Chloromethane	2019/05/30		94	%	60 - 140
			Dibromochloromethane	2019/05/30		108	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		106	%	70 - 130
			Ethylbenzene	2019/05/30		94	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		103	%	70 - 130
			Styrene	2019/05/30		99	%	70 - 130
			Tetrachloroethylene	2019/05/30		97	%	70 - 130
			Toluene	2019/05/30		97	%	70 - 130
			Trichloroethylene	2019/05/30		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		93	%	60 - 140
			Vinyl Chloride	2019/05/30		91	%	60 - 140
			o-Xylene	2019/05/30		94	%	70 - 130
			p+m-Xylene	2019/05/30		92	%	70 - 130
6148613	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/30		101	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		97	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		113	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		111	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		103	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		103	%	70 - 130
			Ethylene Dibromide	2019/05/30		104	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		93	%	70 - 130
			1,2-Dichloroethane	2019/05/30		106	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		100	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		109	%	70 - 130
			1,2-Dichloropropane	2019/05/30		105	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		91	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2019/05/30		104	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		90	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		101	%	70 - 130
			Bromoform	2019/05/30		99	%	70 - 130
			Bromomethane	2019/05/30		95	%	60 - 140
			Carbon Tetrachloride	2019/05/30		108	%	70 - 130
			Chlorobenzene	2019/05/30		94	%	70 - 130
			Chloroethane	2019/05/30		91	%	60 - 140
			Chloroform	2019/05/30		101	%	70 - 130
			Chloromethane	2019/05/30		92	%	60 - 140
			Dibromochloromethane	2019/05/30		104	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		101	%	70 - 130
			Ethylbenzene	2019/05/30		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		101	%	70 - 130
			Styrene	2019/05/30		102	%	70 - 130
			Tetrachloroethylene	2019/05/30		101	%	70 - 130
			Toluene	2019/05/30		99	%	70 - 130
			Trichloroethylene	2019/05/30		101	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		96	%	60 - 140
			Vinyl Chloride	2019/05/30		87	%	60 - 140
			o-Xylene	2019/05/30		98	%	70 - 130
			p+m-Xylene	2019/05/30		96	%	70 - 130
6148613	ASL	Method Blank	4-Bromofluorobenzene	2019/05/30		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		100	%	70 - 130
			1,1-Dichloroethane	2019/05/30	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/30	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/30	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/30	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Benzene	2019/05/30	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/30	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/30	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/30	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/30	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/30	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/30	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/30	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/30	ND, RDL=2.0		ug/L	
			Styrene	2019/05/30	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Toluene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/30	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/30	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/30	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/30	ND, RDL=2.0		ug/L	
			Total Xylenes	2019/05/30	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/30	ND, RDL=1.0		ug/L	
6148613	ASL	RPD	1,1-Dichloroethane	2019/05/30	NC		%	40
			1,1-Dichloroethylene	2019/05/30	NC		%	40
			1,1,1-Trichloroethane	2019/05/30	NC		%	40
			1,1,2-Trichloroethane	2019/05/30	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/30	NC		%	40
			Ethylene Dibromide	2019/05/30	NC		%	40
			1,2-Dichlorobenzene	2019/05/30	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloroethane	2019/05/30	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/30	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/30	NC		%	40
			1,2-Dichloropropane	2019/05/30	NC		%	40
			1,3-Dichlorobenzene	2019/05/30	NC		%	40
			cis-1,3-Dichloropropene	2019/05/30	NC		%	40
			trans-1,3-Dichloropropene	2019/05/30	NC		%	40
			1,4-Dichlorobenzene	2019/05/30	NC		%	40
			Benzene	2019/05/30	NC		%	40
			Bromodichloromethane	2019/05/30	NC		%	40
			Bromoform	2019/05/30	NC		%	40
			Bromomethane	2019/05/30	NC		%	40
			Carbon Tetrachloride	2019/05/30	NC		%	40
			Chlorobenzene	2019/05/30	NC		%	40
			Chloroethane	2019/05/30	NC		%	40
			Chloroform	2019/05/30	NC		%	40
			Chloromethane	2019/05/30	NC		%	40
			Dibromochloromethane	2019/05/30	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/30	NC		%	40
			Ethylbenzene	2019/05/30	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/30	NC		%	40
			Styrene	2019/05/30	NC		%	40
			Tetrachloroethylene	2019/05/30	NC		%	40
			Toluene	2019/05/30	NC		%	40
			Trichloroethylene	2019/05/30	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/30	NC		%	40
			Vinyl Chloride	2019/05/30	NC		%	40
			o-Xylene	2019/05/30	NC		%	40
			p+m-Xylene	2019/05/30	NC		%	40
			Total Xylenes	2019/05/30	NC		%	40
			Total Trihalomethanes	2019/05/30	NC		%	40
6148620	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/05/30		81	%	80 - 120
6148620	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/30		103	%	80 - 120
6148620	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/30		105	%	80 - 120
6148620	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/30	ND, RDL=20		mg/L	
6148620	ZZH	RPD	Total Chemical Oxygen Demand	2019/05/30	12		%	25
6148701	MLW	QC Standard	Carbonaceous BOD	2019/06/04		111	%	80 - 120
6148701	MLW	Spiked Blank	Carbonaceous BOD	2019/06/04		138 (1)	%	80 - 120
6148701	MLW	Method Blank	Carbonaceous BOD	2019/06/04	ND, RDL=2.0		mg/L	
6148701	MLW	RPD	Carbonaceous BOD	2019/06/04	3.5		%	25
6148915	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/30		92	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		117	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/30		96	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/30		87	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/30		98	%	70 - 130
6148915	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/30		92	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		115	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/30		111	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/30		101	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/30		115	%	70 - 130
6148915	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/30		90	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		105	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C10-C16 Hydrocarbons	2019/05/30	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/30	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/30	ND, RDL=0.10		mg/L	
6148915	BCD	RPD [JVR046-11]	>C10-C16 Hydrocarbons	2019/05/30	NC		%	40
			>C16-C21 Hydrocarbons	2019/05/30	11		%	40
			>C21-<C32 Hydrocarbons	2019/05/30	NC		%	40
6148971	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/31		103	%	80 - 120
			Total Antimony (Sb)	2019/05/31		110	%	80 - 120
			Total Arsenic (As)	2019/05/31		98	%	80 - 120
			Total Barium (Ba)	2019/05/31		102	%	80 - 120
			Total Beryllium (Be)	2019/05/31		100	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		104	%	80 - 120
			Total Boron (B)	2019/05/31		NC	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		98	%	80 - 120
			Total Calcium (Ca)	2019/05/31		106	%	80 - 120
			Total Chromium (Cr)	2019/05/31		97	%	80 - 120
			Total Cobalt (Co)	2019/05/31		100	%	80 - 120
			Total Copper (Cu)	2019/05/31		98	%	80 - 120
			Total Iron (Fe)	2019/05/31		106	%	80 - 120
			Total Lead (Pb)	2019/05/31		104	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		101	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		105	%	80 - 120
			Total Nickel (Ni)	2019/05/31		102	%	80 - 120
			Total Phosphorus (P)	2019/05/31		104	%	80 - 120
			Total Potassium (K)	2019/05/31		104	%	80 - 120
			Total Selenium (Se)	2019/05/31		96	%	80 - 120
			Total Silver (Ag)	2019/05/31		101	%	80 - 120
			Total Sodium (Na)	2019/05/31		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/31		103	%	80 - 120
			Total Thallium (Tl)	2019/05/31		105	%	80 - 120
			Total Tin (Sn)	2019/05/31		105	%	80 - 120
			Total Titanium (Ti)	2019/05/31		99	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		101	%	80 - 120
			Total Zinc (Zn)	2019/05/31		100	%	80 - 120
6148971	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/31		101	%	80 - 120
			Total Antimony (Sb)	2019/05/31		107	%	80 - 120
			Total Arsenic (As)	2019/05/31		99	%	80 - 120
			Total Barium (Ba)	2019/05/31		100	%	80 - 120
			Total Beryllium (Be)	2019/05/31		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		105	%	80 - 120
			Total Boron (B)	2019/05/31		98	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		96	%	80 - 120
			Total Calcium (Ca)	2019/05/31		107	%	80 - 120
			Total Chromium (Cr)	2019/05/31		99	%	80 - 120
			Total Cobalt (Co)	2019/05/31		101	%	80 - 120
			Total Copper (Cu)	2019/05/31		99	%	80 - 120
			Total Iron (Fe)	2019/05/31		107	%	80 - 120
			Total Lead (Pb)	2019/05/31		103	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2019/05/31		102	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		102	%	80 - 120
			Total Nickel (Ni)	2019/05/31		99	%	80 - 120
			Total Phosphorus (P)	2019/05/31		105	%	80 - 120
			Total Potassium (K)	2019/05/31		102	%	80 - 120
			Total Selenium (Se)	2019/05/31		97	%	80 - 120
			Total Silver (Ag)	2019/05/31		100	%	80 - 120
			Total Sodium (Na)	2019/05/31		102	%	80 - 120
			Total Strontium (Sr)	2019/05/31		106	%	80 - 120
			Total Thallium (Tl)	2019/05/31		107	%	80 - 120
			Total Tin (Sn)	2019/05/31		106	%	80 - 120
			Total Titanium (Ti)	2019/05/31		98	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		102	%	80 - 120
			Total Zinc (Zn)	2019/05/31		101	%	80 - 120
6148971	BAN	Method Blank	Total Aluminum (Al)	2019/05/31	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/31	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/31	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/31	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/31	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/31	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/31	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/31	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/31	ND, RDL=100		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/31	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/05/31	ND, RDL=5.0		ug/L	
6148971	BAN	RPD	Total Aluminum (Al)	2019/05/31	4.3		%	20
6149403	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6149403	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6149403	CCR	Method Blank	Total Mercury (Hg)	2019/05/31	ND, RDL=0.013		ug/L	
6149403	CCR	RPD	Total Mercury (Hg)	2019/05/31	NC		%	20
6151063	AM6	QC Standard	Total Suspended Solids	2019/06/03		100	%	80 - 120
6151063	AM6	Method Blank	Total Suspended Solids	2019/06/03	ND, RDL=1.0		mg/L	
6151063	AM6	RPD	Total Suspended Solids	2019/06/03	0		%	20
6151065	LGE	Matrix Spike	D10-Anthracene	2019/06/01		90	%	50 - 130
			D14-Terphenyl	2019/06/01		70 (2)	%	50 - 130
			D8-Acenaphthylene	2019/06/01		85	%	50 - 130
			1-Methylnaphthalene	2019/06/01		81	%	50 - 130
			2-Methylnaphthalene	2019/06/01		84	%	50 - 130
			Acenaphthene	2019/06/01		87	%	50 - 130
			Acenaphthylene	2019/06/01		84	%	50 - 130
			Anthracene	2019/06/01		79	%	50 - 130
			Benzo(a)anthracene	2019/06/01		76	%	50 - 130
			Benzo(a)pyrene	2019/06/01		61	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		75	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		36 (3)	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		60	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		69	%	50 - 130
			Chrysene	2019/06/01		96	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		40 (3)	%	50 - 130
			Fluoranthene	2019/06/01		88	%	50 - 130
			Fluorene	2019/06/01		95	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		33 (3)	%	50 - 130
			Naphthalene	2019/06/01		84	%	50 - 130
			Perylene	2019/06/01		31 (3)	%	50 - 130
			Phenanthrene	2019/06/01		96	%	50 - 130
			Pyrene	2019/06/01		86	%	50 - 130
6151065	LGE	Spiked Blank	D10-Anthracene	2019/06/01		105	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		100	%	50 - 130
			1-Methylnaphthalene	2019/06/01		93	%	50 - 130
			2-Methylnaphthalene	2019/06/01		95	%	50 - 130
			Acenaphthene	2019/06/01		100	%	50 - 130
			Acenaphthylene	2019/06/01		98	%	50 - 130
			Anthracene	2019/06/01		93	%	50 - 130
			Benzo(a)anthracene	2019/06/01		86	%	50 - 130
			Benzo(a)pyrene	2019/06/01		94	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		106	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		96	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		95	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		101	%	50 - 130
			Chrysene	2019/06/01		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		96	%	50 - 130
			Fluoranthene	2019/06/01		99	%	50 - 130
			Fluorene	2019/06/01		109	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		94	%	50 - 130
			Naphthalene	2019/06/01		95	%	50 - 130
			Perylene	2019/06/01		90	%	50 - 130
			Phenanthrene	2019/06/01		111	%	50 - 130
			Pyrene	2019/06/01		98	%	50 - 130
6151065	LGE	Method Blank	D10-Anthracene	2019/06/01		108	%	50 - 130
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		99	%	50 - 130
			1-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/06/01	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/06/01	ND, RDL=0.010		ug/L	
			Anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Chrysene	2019/06/01	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluorene	2019/06/01	ND, RDL=0.010		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Indeno(1,2,3-cd)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Naphthalene	2019/06/01	ND, RDL=0.20		ug/L	
			Perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/06/01	ND, RDL=0.010		ug/L	
			Pyrene	2019/06/01	ND, RDL=0.010		ug/L	
6151065	LGE	RPD	1-Methylnaphthalene	2019/06/01	NC		%	40
			2-Methylnaphthalene	2019/06/01	NC		%	40
			Acenaphthene	2019/06/01	NC		%	40
			Acenaphthylene	2019/06/01	NC		%	40
			Anthracene	2019/06/01	NC		%	40
			Benzo(a)anthracene	2019/06/01	NC		%	40
			Benzo(a)pyrene	2019/06/01	NC		%	40
			Benzo(b)fluoranthene	2019/06/01	NC		%	40
			Benzo(g,h,i)perylene	2019/06/01	NC		%	40
			Benzo(j)fluoranthene	2019/06/01	NC		%	40
			Benzo(k)fluoranthene	2019/06/01	NC		%	40
			Chrysene	2019/06/01	NC		%	40
			Dibenz(a,h)anthracene	2019/06/01	NC		%	40
			Fluoranthene	2019/06/01	13		%	40
			Fluorene	2019/06/01	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/06/01	NC		%	40
			Naphthalene	2019/06/01	NC		%	40
			Perylene	2019/06/01	NC		%	40
			Phenanthrene	2019/06/01	NC		%	40
			Pyrene	2019/06/01	12		%	40
6153412	THL	Matrix Spike	Isobutylbenzene - Volatile	2019/06/02		94	%	70 - 130
			Benzene	2019/06/02		106	%	70 - 130
			Toluene	2019/06/02		108	%	70 - 130
			Ethylbenzene	2019/06/02		117	%	70 - 130
			Total Xylenes	2019/06/02		114	%	70 - 130
6153412	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/06/02		107	%	70 - 130
			Benzene	2019/06/02		125	%	70 - 130
			Toluene	2019/06/02		124	%	70 - 130
			Ethylbenzene	2019/06/02		124	%	70 - 130
			Total Xylenes	2019/06/02		121	%	70 - 130
6153412	THL	Method Blank	Isobutylbenzene - Volatile	2019/06/02		105	%	70 - 130
			Benzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Toluene	2019/06/02	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/06/02	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/06/02	ND, RDL=0.010		mg/L	
6153412	THL	RPD [JVR046-12]	Benzene	2019/06/02	NC		%	40
			Toluene	2019/06/02	NC		%	40
			Ethylbenzene	2019/06/02	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Xylenes	2019/06/02	NC		%	40
			C6 - C10 (less BTEX)	2019/06/02	NC		%	40
6153709	SSV	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2019/06/04		99	%	80 - 120
6153709	SSV	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/06/04		102	%	80 - 120
6153709	SSV	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04		103	%	80 - 120
6153709	SSV	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04	ND, RDL=0.10		mg/L	
6153709	SSV	RPD	Total Kjeldahl Nitrogen (TKN)	2019/06/04	0		%	20
6154726	GTO	Matrix Spike	Sulphide	2019/06/03		90	%	80 - 120
6154726	GTO	Spiked Blank	Sulphide	2019/06/03		101	%	80 - 120
6154726	GTO	Method Blank	Sulphide	2019/06/03	ND, RDL=0.020		mg/L	
6154726	GTO	RPD	Sulphide	2019/06/03	NC		%	20
6156517	RGE	Matrix Spike [JVR046-09]	Decachlorobiphenyl	2019/06/05		96	%	30 - 130
			Aroclor 1254	2019/06/05		109	%	70 - 130
6156517	RGE	Spiked Blank	Decachlorobiphenyl	2019/06/05		74	%	30 - 130
			Aroclor 1254	2019/06/05		103	%	70 - 130
6156517	RGE	Method Blank	Decachlorobiphenyl	2019/06/05		65	%	30 - 130
			Aroclor 1016	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/06/05	ND, RDL=0.050		ug/L	
6156517	RGE	RPD	Aroclor 1016	2019/06/05	NC		%	40
			Aroclor 1221	2019/06/05	NC		%	40
			Aroclor 1232	2019/06/05	NC		%	40
			Aroclor 1248	2019/06/05	NC		%	40
			Aroclor 1242	2019/06/05	NC		%	40
			Aroclor 1254	2019/06/05	NC		%	40
			Aroclor 1260	2019/06/05	NC		%	40
6157072	AM6	QC Standard	Volatile Suspended Solids	2019/06/04		98	%	80 - 120
6157072	AM6	Method Blank	Volatile Suspended Solids	2019/06/04	ND, RDL=2.0		mg/L	
6157072	AM6	RPD	Volatile Suspended Solids	2019/06/04	9.5		%	25
6157791	BB3	Matrix Spike	Total Nitrogen (N)	2019/06/03		101	%	80 - 120
6157791	BB3	Spiked Blank	Total Nitrogen (N)	2019/06/03		99	%	80 - 120
6157791	BB3	Method Blank	Total Nitrogen (N)	2019/06/03	ND, RDL=0.020		mg/L	
6157791	BB3	RPD	Total Nitrogen (N)	2019/06/03	3.0		%	20
6158894	NRG	Matrix Spike	Total Phosphorus	2019/06/06		110	%	80 - 120
6158894	NRG	Spiked Blank	Total Phosphorus	2019/06/06		103	%	80 - 120
6158894	NRG	Method Blank	Total Phosphorus	2019/06/06	ND, RDL=0.020		mg/L	
6158894	NRG	RPD	Total Phosphorus	2019/06/06	NC		%	25
6158927	SSI	Matrix Spike	Dissolved Organic Carbon (C)	2019/06/05		95	%	85 - 115

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6158927	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/06/05		98	%	80 - 120
6158927	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/06/05	ND, RDL=0.50		mg/L	
6158927	SSI	RPD	Dissolved Organic Carbon (C)	2019/06/05	NC		%	15
6159669	LHA	Matrix Spike	Total Cyanide (CN)	2019/06/07		78 (4)	%	80 - 120
6159669	LHA	Spiked Blank	Total Cyanide (CN)	2019/06/07		97	%	80 - 120
6159669	LHA	Method Blank	Total Cyanide (CN)	2019/06/07	ND, RDL=0.0050		mg/L	
6159669	LHA	RPD	Total Cyanide (CN)	2019/06/07	NC		%	20
6159706	NRG	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/06/06		106	%	80 - 120
6159706	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/06/07		100	%	80 - 120
6159706	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/06/07	ND, RDL=0.050		mg/L	
6159706	NRG	RPD	Nitrogen (Ammonia Nitrogen)	2019/06/06	16		%	20
6163938	KMC	Matrix Spike	Total Organic Carbon (C)	2019/06/07		98	%	85 - 115
6163938	KMC	Spiked Blank	Total Organic Carbon (C)	2019/06/07		99	%	80 - 120
6163938	KMC	Method Blank	Total Organic Carbon (C)	2019/06/07	ND, RDL=0.50		mg/L	
6163938	KMC	RPD	Total Organic Carbon (C)	2019/06/07	3.7		%	15
6165901	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
6165901	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
6165901	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
6170521	OBC	Spiked Blank	C13-1234678 HeptaCDD	2019/06/11		123	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/11		99	%	30 - 130
			C13-123678 HexaCDD	2019/06/11		127	%	30 - 130
			C13-123678 HexaCDF	2019/06/11		88	%	30 - 130
			C13-12378 PentaCDD	2019/06/11		87	%	30 - 130
			C13-12378 PentaCDF	2019/06/11		66	%	30 - 130
			C13-2378 TetraCDD	2019/06/11		92	%	30 - 130
			C13-2378 TetraCDF	2019/06/11		80	%	30 - 130
			C13-OCDD	2019/06/11		116	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/11		90	%	80 - 140
			1,2,3,7,8-Penta CDD	2019/06/11		100	%	80 - 140

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2019/06/11		85	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2019/06/11		97	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2019/06/11		93	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2019/06/11		85	%	80 - 140
			Octa CDD	2019/06/11		81	%	80 - 140
			2,3,7,8-Tetra CDF	2019/06/11		101	%	80 - 140
			1,2,3,7,8-Penta CDF	2019/06/11		126	%	80 - 140
			2,3,4,7,8-Penta CDF	2019/06/11		119	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2019/06/11		113	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2019/06/11		120	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2019/06/11		123	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2019/06/11		122	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2019/06/11		105	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2019/06/11		99	%	80 - 140
			Octa CDF	2019/06/11		86	%	80 - 140
6170521	OBC	RPD	2,3,7,8-Tetra CDD	2019/06/12	4.3		%	35
			1,2,3,7,8-Penta CDD	2019/06/12	12		%	35
			1,2,3,4,7,8-Hexa CDD	2019/06/12	9.0		%	35
			1,2,3,6,7,8-Hexa CDD	2019/06/12	1.0		%	35
			1,2,3,7,8,9-Hexa CDD	2019/06/12	8.2		%	35
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	28		%	35
			Octa CDD	2019/06/12	0		%	35
			2,3,7,8-Tetra CDF	2019/06/12	16		%	35
			1,2,3,7,8-Penta CDF	2019/06/12	3.1		%	35
			2,3,4,7,8-Penta CDF	2019/06/12	14		%	35
			1,2,3,4,7,8-Hexa CDF	2019/06/12	2.6		%	35
			1,2,3,6,7,8-Hexa CDF	2019/06/12	0		%	35
			2,3,4,6,7,8-Hexa CDF	2019/06/12	4.8		%	35
			1,2,3,7,8,9-Hexa CDF	2019/06/12	2.5		%	35
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	4.7		%	35
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	1.0		%	35
			Octa CDF	2019/06/12	0		%	35
6170521	OBC	Method Blank	C13-1234678 HeptaCDD	2019/06/12		107	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/12		96	%	30 - 130
			C13-123678 HexaCDD	2019/06/12		118	%	30 - 130
			C13-123678 HexaCDF	2019/06/12		82	%	30 - 130
			C13-12378 PentaCDD	2019/06/12		77	%	30 - 130
			C13-12378 PentaCDF	2019/06/12		61	%	30 - 130
			C13-2378 TetraCDD	2019/06/12		85	%	30 - 130
			C13-2378 TetraCDF	2019/06/12		79	%	30 - 130
			C13-OCDD	2019/06/12		113	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			1,2,3,7,8-Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			1,2,3,4,7,8-Hexa CDD	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,6,7,8-Hexa CDD	2019/06/12	ND, EDL=1.02		pg/L	
			1,2,3,7,8,9-Hexa CDD	2019/06/12	ND, EDL=0.995		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Octa CDD	2019/06/12	ND, EDL=1.16 (5)		pg/L	
			Total Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			Total Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			Total Hexa CDD	2019/06/12	ND, EDL=1.13 (5)		pg/L	
			Total Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	
			2,3,7,8-Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,7,8-Penta CDF	2019/06/12	ND, EDL=1.18		pg/L	
			2,3,4,7,8-Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			1,2,3,4,7,8-Hexa CDF	2019/06/12	ND, EDL=1.13		pg/L	
			1,2,3,6,7,8-Hexa CDF	2019/06/12	ND, EDL=0.939		pg/L	
			2,3,4,6,7,8-Hexa CDF	2019/06/12	ND, EDL=1.06		pg/L	
			1,2,3,7,8,9-Hexa CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	ND, EDL=1.09		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	ND, EDL=1.24		pg/L	
			Octa CDF	2019/06/12	ND, EDL=1.16		pg/L	
			Total Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			Total Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			Total Hexa CDF	2019/06/12	ND, EDL=1.07		pg/L	
			Total Hepta CDF	2019/06/12	ND, EDL=1.16		pg/L	
6172547	LZ3	Matrix Spike	9,10-Dichlorostearic acid	2019/06/01		96	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		90	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		85	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		92	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		98	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		85	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		87	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		94	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		94	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		92	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		91	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		102	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		106	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			Abietic acid	2019/06/01		NC	%	50 - 130
			Dehydroabietic acid	2019/06/01		NC	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Isopimaric acid	2019/06/01		NC	%	50 - 130
			Neoabietic acid	2019/06/01		68	%	50 - 130
			Palustric acid	2019/06/01		67	%	50 - 130
			Pimaric acid	2019/06/01		102	%	50 - 130
			Sandaracopimaric acid	2019/06/01		101	%	50 - 130
6172547	LZ3	Spiked Blank	9,10-Dichlorostearic acid	2019/06/01		94	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		94	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		88	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		94	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		96	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		99	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		89	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		86	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		105	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		99	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		94	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		103	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		114	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		108	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		110	%	50 - 130
			Abietic acid	2019/06/01		94	%	50 - 130
			Dehydroabietic acid	2019/06/01		128	%	50 - 130
			Isopimaric acid	2019/06/01		115	%	50 - 130
			Neoabietic acid	2019/06/01		63	%	50 - 130
			Palustric acid	2019/06/01		74	%	50 - 130
			Pimaric acid	2019/06/01		107	%	50 - 130
			Sandaracopimaric acid	2019/06/01		105	%	50 - 130
6172547	LZ3	Method Blank	Total Fatty Acids	2019/06/01	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/06/01	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/06/01	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/06/01	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/06/01	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/06/01	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/06/01	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/06/01	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/06/01	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/06/01	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/06/01	ND, RDL=0.0060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			12,14-Dichlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
6172547	LZ3	RPD [JVR046-21]	Total Fatty Acids	2019/06/01	NC		%	30
			Total Resin Acids	2019/06/01	NC		%	30
			9,10-Dichlorostearic acid	2019/06/01	NC		%	30
			Decanoic Acid (C10)	2019/06/01	NC		%	30
			Docosanoic acid (C22)	2019/06/01	NC		%	30
			Dodecanoic acid (C12)	2019/06/01	NC		%	30
			Eicosanoic acid (C20)	2019/06/01	NC		%	30
			Hexadecanoic acid (C16)	2019/06/01	NC		%	30
			Linoleic acid (C18:2)	2019/06/01	NC		%	30
			Linolenic acid (C18:3)	2019/06/01	NC		%	30
			Octadecanoic acid (C18)	2019/06/01	NC		%	30
			Oleic acid (C18:1)	2019/06/01	NC		%	30
			Tetradecanoic acid (C14)	2019/06/01	NC		%	30
			Undecanoic acid (C11)	2019/06/01	NC		%	30
			12,14-Dichlorodehydroabietic acid	2019/06/01	NC		%	30
			12-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			14-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			Abietic acid	2019/06/01	NC		%	30
			Dehydroabietic acid	2019/06/01	NC		%	30
			Isopimaric acid	2019/06/01	NC		%	30
			Neoabietic acid	2019/06/01	NC		%	30
			Palustric acid	2019/06/01	NC		%	30
			Pimaric acid	2019/06/01	NC		%	30
			Sandaracopimaric acid	2019/06/01	NC		%	30
6181990	BBD	QC Standard	Salinity	2019/06/18		101	%	80 - 120
6181990	BBD	Method Blank	Salinity	2019/06/18	ND, RDL=2.0		N/A	
6181990	BBD	RPD	Salinity	2019/06/18	0		%	25
6182160	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/06/18		101	%	80 - 120
6182160	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/06/18		107	%	80 - 120
6182160	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/06/18	ND, RDL=5.0		mg/L	
6182160	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/06/18	0.41		%	25
6182167	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/06/19		101	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6182167	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/06/19		100	%	80 - 120
6182167	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/06/19	ND, RDL=1.0		mg/L	
6182167	SRM	RPD	Dissolved Chloride (Cl-)	2019/06/19	3.0		%	25
6182168	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/06/19		100	%	80 - 120
6182168	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/06/19		108	%	80 - 120
6182168	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/06/19	ND, RDL=2.0		mg/L	
6182168	SRM	RPD	Dissolved Sulphate (SO4)	2019/06/19	5.3		%	25
6182169	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/06/19		97	%	80 - 120
6182169	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/06/19		101	%	80 - 120
6182169	SRM	Method Blank	Reactive Silica (SiO2)	2019/06/19	ND, RDL=0.50		mg/L	
6182169	SRM	RPD	Reactive Silica (SiO2)	2019/06/19	1.4		%	25
6182170	SRM	Spiked Blank	Colour	2019/06/18		98	%	80 - 120
6182170	SRM	Method Blank	Colour	2019/06/18	ND, RDL=5.0		TCU	
6182170	SRM	RPD	Colour	2019/06/18	NC		%	20
6182171	SRM	Matrix Spike	Orthophosphate (P)	2019/06/18		NC	%	80 - 120
6182171	SRM	Spiked Blank	Orthophosphate (P)	2019/06/18		97	%	80 - 120
6182171	SRM	Method Blank	Orthophosphate (P)	2019/06/18	ND, RDL=0.010		mg/L	
6182171	SRM	RPD	Orthophosphate (P)	2019/06/18	0.12		%	25
6182172	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/06/18		95	%	80 - 120
6182172	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/06/18		95	%	80 - 120
6182172	SRM	Method Blank	Nitrate + Nitrite (N)	2019/06/18	ND, RDL=0.050		mg/L	
6182172	SRM	RPD	Nitrate + Nitrite (N)	2019/06/18	NC		%	25
6182173	SRM	Matrix Spike	Nitrite (N)	2019/06/18		95	%	80 - 120
6182173	SRM	Spiked Blank	Nitrite (N)	2019/06/18		99	%	80 - 120
6182173	SRM	Method Blank	Nitrite (N)	2019/06/18	ND, RDL=0.010		mg/L	
6182173	SRM	RPD	Nitrite (N)	2019/06/18	NC		%	20
6184399	EMT	QC Standard	Turbidity	2019/06/19		107	%	80 - 120
6184399	EMT	Spiked Blank	Turbidity	2019/06/19		100	%	80 - 120
6184399	EMT	Method Blank	Turbidity	2019/06/19	ND, RDL=0.10		NTU	
6184399	EMT	RPD	Turbidity	2019/06/19	6.7		%	20
6184783	EMT	QC Standard	pH	2019/06/19		100	%	97 - 103
6184783	EMT	RPD	pH	2019/06/19	0.76		%	N/A
6184788	EMT	Spiked Blank	Conductivity	2019/06/19		103	%	80 - 120
6184788	EMT	Method Blank	Conductivity	2019/06/19	1.4, RDL=1.0		uS/cm	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6184788	EMT	RPD	Conductivity	2019/06/19	0.0059		%	10

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) BOD Analysis: Second source QC recovery high. Reference Material recovery and all other QC acceptable.

(2) PAH sample contained sediment.

(3) Matrix Spike: results are outside acceptance limit. Probable matrix interference.

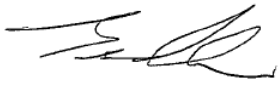
(4) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(5) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

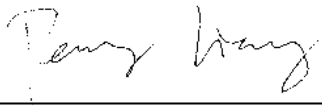
Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE

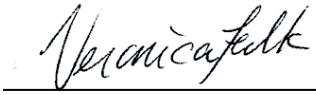
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



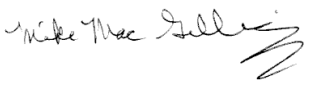
Brad Newman, Scientific Service Specialist



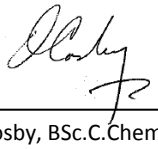
Harry (Peng) Liang, Senior Analyst



Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics



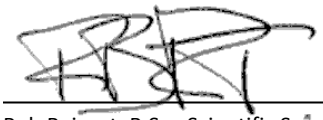
Mike MacGillivray, Scientific Specialist (Inorganics)



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services



Rosemarie MacDonald, Scientific Specialist (Organics)



Rob Reinert, B.Sc., Scientific Specialist

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your Project #: B9E4451
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449985
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920967
Received: 2019/05/31, 09:29

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/06/03	2019/06/05	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Your Project #: B9E4451
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449985
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920967
Received: 2019/05/31, 09:29

Encryption Key

Sophie Retailleau
Project Manager
21 Jun 2019 16:06:19

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: Sophie.RETAILLEAU@bvlabs.com
Phone# (514)448-9001 Ext:7066232

==========

This report has been generated and distributed using a secure automated process.
Lab BV has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5627		
Sampling Date		2019/05/25 17:00		
COC Number		N-A		
	Units	**JVR046-13R\CARIBOU SEA WATER 1**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	<10	10	1994633
Phenol	ug/L	<1.0	1.0	1994633
2-Chlorophenol	ug/L	<1.0	1.0	1994633
3-Chlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorophenol	ug/L	<1.0	1.0	1994633
o-Cresol	ug/L	<1.0	1.0	1994633
m-Cresol	ug/L	<1.0	1.0	1994633
p-Cresol	ug/L	<1.0	1.0	1994633
Guaiacol	ug/L	<1.0	1.0	1994633
Catechol	ug/L	<1.0	1.0	1994633
Eugenol	ug/L	<1.0	1.0	1994633
Isoeugenol	ug/L	<1.0	1.0	1994633
6-Chlorovanillin	ug/L	<1.0	1.0	1994633
5,6-Dichlorovanillin	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorosyringol	ug/L	<1.0	1.0	1994633
2,4-Dimethylphenol	ug/L	<1.0	1.0	1994633
2,6-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,3-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,4-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,4 + 2,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2-Nitrophenol	ug/L	<2.0	2.0	1994633
4-Nitrophenol	ug/L	<10	10	1994633
2,4,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,4-Trichlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
4-Chloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
4,6-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
2,3,5,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
2,3,4,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5627		
Sampling Date		2019/05/25 17:00		
COC Number		N-A		
	Units	**JVR046-13R\CARIBOU SEA WATER 1**	**RDL**	**QC Batch**
2,3,4,5-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorocatechol	ug/L	<1.0	1.0	1994633
3,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
4,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
4,5,6-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
Pentachlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5,6-Tetrachloroveratrol	ug/L	<1.0	1.0	1994633
Surrogate Recovery (%)				
D6-Phenol	%	113	N/A	1994633
Tribromophenol-2,4,6	%	72	N/A	1994633
Trifluoro-m-cresol	%	88	N/A	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total "Total Phenols (RFPP) " calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Reported detection limits are modified according to the volume of sample received.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1994633	GDL	Spiked Blank	D6-Phenol	2019/06/04		107	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		95	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		105	%	50 - 130
			Phenol	2019/06/04		100	%	50 - 130
			2-Chlorophenol	2019/06/04		95	%	50 - 130
			3-Chlorophenol	2019/06/04		96	%	50 - 130
			4-Chlorophenol	2019/06/04		99	%	50 - 130
			o-Cresol	2019/06/04		104	%	50 - 130
			m-Cresol	2019/06/04		101	%	50 - 130
			p-Cresol	2019/06/04		101	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		95	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		105	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		95	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		106	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		100	%	50 - 130
			2-Nitrophenol	2019/06/04		94	%	50 - 130
			4-Nitrophenol	2019/06/04		92	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		94	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		107	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		109	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		102	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		95	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/06/04		107	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		96	%	50 - 130
			Pentachlorophenol	2019/06/04		90	%	50 - 130
1994633	GDL	Spiked Blank DUP	D6-Phenol	2019/06/04		105	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04		98	%	50 - 130
			2-Chlorophenol	2019/06/04		93	%	50 - 130
			3-Chlorophenol	2019/06/04		95	%	50 - 130
			4-Chlorophenol	2019/06/04		93	%	50 - 130
			o-Cresol	2019/06/04		102	%	50 - 130
			m-Cresol	2019/06/04		100	%	50 - 130
			p-Cresol	2019/06/04		98	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		91	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		91	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		94	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		100	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		96	%	50 - 130
			2-Nitrophenol	2019/06/04		87	%	50 - 130
			4-Nitrophenol	2019/06/04		89	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		97	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		87	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		98	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		95	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		95	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		88	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/06/04		103	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		92	%	50 - 130
			Pentachlorophenol	2019/06/04		87	%	50 - 130
1994633	GDL	Method Blank	D6-Phenol	2019/06/04		99	%	50 - 130
			Total of Regl. P&P Phenols	2019/06/04	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04	<0.50		ug/L	
			2-Chlorophenol	2019/06/04	<0.50		ug/L	
			3-Chlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorophenol	2019/06/04	<0.50		ug/L	
			o-Cresol	2019/06/04	<0.50		ug/L	
			m-Cresol	2019/06/04	<0.50		ug/L	
			p-Cresol	2019/06/04	<0.50		ug/L	
			Guaiacol	2019/06/04	<0.50		ug/L	
			Catechol	2019/06/04	<0.50		ug/L	
			Eugenol	2019/06/04	<0.50		ug/L	
			Isoeugenol	2019/06/04	<0.50		ug/L	
			6-Chlorovanillin	2019/06/04	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/06/04	<0.50		ug/L	
			2,4-Dimethylphenol	2019/06/04	<0.50		ug/L	
			2,6-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,3-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,4-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2-Nitrophenol	2019/06/04	<1.0		ug/L	
			4-Nitrophenol	2019/06/04	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			4-Chloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorocatechol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			Pentachlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/06/04	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/06/04	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

MAXXAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Maxxam
A Bureau Veritas Group Company

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac

Job# B9E4451

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JVR046-13R\CARIBOU SEA WATER 1	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/25 17:00	2019/06/20

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	3	1	1	Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) _____ (print) KIM GRACE Date and Time 2019/05/30 13:03

Received by (Sign) _____ (print) Valerie Dewey Date and Time 2019/05/30 09:10

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:

National: N001

Regional:

31-May-19 09:29
Sophie Retailleau
B920967

B920967_COC

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☐ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☑ COC Must be Attached

Sender (Print) KIM GRACE Initial KG

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler, Ice, Tape-custody seal, Date&Sign
Date Shipped May 30/19 Number of coolers ____
Shipper (Print) _____ Initial _____

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715281-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768478
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4487
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/06/05	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/06/05	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/06/03	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/30	2019/06/04	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/06/06	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/30	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/05/31	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/06/05	2019/06/08	CAM SOP-00457	OMOE E3015 5 m
Dioxins/Furans in Water (EPS 1/RM/23) (1, 5)	1	2019/06/06	2019/06/12	BRL SOP-00406 (mod)	EPS 1/RM/23 m
Organic carbon - Diss (DOC) (6)	1	N/A	2019/06/04	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/06/05	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/05/30	2019/05/30	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/06/03		
Hardness (calculated as CaCO3)	1	N/A	2019/05/31	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/31	2019/05/31	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/30	2019/05/31	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/06/06	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/06/05	N/A	Auto Calc.
Chlorate and Chlorite by IC (2)	1	N/A	2019/06/06	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (3)	1	N/A	2019/06/03	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (2)	1	2019/05/31	2019/06/02	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/06/04	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/06/05	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/06/05	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/06/06	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/31	2019/06/01	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/06/04	2019/06/05	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/06/05	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (4)	1	2019/06/01	2019/06/05		
pH (7)	1	N/A	2019/06/05	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	1	N/A	2019/06/05	ATL SOP 00021	SM 23 4500-P E m

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715281-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768478
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4487
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VPH in Water (PIRI)	1	N/A	2019/06/02	ATL SOP 00118	Atl. RBCA v3.1 m
Salinity (8)	1	N/A	2019/06/04		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/06/06	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/06/06	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/06/06	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/06/06	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2019/06/03	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/06/06	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/06/01	2019/06/04	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (6)	1	N/A	2019/05/31	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/06/03	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/06/03	2019/06/04	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/31	2019/06/03	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/06/05	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/30	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/06/04	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715281-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768478
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4487
Received: 2019/05/29, 12:45

dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Calgary Offsite
(3) This test was performed by Bedford to Burnaby - Offsite
(4) This test was performed by Bedford to Montreal Subcontrac
(5) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(6) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(7) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(8) Non-accredited test method

Encryption Key



Neyousha Shahisavandi
Project Manager Assistant
24 Jun 2019 14:29:34

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4487
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	494	N/A	N/A	6147444
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	90	1.0	0.20	6147433
Calculated TDS	mg/L	29000	1.0	0.20	6147453
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	6147433
Cation Sum	me/L	496	N/A	N/A	6147444
Hardness (CaCO3)	mg/L	5300	1.0	1.0	6147440
Ion Balance (% Difference)	%	0.190	N/A	N/A	6147442
Langelier Index (@ 20C)	N/A	0.448			6147449
Langelier Index (@ 4C)	N/A	0.210			6147451
Nitrate (N)	mg/L	ND	0.050	N/A	6147446
Saturation pH (@ 20C)	N/A	7.35			6147449
Saturation pH (@ 4C)	N/A	7.59			6147451
Sulphide (as H2S)	mg/L	ND	0.021	0.011	6147649
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	91	5.0	N/A	6158831
Carbonaceous BOD	mg/L	ND (1)	10	N/A	6148701
Total Chemical Oxygen Demand	mg/L	940	200	N/A	6148620
Dissolved Chlorate (ClO3-)	mg/L	ND (2)	5.0	N/A	6165901
Dissolved Chloride (Cl-)	mg/L	16000	500	N/A	6158832
Dissolved Chlorite (CLO2-)	mg/L	ND (2)	5.0	N/A	6165901
Colour	TCU	ND	5.0	N/A	6151471
Total Kjeldahl Nitrogen (TKN)	mg/L	0.20	0.10	0.060	6153711
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	6158840
Nitrite (N)	mg/L	ND	0.010	N/A	6158842
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	N/A	6156546
Dissolved Organic Carbon (C)	mg/L	1.8	0.50	N/A	6155176
Total Organic Carbon (C)	mg/L	2.1	0.50	N/A	6151090
Orthophosphate (P)	mg/L	ND	0.010	N/A	6158838
pH	pH	7.80	N/A	N/A	6158767

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Sample integrity may have been compromised, the sample exceeded it's hold time prior to being analyzed.
(2) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4487
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Total Phosphorus	mg/L	ND	0.020	N/A	6154440
Salinity	N/A	27	2.0	N/A	6156521
Reactive Silica (SiO2)	mg/L	0.54	0.50	N/A	6158837
Total Suspended Solids	mg/L	2.2	1.0	N/A	6151063
Dissolved Sulphate (SO4)	mg/L	2000	40	N/A	6158834
Sulphide	mg/L	ND	0.020	0.010	6154879
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6160103
Turbidity	NTU	1.0	0.10	0.10	6158813
Volatile Suspended Solids	mg/L	ND	2.0	N/A	6157072
Conductivity	uS/cm	42000	1.0	N/A	6158768
Nutritional Parameters					
Total Nitrogen (N)	mg/L	0.147	0.020	N/A	6157791
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6153392

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	ND	0.013	N/A	6148649

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	5700	50	N/A	6148971
Total Antimony (Sb)	ug/L	ND	10	N/A	6148971
Total Arsenic (As)	ug/L	ND	10	N/A	6148971
Total Barium (Ba)	ug/L	13	10	N/A	6148971
Total Beryllium (Be)	ug/L	ND	10	N/A	6148971
Total Bismuth (Bi)	ug/L	ND	20	N/A	6148971
Total Boron (B)	ug/L	3700	500	N/A	6148971
Total Cadmium (Cd)	ug/L	0.12	0.10	N/A	6148971
Total Calcium (Ca)	ug/L	340000	1000	N/A	6148971
Total Chromium (Cr)	ug/L	ND	10	N/A	6148971
Total Cobalt (Co)	ug/L	ND	4.0	N/A	6148971
Total Copper (Cu)	ug/L	ND	5.0	N/A	6148971
Total Iron (Fe)	ug/L	ND	500	N/A	6148971
Total Lead (Pb)	ug/L	ND	5.0	N/A	6148971
Total Magnesium (Mg)	ug/L	1100000	1000	N/A	6148971
Total Manganese (Mn)	ug/L	ND	20	N/A	6148971
Total Molybdenum (Mo)	ug/L	ND	20	N/A	6148971
Total Nickel (Ni)	ug/L	ND	20	N/A	6148971
Total Phosphorus (P)	ug/L	ND	1000	N/A	6148971
Total Potassium (K)	ug/L	320000	1000	N/A	6148971
Total Selenium (Se)	ug/L	ND	10	N/A	6148971
Total Silver (Ag)	ug/L	ND	1.0	N/A	6148971
Total Sodium (Na)	ug/L	8800000	1000	N/A	6148971
Total Strontium (Sr)	ug/L	6300	20	N/A	6148971
Total Thallium (Tl)	ug/L	ND	1.0	N/A	6148971
Total Tin (Sn)	ug/L	ND	20	N/A	6148971
Total Titanium (Ti)	ug/L	ND	20	N/A	6148971
Total Uranium (U)	ug/L	2.8	1.0	N/A	6148971
Total Vanadium (V)	ug/L	ND	20	N/A	6148971
Total Zinc (Zn)	ug/L	ND	50	N/A	6148971

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
Acenaphthene	ug/L	ND	0.010	N/A	6151065
Acenaphthylene	ug/L	ND	0.010	N/A	6151065
Anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6151065
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6146340
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6151065
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6151065
Chrysene	ug/L	ND	0.010	N/A	6151065
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6151065
Fluoranthene	ug/L	ND	0.010	N/A	6151065
Fluorene	ug/L	ND	0.010	N/A	6151065
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6151065
Naphthalene	ug/L	ND	0.20	N/A	6151065
Perylene	ug/L	ND	0.010	N/A	6151065
Phenanthrene	ug/L	ND	0.010	N/A	6151065
Pyrene	ug/L	ND	0.010	N/A	6151065
Surrogate Recovery (%)					
D10-Anthracene	%	88			6151065
D14-Terphenyl	%	95			6151065
D8-Acenaphthylene	%	83			6151065

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6148613
1,1-Dichloroethylene	ug/L	ND	0.50	1.0	6148613
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6148613
Ethylene Dibromide	ug/L	ND	0.20	0.50	6148613
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6148613
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6148613
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
Benzene	ug/L	ND	1.0	N/A	6148613
Bromodichloromethane	ug/L	ND	1.0	0.20	6148613
Bromoform	ug/L	ND	1.0	0.20	6148613
Bromomethane	ug/L	ND	0.50	N/A	6148613
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6148613
Chlorobenzene	ug/L	ND	1.0	N/A	6148613
Chloroethane	ug/L	ND	8.0	N/A	6148613
Chloroform	ug/L	ND	1.0	0.20	6148613
Chloromethane	ug/L	ND	8.0	N/A	6148613
Dibromochloromethane	ug/L	ND	1.0	0.20	6148613
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6148613
Ethylbenzene	ug/L	ND	1.0	N/A	6148613
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6148613
Styrene	ug/L	ND	1.0	N/A	6148613
Tetrachloroethylene	ug/L	ND	1.0	N/A	6148613
Toluene	ug/L	ND	1.0	N/A	6148613
Trichloroethylene	ug/L	ND	1.0	N/A	6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6148613
Vinyl Chloride	ug/L	ND	0.50	2.0	6148613
o-Xylene	ug/L	ND	1.0	N/A	6148613
p+m-Xylene	ug/L	ND	2.0	N/A	6148613
Total Xylenes	ug/L	ND	1.0	1.0	6148613
Total Trihalomethanes	ug/L	ND	1.0	N/A	6148613
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	98			6148613
D4-1,2-Dichloroethane	%	116			6148613
D8-Toluene	%	100			6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6153411
Toluene	mg/L	ND	0.0010	N/A	6153411
Ethylbenzene	mg/L	ND	0.0010	N/A	6153411
Total Xylenes	mg/L	ND	0.0020	N/A	6153411
C6 - C10 (less BTEX)	mg/L	ND	0.010	N/A	6153411
>C10-C16 Hydrocarbons	mg/L	ND	0.050	N/A	6148915
>C16-C21 Hydrocarbons	mg/L	ND	0.050	N/A	6148915
>C21-<C32 Hydrocarbons	mg/L	ND	0.10	N/A	6148915
Modified TPH (Tier1)	mg/L	ND	0.10	N/A	6146630
Reached Baseline at C32	mg/L	NA	N/A	N/A	6148915
Hydrocarbon Resemblance	mg/L	NA	N/A	N/A	6148915
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	89			6148915
n-Dotriacontane - Extractable	%	103			6148915
Isobutylbenzene - Volatile	%	93			6153411

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4487
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6156517
Aroclor 1221	ug/L	ND	0.050	N/A	6156517
Aroclor 1232	ug/L	ND	0.050	N/A	6156517
Aroclor 1248	ug/L	ND	0.050	N/A	6156517
Aroclor 1242	ug/L	ND	0.050	N/A	6156517
Aroclor 1254	ug/L	ND	0.050	N/A	6156517
Aroclor 1260	ug/L	ND	0.050	N/A	6156517
Calculated Total PCB	ug/L	ND	0.050	N/A	6146342
Surrogate Recovery (%)					
Decachlorobiphenyl	%	91			6156517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JVR264			
Sampling Date		2019/05/24 13:30			
COC Number		715281-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	ND	0.072	N/A	6172547
Total Resin Acids	mg/L	ND	0.060	N/A	6172547
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND	0.0060	N/A	6172547
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6172547
Docosanoic acid (C22)	mg/L	ND	0.0060	N/A	6172547
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6172547
Eicosanoic acid (C20)	mg/L	ND	0.0060	N/A	6172547
Hexadecanoic acid (C16)	mg/L	ND	0.0060	N/A	6172547
Linoleic acid (C18:2)	mg/L	ND	0.0060	N/A	6172547
Linolenic acid (C18:3)	mg/L	ND	0.0060	N/A	6172547
Octadecanoic acid (C18)	mg/L	ND	0.0060	N/A	6172547
Oleic acid (C18:1)	mg/L	ND	0.0060	N/A	6172547
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6172547
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6172547
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Abietic acid	mg/L	ND	0.0060	N/A	6172547
Dehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Isopimaric acid	mg/L	ND	0.0060	N/A	6172547
Neoabietic acid	mg/L	ND	0.0060	N/A	6172547
Palustric acid	mg/L	ND	0.0060	N/A	6172547
Pimaric acid	mg/L	ND	0.0060	N/A	6172547
Sandaracopimaric acid	mg/L	ND	0.0060	N/A	6172547

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVR264							
Sampling Date		2019/05/24 13:30							
COC Number		715281-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/L	ND	1.11	9.76	N/A	1.00	1.11		6170521
1,2,3,7,8-Penta CDD *	pg/L	ND	0.988	9.76	N/A	1.00	0.988		6170521
1,2,3,4,7,8-Hexa CDD *	pg/L	ND	1.18	9.76	N/A	0.100	0.118		6170521
1,2,3,6,7,8-Hexa CDD *	pg/L	ND	1.02	9.76	N/A	0.100	0.102		6170521
1,2,3,7,8,9-Hexa CDD *	pg/L	ND	0.992	9.76	N/A	0.100	0.0992		6170521
1,2,3,4,6,7,8-Hepta CDD *	pg/L	ND	1.16	9.76	N/A	0.0100	0.0116		6170521
Octa CDD *	pg/L	ND (1)	1.79	97.6	N/A	0.000300	0.000537		6170521
Total Tetra CDD *	pg/L	ND	1.11	9.76	N/A			0	6170521
Total Penta CDD *	pg/L	ND	0.988	9.76	N/A			0	6170521
Total Hexa CDD *	pg/L	ND	1.06	9.76	N/A			0	6170521
Total Hepta CDD *	pg/L	ND	1.16	9.76	N/A			0	6170521
2,3,7,8-Tetra CDF **	pg/L	ND	1.06	9.76	N/A	0.100	0.106		6170521
1,2,3,7,8-Penta CDF **	pg/L	ND	1.09	9.76	N/A	0.0300	0.0327		6170521
2,3,4,7,8-Penta CDF **	pg/L	ND	1.10	9.76	N/A	0.300	0.330		6170521
1,2,3,4,7,8-Hexa CDF **	pg/L	ND	0.960	9.76	N/A	0.100	0.0960		6170521
1,2,3,6,7,8-Hexa CDF **	pg/L	ND	0.800	9.76	N/A	0.100	0.0800		6170521
2,3,4,6,7,8-Hexa CDF **	pg/L	ND	0.906	9.76	N/A	0.100	0.0906		6170521
1,2,3,7,8,9-Hexa CDF **	pg/L	ND	1.00	9.76	N/A	0.100	0.100		6170521
1,2,3,4,6,7,8-Hepta CDF **	pg/L	ND	0.968	9.76	N/A	0.0100	0.00968		6170521
1,2,3,4,7,8,9-Hepta CDF **	pg/L	ND	1.10	9.76	N/A	0.0100	0.0110		6170521
Octa CDF **	pg/L	ND	0.553	97.6	N/A	0.000300	0.000166		6170521
Total Tetra CDF **	pg/L	ND	1.06	9.76	N/A			0	6170521
Total Penta CDF **	pg/L	ND	1.09	9.76	N/A			0	6170521
Total Hexa CDF **	pg/L	ND	0.911	9.76	N/A			0	6170521

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVR264							
Sampling Date		2019/05/24 13:30							
COC Number		715281-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER CH-BOF 1-1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Total Hepta CDF **	pg/L	ND	1.03	9.76	N/A			0	6170521
TOTAL TOXIC EQUIVALENCY	pg/L						3.29		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	104							6170521
C13-1234678 HeptaCDF **	%	110							6170521
C13-123678 HexaCDD *	%	125							6170521
C13-123678 HexaCDF **	%	86							6170521
C13-12378 PentaCDD *	%	69							6170521
C13-12378 PentaCDF **	%	51							6170521
C13-2378 TetraCDD *	%	94							6170521
C13-2378 TetraCDF **	%	72							6170521
C13-OCDD *	%	113							6170521

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

GENERAL COMMENTS

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

Package 1	7.7°C

Sample JVR264 [CARIBOU SEA WATER CH-BOF 1-1] : Elevated reporting limits for trace metals due to sample matrix.

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6148613	ASL	Matrix Spike	4-Bromofluorobenzene	2019/05/30		99	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		120	%	70 - 130
			D8-Toluene	2019/05/30		96	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		110	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		109	%	70 - 130
			Ethylene Dibromide	2019/05/30		112	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		91	%	70 - 130
			1,2-Dichloroethane	2019/05/30		112	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		102	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		108	%	70 - 130
			1,2-Dichloropropane	2019/05/30		106	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		87	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/30		111	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		121	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		87	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		102	%	70 - 130
			Bromoform	2019/05/30		104	%	70 - 130
			Bromomethane	2019/05/30		100	%	60 - 140
			Carbon Tetrachloride	2019/05/30		105	%	70 - 130
			Chlorobenzene	2019/05/30		92	%	70 - 130
			Chloroethane	2019/05/30		90	%	60 - 140
			Chloroform	2019/05/30		102	%	70 - 130
			Chloromethane	2019/05/30		94	%	60 - 140
			Dibromochloromethane	2019/05/30		108	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		106	%	70 - 130
			Ethylbenzene	2019/05/30		94	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		103	%	70 - 130
			Styrene	2019/05/30		99	%	70 - 130
			Tetrachloroethylene	2019/05/30		97	%	70 - 130
			Toluene	2019/05/30		97	%	70 - 130
			Trichloroethylene	2019/05/30		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		93	%	60 - 140
			Vinyl Chloride	2019/05/30		91	%	60 - 140
			o-Xylene	2019/05/30		94	%	70 - 130
			p+m-Xylene	2019/05/30		92	%	70 - 130
6148613	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/30		101	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		97	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		113	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		111	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		103	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		103	%	70 - 130
			Ethylene Dibromide	2019/05/30		104	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		93	%	70 - 130
			1,2-Dichloroethane	2019/05/30		106	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		100	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		109	%	70 - 130
			1,2-Dichloropropane	2019/05/30		105	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		91	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2019/05/30		104	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		90	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		101	%	70 - 130
			Bromoform	2019/05/30		99	%	70 - 130
			Bromomethane	2019/05/30		95	%	60 - 140
			Carbon Tetrachloride	2019/05/30		108	%	70 - 130
			Chlorobenzene	2019/05/30		94	%	70 - 130
			Chloroethane	2019/05/30		91	%	60 - 140
			Chloroform	2019/05/30		101	%	70 - 130
			Chloromethane	2019/05/30		92	%	60 - 140
			Dibromochloromethane	2019/05/30		104	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		101	%	70 - 130
			Ethylbenzene	2019/05/30		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		101	%	70 - 130
			Styrene	2019/05/30		102	%	70 - 130
			Tetrachloroethylene	2019/05/30		101	%	70 - 130
			Toluene	2019/05/30		99	%	70 - 130
			Trichloroethylene	2019/05/30		101	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		96	%	60 - 140
			Vinyl Chloride	2019/05/30		87	%	60 - 140
			o-Xylene	2019/05/30		98	%	70 - 130
			p+m-Xylene	2019/05/30		96	%	70 - 130
6148613	ASL	Method Blank	4-Bromofluorobenzene	2019/05/30		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		100	%	70 - 130
			1,1-Dichloroethane	2019/05/30	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/30	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/30	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/30	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Benzene	2019/05/30	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/30	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/30	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/30	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/30	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/30	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/30	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/30	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/30	ND, RDL=2.0		ug/L	
			Styrene	2019/05/30	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Toluene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/30	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/30	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/30	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/30	ND, RDL=2.0		ug/L	
			Total Xylenes	2019/05/30	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/30	ND, RDL=1.0		ug/L	
6148613	ASL	RPD	1,1-Dichloroethane	2019/05/30	NC		%	40
			1,1-Dichloroethylene	2019/05/30	NC		%	40
			1,1,1-Trichloroethane	2019/05/30	NC		%	40
			1,1,2-Trichloroethane	2019/05/30	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/30	NC		%	40
			Ethylene Dibromide	2019/05/30	NC		%	40
			1,2-Dichlorobenzene	2019/05/30	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloroethane	2019/05/30	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/30	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/30	NC		%	40
			1,2-Dichloropropane	2019/05/30	NC		%	40
			1,3-Dichlorobenzene	2019/05/30	NC		%	40
			cis-1,3-Dichloropropene	2019/05/30	NC		%	40
			trans-1,3-Dichloropropene	2019/05/30	NC		%	40
			1,4-Dichlorobenzene	2019/05/30	NC		%	40
			Benzene	2019/05/30	NC		%	40
			Bromodichloromethane	2019/05/30	NC		%	40
			Bromoform	2019/05/30	NC		%	40
			Bromomethane	2019/05/30	NC		%	40
			Carbon Tetrachloride	2019/05/30	NC		%	40
			Chlorobenzene	2019/05/30	NC		%	40
			Chloroethane	2019/05/30	NC		%	40
			Chloroform	2019/05/30	NC		%	40
			Chloromethane	2019/05/30	NC		%	40
			Dibromochloromethane	2019/05/30	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/30	NC		%	40
			Ethylbenzene	2019/05/30	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/30	NC		%	40
			Styrene	2019/05/30	NC		%	40
			Tetrachloroethylene	2019/05/30	NC		%	40
			Toluene	2019/05/30	NC		%	40
			Trichloroethylene	2019/05/30	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/30	NC		%	40
			Vinyl Chloride	2019/05/30	NC		%	40
			o-Xylene	2019/05/30	NC		%	40
			p+m-Xylene	2019/05/30	NC		%	40
			Total Xylenes	2019/05/30	NC		%	40
			Total Trihalomethanes	2019/05/30	NC		%	40
6148620	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/05/30		81	%	80 - 120
6148620	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/30		103	%	80 - 120
6148620	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/30		105	%	80 - 120
6148620	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/30	ND, RDL=20		mg/L	
6148620	ZZH	RPD	Total Chemical Oxygen Demand	2019/05/30	12		%	25
6148649	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/31		101	%	80 - 120
6148649	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6148649	CCR	Method Blank	Total Mercury (Hg)	2019/05/31	ND, RDL=0.013		ug/L	
6148649	CCR	RPD	Total Mercury (Hg)	2019/05/31	NC		%	20
6148701	MLW	QC Standard	Carbonaceous BOD	2019/06/04		111	%	80 - 120
6148701	MLW	Spiked Blank	Carbonaceous BOD	2019/06/04		138 (1)	%	80 - 120
6148701	MLW	Method Blank	Carbonaceous BOD	2019/06/04	ND, RDL=2.0		mg/L	
6148701	MLW	RPD	Carbonaceous BOD	2019/06/04	3.5		%	25
6148915	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/30		92	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		117	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/30		96	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/30		87	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/30		98	%	70 - 130
6148915	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/30		92	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		115	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C10-C16 Hydrocarbons	2019/05/30		111	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/30		101	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/30		115	%	70 - 130
6148915	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/30		90	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		105	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/30	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/30	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/30	ND, RDL=0.10		mg/L	
6148915	BCD	RPD	>C10-C16 Hydrocarbons	2019/05/30	NC		%	40
			>C16-C21 Hydrocarbons	2019/05/30	11		%	40
			>C21-<C32 Hydrocarbons	2019/05/30	NC		%	40
6148971	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/31		103	%	80 - 120
			Total Antimony (Sb)	2019/05/31		110	%	80 - 120
			Total Arsenic (As)	2019/05/31		98	%	80 - 120
			Total Barium (Ba)	2019/05/31		102	%	80 - 120
			Total Beryllium (Be)	2019/05/31		100	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		104	%	80 - 120
			Total Boron (B)	2019/05/31		NC	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		98	%	80 - 120
			Total Calcium (Ca)	2019/05/31		106	%	80 - 120
			Total Chromium (Cr)	2019/05/31		97	%	80 - 120
			Total Cobalt (Co)	2019/05/31		100	%	80 - 120
			Total Copper (Cu)	2019/05/31		98	%	80 - 120
			Total Iron (Fe)	2019/05/31		106	%	80 - 120
			Total Lead (Pb)	2019/05/31		104	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		101	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		105	%	80 - 120
			Total Nickel (Ni)	2019/05/31		102	%	80 - 120
			Total Phosphorus (P)	2019/05/31		104	%	80 - 120
			Total Potassium (K)	2019/05/31		104	%	80 - 120
			Total Selenium (Se)	2019/05/31		96	%	80 - 120
			Total Silver (Ag)	2019/05/31		101	%	80 - 120
			Total Sodium (Na)	2019/05/31		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/31		103	%	80 - 120
			Total Thallium (Tl)	2019/05/31		105	%	80 - 120
			Total Tin (Sn)	2019/05/31		105	%	80 - 120
			Total Titanium (Ti)	2019/05/31		99	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		101	%	80 - 120
			Total Zinc (Zn)	2019/05/31		100	%	80 - 120
6148971	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/31		101	%	80 - 120
			Total Antimony (Sb)	2019/05/31		107	%	80 - 120
			Total Arsenic (As)	2019/05/31		99	%	80 - 120
			Total Barium (Ba)	2019/05/31		100	%	80 - 120
			Total Beryllium (Be)	2019/05/31		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		105	%	80 - 120
			Total Boron (B)	2019/05/31		98	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		96	%	80 - 120
			Total Calcium (Ca)	2019/05/31		107	%	80 - 120
			Total Chromium (Cr)	2019/05/31		99	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cobalt (Co)	2019/05/31		101	%	80 - 120
			Total Copper (Cu)	2019/05/31		99	%	80 - 120
			Total Iron (Fe)	2019/05/31		107	%	80 - 120
			Total Lead (Pb)	2019/05/31		103	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		102	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		102	%	80 - 120
			Total Nickel (Ni)	2019/05/31		99	%	80 - 120
			Total Phosphorus (P)	2019/05/31		105	%	80 - 120
			Total Potassium (K)	2019/05/31		102	%	80 - 120
			Total Selenium (Se)	2019/05/31		97	%	80 - 120
			Total Silver (Ag)	2019/05/31		100	%	80 - 120
			Total Sodium (Na)	2019/05/31		102	%	80 - 120
			Total Strontium (Sr)	2019/05/31		106	%	80 - 120
			Total Thallium (Tl)	2019/05/31		107	%	80 - 120
			Total Tin (Sn)	2019/05/31		106	%	80 - 120
			Total Titanium (Ti)	2019/05/31		98	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		102	%	80 - 120
			Total Zinc (Zn)	2019/05/31		101	%	80 - 120
6148971	BAN	Method Blank	Total Aluminum (Al)	2019/05/31	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/31	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/31	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/31	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/31	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/31	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/31	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/31	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/31	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/31	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/31	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/05/31	ND, RDL=5.0		ug/L	
6148971	BAN	RPD	Total Aluminum (Al)	2019/05/31	4.3		%	20
6151063	AM6	QC Standard	Total Suspended Solids	2019/06/03		100	%	80 - 120
6151063	AM6	Method Blank	Total Suspended Solids	2019/06/03	ND, RDL=1.0		mg/L	
6151063	AM6	RPD	Total Suspended Solids	2019/06/03	0		%	20
6151065	LGE	Matrix Spike	D10-Anthracene	2019/06/01		90	%	50 - 130
			D14-Terphenyl	2019/06/01		70 (2)	%	50 - 130
			D8-Acenaphthylene	2019/06/01		85	%	50 - 130
			1-Methylnaphthalene	2019/06/01		81	%	50 - 130
			2-Methylnaphthalene	2019/06/01		84	%	50 - 130
			Acenaphthene	2019/06/01		87	%	50 - 130
			Acenaphthylene	2019/06/01		84	%	50 - 130
			Anthracene	2019/06/01		79	%	50 - 130
			Benzo(a)anthracene	2019/06/01		76	%	50 - 130
			Benzo(a)pyrene	2019/06/01		61	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		75	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		36 (3)	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		60	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		69	%	50 - 130
			Chrysene	2019/06/01		96	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		40 (3)	%	50 - 130
			Fluoranthene	2019/06/01		88	%	50 - 130
			Fluorene	2019/06/01		95	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		33 (3)	%	50 - 130
			Naphthalene	2019/06/01		84	%	50 - 130
			Perylene	2019/06/01		31 (3)	%	50 - 130
			Phenanthrene	2019/06/01		96	%	50 - 130
			Pyrene	2019/06/01		86	%	50 - 130
6151065	LGE	Spiked Blank	D10-Anthracene	2019/06/01		105	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		100	%	50 - 130
			1-Methylnaphthalene	2019/06/01		93	%	50 - 130
			2-Methylnaphthalene	2019/06/01		95	%	50 - 130
			Acenaphthene	2019/06/01		100	%	50 - 130
			Acenaphthylene	2019/06/01		98	%	50 - 130
			Anthracene	2019/06/01		93	%	50 - 130
			Benzo(a)anthracene	2019/06/01		86	%	50 - 130
			Benzo(a)pyrene	2019/06/01		94	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		106	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		96	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		95	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		101	%	50 - 130
			Chrysene	2019/06/01		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		96	%	50 - 130
			Fluoranthene	2019/06/01		99	%	50 - 130
			Fluorene	2019/06/01		109	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		94	%	50 - 130
			Naphthalene	2019/06/01		95	%	50 - 130
			Perylene	2019/06/01		90	%	50 - 130
			Phenanthrene	2019/06/01		111	%	50 - 130
			Pyrene	2019/06/01		98	%	50 - 130
6151065	LGE	Method Blank	D10-Anthracene	2019/06/01		108	%	50 - 130
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		99	%	50 - 130
			1-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/06/01	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/06/01	ND, RDL=0.010		ug/L	
			Anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Chrysene	2019/06/01	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluorene	2019/06/01	ND, RDL=0.010		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Indeno(1,2,3-cd)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Naphthalene	2019/06/01	ND, RDL=0.20		ug/L	
			Perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/06/01	ND, RDL=0.010		ug/L	
			Pyrene	2019/06/01	ND, RDL=0.010		ug/L	
6151065	LGE	RPD	1-Methylnaphthalene	2019/06/01	NC		%	40
			2-Methylnaphthalene	2019/06/01	NC		%	40
			Acenaphthene	2019/06/01	NC		%	40
			Acenaphthylene	2019/06/01	NC		%	40
			Anthracene	2019/06/01	NC		%	40
			Benzo(a)anthracene	2019/06/01	NC		%	40
			Benzo(a)pyrene	2019/06/01	NC		%	40
			Benzo(b)fluoranthene	2019/06/01	NC		%	40
			Benzo(g,h,i)perylene	2019/06/01	NC		%	40
			Benzo(j)fluoranthene	2019/06/01	NC		%	40
			Benzo(k)fluoranthene	2019/06/01	NC		%	40
			Chrysene	2019/06/01	NC		%	40
			Dibenz(a,h)anthracene	2019/06/01	NC		%	40
			Fluoranthene	2019/06/01	13		%	40
			Fluorene	2019/06/01	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/06/01	NC		%	40
			Naphthalene	2019/06/01	NC		%	40
			Perylene	2019/06/01	NC		%	40
			Phenanthrene	2019/06/01	NC		%	40
			Pyrene	2019/06/01	12		%	40
6151090	SSI	Matrix Spike [JVR264-16]	Total Organic Carbon (C)	2019/05/31		96	%	85 - 115
6151090	SSI	Spiked Blank	Total Organic Carbon (C)	2019/05/31		102	%	80 - 120
6151090	SSI	Method Blank	Total Organic Carbon (C)	2019/05/31	ND, RDL=0.50		mg/L	
6151090	SSI	RPD [JVR264-16]	Total Organic Carbon (C)	2019/05/31	6.2		%	15
6151471	NRG	Spiked Blank	Colour	2019/05/31		103	%	80 - 120
6151471	NRG	Method Blank	Colour	2019/05/31	ND, RDL=5.0		TCU	
6151471	NRG	RPD	Colour	2019/05/31	NC		%	20
6153411	THL	Matrix Spike	Isobutylbenzene - Volatile	2019/06/02		90	%	70 - 130
			Benzene	2019/06/02		106	%	70 - 130
			Toluene	2019/06/02		108	%	70 - 130
			Ethylbenzene	2019/06/02		112	%	70 - 130
			Total Xylenes	2019/06/02		109	%	70 - 130
6153411	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/06/02		103	%	70 - 130
			Benzene	2019/06/02		117	%	70 - 130
			Toluene	2019/06/02		118	%	70 - 130
			Ethylbenzene	2019/06/02		118	%	70 - 130
			Total Xylenes	2019/06/02		117	%	70 - 130
6153411	THL	Method Blank	Isobutylbenzene - Volatile	2019/06/02		102	%	70 - 130
			Benzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Toluene	2019/06/02	ND, RDL=0.0010		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethylbenzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/06/02	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/06/02	ND, RDL=0.010		mg/L	
6153411	THL	RPD	Benzene	2019/06/02	NC		%	40
			Toluene	2019/06/02	NC		%	40
			Ethylbenzene	2019/06/02	NC		%	40
			Total Xylenes	2019/06/02	NC		%	40
			C6 - C10 (less BTEX)	2019/06/02	NC		%	40
6153711	SSV	Matrix Spike [JVR264-05]	Total Kjeldahl Nitrogen (TKN)	2019/06/04		104	%	80 - 120
6153711	SSV	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/06/04		98	%	80 - 120
6153711	SSV	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04		103	%	80 - 120
6153711	SSV	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04	ND, RDL=0.10		mg/L	
6153711	SSV	RPD [JVR264-05]	Total Kjeldahl Nitrogen (TKN)	2019/06/04	16		%	20
6154440	NRG	Matrix Spike	Total Phosphorus	2019/06/04		123 (4)	%	80 - 120
6154440	NRG	Spiked Blank	Total Phosphorus	2019/06/04		102	%	80 - 120
6154440	NRG	Method Blank	Total Phosphorus	2019/06/04	ND, RDL=0.020		mg/L	
6154440	NRG	RPD	Total Phosphorus	2019/06/04	NC		%	25
6154879	GTO	Matrix Spike	Sulphide	2019/06/03		83	%	80 - 120
6154879	GTO	Spiked Blank	Sulphide	2019/06/03		90	%	80 - 120
6154879	GTO	Method Blank	Sulphide	2019/06/03	ND, RDL=0.020		mg/L	
6154879	GTO	RPD	Sulphide	2019/06/03	NC		%	20
6155176	SSI	Matrix Spike	Dissolved Organic Carbon (C)	2019/06/04		94	%	85 - 115
6155176	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/06/04		100	%	80 - 120
6155176	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/06/04	ND, RDL=0.50		mg/L	
6155176	SSI	RPD	Dissolved Organic Carbon (C)	2019/06/04	0.90		%	15
6156517	RGE	Matrix Spike	Decachlorobiphenyl	2019/06/05		96	%	30 - 130
			Aroclor 1254	2019/06/05		109	%	70 - 130
6156517	RGE	Spiked Blank	Decachlorobiphenyl	2019/06/05		74	%	30 - 130
			Aroclor 1254	2019/06/05		103	%	70 - 130
6156517	RGE	Method Blank	Decachlorobiphenyl	2019/06/05		65	%	30 - 130
			Aroclor 1016	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/06/05	ND, RDL=0.050		ug/L	
6156517	RGE	RPD	Aroclor 1016	2019/06/05	NC		%	40
			Aroclor 1221	2019/06/05	NC		%	40
			Aroclor 1232	2019/06/05	NC		%	40
			Aroclor 1248	2019/06/05	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Aroclor 1242	2019/06/05	NC		%	40
			Aroclor 1254	2019/06/05	NC		%	40
			Aroclor 1260	2019/06/05	NC		%	40
6156521	BBD	QC Standard	Salinity	2019/06/04		100	%	80 - 120
6156521	BBD	Method Blank	Salinity	2019/06/04	ND, RDL=2.0		N/A	
6156521	BBD	RPD	Salinity	2019/06/04	0		%	25
6156546	NRG	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/06/04		105	%	80 - 120
6156546	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/06/04		107	%	80 - 120
6156546	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/06/04	ND, RDL=0.050		mg/L	
6156546	NRG	RPD	Nitrogen (Ammonia Nitrogen)	2019/06/04	9.2		%	20
6157072	AM6	QC Standard	Volatile Suspended Solids	2019/06/04		98	%	80 - 120
6157072	AM6	Method Blank	Volatile Suspended Solids	2019/06/04	ND, RDL=2.0		mg/L	
6157072	AM6	RPD	Volatile Suspended Solids	2019/06/04	9.5		%	25
6157791	BB3	Matrix Spike	Total Nitrogen (N)	2019/06/03		101	%	80 - 120
6157791	BB3	Spiked Blank	Total Nitrogen (N)	2019/06/03		99	%	80 - 120
6157791	BB3	Method Blank	Total Nitrogen (N)	2019/06/03	ND, RDL=0.020		mg/L	
6157791	BB3	RPD	Total Nitrogen (N)	2019/06/03	3.0		%	20
6158767	EMT	QC Standard	pH	2019/06/05		101	%	97 - 103
6158767	EMT	RPD	pH	2019/06/05	1.7		%	N/A
6158768	EMT	Spiked Blank	Conductivity	2019/06/05		106	%	80 - 120
6158768	EMT	Method Blank	Conductivity	2019/06/05	110, RDL=1.0		uS/cm	
6158768	EMT	RPD	Conductivity	2019/06/05	0.94		%	10
6158813	EMT	QC Standard	Turbidity	2019/06/05		105	%	80 - 120
6158813	EMT	Spiked Blank	Turbidity	2019/06/05		97	%	80 - 120
6158813	EMT	Method Blank	Turbidity	2019/06/05	ND, RDL=0.10		NTU	
6158813	EMT	RPD	Turbidity	2019/06/05	37 (5)		%	20
6158831	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/06/06		NC	%	80 - 120
6158831	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/06/05		103	%	80 - 120
6158831	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/06/05	ND, RDL=5.0		mg/L	
6158831	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/06/06	2.5		%	25
6158832	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/06/05		99	%	80 - 120
6158832	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/06/05		99	%	80 - 120
6158832	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/06/05	ND, RDL=1.0		mg/L	
6158832	SRM	RPD	Dissolved Chloride (Cl-)	2019/06/05	2.4		%	25
6158834	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/06/05		100	%	80 - 120
6158834	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/06/05		99	%	80 - 120
6158834	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/06/05	ND, RDL=2.0		mg/L	
6158834	SRM	RPD	Dissolved Sulphate (SO4)	2019/06/05	6.4		%	25
6158837	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/06/06		NC	%	80 - 120
6158837	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/06/06		98	%	80 - 120
6158837	SRM	Method Blank	Reactive Silica (SiO2)	2019/06/06	ND, RDL=0.50		mg/L	
6158837	SRM	RPD	Reactive Silica (SiO2)	2019/06/06	4.8		%	25
6158838	SRM	Matrix Spike	Orthophosphate (P)	2019/06/05		95	%	80 - 120
6158838	SRM	Spiked Blank	Orthophosphate (P)	2019/06/05		94	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6158838	SRM	Method Blank	Orthophosphate (P)	2019/06/05	ND, RDL=0.010		mg/L	
6158838	SRM	RPD	Orthophosphate (P)	2019/06/05	1.8		%	25
6158840	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/06/05		101	%	80 - 120
6158840	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/06/05		93	%	80 - 120
6158840	SRM	Method Blank	Nitrate + Nitrite (N)	2019/06/05	ND, RDL=0.050		mg/L	
6158840	SRM	RPD	Nitrate + Nitrite (N)	2019/06/05	NC		%	25
6158842	SRM	Matrix Spike	Nitrite (N)	2019/06/05		45 (6)	%	80 - 120
6158842	SRM	Spiked Blank	Nitrite (N)	2019/06/05		99	%	80 - 120
6158842	SRM	Method Blank	Nitrite (N)	2019/06/05	ND, RDL=0.010		mg/L	
6158842	SRM	RPD	Nitrite (N)	2019/06/05	NC		%	20
6160103	BKE	Matrix Spike	Total Cyanide (CN)	2019/06/08		92	%	80 - 120
6160103	BKE	Spiked Blank	Total Cyanide (CN)	2019/06/08		100	%	80 - 120
6160103	BKE	Method Blank	Total Cyanide (CN)	2019/06/08	ND, RDL=0.0050		mg/L	
6160103	BKE	RPD	Total Cyanide (CN)	2019/06/08	NC		%	20
6165901	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
6165901	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
6165901	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
6170521	OBC	Spiked Blank	C13-1234678 HeptaCDD	2019/06/11		123	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/11		99	%	30 - 130
			C13-123678 HexaCDD	2019/06/11		127	%	30 - 130
			C13-123678 HexaCDF	2019/06/11		88	%	30 - 130
			C13-12378 PentaCDD	2019/06/11		87	%	30 - 130
			C13-12378 PentaCDF	2019/06/11		66	%	30 - 130
			C13-2378 TetraCDD	2019/06/11		92	%	30 - 130
			C13-2378 TetraCDF	2019/06/11		80	%	30 - 130
			C13-OCDD	2019/06/11		116	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/11		90	%	80 - 140
			1,2,3,7,8-Penta CDD	2019/06/11		100	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2019/06/11		85	%	80 - 140

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3,6,7,8-Hexa CDD	2019/06/11		97	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2019/06/11		93	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2019/06/11		85	%	80 - 140
			Octa CDD	2019/06/11		81	%	80 - 140
			2,3,7,8-Tetra CDF	2019/06/11		101	%	80 - 140
			1,2,3,7,8-Penta CDF	2019/06/11		126	%	80 - 140
			2,3,4,7,8-Penta CDF	2019/06/11		119	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2019/06/11		113	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2019/06/11		120	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2019/06/11		123	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2019/06/11		122	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2019/06/11		105	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2019/06/11		99	%	80 - 140
			Octa CDF	2019/06/11		86	%	80 - 140
6170521	OBC	RPD	2,3,7,8-Tetra CDD	2019/06/12	4.3		%	35
			1,2,3,7,8-Penta CDD	2019/06/12	12		%	35
			1,2,3,4,7,8-Hexa CDD	2019/06/12	9.0		%	35
			1,2,3,6,7,8-Hexa CDD	2019/06/12	1.0		%	35
			1,2,3,7,8,9-Hexa CDD	2019/06/12	8.2		%	35
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	28		%	35
			Octa CDD	2019/06/12	0		%	35
			2,3,7,8-Tetra CDF	2019/06/12	16		%	35
			1,2,3,7,8-Penta CDF	2019/06/12	3.1		%	35
			2,3,4,7,8-Penta CDF	2019/06/12	14		%	35
			1,2,3,4,7,8-Hexa CDF	2019/06/12	2.6		%	35
			1,2,3,6,7,8-Hexa CDF	2019/06/12	0		%	35
			2,3,4,6,7,8-Hexa CDF	2019/06/12	4.8		%	35
			1,2,3,7,8,9-Hexa CDF	2019/06/12	2.5		%	35
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	4.7		%	35
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	1.0		%	35
			Octa CDF	2019/06/12	0		%	35
6170521	OBC	Method Blank	C13-1234678 HeptaCDD	2019/06/12		107	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/12		96	%	30 - 130
			C13-123678 HexaCDD	2019/06/12		118	%	30 - 130
			C13-123678 HexaCDF	2019/06/12		82	%	30 - 130
			C13-12378 PentaCDD	2019/06/12		77	%	30 - 130
			C13-12378 PentaCDF	2019/06/12		61	%	30 - 130
			C13-2378 TetraCDD	2019/06/12		85	%	30 - 130
			C13-2378 TetraCDF	2019/06/12		79	%	30 - 130
			C13-OCDD	2019/06/12		113	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			1,2,3,7,8-Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			1,2,3,4,7,8-Hexa CDD	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,6,7,8-Hexa CDD	2019/06/12	ND, EDL=1.02		pg/L	
			1,2,3,7,8,9-Hexa CDD	2019/06/12	ND, EDL=0.995		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	
			Octa CDD	2019/06/12	ND, EDL=1.16 (7)		pg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			Total Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			Total Hexa CDD	2019/06/12	ND, EDL=1.13 (7)		pg/L	
			Total Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	
			2,3,7,8-Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,7,8-Penta CDF	2019/06/12	ND, EDL=1.18		pg/L	
			2,3,4,7,8-Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			1,2,3,4,7,8-Hexa CDF	2019/06/12	ND, EDL=1.13		pg/L	
			1,2,3,6,7,8-Hexa CDF	2019/06/12	ND, EDL=0.939		pg/L	
			2,3,4,6,7,8-Hexa CDF	2019/06/12	ND, EDL=1.06		pg/L	
			1,2,3,7,8,9-Hexa CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	ND, EDL=1.09		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	ND, EDL=1.24		pg/L	
			Octa CDF	2019/06/12	ND, EDL=1.16		pg/L	
			Total Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			Total Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			Total Hexa CDF	2019/06/12	ND, EDL=1.07		pg/L	
			Total Hepta CDF	2019/06/12	ND, EDL=1.16		pg/L	
6172547	LZ3	Matrix Spike	9,10-Dichlorostearic acid	2019/06/01		96	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		90	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		85	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		92	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		98	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		85	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		87	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		94	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		94	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		92	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		91	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		102	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		106	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			Abietic acid	2019/06/01		NC	%	50 - 130
			Dehydroabietic acid	2019/06/01		NC	%	50 - 130
			Isopimaric acid	2019/06/01		NC	%	50 - 130
			Neoabietic acid	2019/06/01		68	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Palustric acid	2019/06/01		67	%	50 - 130
			Pimaric acid	2019/06/01		102	%	50 - 130
			Sandaracopimaric acid	2019/06/01		101	%	50 - 130
6172547	LZ3	Spiked Blank	9,10-Dichlorostearic acid	2019/06/01		94	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		94	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		88	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		94	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		96	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		99	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		89	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		86	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		105	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		99	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		94	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		103	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		114	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		108	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		110	%	50 - 130
			Abietic acid	2019/06/01		94	%	50 - 130
			Dehydroabietic acid	2019/06/01		128	%	50 - 130
			Isopimaric acid	2019/06/01		115	%	50 - 130
			Neoabietic acid	2019/06/01		63	%	50 - 130
			Palustric acid	2019/06/01		74	%	50 - 130
			Pimaric acid	2019/06/01		107	%	50 - 130
			Sandaracopimaric acid	2019/06/01		105	%	50 - 130
6172547	LZ3	Method Blank	Total Fatty Acids	2019/06/01	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/06/01	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/06/01	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/06/01	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/06/01	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/06/01	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/06/01	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/06/01	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/06/01	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/06/01	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/06/01	ND, RDL=0.0060		mg/L	
			12,14-Dichlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			12-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
6172547	LZ3	RPD	Total Fatty Acids	2019/06/01	NC		%	30
			Total Resin Acids	2019/06/01	NC		%	30
			9,10-Dichlorostearic acid	2019/06/01	NC		%	30
			Decanoic Acid (C10)	2019/06/01	NC		%	30
			Docosanoic acid (C22)	2019/06/01	NC		%	30
			Dodecanoic acid (C12)	2019/06/01	NC		%	30
			Eicosanoic acid (C20)	2019/06/01	NC		%	30
			Hexadecanoic acid (C16)	2019/06/01	NC		%	30
			Linoleic acid (C18:2)	2019/06/01	NC		%	30
			Linolenic acid (C18:3)	2019/06/01	NC		%	30
			Octadecanoic acid (C18)	2019/06/01	NC		%	30
			Oleic acid (C18:1)	2019/06/01	NC		%	30
			Tetradecanoic acid (C14)	2019/06/01	NC		%	30
			Undecanoic acid (C11)	2019/06/01	NC		%	30
			12,14-Dichlorodehydroabietic acid	2019/06/01	NC		%	30
			12-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			14-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			Abietic acid	2019/06/01	NC		%	30
			Dehydroabietic acid	2019/06/01	NC		%	30
			Isopimaric acid	2019/06/01	NC		%	30
			Neoabietic acid	2019/06/01	NC		%	30
			Palustric acid	2019/06/01	NC		%	30
			Pimaric acid	2019/06/01	NC		%	30

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Sandaracopimaric acid	2019/06/01	NC		%	30

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) BOD Analysis: Second source QC recovery high. Reference Material recovery and all other QC acceptable.

(2) PAH sample contained sediment.

(3) Matrix Spike: results are outside acceptance limit. Probable matrix interference.

(4) Elevated spike recovery due to sample matrix, result confirmed by repeat analysis.

(5) Poor duplicate agreement due to sample inhomogeneity, insufficient sample available to confirm results.

(6) Poor spike recovery due to sample matrix, result confirmed by repeat analysis.

(7) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE

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

Brad Newman, Scientific Service Specialist

Harry (Peng) Liang, Senior Analyst

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Eric Dearman, Scientific Specialist

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Mike MacGillivray, Scientific Specialist (Inorganics)

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE(CONT'D)

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



Rosemarie MacDonald, Scientific Specialist (Organics)



Rob Reinert, B.Sc., Scientific Specialist

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your Project #: B9E4487
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449981
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920963
Received: 2019/06/01, 09:16

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/06/03	2019/06/05	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Your Project #: B9E4487
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

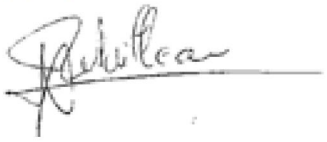
Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449981
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920963
Received: 2019/06/01, 09:16

Encryption Key



Sophie Retailleau
Project Manager
21 Jun 2019 16:05:12

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: Sophie.RETAILLEAU@bvlabs.com
Phone# (514)448-9001 Ext:7066232

==========

This report has been generated and distributed using a secure automated process.
Lab BV has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5618		
Sampling Date		2019/05/24 13:30		
COC Number		N-A		
	Units	**JVR264-13R\CARIBOU SEA WATER CH-BOF 1-1**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	<10	10	1994633
Phenol	ug/L	<1.0	1.0	1994633
2-Chlorophenol	ug/L	<1.0	1.0	1994633
3-Chlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorophenol	ug/L	<1.0	1.0	1994633
o-Cresol	ug/L	<1.0	1.0	1994633
m-Cresol	ug/L	<1.0	1.0	1994633
p-Cresol	ug/L	<1.0	1.0	1994633
Guaiacol	ug/L	<1.0	1.0	1994633
Catechol	ug/L	<1.0	1.0	1994633
Eugenol	ug/L	<1.0	1.0	1994633
Isoeugenol	ug/L	<1.0	1.0	1994633
6-Chlorovanillin	ug/L	<1.0	1.0	1994633
5,6-Dichlorovanillin	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorosyringol	ug/L	<1.0	1.0	1994633
2,4-Dimethylphenol	ug/L	<1.0	1.0	1994633
2,6-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,3-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,4-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,4 + 2,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2-Nitrophenol	ug/L	<2.0	2.0	1994633
4-Nitrophenol	ug/L	<10	10	1994633
2,4,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,4-Trichlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
4-Chloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
4,6-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
2,3,5,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5618		
Sampling Date		2019/05/24 13:30		
COC Number		N-A		
	Units	**JVR264-13R\CARIBOU SEA WATER CH-BOF 1-1**	**RDL**	**QC Batch**
2,3,4,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
2,3,4,5-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorocatechol	ug/L	<1.0	1.0	1994633
3,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
4,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
4,5,6-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
Pentachlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5,6-Tetrachloroveratrol	ug/L	<1.0	1.0	1994633
Surrogate Recovery (%)				
D6-Phenol	%	122	N/A	1994633
Tribromophenol-2,4,6	%	76	N/A	1994633
Trifluoro-m-cresol	%	92	N/A	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total "Total Phenols (RFPP) " calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Reported detection limits are modified according to the volume of sample received.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1994633	GDL	Spiked Blank	D6-Phenol	2019/06/04		107	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		95	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		105	%	50 - 130
			Phenol	2019/06/04		100	%	50 - 130
			2-Chlorophenol	2019/06/04		95	%	50 - 130
			3-Chlorophenol	2019/06/04		96	%	50 - 130
			4-Chlorophenol	2019/06/04		99	%	50 - 130
			o-Cresol	2019/06/04		104	%	50 - 130
			m-Cresol	2019/06/04		101	%	50 - 130
			p-Cresol	2019/06/04		101	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		95	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		105	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		95	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		106	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		100	%	50 - 130
			2-Nitrophenol	2019/06/04		94	%	50 - 130
			4-Nitrophenol	2019/06/04		92	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		94	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		107	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		109	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		102	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		95	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/06/04		107	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		96	%	50 - 130
			Pentachlorophenol	2019/06/04		90	%	50 - 130
1994633	GDL	Spiked Blank DUP	D6-Phenol	2019/06/04		105	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04		98	%	50 - 130
			2-Chlorophenol	2019/06/04		93	%	50 - 130
			3-Chlorophenol	2019/06/04		95	%	50 - 130
			4-Chlorophenol	2019/06/04		93	%	50 - 130
			o-Cresol	2019/06/04		102	%	50 - 130
			m-Cresol	2019/06/04		100	%	50 - 130
			p-Cresol	2019/06/04		98	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		91	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		91	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		94	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		100	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		96	%	50 - 130
			2-Nitrophenol	2019/06/04		87	%	50 - 130
			4-Nitrophenol	2019/06/04		89	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		97	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		87	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		98	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		95	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		95	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		88	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/06/04		103	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		92	%	50 - 130
			Pentachlorophenol	2019/06/04		87	%	50 - 130
1994633	GDL	Method Blank	D6-Phenol	2019/06/04		99	%	50 - 130
			Total of Regl. P&P Phenols	2019/06/04	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04	<0.50		ug/L	
			2-Chlorophenol	2019/06/04	<0.50		ug/L	
			3-Chlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorophenol	2019/06/04	<0.50		ug/L	
			o-Cresol	2019/06/04	<0.50		ug/L	
			m-Cresol	2019/06/04	<0.50		ug/L	
			p-Cresol	2019/06/04	<0.50		ug/L	
			Guaiacol	2019/06/04	<0.50		ug/L	
			Catechol	2019/06/04	<0.50		ug/L	
			Eugenol	2019/06/04	<0.50		ug/L	
			Isoeugenol	2019/06/04	<0.50		ug/L	
			6-Chlorovanillin	2019/06/04	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/06/04	<0.50		ug/L	
			2,4-Dimethylphenol	2019/06/04	<0.50		ug/L	
			2,6-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,3-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,4-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2-Nitrophenol	2019/06/04	<1.0		ug/L	
			4-Nitrophenol	2019/06/04	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			4-Chloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorocatechol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			Pentachlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/06/04	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/06/04	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

[redacted]XAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Maxxam
A Bureau Veritas Group Company

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac

Job# B9E4487

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JVR264-13R\CARIBOU SEA WATER CH-BOF 1-1	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/24 13:30	2019/06/06

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	3	1	1	Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) _____ (print) _____ Date and Time 2019/05/30 13:30

Received by (Sign) _____ (print) _____ Date and Time 2019/05/31 09:40

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:

National: N001

Regional:

B920963_COC

01-Jun-19 09:16
Sophie Retailleau
B920963

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☐ COC Must be Attached

Sender (Print) _____ Initial _____

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler, Ice, Tape-custody seal, Date&Sign
Date Shipped May 30/19 Number of coolers 1
Shipper (Print) _____ Initial _____

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715280-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768479
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4914
Received: 2019/05/29, 12:53

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/06/05	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/06/05	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/06/03	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/30	2019/06/04	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/06/06	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/30	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/05/31	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/06/05	2019/06/08	CAM SOP-00457	OMOE E3015 5 m
Organic carbon - Diss (DOC) (6)	1	N/A	2019/06/04	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/06/05	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/06/06	2019/06/06	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/06/03		
Hardness (calculated as CaCO3)	1	N/A	2019/05/31	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/31	2019/05/31	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/30	2019/05/31	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/06/06	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/06/05	N/A	Auto Calc.
Chlorate and Chlorite by IC (2)	1	N/A	2019/06/06	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (3)	1	N/A	2019/06/03	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (2)	1	2019/05/31	2019/06/02	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/06/04	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/06/05	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/06/05	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/06/06	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/31	2019/06/01	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/06/04	2019/06/05	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/06/05	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (4)	1	2019/06/01	2019/06/05		
pH (7)	1	N/A	2019/06/05	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	1	N/A	2019/06/05	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	1	N/A	2019/06/02	ATL SOP 00118	Atl. RBCA v3.1 m

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715280-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768479
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4914
Received: 2019/05/29, 12:53

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Salinity (8)	1	N/A	2019/06/04		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/06/06	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/06/06	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/06/06	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/06/06	ATL SOP 00023	ASTM D516-16 m
Particle Size (Oily W)(Sub from Bedford) (5)	1	2019/06/01	2019/06/17		
Sulphide (1)	1	N/A	2019/06/03	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/06/06	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/06/01	2019/06/04	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (6)	1	N/A	2019/06/03	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/06/07	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/06/03	2019/06/04	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/31	2019/06/03	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/06/06	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/30	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/06/04	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715280-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768479
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4914
Received: 2019/05/29, 12:53

dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Calgary Offsite
(3) This test was performed by Bedford to Burnaby - Offsite
(4) This test was performed by Bedford to Montreal Subcontrac
(5) This test was performed by Bedford to Lex Subcontract
(6) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(7) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(8) Non-accredited test method

Encryption Key



Neyousha Shahisavandi
Project Manager Assistant
24 Jun 2019 14:29:02

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4914
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	489	N/A	N/A	6148659
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	92	1.0	0.20	6148652
Calculated TDS	mg/L	28000	1.0	0.20	6148671
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	6148652
Cation Sum	me/L	495	N/A	N/A	6148659
Hardness (CaCO3)	mg/L	5300	1.0	1.0	6148656
Ion Balance (% Difference)	%	0.570	N/A	N/A	6148657
Langelier Index (@ 20C)	N/A	0.265			6148667
Langelier Index (@ 4C)	N/A	0.0270			6148669
Nitrate (N)	mg/L	ND	0.050	N/A	6148661
Saturation pH (@ 20C)	N/A	7.35			6148667
Saturation pH (@ 4C)	N/A	7.58			6148669
Sulphide (as H2S)	mg/L	ND	0.021	0.011	6148642
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	92	5.0	N/A	6158831
Carbonaceous BOD	mg/L	ND (1)	10	N/A	6148701
Total Chemical Oxygen Demand	mg/L	990	200	N/A	6148620
Dissolved Chlorate (ClO3-)	mg/L	ND (2)	5.0	N/A	6165901
Dissolved Chloride (Cl-)	mg/L	16000	500	N/A	6158832
Dissolved Chlorite (CLO2-)	mg/L	ND (2)	5.0	N/A	6165901
Colour	TCU	ND	5.0	N/A	6151471
Total Kjeldahl Nitrogen (TKN)	mg/L	0.14	0.10	0.060	6153709
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	6158840
Nitrite (N)	mg/L	ND	0.010	N/A	6158842
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	N/A	6156546
Dissolved Organic Carbon (C)	mg/L	1.7	0.50	N/A	6155176
Total Organic Carbon (C)	mg/L	2.3	0.50	N/A	6154507
Orthophosphate (P)	mg/L	ND	0.010	N/A	6158838
pH	pH	7.61	N/A	N/A	6158767

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Sample integrity may have been compromised, the sample exceeded it's hold time prior to being analyzed.
(2) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4914
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Total Phosphorus	mg/L	ND	0.020	N/A	6154440
Salinity	N/A	26	2.0	N/A	6156521
Reactive Silica (SiO2)	mg/L	ND	0.50	N/A	6158837
Total Suspended Solids	mg/L	4.8	1.0	N/A	6151063
Dissolved Sulphate (SO4)	mg/L	2000	40	N/A	6158834
Sulphide	mg/L	ND	0.020	0.010	6154879
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6160103
Turbidity	NTU	0.75	0.10	0.10	6161254
Volatile Suspended Solids	mg/L	2.6	2.0	N/A	6157072
Conductivity	uS/cm	42000	1.0	N/A	6158768
Nutritional Parameters					
Total Nitrogen (N)	mg/L	0.176	0.020	N/A	6157791
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6153395

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	ND	0.013	N/A	6148649

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4914
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	ND	50	N/A	6148971
Total Antimony (Sb)	ug/L	ND	10	N/A	6148971
Total Arsenic (As)	ug/L	ND	10	N/A	6148971
Total Barium (Ba)	ug/L	12	10	N/A	6148971
Total Beryllium (Be)	ug/L	ND	10	N/A	6148971
Total Bismuth (Bi)	ug/L	ND	20	N/A	6148971
Total Boron (B)	ug/L	3700	500	N/A	6148971
Total Cadmium (Cd)	ug/L	ND	0.10	N/A	6148971
Total Calcium (Ca)	ug/L	340000	1000	N/A	6148971
Total Chromium (Cr)	ug/L	ND	10	N/A	6148971
Total Cobalt (Co)	ug/L	ND	4.0	N/A	6148971
Total Copper (Cu)	ug/L	ND	5.0	N/A	6148971
Total Iron (Fe)	ug/L	ND	500	N/A	6148971
Total Lead (Pb)	ug/L	ND	5.0	N/A	6148971
Total Magnesium (Mg)	ug/L	1100000	1000	N/A	6148971
Total Manganese (Mn)	ug/L	ND	20	N/A	6148971
Total Molybdenum (Mo)	ug/L	ND	20	N/A	6148971
Total Nickel (Ni)	ug/L	ND	20	N/A	6148971
Total Phosphorus (P)	ug/L	ND	1000	N/A	6148971
Total Potassium (K)	ug/L	320000	1000	N/A	6148971
Total Selenium (Se)	ug/L	ND	10	N/A	6148971
Total Silver (Ag)	ug/L	ND	1.0	N/A	6148971
Total Sodium (Na)	ug/L	8800000	1000	N/A	6148971
Total Strontium (Sr)	ug/L	6200	20	N/A	6148971
Total Thallium (Tl)	ug/L	ND	1.0	N/A	6148971
Total Tin (Sn)	ug/L	ND	20	N/A	6148971
Total Titanium (Ti)	ug/L	ND	20	N/A	6148971
Total Uranium (U)	ug/L	2.8	1.0	N/A	6148971
Total Vanadium (V)	ug/L	ND	20	N/A	6148971
Total Zinc (Zn)	ug/L	ND	50	N/A	6148971

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
Acenaphthene	ug/L	ND	0.010	N/A	6151065
Acenaphthylene	ug/L	ND	0.010	N/A	6151065
Anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6151065
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6148653
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6151065
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6151065
Chrysene	ug/L	ND	0.010	N/A	6151065
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6151065
Fluoranthene	ug/L	ND	0.010	N/A	6151065
Fluorene	ug/L	ND	0.010	N/A	6151065
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6151065
Naphthalene	ug/L	ND	0.20	N/A	6151065
Perylene	ug/L	ND	0.010	N/A	6151065
Phenanthrene	ug/L	ND	0.010	N/A	6151065
Pyrene	ug/L	ND	0.010	N/A	6151065
Surrogate Recovery (%)					
D10-Anthracene	%	83			6151065
D14-Terphenyl	%	97			6151065
D8-Acenaphthylene	%	84			6151065

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6148613
1,1-Dichloroethylene	ug/L	ND	0.50	1.0	6148613
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6148613
Ethylene Dibromide	ug/L	ND	0.20	0.50	6148613
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6148613
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6148613
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
Benzene	ug/L	ND	1.0	N/A	6148613
Bromodichloromethane	ug/L	ND	1.0	0.20	6148613
Bromoform	ug/L	ND	1.0	0.20	6148613
Bromomethane	ug/L	ND	0.50	N/A	6148613
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6148613
Chlorobenzene	ug/L	ND	1.0	N/A	6148613
Chloroethane	ug/L	ND	8.0	N/A	6148613
Chloroform	ug/L	ND	1.0	0.20	6148613
Chloromethane	ug/L	ND	8.0	N/A	6148613
Dibromochloromethane	ug/L	ND	1.0	0.20	6148613
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6148613
Ethylbenzene	ug/L	ND	1.0	N/A	6148613
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6148613
Styrene	ug/L	ND	1.0	N/A	6148613
Tetrachloroethylene	ug/L	ND	1.0	N/A	6148613
Toluene	ug/L	ND	1.0	N/A	6148613
Trichloroethylene	ug/L	ND	1.0	N/A	6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6148613
Vinyl Chloride	ug/L	ND	0.50	2.0	6148613
o-Xylene	ug/L	ND	1.0	N/A	6148613
p+m-Xylene	ug/L	ND	2.0	N/A	6148613
Total Xylenes	ug/L	ND	1.0	1.0	6148613
Total Trihalomethanes	ug/L	ND	1.0	N/A	6148613
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	97			6148613
D4-1,2-Dichloroethane	%	119			6148613
D8-Toluene	%	100			6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6153411
Toluene	mg/L	ND	0.0010	N/A	6153411
Ethylbenzene	mg/L	ND	0.0010	N/A	6153411
Total Xylenes	mg/L	ND	0.0020	N/A	6153411
C6 - C10 (less BTEX)	mg/L	ND	0.010	N/A	6153411
>C10-C16 Hydrocarbons	mg/L	ND	0.050	N/A	6159674
>C16-C21 Hydrocarbons	mg/L	ND	0.050	N/A	6159674
>C21-<C32 Hydrocarbons	mg/L	ND	0.10	N/A	6159674
Modified TPH (Tier1)	mg/L	ND	0.10	N/A	6148673
Reached Baseline at C32	mg/L	NA	N/A	N/A	6159674
Hydrocarbon Resemblance	mg/L	NA	N/A	N/A	6159674
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	97			6159674
n-Dotriacontane - Extractable	%	97			6159674
Isobutylbenzene - Volatile	%	93			6153411

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4914
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.060	N/A	6156517
Aroclor 1221	ug/L	ND	0.060	N/A	6156517
Aroclor 1232	ug/L	ND	0.060	N/A	6156517
Aroclor 1248	ug/L	ND	0.060	N/A	6156517
Aroclor 1242	ug/L	ND	0.060	N/A	6156517
Aroclor 1254	ug/L	ND	0.060	N/A	6156517
Aroclor 1260	ug/L	ND	0.060	N/A	6156517
Calculated Total PCB	ug/L	ND	0.060	N/A	6148663
Surrogate Recovery (%)					
Decachlorobiphenyl	%	89 (1)			6156517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) Elevated PCB RDL due to limited sample.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JVU441			
Sampling Date		2019/05/24 13:00			
COC Number		715280-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 1-2	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	ND	0.072	N/A	6172547
Total Resin Acids	mg/L	ND	0.060	N/A	6172547
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND	0.0060	N/A	6172547
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6172547
Docosanoic acid (C22)	mg/L	ND	0.0060	N/A	6172547
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6172547
Eicosanoic acid (C20)	mg/L	ND	0.0060	N/A	6172547
Hexadecanoic acid (C16)	mg/L	ND	0.0060	N/A	6172547
Linoleic acid (C18:2)	mg/L	ND	0.0060	N/A	6172547
Linolenic acid (C18:3)	mg/L	ND	0.0060	N/A	6172547
Octadecanoic acid (C18)	mg/L	ND	0.0060	N/A	6172547
Oleic acid (C18:1)	mg/L	ND	0.0060	N/A	6172547
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6172547
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6172547
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Abietic acid	mg/L	ND	0.0060	N/A	6172547
Dehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Isopimaric acid	mg/L	ND	0.0060	N/A	6172547
Neoabietic acid	mg/L	ND	0.0060	N/A	6172547
Palustric acid	mg/L	ND	0.0060	N/A	6172547
Pimaric acid	mg/L	ND	0.0060	N/A	6172547
Sandaracopimaric acid	mg/L	ND	0.0060	N/A	6172547

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

GENERAL COMMENTS

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

Package 1	6.3°C

Sample received past the recommended holding time for BOD testing.

Sample JVU441 [CARIBOU SEA WATER CH-BOF 1-2] : Elevated reporting limits for trace metals due to sample matrix.

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6148613	ASL	Matrix Spike	4-Bromofluorobenzene	2019/05/30		99	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		120	%	70 - 130
			D8-Toluene	2019/05/30		96	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		110	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		109	%	70 - 130
			Ethylene Dibromide	2019/05/30		112	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		91	%	70 - 130
			1,2-Dichloroethane	2019/05/30		112	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		102	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		108	%	70 - 130
			1,2-Dichloropropane	2019/05/30		106	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		87	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/30		111	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		121	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		87	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		102	%	70 - 130
			Bromoform	2019/05/30		104	%	70 - 130
			Bromomethane	2019/05/30		100	%	60 - 140
			Carbon Tetrachloride	2019/05/30		105	%	70 - 130
			Chlorobenzene	2019/05/30		92	%	70 - 130
			Chloroethane	2019/05/30		90	%	60 - 140
			Chloroform	2019/05/30		102	%	70 - 130
			Chloromethane	2019/05/30		94	%	60 - 140
			Dibromochloromethane	2019/05/30		108	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		106	%	70 - 130
			Ethylbenzene	2019/05/30		94	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		103	%	70 - 130
			Styrene	2019/05/30		99	%	70 - 130
			Tetrachloroethylene	2019/05/30		97	%	70 - 130
			Toluene	2019/05/30		97	%	70 - 130
			Trichloroethylene	2019/05/30		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		93	%	60 - 140
			Vinyl Chloride	2019/05/30		91	%	60 - 140
			o-Xylene	2019/05/30		94	%	70 - 130
			p+m-Xylene	2019/05/30		92	%	70 - 130
6148613	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/30		101	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		97	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		113	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		111	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		103	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		103	%	70 - 130
			Ethylene Dibromide	2019/05/30		104	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		93	%	70 - 130
			1,2-Dichloroethane	2019/05/30		106	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		100	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		109	%	70 - 130
			1,2-Dichloropropane	2019/05/30		105	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		91	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2019/05/30		104	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		90	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		101	%	70 - 130
			Bromoform	2019/05/30		99	%	70 - 130
			Bromomethane	2019/05/30		95	%	60 - 140
			Carbon Tetrachloride	2019/05/30		108	%	70 - 130
			Chlorobenzene	2019/05/30		94	%	70 - 130
			Chloroethane	2019/05/30		91	%	60 - 140
			Chloroform	2019/05/30		101	%	70 - 130
			Chloromethane	2019/05/30		92	%	60 - 140
			Dibromochloromethane	2019/05/30		104	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		101	%	70 - 130
			Ethylbenzene	2019/05/30		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		101	%	70 - 130
			Styrene	2019/05/30		102	%	70 - 130
			Tetrachloroethylene	2019/05/30		101	%	70 - 130
			Toluene	2019/05/30		99	%	70 - 130
			Trichloroethylene	2019/05/30		101	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		96	%	60 - 140
			Vinyl Chloride	2019/05/30		87	%	60 - 140
			o-Xylene	2019/05/30		98	%	70 - 130
			p+m-Xylene	2019/05/30		96	%	70 - 130
6148613	ASL	Method Blank	4-Bromofluorobenzene	2019/05/30		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		100	%	70 - 130
			1,1-Dichloroethane	2019/05/30	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/30	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/30	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/30	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Benzene	2019/05/30	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/30	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/30	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/30	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/30	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/30	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/30	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/30	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/30	ND, RDL=2.0		ug/L	
			Styrene	2019/05/30	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Toluene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/30	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/30	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/30	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/30	ND, RDL=2.0		ug/L	
			Total Xylenes	2019/05/30	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/30	ND, RDL=1.0		ug/L	
6148613	ASL	RPD	1,1-Dichloroethane	2019/05/30	NC		%	40
			1,1-Dichloroethylene	2019/05/30	NC		%	40
			1,1,1-Trichloroethane	2019/05/30	NC		%	40
			1,1,2-Trichloroethane	2019/05/30	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/30	NC		%	40
			Ethylene Dibromide	2019/05/30	NC		%	40
			1,2-Dichlorobenzene	2019/05/30	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloroethane	2019/05/30	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/30	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/30	NC		%	40
			1,2-Dichloropropane	2019/05/30	NC		%	40
			1,3-Dichlorobenzene	2019/05/30	NC		%	40
			cis-1,3-Dichloropropene	2019/05/30	NC		%	40
			trans-1,3-Dichloropropene	2019/05/30	NC		%	40
			1,4-Dichlorobenzene	2019/05/30	NC		%	40
			Benzene	2019/05/30	NC		%	40
			Bromodichloromethane	2019/05/30	NC		%	40
			Bromoform	2019/05/30	NC		%	40
			Bromomethane	2019/05/30	NC		%	40
			Carbon Tetrachloride	2019/05/30	NC		%	40
			Chlorobenzene	2019/05/30	NC		%	40
			Chloroethane	2019/05/30	NC		%	40
			Chloroform	2019/05/30	NC		%	40
			Chloromethane	2019/05/30	NC		%	40
			Dibromochloromethane	2019/05/30	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/30	NC		%	40
			Ethylbenzene	2019/05/30	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/30	NC		%	40
			Styrene	2019/05/30	NC		%	40
			Tetrachloroethylene	2019/05/30	NC		%	40
			Toluene	2019/05/30	NC		%	40
			Trichloroethylene	2019/05/30	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/30	NC		%	40
			Vinyl Chloride	2019/05/30	NC		%	40
			o-Xylene	2019/05/30	NC		%	40
			p+m-Xylene	2019/05/30	NC		%	40
			Total Xylenes	2019/05/30	NC		%	40
			Total Trihalomethanes	2019/05/30	NC		%	40
6148620	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/05/30		81	%	80 - 120
6148620	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/30		103	%	80 - 120
6148620	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/30		105	%	80 - 120
6148620	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/30	ND, RDL=20		mg/L	
6148620	ZZH	RPD	Total Chemical Oxygen Demand	2019/05/30	12		%	25
6148649	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/31		101	%	80 - 120
6148649	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6148649	CCR	Method Blank	Total Mercury (Hg)	2019/05/31	ND, RDL=0.013		ug/L	
6148649	CCR	RPD	Total Mercury (Hg)	2019/05/31	NC		%	20
6148701	MLW	QC Standard	Carbonaceous BOD	2019/06/04		111	%	80 - 120
6148701	MLW	Spiked Blank	Carbonaceous BOD	2019/06/04		138 (1)	%	80 - 120
6148701	MLW	Method Blank	Carbonaceous BOD	2019/06/04	ND, RDL=2.0		mg/L	
6148701	MLW	RPD	Carbonaceous BOD	2019/06/04	3.5		%	25
6148971	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/31		103	%	80 - 120
			Total Antimony (Sb)	2019/05/31		110	%	80 - 120
			Total Arsenic (As)	2019/05/31		98	%	80 - 120
			Total Barium (Ba)	2019/05/31		102	%	80 - 120
			Total Beryllium (Be)	2019/05/31		100	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		104	%	80 - 120
			Total Boron (B)	2019/05/31		NC	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cadmium (Cd)	2019/05/31		98	%	80 - 120
			Total Calcium (Ca)	2019/05/31		106	%	80 - 120
			Total Chromium (Cr)	2019/05/31		97	%	80 - 120
			Total Cobalt (Co)	2019/05/31		100	%	80 - 120
			Total Copper (Cu)	2019/05/31		98	%	80 - 120
			Total Iron (Fe)	2019/05/31		106	%	80 - 120
			Total Lead (Pb)	2019/05/31		104	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		101	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		105	%	80 - 120
			Total Nickel (Ni)	2019/05/31		102	%	80 - 120
			Total Phosphorus (P)	2019/05/31		104	%	80 - 120
			Total Potassium (K)	2019/05/31		104	%	80 - 120
			Total Selenium (Se)	2019/05/31		96	%	80 - 120
			Total Silver (Ag)	2019/05/31		101	%	80 - 120
			Total Sodium (Na)	2019/05/31		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/31		103	%	80 - 120
			Total Thallium (Tl)	2019/05/31		105	%	80 - 120
			Total Tin (Sn)	2019/05/31		105	%	80 - 120
			Total Titanium (Ti)	2019/05/31		99	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		101	%	80 - 120
			Total Zinc (Zn)	2019/05/31		100	%	80 - 120
6148971	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/31		101	%	80 - 120
			Total Antimony (Sb)	2019/05/31		107	%	80 - 120
			Total Arsenic (As)	2019/05/31		99	%	80 - 120
			Total Barium (Ba)	2019/05/31		100	%	80 - 120
			Total Beryllium (Be)	2019/05/31		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		105	%	80 - 120
			Total Boron (B)	2019/05/31		98	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		96	%	80 - 120
			Total Calcium (Ca)	2019/05/31		107	%	80 - 120
			Total Chromium (Cr)	2019/05/31		99	%	80 - 120
			Total Cobalt (Co)	2019/05/31		101	%	80 - 120
			Total Copper (Cu)	2019/05/31		99	%	80 - 120
			Total Iron (Fe)	2019/05/31		107	%	80 - 120
			Total Lead (Pb)	2019/05/31		103	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		102	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		102	%	80 - 120
			Total Nickel (Ni)	2019/05/31		99	%	80 - 120
			Total Phosphorus (P)	2019/05/31		105	%	80 - 120
			Total Potassium (K)	2019/05/31		102	%	80 - 120
			Total Selenium (Se)	2019/05/31		97	%	80 - 120
			Total Silver (Ag)	2019/05/31		100	%	80 - 120
			Total Sodium (Na)	2019/05/31		102	%	80 - 120
			Total Strontium (Sr)	2019/05/31		106	%	80 - 120
			Total Thallium (Tl)	2019/05/31		107	%	80 - 120
			Total Tin (Sn)	2019/05/31		106	%	80 - 120
			Total Titanium (Ti)	2019/05/31		98	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		102	%	80 - 120
			Total Zinc (Zn)	2019/05/31		101	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6148971	BAN	Method Blank	Total Aluminum (Al)	2019/05/31	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/31	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/31	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/31	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/31	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/31	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/31	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/31	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/31	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/31	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/31	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Uranium (U)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/05/31	ND, RDL=5.0		ug/L	
6148971	BAN	RPD	Total Aluminum (Al)	2019/05/31	4.3		%	20
6151063	AM6	QC Standard	Total Suspended Solids	2019/06/03		100	%	80 - 120
6151063	AM6	Method Blank	Total Suspended Solids	2019/06/03	ND, RDL=1.0		mg/L	
6151063	AM6	RPD	Total Suspended Solids	2019/06/03	0		%	20
6151065	LGE	Matrix Spike	D10-Anthracene	2019/06/01		90	%	50 - 130
			D14-Terphenyl	2019/06/01		70 (2)	%	50 - 130
			D8-Acenaphthylene	2019/06/01		85	%	50 - 130
			1-Methylnaphthalene	2019/06/01		81	%	50 - 130
			2-Methylnaphthalene	2019/06/01		84	%	50 - 130
			Acenaphthene	2019/06/01		87	%	50 - 130
			Acenaphthylene	2019/06/01		84	%	50 - 130
			Anthracene	2019/06/01		79	%	50 - 130
			Benzo(a)anthracene	2019/06/01		76	%	50 - 130
			Benzo(a)pyrene	2019/06/01		61	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		75	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		36 (3)	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		60	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		69	%	50 - 130
			Chrysene	2019/06/01		96	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		40 (3)	%	50 - 130
			Fluoranthene	2019/06/01		88	%	50 - 130
			Fluorene	2019/06/01		95	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		33 (3)	%	50 - 130
			Naphthalene	2019/06/01		84	%	50 - 130
			Perylene	2019/06/01		31 (3)	%	50 - 130
			Phenanthrene	2019/06/01		96	%	50 - 130
			Pyrene	2019/06/01		86	%	50 - 130
6151065	LGE	Spiked Blank	D10-Anthracene	2019/06/01		105	%	50 - 130
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		100	%	50 - 130
			1-Methylnaphthalene	2019/06/01		93	%	50 - 130
			2-Methylnaphthalene	2019/06/01		95	%	50 - 130
			Acenaphthene	2019/06/01		100	%	50 - 130
			Acenaphthylene	2019/06/01		98	%	50 - 130
			Anthracene	2019/06/01		93	%	50 - 130
			Benzo(a)anthracene	2019/06/01		86	%	50 - 130
			Benzo(a)pyrene	2019/06/01		94	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		106	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		96	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		95	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		101	%	50 - 130
			Chrysene	2019/06/01		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		96	%	50 - 130
			Fluoranthene	2019/06/01		99	%	50 - 130
			Fluorene	2019/06/01		109	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		94	%	50 - 130
			Naphthalene	2019/06/01		95	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Perylene	2019/06/01		90	%	50 - 130
			Phenanthrene	2019/06/01		111	%	50 - 130
			Pyrene	2019/06/01		98	%	50 - 130
6151065	LGE	Method Blank	D10-Anthracene	2019/06/01		108	%	50 - 130
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		99	%	50 - 130
			1-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/06/01	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/06/01	ND, RDL=0.010		ug/L	
			Anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Chrysene	2019/06/01	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluorene	2019/06/01	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Naphthalene	2019/06/01	ND, RDL=0.20		ug/L	
			Perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/06/01	ND, RDL=0.010		ug/L	
			Pyrene	2019/06/01	ND, RDL=0.010		ug/L	
6151065	LGE	RPD	1-Methylnaphthalene	2019/06/01	NC		%	40
			2-Methylnaphthalene	2019/06/01	NC		%	40
			Acenaphthene	2019/06/01	NC		%	40
			Acenaphthylene	2019/06/01	NC		%	40
			Anthracene	2019/06/01	NC		%	40
			Benzo(a)anthracene	2019/06/01	NC		%	40
			Benzo(a)pyrene	2019/06/01	NC		%	40
			Benzo(b)fluoranthene	2019/06/01	NC		%	40
			Benzo(g,h,i)perylene	2019/06/01	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(j)fluoranthene	2019/06/01	NC		%	40
			Benzo(k)fluoranthene	2019/06/01	NC		%	40
			Chrysene	2019/06/01	NC		%	40
			Dibenz(a,h)anthracene	2019/06/01	NC		%	40
			Fluoranthene	2019/06/01	13		%	40
			Fluorene	2019/06/01	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/06/01	NC		%	40
			Naphthalene	2019/06/01	NC		%	40
			Perylene	2019/06/01	NC		%	40
			Phenanthrene	2019/06/01	NC		%	40
			Pyrene	2019/06/01	12		%	40
6151471	NRG	Spiked Blank	Colour	2019/05/31		103	%	80 - 120
6151471	NRG	Method Blank	Colour	2019/05/31	ND, RDL=5.0		TCU	
6151471	NRG	RPD [JVU441-06]	Colour	2019/05/31	NC		%	20
6153411	THL	Matrix Spike	Isobutylbenzene - Volatile	2019/06/02		90	%	70 - 130
			Benzene	2019/06/02		106	%	70 - 130
			Toluene	2019/06/02		108	%	70 - 130
			Ethylbenzene	2019/06/02		112	%	70 - 130
			Total Xylenes	2019/06/02		109	%	70 - 130
6153411	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/06/02		103	%	70 - 130
			Benzene	2019/06/02		117	%	70 - 130
			Toluene	2019/06/02		118	%	70 - 130
			Ethylbenzene	2019/06/02		118	%	70 - 130
			Total Xylenes	2019/06/02		117	%	70 - 130
6153411	THL	Method Blank	Isobutylbenzene - Volatile	2019/06/02		102	%	70 - 130
			Benzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Toluene	2019/06/02	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/06/02	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/06/02	ND, RDL=0.010		mg/L	
6153411	THL	RPD	Benzene	2019/06/02	NC		%	40
			Toluene	2019/06/02	NC		%	40
			Ethylbenzene	2019/06/02	NC		%	40
			Total Xylenes	2019/06/02	NC		%	40
			C6 - C10 (less BTEX)	2019/06/02	NC		%	40
6153709	SSV	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2019/06/04		99	%	80 - 120
6153709	SSV	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/06/04		102	%	80 - 120
6153709	SSV	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04		103	%	80 - 120
6153709	SSV	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04	ND, RDL=0.10		mg/L	
6153709	SSV	RPD	Total Kjeldahl Nitrogen (TKN)	2019/06/04	0		%	20
6154440	NRG	Matrix Spike	Total Phosphorus	2019/06/04		123 (4)	%	80 - 120
6154440	NRG	Spiked Blank	Total Phosphorus	2019/06/04		102	%	80 - 120
6154440	NRG	Method Blank	Total Phosphorus	2019/06/04	ND, RDL=0.020		mg/L	
6154440	NRG	RPD	Total Phosphorus	2019/06/04	NC		%	25
6154507	SSI	Matrix Spike	Total Organic Carbon (C)	2019/06/03		105	%	85 - 115
6154507	SSI	Spiked Blank	Total Organic Carbon (C)	2019/06/03		110	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6154507	SSI	Method Blank	Total Organic Carbon (C)	2019/06/03	ND, RDL=0.50		mg/L	
6154507	SSI	RPD	Total Organic Carbon (C)	2019/06/03	1.1		%	15
6154879	GTO	Matrix Spike	Sulphide	2019/06/03		83	%	80 - 120
6154879	GTO	Spiked Blank	Sulphide	2019/06/03		90	%	80 - 120
6154879	GTO	Method Blank	Sulphide	2019/06/03	ND, RDL=0.020		mg/L	
6154879	GTO	RPD	Sulphide	2019/06/03	NC		%	20
6155176	SSI	Matrix Spike	Dissolved Organic Carbon (C)	2019/06/04		94	%	85 - 115
6155176	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/06/04		100	%	80 - 120
6155176	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/06/04	ND, RDL=0.50		mg/L	
6155176	SSI	RPD	Dissolved Organic Carbon (C)	2019/06/04	0.90		%	15
6156517	RGE	Matrix Spike	Decachlorobiphenyl	2019/06/05		96	%	30 - 130
			Aroclor 1254	2019/06/05		109	%	70 - 130
6156517	RGE	Spiked Blank	Decachlorobiphenyl	2019/06/05		74	%	30 - 130
			Aroclor 1254	2019/06/05		103	%	70 - 130
6156517	RGE	Method Blank	Decachlorobiphenyl	2019/06/05		65	%	30 - 130
			Aroclor 1016	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/06/05	ND, RDL=0.050		ug/L	
6156517	RGE	RPD	Aroclor 1016	2019/06/05	NC		%	40
			Aroclor 1221	2019/06/05	NC		%	40
			Aroclor 1232	2019/06/05	NC		%	40
			Aroclor 1248	2019/06/05	NC		%	40
			Aroclor 1242	2019/06/05	NC		%	40
			Aroclor 1254	2019/06/05	NC		%	40
			Aroclor 1260	2019/06/05	NC		%	40
6156521	BBD	QC Standard	Salinity	2019/06/04		100	%	80 - 120
6156521	BBD	Method Blank	Salinity	2019/06/04	ND, RDL=2.0		N/A	
6156521	BBD	RPD	Salinity	2019/06/04	0		%	25
6156546	NRG	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/06/04		105	%	80 - 120
6156546	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/06/04		107	%	80 - 120
6156546	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/06/04	ND, RDL=0.050		mg/L	
6156546	NRG	RPD	Nitrogen (Ammonia Nitrogen)	2019/06/04	9.2		%	20
6157072	AM6	QC Standard	Volatile Suspended Solids	2019/06/04		98	%	80 - 120
6157072	AM6	Method Blank	Volatile Suspended Solids	2019/06/04	ND, RDL=2.0		mg/L	
6157072	AM6	RPD	Volatile Suspended Solids	2019/06/04	9.5		%	25
6157791	BB3	Matrix Spike	Total Nitrogen (N)	2019/06/03		101	%	80 - 120
6157791	BB3	Spiked Blank	Total Nitrogen (N)	2019/06/03		99	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6157791	BB3	Method Blank	Total Nitrogen (N)	2019/06/03	ND, RDL=0.020		mg/L	
6157791	BB3	RPD	Total Nitrogen (N)	2019/06/03	3.0		%	20
6158767	EMT	QC Standard	pH	2019/06/05		101	%	97 - 103
6158767	EMT	RPD [JVU441-06]	pH	2019/06/05	1.7		%	N/A
6158768	EMT	Spiked Blank	Conductivity	2019/06/05		106	%	80 - 120
6158768	EMT	Method Blank	Conductivity	2019/06/05	110, RDL=1.0		uS/cm	
6158768	EMT	RPD [JVU441-06]	Conductivity	2019/06/05	0.94		%	10
6158831	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/06/06		NC	%	80 - 120
6158831	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/06/05		103	%	80 - 120
6158831	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/06/05	ND, RDL=5.0		mg/L	
6158831	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/06/06	2.5		%	25
6158832	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/06/05		99	%	80 - 120
6158832	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/06/05		99	%	80 - 120
6158832	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/06/05	ND, RDL=1.0		mg/L	
6158832	SRM	RPD	Dissolved Chloride (Cl-)	2019/06/05	2.4		%	25
6158834	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/06/05		100	%	80 - 120
6158834	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/06/05		99	%	80 - 120
6158834	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/06/05	ND, RDL=2.0		mg/L	
6158834	SRM	RPD	Dissolved Sulphate (SO4)	2019/06/05	6.4		%	25
6158837	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/06/06		NC	%	80 - 120
6158837	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/06/06		98	%	80 - 120
6158837	SRM	Method Blank	Reactive Silica (SiO2)	2019/06/06	ND, RDL=0.50		mg/L	
6158837	SRM	RPD	Reactive Silica (SiO2)	2019/06/06	4.8		%	25
6158838	SRM	Matrix Spike	Orthophosphate (P)	2019/06/05		95	%	80 - 120
6158838	SRM	Spiked Blank	Orthophosphate (P)	2019/06/05		94	%	80 - 120
6158838	SRM	Method Blank	Orthophosphate (P)	2019/06/05	ND, RDL=0.010		mg/L	
6158838	SRM	RPD	Orthophosphate (P)	2019/06/05	1.8		%	25
6158840	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/06/05		101	%	80 - 120
6158840	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/06/05		93	%	80 - 120
6158840	SRM	Method Blank	Nitrate + Nitrite (N)	2019/06/05	ND, RDL=0.050		mg/L	
6158840	SRM	RPD	Nitrate + Nitrite (N)	2019/06/05	NC		%	25
6158842	SRM	Matrix Spike	Nitrite (N)	2019/06/05		45 (5)	%	80 - 120
6158842	SRM	Spiked Blank	Nitrite (N)	2019/06/05		99	%	80 - 120
6158842	SRM	Method Blank	Nitrite (N)	2019/06/05	ND, RDL=0.010		mg/L	
6158842	SRM	RPD	Nitrite (N)	2019/06/05	NC		%	20
6159674	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/06/06		98	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/06		106	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/06		83	%	70 - 130
			>C16-C21 Hydrocarbons	2019/06/06		81	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/06/06		93	%	70 - 130
6159674	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/06/06		98	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/06		107	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/06		84	%	70 - 130
			>C16-C21 Hydrocarbons	2019/06/06		81	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/06/06		98	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6159674	BCD	Method Blank	Isobutylbenzene - Extractable	2019/06/06		97	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/06		104	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/06	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/06/06	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/06/06	ND, RDL=0.10		mg/L	
6159674	BCD	RPD	>C10-C16 Hydrocarbons	2019/06/06	NC		%	40
			>C16-C21 Hydrocarbons	2019/06/06	NC		%	40
			>C21-<C32 Hydrocarbons	2019/06/06	NC		%	40
6160103	BKE	Matrix Spike [JVU441-20]	Total Cyanide (CN)	2019/06/08		92	%	80 - 120
6160103	BKE	Spiked Blank	Total Cyanide (CN)	2019/06/08		100	%	80 - 120
6160103	BKE	Method Blank	Total Cyanide (CN)	2019/06/08	ND, RDL=0.0050		mg/L	
6160103	BKE	RPD [JVU441-20]	Total Cyanide (CN)	2019/06/08	NC		%	20
6161254	EMT	QC Standard	Turbidity	2019/06/06		106	%	80 - 120
6161254	EMT	Spiked Blank	Turbidity	2019/06/06		96	%	80 - 120
6161254	EMT	Method Blank	Turbidity	2019/06/06	ND, RDL=0.10		NTU	
6161254	EMT	RPD [JVU441-06]	Turbidity	2019/06/06	4.1		%	20
6165901	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
6165901	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
6165901	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
6172547	LZ3	Matrix Spike	9,10-Dichlorostearic acid	2019/06/01		96	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		90	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		85	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		92	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		98	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		85	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		87	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		94	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		94	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Oleic acid (C18:1)	2019/06/01		92	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		91	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		102	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		106	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			Abietic acid	2019/06/01		NC	%	50 - 130
			Dehydroabietic acid	2019/06/01		NC	%	50 - 130
			Isopimaric acid	2019/06/01		NC	%	50 - 130
			Neoabietic acid	2019/06/01		68	%	50 - 130
			Palustric acid	2019/06/01		67	%	50 - 130
			Pimaric acid	2019/06/01		102	%	50 - 130
			Sandaracopimaric acid	2019/06/01		101	%	50 - 130
6172547	LZ3	Spiked Blank	9,10-Dichlorostearic acid	2019/06/01		94	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		94	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		88	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		94	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		96	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		99	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		89	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		86	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		105	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		99	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		94	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		103	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		114	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		108	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		110	%	50 - 130
			Abietic acid	2019/06/01		94	%	50 - 130
			Dehydroabietic acid	2019/06/01		128	%	50 - 130
			Isopimaric acid	2019/06/01		115	%	50 - 130
			Neoabietic acid	2019/06/01		63	%	50 - 130
			Palustric acid	2019/06/01		74	%	50 - 130
			Pimaric acid	2019/06/01		107	%	50 - 130
			Sandaracopimaric acid	2019/06/01		105	%	50 - 130
6172547	LZ3	Method Blank	Total Fatty Acids	2019/06/01	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/06/01	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/06/01	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/06/01	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/06/01	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/06/01	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/06/01	ND, RDL=0.0060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Linolenic acid (C18:3)	2019/06/01	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/06/01	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/06/01	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/06/01	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/06/01	ND, RDL=0.0060		mg/L	
			12,14-Dichlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
6172547	LZ3	RPD	Total Fatty Acids	2019/06/01	NC		%	30
			Total Resin Acids	2019/06/01	NC		%	30
			9,10-Dichlorostearic acid	2019/06/01	NC		%	30
			Decanoic Acid (C10)	2019/06/01	NC		%	30
			Docosanoic acid (C22)	2019/06/01	NC		%	30
			Dodecanoic acid (C12)	2019/06/01	NC		%	30
			Eicosanoic acid (C20)	2019/06/01	NC		%	30
			Hexadecanoic acid (C16)	2019/06/01	NC		%	30
			Linoleic acid (C18:2)	2019/06/01	NC		%	30
			Linolenic acid (C18:3)	2019/06/01	NC		%	30
			Octadecanoic acid (C18)	2019/06/01	NC		%	30
			Oleic acid (C18:1)	2019/06/01	NC		%	30
			Tetradecanoic acid (C14)	2019/06/01	NC		%	30
			Undecanoic acid (C11)	2019/06/01	NC		%	30
			12,14-Dichlorodehydroabietic acid	2019/06/01	NC		%	30
			12-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			14-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			Abietic acid	2019/06/01	NC		%	30
			Dehydroabietic acid	2019/06/01	NC		%	30
			Isopimaric acid	2019/06/01	NC		%	30
			Neoabietic acid	2019/06/01	NC		%	30
			Palustric acid	2019/06/01	NC		%	30
			Pimaric acid	2019/06/01	NC		%	30

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Sandaracopimaric acid	2019/06/01	NC		%	30

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) BOD Analysis: Second source QC recovery high. Reference Material recovery and all other QC acceptable.

(2) PAH sample contained sediment.

(3) Matrix Spike: results are outside acceptance limit. Probable matrix interference.

(4) Elevated spike recovery due to sample matrix, result confirmed by repeat analysis.

(5) Poor spike recovery due to sample matrix, result confirmed by repeat analysis.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4914
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

VALIDATION SIGNATURE PAGE

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

Brad Newman, Scientific Service Specialist

Harry (Peng) Liang, Senior Analyst

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Eric Dearman, Scientific Specialist

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Rosemarie MacDonald, Scientific Specialist (Organics)

Rob Reinert, B.Sc., Scientific Specialist

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your Project #: B9E4914
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449980
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920960
Received: 2019/05/31, 09:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/06/03	2019/06/05	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Your Project #: B9E4914
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449980
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920960
Received: 2019/05/31, 09:00

Encryption Key

Sophie Retailleau
Project Manager
21 Jun 2019 16:04:40

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: Sophie.RETAILLEAU@bvlabs.com
Phone# (514)448-9001 Ext:7066232

==========

This report has been generated and distributed using a secure automated process.
Lab BV has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5613		
Sampling Date		2019/05/24 13:00		
COC Number		N-A		
	Units	**JVU441-13R\CARIBOU SEA WATER CH-BOF 1-2**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	<10	10	1994633
Phenol	ug/L	<1.0	1.0	1994633
2-Chlorophenol	ug/L	<1.0	1.0	1994633
3-Chlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorophenol	ug/L	<1.0	1.0	1994633
o-Cresol	ug/L	<1.0	1.0	1994633
m-Cresol	ug/L	<1.0	1.0	1994633
p-Cresol	ug/L	<1.0	1.0	1994633
Guaiacol	ug/L	<1.0	1.0	1994633
Catechol	ug/L	<1.0	1.0	1994633
Eugenol	ug/L	<1.0	1.0	1994633
Isoeugenol	ug/L	<1.0	1.0	1994633
6-Chlorovanillin	ug/L	<1.0	1.0	1994633
5,6-Dichlorovanillin	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorosyringol	ug/L	<1.0	1.0	1994633
2,4-Dimethylphenol	ug/L	<1.0	1.0	1994633
2,6-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,3-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,4-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,4 + 2,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2-Nitrophenol	ug/L	<2.0	2.0	1994633
4-Nitrophenol	ug/L	<10	10	1994633
2,4,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,4-Trichlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
4-Chloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
4,6-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
2,3,5,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5613		
Sampling Date		2019/05/24 13:00		
COC Number		N-A		
	Units	**JVU441-13R\CARIBOU SEA WATER CH-BOF 1-2**	**RDL**	**QC Batch**
2,3,4,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
2,3,4,5-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorocatechol	ug/L	<1.0	1.0	1994633
3,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
4,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
4,5,6-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
Pentachlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5,6-Tetrachloroveratrol	ug/L	<1.0	1.0	1994633
Surrogate Recovery (%)				
D6-Phenol	%	120	N/A	1994633
Tribromophenol-2,4,6	%	78	N/A	1994633
Trifluoro-m-cresol	%	96	N/A	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total "Total Phenols (RFPP) " calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Reported detection limits are modified according to the volume of sample received.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1994633	GDL	Spiked Blank	D6-Phenol	2019/06/04		107	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		95	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		105	%	50 - 130
			Phenol	2019/06/04		100	%	50 - 130
			2-Chlorophenol	2019/06/04		95	%	50 - 130
			3-Chlorophenol	2019/06/04		96	%	50 - 130
			4-Chlorophenol	2019/06/04		99	%	50 - 130
			o-Cresol	2019/06/04		104	%	50 - 130
			m-Cresol	2019/06/04		101	%	50 - 130
			p-Cresol	2019/06/04		101	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		95	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		105	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		95	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		106	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		100	%	50 - 130
			2-Nitrophenol	2019/06/04		94	%	50 - 130
			4-Nitrophenol	2019/06/04		92	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		94	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		107	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		109	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		102	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		95	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/06/04		107	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		96	%	50 - 130
			Pentachlorophenol	2019/06/04		90	%	50 - 130
1994633	GDL	Spiked Blank DUP	D6-Phenol	2019/06/04		105	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04		98	%	50 - 130
			2-Chlorophenol	2019/06/04		93	%	50 - 130
			3-Chlorophenol	2019/06/04		95	%	50 - 130
			4-Chlorophenol	2019/06/04		93	%	50 - 130
			o-Cresol	2019/06/04		102	%	50 - 130
			m-Cresol	2019/06/04		100	%	50 - 130
			p-Cresol	2019/06/04		98	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		91	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		91	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		94	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		100	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		96	%	50 - 130
			2-Nitrophenol	2019/06/04		87	%	50 - 130
			4-Nitrophenol	2019/06/04		89	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		97	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		87	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		98	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		95	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		95	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		88	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/06/04		103	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		92	%	50 - 130
			Pentachlorophenol	2019/06/04		87	%	50 - 130
1994633	GDL	Method Blank	D6-Phenol	2019/06/04		99	%	50 - 130
			Total of Regl. P&P Phenols	2019/06/04	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04	<0.50		ug/L	
			2-Chlorophenol	2019/06/04	<0.50		ug/L	
			3-Chlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorophenol	2019/06/04	<0.50		ug/L	
			o-Cresol	2019/06/04	<0.50		ug/L	
			m-Cresol	2019/06/04	<0.50		ug/L	
			p-Cresol	2019/06/04	<0.50		ug/L	
			Guaiacol	2019/06/04	<0.50		ug/L	
			Catechol	2019/06/04	<0.50		ug/L	
			Eugenol	2019/06/04	<0.50		ug/L	
			Isoeugenol	2019/06/04	<0.50		ug/L	
			6-Chlorovanillin	2019/06/04	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/06/04	<0.50		ug/L	
			2,4-Dimethylphenol	2019/06/04	<0.50		ug/L	
			2,6-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,3-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,4-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2-Nitrophenol	2019/06/04	<1.0		ug/L	
			4-Nitrophenol	2019/06/04	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			4-Chloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorocatechol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			Pentachlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/06/04	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/06/04	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

MAXXAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Maxxam
A Bureau Veritas Group Company

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac

Job# B9E4914

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JVU441-13R\CARIBOU SEA WATER CH-BOF 1-2	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/24 13:00	2019/06/06

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	3	3	1	Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) _____ (print) KIM BRULE Date and Time 2019/05/30 17:15

Received by (Sign) _____ (print) Louise Dewey Date and Time 2019/05/31 09:00

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:

National: N001

Regional:

B920960_COC

31-May-19 09:00
Sophie Retailleau
B920960

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☑ COC Must be Attached

Sender (Print) Kim Brule Initial KB

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Cooler, Ice, Tape-custody seal, Date&Sign
Date Shipped May 30/19 Number of coolers ____
Shipper (Print) _____ Initial _____

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715284-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768673
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4476
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/06/20	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/06/18	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/06/03	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/30	2019/06/04	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/06/19	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/30	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/06/18	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/06/05	2019/06/07	CAM SOP-00457	OMOE E3015 5 m
Dioxins/Furans in Water (EPS 1/RM/23) (1, 5)	1	2019/06/06	2019/06/12	BRL SOP-00406 (mod)	EPS 1/RM/23 m
Organic carbon - Diss (DOC) (6)	1	N/A	2019/06/05	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/06/19	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/06/04	2019/06/04	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/06/03		
Hardness (calculated as CaCO3)	1	N/A	2019/05/31	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/31	2019/05/31	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/30	2019/05/31	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/06/20	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/06/20	N/A	Auto Calc.
Chlorate and Chlorite by IC (2)	1	N/A	2019/06/06	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (3)	1	N/A	2019/06/03	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (2)	1	2019/05/31	2019/06/01	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/06/06	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/06/18	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/06/18	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/06/19	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/31	2019/06/01	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/06/04	2019/06/05	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/06/05	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (4)	1	2019/06/01	2019/06/05		
pH (7)	1	N/A	2019/06/19	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	1	N/A	2019/06/18	ATL SOP 00021	SM 23 4500-P E m

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715284-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768673
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4476
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VPH in Water (PIRI)	1	N/A	2019/06/02	ATL SOP 00118	Atl. RBCA v3.1 m
Salinity (8)	1	N/A	2019/06/18		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/06/20	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/06/20	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/06/19	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/06/19	ATL SOP 00023	ASTM D516-16 m
Sulphide (1)	1	N/A	2019/06/03	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/06/19	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/06/01	2019/06/04	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (6)	1	N/A	2019/06/04	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/06/05	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/06/05	2019/06/06	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/31	2019/06/03	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/06/10	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/30	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/06/04	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715284-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768673
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4476
Received: 2019/05/29, 12:45

dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Calgary Offsite
(3) This test was performed by Bedford to Burnaby - Offsite
(4) This test was performed by Bedford to Montreal Subcontrac
(5) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(6) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(7) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(8) Non-accredited test method

Encryption Key



Neyousha Shahisavandi
Project Manager Assistant
24 Jun 2019 14:31:49

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4476
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	509	N/A	N/A	6147444
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	92	1.0	0.20	6147433
Calculated TDS	mg/L	29000	1.0	0.20	6147453
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	6147433
Cation Sum	me/L	481	N/A	N/A	6147444
Hardness (CaCO3)	mg/L	5200	1.0	1.0	6147440
Ion Balance (% Difference)	%	2.82	N/A	N/A	6147442
Langelier Index (@ 20C)	N/A	0.258			6147449
Langelier Index (@ 4C)	N/A	0.0200			6147451
Nitrate (N)	mg/L	ND	0.050	N/A	6147446
Saturation pH (@ 20C)	N/A	7.35			6147449
Saturation pH (@ 4C)	N/A	7.58			6147451
Sulphide (as H2S)	mg/L	ND	0.021	0.011	6147649
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	93	5.0	N/A	6182160
Carbonaceous BOD	mg/L	ND (1)	10	N/A	6148701
Total Chemical Oxygen Demand	mg/L	1200	200	N/A	6148620
Dissolved Chlorate (ClO3-)	mg/L	ND (2)	5.0	N/A	6165901
Dissolved Chloride (Cl-)	mg/L	17000	500	N/A	6182167
Dissolved Chlorite (CLO2-)	mg/L	ND (2)	5.0	N/A	6165901
Colour	TCU	ND	5.0	N/A	6182170
Total Kjeldahl Nitrogen (TKN)	mg/L	0.20	0.10	0.060	6153709
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	6182172
Nitrite (N)	mg/L	ND	0.010	N/A	6182173
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	N/A	6159706
Dissolved Organic Carbon (C)	mg/L	1.6	0.50	N/A	6158927
Total Organic Carbon (C)	mg/L	2.2	0.50	N/A	6154507
Orthophosphate (P)	mg/L	ND	0.010	N/A	6182171
pH	pH	7.60	N/A	N/A	6184783

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Sample integrity may have been compromised, the sample exceeded it's hold time prior to being analyzed.
(2) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4476
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Total Phosphorus	mg/L	ND	0.020	N/A	6158894
Salinity	N/A	30	2.0	N/A	6181990
Reactive Silica (SiO2)	mg/L	ND	0.50	N/A	6182169
Total Suspended Solids	mg/L	2.0	1.0	N/A	6151063
Dissolved Sulphate (SO4)	mg/L	1900	40	N/A	6182168
Sulphide	mg/L	ND	0.020	0.010	6154879
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6159669
Turbidity	NTU	0.82	0.10	0.10	6186832
Volatile Suspended Solids	mg/L	ND	2.0	N/A	6157072
Conductivity	uS/cm	44000	1.0	N/A	6184788
Nutritional Parameters					
Total Nitrogen (N)	mg/L	0.131	0.020	N/A	6157791
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6153391

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	0.013	0.013	N/A	6149403

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	ND	50	N/A	6148971
Total Antimony (Sb)	ug/L	ND	10	N/A	6148971
Total Arsenic (As)	ug/L	ND	10	N/A	6148971
Total Barium (Ba)	ug/L	11	10	N/A	6148971
Total Beryllium (Be)	ug/L	ND	10	N/A	6148971
Total Bismuth (Bi)	ug/L	ND	20	N/A	6148971
Total Boron (B)	ug/L	3600	500	N/A	6148971
Total Cadmium (Cd)	ug/L	ND	0.10	N/A	6148971
Total Calcium (Ca)	ug/L	340000	1000	N/A	6148971
Total Chromium (Cr)	ug/L	ND	10	N/A	6148971
Total Cobalt (Co)	ug/L	ND	4.0	N/A	6148971
Total Copper (Cu)	ug/L	ND	5.0	N/A	6148971
Total Iron (Fe)	ug/L	ND	500	N/A	6148971
Total Lead (Pb)	ug/L	ND	5.0	N/A	6148971
Total Magnesium (Mg)	ug/L	1100000	1000	N/A	6148971
Total Manganese (Mn)	ug/L	ND	20	N/A	6148971
Total Molybdenum (Mo)	ug/L	ND	20	N/A	6148971
Total Nickel (Ni)	ug/L	ND	20	N/A	6148971
Total Phosphorus (P)	ug/L	ND	1000	N/A	6148971
Total Potassium (K)	ug/L	320000	1000	N/A	6148971
Total Selenium (Se)	ug/L	ND	10	N/A	6148971
Total Silver (Ag)	ug/L	ND	1.0	N/A	6148971
Total Sodium (Na)	ug/L	8500000	1000	N/A	6148971
Total Strontium (Sr)	ug/L	6100	20	N/A	6148971
Total Thallium (Tl)	ug/L	ND	1.0	N/A	6148971
Total Tin (Sn)	ug/L	ND	20	N/A	6148971
Total Titanium (Ti)	ug/L	ND	20	N/A	6148971
Total Uranium (U)	ug/L	2.9	1.0	N/A	6148971
Total Vanadium (V)	ug/L	ND	20	N/A	6148971
Total Zinc (Zn)	ug/L	ND	50	N/A	6148971

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
Acenaphthene	ug/L	ND	0.010	N/A	6151065
Acenaphthylene	ug/L	ND	0.010	N/A	6151065
Anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6151065
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6146340
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6151065
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6151065
Chrysene	ug/L	ND	0.010	N/A	6151065
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6151065
Fluoranthene	ug/L	ND	0.010	N/A	6151065
Fluorene	ug/L	ND	0.010	N/A	6151065
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6151065
Naphthalene	ug/L	ND	0.20	N/A	6151065
Perylene	ug/L	ND	0.010	N/A	6151065
Phenanthrene	ug/L	ND	0.010	N/A	6151065
Pyrene	ug/L	ND	0.010	N/A	6151065
Surrogate Recovery (%)					
D10-Anthracene	%	98			6151065
D14-Terphenyl	%	107			6151065
D8-Acenaphthylene	%	92			6151065

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6148613
1,1-Dichloroethylene	ug/L	ND	0.50	1.0	6148613
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6148613
Ethylene Dibromide	ug/L	ND	0.20	0.50	6148613
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6148613
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6148613
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
Benzene	ug/L	ND	1.0	N/A	6148613
Bromodichloromethane	ug/L	ND	1.0	0.20	6148613
Bromoform	ug/L	ND	1.0	0.20	6148613
Bromomethane	ug/L	ND	0.50	N/A	6148613
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6148613
Chlorobenzene	ug/L	ND	1.0	N/A	6148613
Chloroethane	ug/L	ND	8.0	N/A	6148613
Chloroform	ug/L	ND	1.0	0.20	6148613
Chloromethane	ug/L	ND	8.0	N/A	6148613
Dibromochloromethane	ug/L	ND	1.0	0.20	6148613
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6148613
Ethylbenzene	ug/L	ND	1.0	N/A	6148613
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6148613
Styrene	ug/L	ND	1.0	N/A	6148613
Tetrachloroethylene	ug/L	ND	1.0	N/A	6148613
Toluene	ug/L	ND	1.0	N/A	6148613
Trichloroethylene	ug/L	ND	1.0	N/A	6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6148613
Vinyl Chloride	ug/L	ND	0.50	2.0	6148613
o-Xylene	ug/L	ND	1.0	N/A	6148613
p+m-Xylene	ug/L	ND	2.0	N/A	6148613
Total Xylenes	ug/L	ND	1.0	1.0	6148613
Total Trihalomethanes	ug/L	ND	1.0	N/A	6148613
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	97			6148613
D4-1,2-Dichloroethane	%	117			6148613
D8-Toluene	%	99			6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6153412
Toluene	mg/L	ND	0.0010	N/A	6153412
Ethylbenzene	mg/L	ND	0.0010	N/A	6153412
Total Xylenes	mg/L	ND	0.0020	N/A	6153412
C6 - C10 (less BTEX)	mg/L	ND	0.010	N/A	6153412
>C10-C16 Hydrocarbons	mg/L	ND	0.050	N/A	6156564
>C16-C21 Hydrocarbons	mg/L	ND	0.050	N/A	6156564
>C21-<C32 Hydrocarbons	mg/L	ND	0.10	N/A	6156564
Modified TPH (Tier1)	mg/L	ND	0.10	N/A	6146630
Reached Baseline at C32	mg/L	NA	N/A	N/A	6156564
Hydrocarbon Resemblance	mg/L	NA	N/A	N/A	6156564
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	98			6156564
n-Dotriacontane - Extractable	%	107			6156564
Isobutylbenzene - Volatile	%	92			6153412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6156517
Aroclor 1221	ug/L	ND	0.050	N/A	6156517
Aroclor 1232	ug/L	ND	0.050	N/A	6156517
Aroclor 1248	ug/L	ND	0.050	N/A	6156517
Aroclor 1242	ug/L	ND	0.050	N/A	6156517
Aroclor 1254	ug/L	ND	0.050	N/A	6156517
Aroclor 1260	ug/L	ND	0.050	N/A	6156517
Calculated Total PCB	ug/L	ND	0.050	N/A	6146342
Surrogate Recovery (%)					
Decachlorobiphenyl	%	89			6156517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JVR188			
Sampling Date		2019/05/25 18:15			
COC Number		715284-01-01			
	UNITS	CARIBOU SEA WATER CHB 2-1	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	ND	0.072	N/A	6172547
Total Resin Acids	mg/L	ND	0.060	N/A	6172547
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND	0.0060	N/A	6172547
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6172547
Docosanoic acid (C22)	mg/L	ND	0.0060	N/A	6172547
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6172547
Eicosanoic acid (C20)	mg/L	ND	0.0060	N/A	6172547
Hexadecanoic acid (C16)	mg/L	ND	0.0060	N/A	6172547
Linoleic acid (C18:2)	mg/L	ND	0.0060	N/A	6172547
Linolenic acid (C18:3)	mg/L	ND	0.0060	N/A	6172547
Octadecanoic acid (C18)	mg/L	ND	0.0060	N/A	6172547
Oleic acid (C18:1)	mg/L	ND	0.0060	N/A	6172547
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6172547
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6172547
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Abietic acid	mg/L	ND	0.0060	N/A	6172547
Dehydroabietic acid	mg/L	ND	0.0060	N/A	6172547
Isopimaric acid	mg/L	ND	0.0060	N/A	6172547
Neoabietic acid	mg/L	ND	0.0060	N/A	6172547
Palustric acid	mg/L	ND	0.0060	N/A	6172547
Pimaric acid	mg/L	ND	0.0060	N/A	6172547
Sandaracopimaric acid	mg/L	ND	0.0060	N/A	6172547

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVR188							
Sampling Date		2019/05/25 18:15							
COC Number		715284-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER CHB 2-1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/L	ND	1.00	9.48	N/A	1.00	1.00		6170521
1,2,3,7,8-Penta CDD *	pg/L	ND	1.06	9.48	N/A	1.00	1.06		6170521
1,2,3,4,7,8-Hexa CDD *	pg/L	ND	1.10	9.48	N/A	0.100	0.110		6170521
1,2,3,6,7,8-Hexa CDD *	pg/L	ND	0.952	9.48	N/A	0.100	0.0952		6170521
1,2,3,7,8,9-Hexa CDD *	pg/L	ND	0.925	9.48	N/A	0.100	0.0925		6170521
1,2,3,4,6,7,8-Hepta CDD *	pg/L	ND	1.02	9.48	N/A	0.0100	0.0102		6170521
Octa CDD *	pg/L	1.44	1.11	94.8	N/A	0.000300	0.000432		6170521
Total Tetra CDD *	pg/L	ND	1.00	9.48	N/A			0	6170521
Total Penta CDD *	pg/L	ND	1.06	9.48	N/A			0	6170521
Total Hexa CDD *	pg/L	ND	0.986	9.48	N/A			0	6170521
Total Hepta CDD *	pg/L	ND	1.02	9.48	N/A			0	6170521
2,3,7,8-Tetra CDF **	pg/L	ND	0.999	9.48	N/A	0.100	0.0999		6170521
1,2,3,7,8-Penta CDF **	pg/L	ND	1.03	9.48	N/A	0.0300	0.0309		6170521
2,3,4,7,8-Penta CDF **	pg/L	ND	1.04	9.48	N/A	0.300	0.312		6170521
1,2,3,4,7,8-Hexa CDF **	pg/L	ND	0.975	9.48	N/A	0.100	0.0975		6170521
1,2,3,6,7,8-Hexa CDF **	pg/L	ND	0.813	9.48	N/A	0.100	0.0813		6170521
2,3,4,6,7,8-Hexa CDF **	pg/L	ND	0.920	9.48	N/A	0.100	0.0920		6170521
1,2,3,7,8,9-Hexa CDF **	pg/L	ND	1.02	9.48	N/A	0.100	0.102		6170521
1,2,3,4,6,7,8-Hepta CDF **	pg/L	ND	0.901	9.48	N/A	0.0100	0.00901		6170521
1,2,3,4,7,8,9-Hepta CDF **	pg/L	ND	1.03	9.48	N/A	0.0100	0.0103		6170521
Octa CDF **	pg/L	ND	0.954	94.8	N/A	0.000300	0.000286		6170521
Total Tetra CDF **	pg/L	ND	0.999	9.48	N/A			0	6170521
Total Penta CDF **	pg/L	ND	1.04	9.48	N/A			0	6170521
Total Hexa CDF **	pg/L	ND	0.925	9.48	N/A			0	6170521
Total Hepta CDF **	pg/L	ND	0.959	9.48	N/A			0	6170521

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4476
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVR188							
Sampling Date		2019/05/25 18:15							
COC Number		715284-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER CHB 2-1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/L						3.20		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	118							6170521
C13-1234678 HeptaCDF **	%	108							6170521
C13-123678 HexaCDD *	%	122							6170521
C13-123678 HexaCDF **	%	96							6170521
C13-12378 PentaCDD *	%	83							6170521
C13-12378 PentaCDF **	%	68							6170521
C13-2378 TetraCDD *	%	89							6170521
C13-2378 TetraCDF **	%	73							6170521
C13-OCDD *	%	114							6170521

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

GENERAL COMMENTS

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

Package 1	7.0°C

Sample received past the recommended holding time for BOD testing.

Sample JVR188 [CARIBOU SEA WATER CHB 2-1] : Elevated reporting limits for trace metals due to sample matrix.

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6148613	ASL	Matrix Spike	4-Bromofluorobenzene	2019/05/30		99	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		120	%	70 - 130
			D8-Toluene	2019/05/30		96	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		110	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		109	%	70 - 130
			Ethylene Dibromide	2019/05/30		112	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		91	%	70 - 130
			1,2-Dichloroethane	2019/05/30		112	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		102	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		108	%	70 - 130
			1,2-Dichloropropane	2019/05/30		106	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		87	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/30		111	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		121	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		87	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		102	%	70 - 130
			Bromoform	2019/05/30		104	%	70 - 130
			Bromomethane	2019/05/30		100	%	60 - 140
			Carbon Tetrachloride	2019/05/30		105	%	70 - 130
			Chlorobenzene	2019/05/30		92	%	70 - 130
			Chloroethane	2019/05/30		90	%	60 - 140
			Chloroform	2019/05/30		102	%	70 - 130
			Chloromethane	2019/05/30		94	%	60 - 140
			Dibromochloromethane	2019/05/30		108	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		106	%	70 - 130
			Ethylbenzene	2019/05/30		94	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		103	%	70 - 130
			Styrene	2019/05/30		99	%	70 - 130
			Tetrachloroethylene	2019/05/30		97	%	70 - 130
			Toluene	2019/05/30		97	%	70 - 130
			Trichloroethylene	2019/05/30		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		93	%	60 - 140
			Vinyl Chloride	2019/05/30		91	%	60 - 140
			o-Xylene	2019/05/30		94	%	70 - 130
			p+m-Xylene	2019/05/30		92	%	70 - 130
6148613	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/30		101	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		97	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		113	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		111	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		103	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		103	%	70 - 130
			Ethylene Dibromide	2019/05/30		104	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		93	%	70 - 130
			1,2-Dichloroethane	2019/05/30		106	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		100	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		109	%	70 - 130
			1,2-Dichloropropane	2019/05/30		105	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		91	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2019/05/30		104	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		90	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		101	%	70 - 130
			Bromoform	2019/05/30		99	%	70 - 130
			Bromomethane	2019/05/30		95	%	60 - 140
			Carbon Tetrachloride	2019/05/30		108	%	70 - 130
			Chlorobenzene	2019/05/30		94	%	70 - 130
			Chloroethane	2019/05/30		91	%	60 - 140
			Chloroform	2019/05/30		101	%	70 - 130
			Chloromethane	2019/05/30		92	%	60 - 140
			Dibromochloromethane	2019/05/30		104	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		101	%	70 - 130
			Ethylbenzene	2019/05/30		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		101	%	70 - 130
			Styrene	2019/05/30		102	%	70 - 130
			Tetrachloroethylene	2019/05/30		101	%	70 - 130
			Toluene	2019/05/30		99	%	70 - 130
			Trichloroethylene	2019/05/30		101	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		96	%	60 - 140
			Vinyl Chloride	2019/05/30		87	%	60 - 140
			o-Xylene	2019/05/30		98	%	70 - 130
			p+m-Xylene	2019/05/30		96	%	70 - 130
6148613	ASL	Method Blank	4-Bromofluorobenzene	2019/05/30		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		100	%	70 - 130
			1,1-Dichloroethane	2019/05/30	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/30	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/30	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/30	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Benzene	2019/05/30	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/30	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/30	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/30	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/30	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/30	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/30	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/30	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/30	ND, RDL=2.0		ug/L	
			Styrene	2019/05/30	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Toluene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/30	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/30	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/30	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/30	ND, RDL=2.0		ug/L	
			Total Xylenes	2019/05/30	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/30	ND, RDL=1.0		ug/L	
6148613	ASL	RPD	1,1-Dichloroethane	2019/05/30	NC		%	40
			1,1-Dichloroethylene	2019/05/30	NC		%	40
			1,1,1-Trichloroethane	2019/05/30	NC		%	40
			1,1,2-Trichloroethane	2019/05/30	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/30	NC		%	40
			Ethylene Dibromide	2019/05/30	NC		%	40
			1,2-Dichlorobenzene	2019/05/30	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloroethane	2019/05/30	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/30	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/30	NC		%	40
			1,2-Dichloropropane	2019/05/30	NC		%	40
			1,3-Dichlorobenzene	2019/05/30	NC		%	40
			cis-1,3-Dichloropropene	2019/05/30	NC		%	40
			trans-1,3-Dichloropropene	2019/05/30	NC		%	40
			1,4-Dichlorobenzene	2019/05/30	NC		%	40
			Benzene	2019/05/30	NC		%	40
			Bromodichloromethane	2019/05/30	NC		%	40
			Bromoform	2019/05/30	NC		%	40
			Bromomethane	2019/05/30	NC		%	40
			Carbon Tetrachloride	2019/05/30	NC		%	40
			Chlorobenzene	2019/05/30	NC		%	40
			Chloroethane	2019/05/30	NC		%	40
			Chloroform	2019/05/30	NC		%	40
			Chloromethane	2019/05/30	NC		%	40
			Dibromochloromethane	2019/05/30	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/30	NC		%	40
			Ethylbenzene	2019/05/30	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/30	NC		%	40
			Styrene	2019/05/30	NC		%	40
			Tetrachloroethylene	2019/05/30	NC		%	40
			Toluene	2019/05/30	NC		%	40
			Trichloroethylene	2019/05/30	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/30	NC		%	40
			Vinyl Chloride	2019/05/30	NC		%	40
			o-Xylene	2019/05/30	NC		%	40
			p+m-Xylene	2019/05/30	NC		%	40
			Total Xylenes	2019/05/30	NC		%	40
			Total Trihalomethanes	2019/05/30	NC		%	40
6148620	ZZH	Matrix Spike [JVR188-03]	Total Chemical Oxygen Demand	2019/05/30		81	%	80 - 120
6148620	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/30		103	%	80 - 120
6148620	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/30		105	%	80 - 120
6148620	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/30	ND, RDL=20		mg/L	
6148620	ZZH	RPD [JVR188-03]	Total Chemical Oxygen Demand	2019/05/30	12		%	25
6148701	MLW	QC Standard	Carbonaceous BOD	2019/06/04		111	%	80 - 120
6148701	MLW	Spiked Blank	Carbonaceous BOD	2019/06/04		138 (1)	%	80 - 120
6148701	MLW	Method Blank	Carbonaceous BOD	2019/06/04	ND, RDL=2.0		mg/L	
6148701	MLW	RPD	Carbonaceous BOD	2019/06/04	3.5		%	25
6148971	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/31		103	%	80 - 120
			Total Antimony (Sb)	2019/05/31		110	%	80 - 120
			Total Arsenic (As)	2019/05/31		98	%	80 - 120
			Total Barium (Ba)	2019/05/31		102	%	80 - 120
			Total Beryllium (Be)	2019/05/31		100	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		104	%	80 - 120
			Total Boron (B)	2019/05/31		NC	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		98	%	80 - 120
			Total Calcium (Ca)	2019/05/31		106	%	80 - 120
			Total Chromium (Cr)	2019/05/31		97	%	80 - 120
			Total Cobalt (Co)	2019/05/31		100	%	80 - 120
			Total Copper (Cu)	2019/05/31		98	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Iron (Fe)	2019/05/31		106	%	80 - 120
			Total Lead (Pb)	2019/05/31		104	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		101	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		105	%	80 - 120
			Total Nickel (Ni)	2019/05/31		102	%	80 - 120
			Total Phosphorus (P)	2019/05/31		104	%	80 - 120
			Total Potassium (K)	2019/05/31		104	%	80 - 120
			Total Selenium (Se)	2019/05/31		96	%	80 - 120
			Total Silver (Ag)	2019/05/31		101	%	80 - 120
			Total Sodium (Na)	2019/05/31		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/31		103	%	80 - 120
			Total Thallium (Tl)	2019/05/31		105	%	80 - 120
			Total Tin (Sn)	2019/05/31		105	%	80 - 120
			Total Titanium (Ti)	2019/05/31		99	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		101	%	80 - 120
			Total Zinc (Zn)	2019/05/31		100	%	80 - 120
6148971	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/31		101	%	80 - 120
			Total Antimony (Sb)	2019/05/31		107	%	80 - 120
			Total Arsenic (As)	2019/05/31		99	%	80 - 120
			Total Barium (Ba)	2019/05/31		100	%	80 - 120
			Total Beryllium (Be)	2019/05/31		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		105	%	80 - 120
			Total Boron (B)	2019/05/31		98	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		96	%	80 - 120
			Total Calcium (Ca)	2019/05/31		107	%	80 - 120
			Total Chromium (Cr)	2019/05/31		99	%	80 - 120
			Total Cobalt (Co)	2019/05/31		101	%	80 - 120
			Total Copper (Cu)	2019/05/31		99	%	80 - 120
			Total Iron (Fe)	2019/05/31		107	%	80 - 120
			Total Lead (Pb)	2019/05/31		103	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		102	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		102	%	80 - 120
			Total Nickel (Ni)	2019/05/31		99	%	80 - 120
			Total Phosphorus (P)	2019/05/31		105	%	80 - 120
			Total Potassium (K)	2019/05/31		102	%	80 - 120
			Total Selenium (Se)	2019/05/31		97	%	80 - 120
			Total Silver (Ag)	2019/05/31		100	%	80 - 120
			Total Sodium (Na)	2019/05/31		102	%	80 - 120
			Total Strontium (Sr)	2019/05/31		106	%	80 - 120
			Total Thallium (Tl)	2019/05/31		107	%	80 - 120
			Total Tin (Sn)	2019/05/31		106	%	80 - 120
			Total Titanium (Ti)	2019/05/31		98	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		102	%	80 - 120
			Total Zinc (Zn)	2019/05/31		101	%	80 - 120
6148971	BAN	Method Blank	Total Aluminum (Al)	2019/05/31	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/05/31	ND, RDL=1.0		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Barium (Ba)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/31	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/31	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/31	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/31	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/31	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/31	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/31	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/31	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/31	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/05/31	ND, RDL=5.0		ug/L	
6148971	BAN	RPD	Total Aluminum (Al)	2019/05/31	4.3		%	20

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6149403	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6149403	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6149403	CCR	Method Blank	Total Mercury (Hg)	2019/05/31	ND, RDL=0.013		ug/L	
6149403	CCR	RPD	Total Mercury (Hg)	2019/05/31	NC		%	20
6151063	AM6	QC Standard	Total Suspended Solids	2019/06/03		100	%	80 - 120
6151063	AM6	Method Blank	Total Suspended Solids	2019/06/03	ND, RDL=1.0		mg/L	
6151063	AM6	RPD	Total Suspended Solids	2019/06/03	0		%	20
6151065	LGE	Matrix Spike	D10-Anthracene	2019/06/01		90	%	50 - 130
			D14-Terphenyl	2019/06/01		70 (2)	%	50 - 130
			D8-Acenaphthylene	2019/06/01		85	%	50 - 130
			1-Methylnaphthalene	2019/06/01		81	%	50 - 130
			2-Methylnaphthalene	2019/06/01		84	%	50 - 130
			Acenaphthene	2019/06/01		87	%	50 - 130
			Acenaphthylene	2019/06/01		84	%	50 - 130
			Anthracene	2019/06/01		79	%	50 - 130
			Benzo(a)anthracene	2019/06/01		76	%	50 - 130
			Benzo(a)pyrene	2019/06/01		61	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		75	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		36 (3)	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		60	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		69	%	50 - 130
			Chrysene	2019/06/01		96	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		40 (3)	%	50 - 130
			Fluoranthene	2019/06/01		88	%	50 - 130
			Fluorene	2019/06/01		95	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		33 (3)	%	50 - 130
			Naphthalene	2019/06/01		84	%	50 - 130
			Perylene	2019/06/01		31 (3)	%	50 - 130
			Phenanthrene	2019/06/01		96	%	50 - 130
			Pyrene	2019/06/01		86	%	50 - 130
6151065	LGE	Spiked Blank	D10-Anthracene	2019/06/01		105	%	50 - 130
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		100	%	50 - 130
			1-Methylnaphthalene	2019/06/01		93	%	50 - 130
			2-Methylnaphthalene	2019/06/01		95	%	50 - 130
			Acenaphthene	2019/06/01		100	%	50 - 130
			Acenaphthylene	2019/06/01		98	%	50 - 130
			Anthracene	2019/06/01		93	%	50 - 130
			Benzo(a)anthracene	2019/06/01		86	%	50 - 130
			Benzo(a)pyrene	2019/06/01		94	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		106	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		96	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		95	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		101	%	50 - 130
			Chrysene	2019/06/01		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		96	%	50 - 130
			Fluoranthene	2019/06/01		99	%	50 - 130
			Fluorene	2019/06/01		109	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		94	%	50 - 130
			Naphthalene	2019/06/01		95	%	50 - 130
			Perylene	2019/06/01		90	%	50 - 130
			Phenanthrene	2019/06/01		111	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Pyrene	2019/06/01		98	%	50 - 130
6151065	LGE	Method Blank	D10-Anthracene	2019/06/01		108	%	50 - 130
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		99	%	50 - 130
			1-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/06/01	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/06/01	ND, RDL=0.010		ug/L	
			Anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Chrysene	2019/06/01	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluorene	2019/06/01	ND, RDL=0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Naphthalene	2019/06/01	ND, RDL=0.20		ug/L	
			Perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/06/01	ND, RDL=0.010		ug/L	
			Pyrene	2019/06/01	ND, RDL=0.010		ug/L	
6151065	LGE	RPD	1-Methylnaphthalene	2019/06/01	NC		%	40
			2-Methylnaphthalene	2019/06/01	NC		%	40
			Acenaphthene	2019/06/01	NC		%	40
			Acenaphthylene	2019/06/01	NC		%	40
			Anthracene	2019/06/01	NC		%	40
			Benzo(a)anthracene	2019/06/01	NC		%	40
			Benzo(a)pyrene	2019/06/01	NC		%	40
			Benzo(b)fluoranthene	2019/06/01	NC		%	40
			Benzo(g,h,i)perylene	2019/06/01	NC		%	40
			Benzo(j)fluoranthene	2019/06/01	NC		%	40
			Benzo(k)fluoranthene	2019/06/01	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chrysene	2019/06/01	NC		%	40
			Dibenz(a,h)anthracene	2019/06/01	NC		%	40
			Fluoranthene	2019/06/01	13		%	40
			Fluorene	2019/06/01	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/06/01	NC		%	40
			Naphthalene	2019/06/01	NC		%	40
			Perylene	2019/06/01	NC		%	40
			Phenanthrene	2019/06/01	NC		%	40
			Pyrene	2019/06/01	12		%	40
6153412	THL	Matrix Spike [JVR188-12]	Isobutylbenzene - Volatile	2019/06/02		94	%	70 - 130
			Benzene	2019/06/02		106	%	70 - 130
			Toluene	2019/06/02		108	%	70 - 130
			Ethylbenzene	2019/06/02		117	%	70 - 130
			Total Xylenes	2019/06/02		114	%	70 - 130
6153412	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/06/02		107	%	70 - 130
			Benzene	2019/06/02		125	%	70 - 130
			Toluene	2019/06/02		124	%	70 - 130
			Ethylbenzene	2019/06/02		124	%	70 - 130
			Total Xylenes	2019/06/02		121	%	70 - 130
6153412	THL	Method Blank	Isobutylbenzene - Volatile	2019/06/02		105	%	70 - 130
			Benzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Toluene	2019/06/02	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/06/02	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/06/02	ND, RDL=0.010		mg/L	
6153412	THL	RPD	Benzene	2019/06/02	NC		%	40
			Toluene	2019/06/02	NC		%	40
			Ethylbenzene	2019/06/02	NC		%	40
			Total Xylenes	2019/06/02	NC		%	40
			C6 - C10 (less BTEX)	2019/06/02	NC		%	40
6153709	SSV	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2019/06/04		99	%	80 - 120
6153709	SSV	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/06/04		102	%	80 - 120
6153709	SSV	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04		103	%	80 - 120
6153709	SSV	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04	ND, RDL=0.10		mg/L	
6153709	SSV	RPD	Total Kjeldahl Nitrogen (TKN)	2019/06/04	0		%	20
6154507	SSI	Matrix Spike	Total Organic Carbon (C)	2019/06/03		105	%	85 - 115
6154507	SSI	Spiked Blank	Total Organic Carbon (C)	2019/06/03		110	%	80 - 120
6154507	SSI	Method Blank	Total Organic Carbon (C)	2019/06/03	ND, RDL=0.50		mg/L	
6154507	SSI	RPD	Total Organic Carbon (C)	2019/06/03	1.1		%	15
6154879	GTO	Matrix Spike	Sulphide	2019/06/03		83	%	80 - 120
6154879	GTO	Spiked Blank	Sulphide	2019/06/03		90	%	80 - 120
6154879	GTO	Method Blank	Sulphide	2019/06/03	ND, RDL=0.020		mg/L	
6154879	GTO	RPD	Sulphide	2019/06/03	NC		%	20
6156517	RGE	Matrix Spike	Decachlorobiphenyl	2019/06/05		96	%	30 - 130
			Aroclor 1254	2019/06/05		109	%	70 - 130
6156517	RGE	Spiked Blank	Decachlorobiphenyl	2019/06/05		74	%	30 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Aroclor 1254	2019/06/05		103	%	70 - 130
6156517	RGE	Method Blank	Decachlorobiphenyl	2019/06/05		65	%	30 - 130
			Aroclor 1016	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/06/05	ND, RDL=0.050		ug/L	
6156517	RGE	RPD	Aroclor 1016	2019/06/05	NC		%	40
			Aroclor 1221	2019/06/05	NC		%	40
			Aroclor 1232	2019/06/05	NC		%	40
			Aroclor 1248	2019/06/05	NC		%	40
			Aroclor 1242	2019/06/05	NC		%	40
			Aroclor 1254	2019/06/05	NC		%	40
			Aroclor 1260	2019/06/05	NC		%	40
6156564	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/06/04		99	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/04		109	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/04		89	%	70 - 130
			>C16-C21 Hydrocarbons	2019/06/04		88	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/06/04		101	%	70 - 130
6156564	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/06/04		98	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/04		111	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/04		92	%	70 - 130
			>C16-C21 Hydrocarbons	2019/06/04		90	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/06/04		106	%	70 - 130
6156564	BCD	Method Blank	Isobutylbenzene - Extractable	2019/06/04		98	%	70 - 130
			n-Dotriacontane - Extractable	2019/06/04		105	%	70 - 130
			>C10-C16 Hydrocarbons	2019/06/04	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/06/04	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/06/04	ND, RDL=0.10		mg/L	
6156564	BCD	RPD	>C10-C16 Hydrocarbons	2019/06/04	NC		%	40
			>C16-C21 Hydrocarbons	2019/06/04	NC		%	40
			>C21-<C32 Hydrocarbons	2019/06/04	NC		%	40
6157072	AM6	QC Standard	Volatile Suspended Solids	2019/06/04		98	%	80 - 120
6157072	AM6	Method Blank	Volatile Suspended Solids	2019/06/04	ND, RDL=2.0		mg/L	
6157072	AM6	RPD	Volatile Suspended Solids	2019/06/04	9.5		%	25
6157791	BB3	Matrix Spike	Total Nitrogen (N)	2019/06/03		101	%	80 - 120
6157791	BB3	Spiked Blank	Total Nitrogen (N)	2019/06/03		99	%	80 - 120
6157791	BB3	Method Blank	Total Nitrogen (N)	2019/06/03	ND, RDL=0.020		mg/L	
6157791	BB3	RPD	Total Nitrogen (N)	2019/06/03	3.0		%	20
6158894	NRG	Matrix Spike	Total Phosphorus	2019/06/06		110	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6158894	NRG	Spiked Blank	Total Phosphorus	2019/06/06		103	%	80 - 120
6158894	NRG	Method Blank	Total Phosphorus	2019/06/06	ND, RDL=0.020		mg/L	
6158894	NRG	RPD	Total Phosphorus	2019/06/06	NC		%	25
6158927	SSI	Matrix Spike	Dissolved Organic Carbon (C)	2019/06/05		95	%	85 - 115
6158927	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/06/05		98	%	80 - 120
6158927	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/06/05	ND, RDL=0.50		mg/L	
6158927	SSI	RPD	Dissolved Organic Carbon (C)	2019/06/05	NC		%	15
6159669	LHA	Matrix Spike [JVR188-20]	Total Cyanide (CN)	2019/06/07		78 (4)	%	80 - 120
6159669	LHA	Spiked Blank	Total Cyanide (CN)	2019/06/07		97	%	80 - 120
6159669	LHA	Method Blank	Total Cyanide (CN)	2019/06/07	ND, RDL=0.0050		mg/L	
6159669	LHA	RPD [JVR188-20]	Total Cyanide (CN)	2019/06/07	NC		%	20
6159706	NRG	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/06/06		106	%	80 - 120
6159706	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/06/07		100	%	80 - 120
6159706	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/06/07	ND, RDL=0.050		mg/L	
6159706	NRG	RPD	Nitrogen (Ammonia Nitrogen)	2019/06/06	16		%	20
6165901	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
6165901	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
6165901	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
6170521	OBC	Spiked Blank	C13-1234678 HeptaCDD	2019/06/11		123	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/11		99	%	30 - 130
			C13-123678 HexaCDD	2019/06/11		127	%	30 - 130
			C13-123678 HexaCDF	2019/06/11		88	%	30 - 130
			C13-12378 PentaCDD	2019/06/11		87	%	30 - 130
			C13-12378 PentaCDF	2019/06/11		66	%	30 - 130
			C13-2378 TetraCDD	2019/06/11		92	%	30 - 130
			C13-2378 TetraCDF	2019/06/11		80	%	30 - 130
			C13-OCDD	2019/06/11		116	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/11		90	%	80 - 140
			1,2,3,7,8-Penta CDD	2019/06/11		100	%	80 - 140

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2019/06/11		85	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2019/06/11		97	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2019/06/11		93	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2019/06/11		85	%	80 - 140
			Octa CDD	2019/06/11		81	%	80 - 140
			2,3,7,8-Tetra CDF	2019/06/11		101	%	80 - 140
			1,2,3,7,8-Penta CDF	2019/06/11		126	%	80 - 140
			2,3,4,7,8-Penta CDF	2019/06/11		119	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2019/06/11		113	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2019/06/11		120	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2019/06/11		123	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2019/06/11		122	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2019/06/11		105	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2019/06/11		99	%	80 - 140
			Octa CDF	2019/06/11		86	%	80 - 140
6170521	OBC	RPD	2,3,7,8-Tetra CDD	2019/06/12	4.3		%	35
			1,2,3,7,8-Penta CDD	2019/06/12	12		%	35
			1,2,3,4,7,8-Hexa CDD	2019/06/12	9.0		%	35
			1,2,3,6,7,8-Hexa CDD	2019/06/12	1.0		%	35
			1,2,3,7,8,9-Hexa CDD	2019/06/12	8.2		%	35
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	28		%	35
			Octa CDD	2019/06/12	0		%	35
			2,3,7,8-Tetra CDF	2019/06/12	16		%	35
			1,2,3,7,8-Penta CDF	2019/06/12	3.1		%	35
			2,3,4,7,8-Penta CDF	2019/06/12	14		%	35
			1,2,3,4,7,8-Hexa CDF	2019/06/12	2.6		%	35
			1,2,3,6,7,8-Hexa CDF	2019/06/12	0		%	35
			2,3,4,6,7,8-Hexa CDF	2019/06/12	4.8		%	35
			1,2,3,7,8,9-Hexa CDF	2019/06/12	2.5		%	35
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	4.7		%	35
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	1.0		%	35
			Octa CDF	2019/06/12	0		%	35
6170521	OBC	Method Blank	C13-1234678 HeptaCDD	2019/06/12		107	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/12		96	%	30 - 130
			C13-123678 HexaCDD	2019/06/12		118	%	30 - 130
			C13-123678 HexaCDF	2019/06/12		82	%	30 - 130
			C13-12378 PentaCDD	2019/06/12		77	%	30 - 130
			C13-12378 PentaCDF	2019/06/12		61	%	30 - 130
			C13-2378 TetraCDD	2019/06/12		85	%	30 - 130
			C13-2378 TetraCDF	2019/06/12		79	%	30 - 130
			C13-OCDD	2019/06/12		113	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			1,2,3,7,8-Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			1,2,3,4,7,8-Hexa CDD	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,6,7,8-Hexa CDD	2019/06/12	ND, EDL=1.02		pg/L	
			1,2,3,7,8,9-Hexa CDD	2019/06/12	ND, EDL=0.995		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Octa CDD	2019/06/12	ND, EDL=1.16 (5)		pg/L	
			Total Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			Total Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			Total Hexa CDD	2019/06/12	ND, EDL=1.13 (5)		pg/L	
			Total Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	
			2,3,7,8-Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,7,8-Penta CDF	2019/06/12	ND, EDL=1.18		pg/L	
			2,3,4,7,8-Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			1,2,3,4,7,8-Hexa CDF	2019/06/12	ND, EDL=1.13		pg/L	
			1,2,3,6,7,8-Hexa CDF	2019/06/12	ND, EDL=0.939		pg/L	
			2,3,4,6,7,8-Hexa CDF	2019/06/12	ND, EDL=1.06		pg/L	
			1,2,3,7,8,9-Hexa CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	ND, EDL=1.09		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	ND, EDL=1.24		pg/L	
			Octa CDF	2019/06/12	ND, EDL=1.16		pg/L	
			Total Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			Total Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			Total Hexa CDF	2019/06/12	ND, EDL=1.07		pg/L	
			Total Hepta CDF	2019/06/12	ND, EDL=1.16		pg/L	
6172547	LZ3	Matrix Spike	9,10-Dichlorostearic acid	2019/06/01		96	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		90	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		85	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		92	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		98	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		85	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		87	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		94	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		94	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		92	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		91	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		102	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		106	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			Abietic acid	2019/06/01		NC	%	50 - 130
			Dehydroabietic acid	2019/06/01		NC	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Isopimaric acid	2019/06/01		NC	%	50 - 130
			Neoabietic acid	2019/06/01		68	%	50 - 130
			Palustric acid	2019/06/01		67	%	50 - 130
			Pimaric acid	2019/06/01		102	%	50 - 130
			Sandaracopimaric acid	2019/06/01		101	%	50 - 130
6172547	LZ3	Spiked Blank	9,10-Dichlorostearic acid	2019/06/01		94	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		94	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		88	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		94	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		96	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		99	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		89	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		86	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		105	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		99	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		94	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		103	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		114	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		108	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		110	%	50 - 130
			Abietic acid	2019/06/01		94	%	50 - 130
			Dehydroabietic acid	2019/06/01		128	%	50 - 130
			Isopimaric acid	2019/06/01		115	%	50 - 130
			Neoabietic acid	2019/06/01		63	%	50 - 130
			Palustric acid	2019/06/01		74	%	50 - 130
			Pimaric acid	2019/06/01		107	%	50 - 130
			Sandaracopimaric acid	2019/06/01		105	%	50 - 130
6172547	LZ3	Method Blank	Total Fatty Acids	2019/06/01	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/06/01	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/06/01	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/06/01	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/06/01	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/06/01	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/06/01	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/06/01	ND, RDL=0.0060		mg/L	
			Oleic acid (C18:1)	2019/06/01	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/06/01	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/06/01	ND, RDL=0.0060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			12,14-Dichlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
6172547	LZ3	RPD	Total Fatty Acids	2019/06/01	NC		%	30
			Total Resin Acids	2019/06/01	NC		%	30
			9,10-Dichlorostearic acid	2019/06/01	NC		%	30
			Decanoic Acid (C10)	2019/06/01	NC		%	30
			Docosanoic acid (C22)	2019/06/01	NC		%	30
			Dodecanoic acid (C12)	2019/06/01	NC		%	30
			Eicosanoic acid (C20)	2019/06/01	NC		%	30
			Hexadecanoic acid (C16)	2019/06/01	NC		%	30
			Linoleic acid (C18:2)	2019/06/01	NC		%	30
			Linolenic acid (C18:3)	2019/06/01	NC		%	30
			Octadecanoic acid (C18)	2019/06/01	NC		%	30
			Oleic acid (C18:1)	2019/06/01	NC		%	30
			Tetradecanoic acid (C14)	2019/06/01	NC		%	30
			Undecanoic acid (C11)	2019/06/01	NC		%	30
			12,14-Dichlorodehydroabietic acid	2019/06/01	NC		%	30
			12-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			14-Chlorodehydroabietic acid	2019/06/01	NC		%	30
			Abietic acid	2019/06/01	NC		%	30
			Dehydroabietic acid	2019/06/01	NC		%	30
			Isopimaric acid	2019/06/01	NC		%	30
			Neoabietic acid	2019/06/01	NC		%	30
			Palustric acid	2019/06/01	NC		%	30
			Pimaric acid	2019/06/01	NC		%	30
			Sandaracopimaric acid	2019/06/01	NC		%	30
6181990	BBD	QC Standard	Salinity	2019/06/18		101	%	80 - 120
6181990	BBD	Method Blank	Salinity	2019/06/18	ND, RDL=2.0		N/A	
6181990	BBD	RPD	Salinity	2019/06/18	0		%	25
6182160	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/06/18		101	%	80 - 120
6182160	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/06/18		107	%	80 - 120
6182160	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/06/18	ND, RDL=5.0		mg/L	
6182160	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/06/18	0.41		%	25
6182167	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/06/19		101	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6182167	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/06/19		100	%	80 - 120
6182167	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/06/19	ND, RDL=1.0		mg/L	
6182167	SRM	RPD	Dissolved Chloride (Cl-)	2019/06/19	3.0		%	25
6182168	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/06/19		100	%	80 - 120
6182168	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/06/19		108	%	80 - 120
6182168	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/06/19	ND, RDL=2.0		mg/L	
6182168	SRM	RPD	Dissolved Sulphate (SO4)	2019/06/19	5.3		%	25
6182169	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/06/19		97	%	80 - 120
6182169	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/06/19		101	%	80 - 120
6182169	SRM	Method Blank	Reactive Silica (SiO2)	2019/06/19	ND, RDL=0.50		mg/L	
6182169	SRM	RPD	Reactive Silica (SiO2)	2019/06/19	1.4		%	25
6182170	SRM	Spiked Blank	Colour	2019/06/18		98	%	80 - 120
6182170	SRM	Method Blank	Colour	2019/06/18	ND, RDL=5.0		TCU	
6182170	SRM	RPD	Colour	2019/06/18	NC		%	20
6182171	SRM	Matrix Spike	Orthophosphate (P)	2019/06/18		NC	%	80 - 120
6182171	SRM	Spiked Blank	Orthophosphate (P)	2019/06/18		97	%	80 - 120
6182171	SRM	Method Blank	Orthophosphate (P)	2019/06/18	ND, RDL=0.010		mg/L	
6182171	SRM	RPD	Orthophosphate (P)	2019/06/18	0.12		%	25
6182172	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/06/18		95	%	80 - 120
6182172	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/06/18		95	%	80 - 120
6182172	SRM	Method Blank	Nitrate + Nitrite (N)	2019/06/18	ND, RDL=0.050		mg/L	
6182172	SRM	RPD	Nitrate + Nitrite (N)	2019/06/18	NC		%	25
6182173	SRM	Matrix Spike	Nitrite (N)	2019/06/18		95	%	80 - 120
6182173	SRM	Spiked Blank	Nitrite (N)	2019/06/18		99	%	80 - 120
6182173	SRM	Method Blank	Nitrite (N)	2019/06/18	ND, RDL=0.010		mg/L	
6182173	SRM	RPD	Nitrite (N)	2019/06/18	NC		%	20
6184783	EMT	QC Standard	pH	2019/06/19		100	%	97 - 103
6184783	EMT	RPD	pH	2019/06/19	0.76		%	N/A
6184788	EMT	Spiked Blank	Conductivity	2019/06/19		103	%	80 - 120
6184788	EMT	Method Blank	Conductivity	2019/06/19	1.4, RDL=1.0		uS/cm	
6184788	EMT	RPD	Conductivity	2019/06/19	0.0059		%	10
6186832	EMT	QC Standard	Turbidity	2019/06/20		107	%	80 - 120
6186832	EMT	Spiked Blank	Turbidity	2019/06/20		101	%	80 - 120
6186832	EMT	Method Blank	Turbidity	2019/06/20	ND, RDL=0.10		NTU	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6186832	EMT	RPD	Turbidity	2019/06/20	12		%	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) BOD Analysis: Second source QC recovery high. Reference Material recovery and all other QC acceptable.

(2) PAH sample contained sediment.

(3) Matrix Spike: results are outside acceptance limit. Probable matrix interference.

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

(5) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

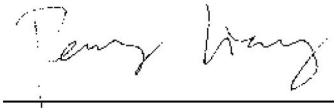
Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE

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



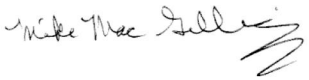
Anastassia Hamanov, Scientific Specialist



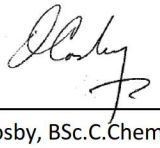
Harry (Peng) Liang, Senior Analyst



Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics



Mike MacGillivray, Scientific Specialist (Inorganics)



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services



Rosemarie MacDonald, Scientific Specialist (Organics)



Rob Reinert, B.Sc., Scientific Specialist

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your Project #: B9E4476
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449984
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920966
Received: 2019/05/31, 09:25

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/06/03	2019/06/05	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Your Project #: B9E4476
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

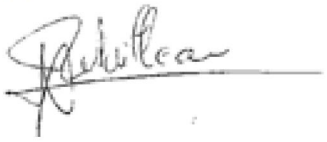
Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449984
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920966
Received: 2019/05/31, 09:25

Encryption Key



Sophie Retailleau
Project Manager
21 Jun 2019 16:05:57

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: Sophie.RETAILLEAU@bvlabs.com
Phone# (514)448-9001 Ext:7066232

==========

This report has been generated and distributed using a secure automated process.
Lab BV has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5626		
Sampling Date		2019/05/25 18:15		
COC Number		N-A		
	Units	**JVR188-13R\CARIBOU SEA WATER CHB 2-W1**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	<10	10	1994633
Phenol	ug/L	<1.0	1.0	1994633
2-Chlorophenol	ug/L	<1.0	1.0	1994633
3-Chlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorophenol	ug/L	<1.0	1.0	1994633
o-Cresol	ug/L	<1.0	1.0	1994633
m-Cresol	ug/L	<1.0	1.0	1994633
p-Cresol	ug/L	<1.0	1.0	1994633
Guaiacol	ug/L	<1.0	1.0	1994633
Catechol	ug/L	<1.0	1.0	1994633
Eugenol	ug/L	<1.0	1.0	1994633
Isoeugenol	ug/L	<1.0	1.0	1994633
6-Chlorovanillin	ug/L	<1.0	1.0	1994633
5,6-Dichlorovanillin	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorosyringol	ug/L	<1.0	1.0	1994633
2,4-Dimethylphenol	ug/L	<1.0	1.0	1994633
2,6-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,3-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,4-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,4 + 2,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2-Nitrophenol	ug/L	<2.0	2.0	1994633
4-Nitrophenol	ug/L	<10	10	1994633
2,4,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,4-Trichlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
4-Chloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
4,6-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
2,3,5,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5626		
Sampling Date		2019/05/25 18:15		
COC Number		N-A		
	Units	**JVR188-13R\CARIBOU SEA WATER CHB 2-W1**	**RDL**	**QC Batch**
2,3,4,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
2,3,4,5-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorocatechol	ug/L	<1.0	1.0	1994633
3,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
4,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
4,5,6-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
Pentachlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5,6-Tetrachloroveratrol	ug/L	<1.0	1.0	1994633
Surrogate Recovery (%)				
D6-Phenol	%	101	N/A	1994633
Tribromophenol-2,4,6	%	76	N/A	1994633
Trifluoro-m-cresol	%	87	N/A	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total "Total Phenols (RFPP) " calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Reported detection limits are modified according to the volume of sample received.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1994633	GDL	Spiked Blank	D6-Phenol	2019/06/04		107	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		95	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		105	%	50 - 130
			Phenol	2019/06/04		100	%	50 - 130
			2-Chlorophenol	2019/06/04		95	%	50 - 130
			3-Chlorophenol	2019/06/04		96	%	50 - 130
			4-Chlorophenol	2019/06/04		99	%	50 - 130
			o-Cresol	2019/06/04		104	%	50 - 130
			m-Cresol	2019/06/04		101	%	50 - 130
			p-Cresol	2019/06/04		101	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		95	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		105	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		95	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		106	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		100	%	50 - 130
			2-Nitrophenol	2019/06/04		94	%	50 - 130
			4-Nitrophenol	2019/06/04		92	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		94	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		107	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		109	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		102	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		95	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/06/04		107	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		96	%	50 - 130
			Pentachlorophenol	2019/06/04		90	%	50 - 130
1994633	GDL	Spiked Blank DUP	D6-Phenol	2019/06/04		105	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04		98	%	50 - 130
			2-Chlorophenol	2019/06/04		93	%	50 - 130
			3-Chlorophenol	2019/06/04		95	%	50 - 130
			4-Chlorophenol	2019/06/04		93	%	50 - 130
			o-Cresol	2019/06/04		102	%	50 - 130
			m-Cresol	2019/06/04		100	%	50 - 130
			p-Cresol	2019/06/04		98	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		91	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		91	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		94	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		100	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		96	%	50 - 130
			2-Nitrophenol	2019/06/04		87	%	50 - 130
			4-Nitrophenol	2019/06/04		89	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		97	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		87	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		98	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		95	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		95	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		88	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/06/04		103	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		92	%	50 - 130
			Pentachlorophenol	2019/06/04		87	%	50 - 130
1994633	GDL	Method Blank	D6-Phenol	2019/06/04		99	%	50 - 130
			Total of Regl. P&P Phenols	2019/06/04	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04	<0.50		ug/L	
			2-Chlorophenol	2019/06/04	<0.50		ug/L	
			3-Chlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorophenol	2019/06/04	<0.50		ug/L	
			o-Cresol	2019/06/04	<0.50		ug/L	
			m-Cresol	2019/06/04	<0.50		ug/L	
			p-Cresol	2019/06/04	<0.50		ug/L	
			Guaiacol	2019/06/04	<0.50		ug/L	
			Catechol	2019/06/04	<0.50		ug/L	
			Eugenol	2019/06/04	<0.50		ug/L	
			Isoeugenol	2019/06/04	<0.50		ug/L	
			6-Chlorovanillin	2019/06/04	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/06/04	<0.50		ug/L	
			2,4-Dimethylphenol	2019/06/04	<0.50		ug/L	
			2,6-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,3-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,4-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2-Nitrophenol	2019/06/04	<1.0		ug/L	
			4-Nitrophenol	2019/06/04	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			4-Chloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorocatechol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			Pentachlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/06/04	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/06/04	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

MAXXAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Maxxam
A Bureau Veritas Group Company

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac

Job# B9E4476

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JVR188-13R\CARIBOU SEA WATER CHB 2-W 1		Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/25 18:15	2019/06/20

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	3	1	1	Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) _____ (print) _____ Date and Time 2019/05/30 13:25

Received by (Sign) _____ (print) Laurie Dewey Date and Time 2019/05/30 09:02

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:

National: N001

Regional:

31-May-19 09:25
Sophie Retailleau
B920966

B920966_COC

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☐ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☑ COC Must be Attached

Sender (Print) _____ Initial _____

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Coolers/Ice, Tape-custody seal, Date&Sign
Date Shipped May 30/19 Number of coolers ____
Shipper (Print) _____ Initial _____

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715274-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768657
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4405
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/06/20	N/A	SM 23 4500-CO2 D
Alkalinity	1	N/A	2019/06/18	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	1	N/A	2019/06/03	N/A	Auto Calc.
Carbonaceous BOD	1	2019/05/30	2019/06/04	ATL SOP 00041	SM 23 5210B m
Chloride	1	N/A	2019/06/19	ATL SOP 00014	SM 23 4500-Cl- E m
Chemical Oxygen Demand (COD)	1	N/A	2019/05/30	ATL SOP 00042	SM 23 5220D m
Colour	1	N/A	2019/06/18	ATL SOP 00020	SM 23 2120C m
Total Cyanide (1)	1	2019/06/05	2019/06/07	CAM SOP-00457	OMOE E3015 5 m
Dioxins/Furans in Water (EPS 1/RM/23) (1, 6)	1	2019/06/06	2019/06/12	BRL SOP-00406 (mod)	EPS 1/RM/23 m
Organic carbon - Diss (DOC) (7)	1	N/A	2019/06/05	ATL SOP 00203	SM 23 5310B m
Conductance - water	1	N/A	2019/06/19	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	1	2019/05/30	2019/05/30	ATL SOP 00113	Atl. RBCA v3.1 m
Sulphide as H2S (1)	1	N/A	2019/06/03		
Hardness (calculated as CaCO3)	1	N/A	2019/05/31	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	1	2019/05/31	2019/05/31	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS	1	2019/05/30	2019/05/31	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	1	N/A	2019/06/20	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2019/06/20	N/A	Auto Calc.
Chlorate and Chlorite by IC (2)	1	N/A	2019/06/05	CAL SOP-00040	SM 23 4110D m
Nitrogen (Total) (3)	1	N/A	2019/06/03	BBY6SOP-00016	SM 22 4500-N C m
Resin and Fatty Acids (2)	1	2019/05/31	2019/06/01	CAL SOP-00099	AE129.0
Nitrogen Ammonia - water	1	N/A	2019/06/04	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2019/06/18	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	1	N/A	2019/06/18	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2019/06/19	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	1	2019/05/31	2019/06/01	ATL SOP 00103	EPA 8270E R6 m
PCBs in water by GC/ECD	1	2019/06/04	2019/06/05	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water)	1	N/A	2019/06/05	N/A	Auto Calc.
Phenols in Pulp and Paper Mill Effluents (4)	1	2019/06/01	2019/06/05		
pH (8)	1	N/A	2019/06/19	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	1	N/A	2019/06/18	ATL SOP 00021	SM 23 4500-P E m

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715274-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768657
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4405
Received: 2019/05/29, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VPH in Water (PIRI)	1	N/A	2019/06/02	ATL SOP 00118	Atl. RBCA v3.1 m
Salinity (9)	1	N/A	2019/06/18		SM 22 2520B
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/06/20	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/06/20	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2019/06/19	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2019/06/19	ATL SOP 00023	ASTM D516-16 m
Particle Size (Oily W)(Sub from Bedford) (5)	1	2019/06/01	2019/06/17		
Sulphide (1)	1	N/A	2019/06/03	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2019/06/19	N/A	Auto Calc.
Total Kjeldahl Nitrogen in Water (1)	1	2019/06/01	2019/06/04	CAM SOP-00938	OMOE E3516 m
Organic carbon - Total (TOC) (7)	1	N/A	2019/06/07	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	1	N/A	2019/06/03	N/A	Atl. RBCA v3 m
Phosphorus Total Colourimetry	1	2019/06/05	2019/06/06	ATL SOP 00057	EPA 365.1 R2 m
Total Suspended Solids	1	2019/05/31	2019/06/03	ATL SOP 00007	SM 23 2540D m
Turbidity	1	N/A	2019/06/10	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	1	N/A	2019/05/30	ATL SOP 00133	EPA 8260D R4 m
Volatile Suspended Solids	1	N/A	2019/06/04	ATL SOP 00008	EPA 160.4 m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Your P.O. #: 43013552
Your Project #: Effluent Treatment Plant
Your C.O.C. #: 715274-01-01

Attention: Michael Pidgeon

Northern Pulp N.S.
Pictou Landing
340 Simpson Lane
Pictou, NS
CANADA B0K 1X2

Report Date: 2019/06/24
Report #: R5768657
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9E4405
Received: 2019/05/29, 12:45

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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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 Laboratories Mississauga
(2) This test was performed by Bedford to Calgary Offsite
(3) This test was performed by Bedford to Burnaby - Offsite
(4) This test was performed by Bedford to Montreal Subcontrac
(5) This test was performed by Bedford to Lex Subcontract
(6) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.
(7) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.
(8) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(9) Non-accredited test method

Encryption Key



Neyousha Shahisavandi
Project Manager Assistant
24 Jun 2019 14:30:15

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Maryann Comeau, Project Manager
Email: Maryann.COMEAU@bvlabs.com
Phone# (902)420-0203 Ext:298

==========

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

BV Labs Job #: B9E4405
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	507	N/A	N/A	6147444
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	92	1.0	0.20	6147433
Calculated TDS	mg/L	29000	1.0	0.20	6147453
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	1.0	0.20	6147433
Cation Sum	me/L	477	N/A	N/A	6147444
Hardness (CaCO3)	mg/L	5100	1.0	1.0	6147440
Ion Balance (% Difference)	%	3.06	N/A	N/A	6147442
Langelier Index (@ 20C)	N/A	0.258			6147449
Langelier Index (@ 4C)	N/A	0.0200			6147451
Nitrate (N)	mg/L	ND	0.050	N/A	6147446
Saturation pH (@ 20C)	N/A	7.35			6147449
Saturation pH (@ 4C)	N/A	7.59			6147451
Sulphide (as H2S)	mg/L	ND	0.021	0.011	6147649
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	92	5.0	N/A	6182160
Carbonaceous BOD	mg/L	ND (1)	10	N/A	6148701
Total Chemical Oxygen Demand	mg/L	910	200	N/A	6148620
Dissolved Chlorate (ClO3-)	mg/L	ND (2)	5.0	N/A	6165901
Dissolved Chloride (Cl-)	mg/L	17000	500	N/A	6182167
Dissolved Chlorite (CLO2-)	mg/L	ND (2)	5.0	N/A	6165901
Colour	TCU	ND	5.0	N/A	6182170
Total Kjeldahl Nitrogen (TKN)	mg/L	0.15	0.10	0.060	6153709
Nitrate + Nitrite (N)	mg/L	ND	0.050	N/A	6182172
Nitrite (N)	mg/L	ND	0.010	N/A	6182173
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	N/A	6156641
Dissolved Organic Carbon (C)	mg/L	1.6	0.50	N/A	6158927
Total Organic Carbon (C)	mg/L	1.9	0.50	N/A	6163938
Orthophosphate (P)	mg/L	ND	0.010	N/A	6182171
pH	pH	7.61	N/A	N/A	6184783

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Sample integrity may have been compromised, the sample exceeded it's hold time prior to being analyzed.
(2) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

BV Labs Job #: B9E4405
Report Date: 2019/06/24

Northern Pulp N.S.
Client Project #: Effluent Treatment Plant
Your P.O. #: 43013552

RESULTS OF ANALYSES OF WATER

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Total Phosphorus	mg/L	ND	0.020	N/A	6158894
Salinity	N/A	30	2.0	N/A	6181990
Reactive Silica (SiO2)	mg/L	ND	0.50	N/A	6182169
Total Suspended Solids	mg/L	2.2	1.0	N/A	6151063
Dissolved Sulphate (SO4)	mg/L	1900	40	N/A	6182168
Sulphide	mg/L	ND	0.020	0.010	6154726
Total Cyanide (CN)	mg/L	ND	0.0050	0.00010	6159669
Turbidity	NTU	0.83	0.10	0.10	6167153
Volatile Suspended Solids	mg/L	2.0	2.0	N/A	6157072
Conductivity	uS/cm	44000	1.0	N/A	6184788
Nutritional Parameters					
Total Nitrogen (N)	mg/L	0.133	0.020	N/A	6157791
Subcontracted Analysis					
Subcontract Parameter	N/A	ATTACHED	N/A	N/A	6153387

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Metals					
Total Mercury (Hg)	ug/L	ND	0.013	N/A	6149403

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Metals					
Total Aluminum (Al)	ug/L	ND	50	N/A	6148971
Total Antimony (Sb)	ug/L	ND	10	N/A	6148971
Total Arsenic (As)	ug/L	ND	10	N/A	6148971
Total Barium (Ba)	ug/L	11	10	N/A	6148971
Total Beryllium (Be)	ug/L	ND	10	N/A	6148971
Total Bismuth (Bi)	ug/L	ND	20	N/A	6148971
Total Boron (B)	ug/L	3600	500	N/A	6148971
Total Cadmium (Cd)	ug/L	ND	0.10	N/A	6148971
Total Calcium (Ca)	ug/L	330000	1000	N/A	6148971
Total Chromium (Cr)	ug/L	ND	10	N/A	6148971
Total Cobalt (Co)	ug/L	ND	4.0	N/A	6148971
Total Copper (Cu)	ug/L	ND	5.0	N/A	6148971
Total Iron (Fe)	ug/L	ND	500	N/A	6148971
Total Lead (Pb)	ug/L	ND	5.0	N/A	6148971
Total Magnesium (Mg)	ug/L	1000000	1000	N/A	6148971
Total Manganese (Mn)	ug/L	ND	20	N/A	6148971
Total Molybdenum (Mo)	ug/L	ND	20	N/A	6148971
Total Nickel (Ni)	ug/L	ND	20	N/A	6148971
Total Phosphorus (P)	ug/L	ND	1000	N/A	6148971
Total Potassium (K)	ug/L	320000	1000	N/A	6148971
Total Selenium (Se)	ug/L	ND	10	N/A	6148971
Total Silver (Ag)	ug/L	ND	1.0	N/A	6148971
Total Sodium (Na)	ug/L	8400000	1000	N/A	6148971
Total Strontium (Sr)	ug/L	6100	20	N/A	6148971
Total Thallium (Tl)	ug/L	ND	1.0	N/A	6148971
Total Tin (Sn)	ug/L	ND	20	N/A	6148971
Total Titanium (Ti)	ug/L	ND	20	N/A	6148971
Total Uranium (U)	ug/L	2.9	1.0	N/A	6148971
Total Vanadium (V)	ug/L	ND	20	N/A	6148971
Total Zinc (Zn)	ug/L	ND	50	N/A	6148971

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Polyaromatic Hydrocarbons					
1-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
2-Methylnaphthalene	ug/L	ND	0.050	N/A	6151065
Acenaphthene	ug/L	ND	0.010	N/A	6151065
Acenaphthylene	ug/L	ND	0.010	N/A	6151065
Anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)anthracene	ug/L	ND	0.010	N/A	6151065
Benzo(a)pyrene	ug/L	ND	0.010	N/A	6151065
Benzo(b)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(b/j)fluoranthene	ug/L	ND	0.020	N/A	6146340
Benzo(g,h,i)perylene	ug/L	ND	0.010	N/A	6151065
Benzo(j)fluoranthene	ug/L	ND	0.010	N/A	6151065
Benzo(k)fluoranthene	ug/L	ND	0.010	N/A	6151065
Chrysene	ug/L	ND	0.010	N/A	6151065
Dibenz(a,h)anthracene	ug/L	ND	0.010	N/A	6151065
Fluoranthene	ug/L	ND	0.010	N/A	6151065
Fluorene	ug/L	ND	0.010	N/A	6151065
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.010	N/A	6151065
Naphthalene	ug/L	ND	0.20	N/A	6151065
Perylene	ug/L	ND	0.010	N/A	6151065
Phenanthrene	ug/L	ND	0.010	N/A	6151065
Pyrene	ug/L	ND	0.010	N/A	6151065
Surrogate Recovery (%)					
D10-Anthracene	%	85			6151065
D14-Terphenyl	%	93			6151065
D8-Acenaphthylene	%	81			6151065

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Volatile Organics					
1,1-Dichloroethane	ug/L	ND	2.0	N/A	6148613
1,1-Dichloroethylene	ug/L	ND	0.50	1.0	6148613
1,1,1-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2-Trichloroethane	ug/L	ND	1.0	N/A	6148613
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	N/A	6148613
Ethylene Dibromide	ug/L	ND	0.20	0.50	6148613
1,2-Dichlorobenzene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloroethane	ug/L	ND	1.0	N/A	6148613
cis-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
trans-1,2-Dichloroethylene	ug/L	ND	0.50	N/A	6148613
1,2-Dichloropropane	ug/L	ND	0.50	N/A	6148613
1,3-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
cis-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
trans-1,3-Dichloropropene	ug/L	ND	0.50	N/A	6148613
1,4-Dichlorobenzene	ug/L	ND	1.0	N/A	6148613
Benzene	ug/L	ND	1.0	N/A	6148613
Bromodichloromethane	ug/L	ND	1.0	0.20	6148613
Bromoform	ug/L	ND	1.0	0.20	6148613
Bromomethane	ug/L	ND	0.50	N/A	6148613
Carbon Tetrachloride	ug/L	ND	0.50	N/A	6148613
Chlorobenzene	ug/L	ND	1.0	N/A	6148613
Chloroethane	ug/L	ND	8.0	N/A	6148613
Chloroform	ug/L	ND	1.0	0.20	6148613
Chloromethane	ug/L	ND	8.0	N/A	6148613
Dibromochloromethane	ug/L	ND	1.0	0.20	6148613
Methylene Chloride(Dichloromethane)	ug/L	ND	3.0	N/A	6148613
Ethylbenzene	ug/L	ND	1.0	N/A	6148613
Methyl t-butyl ether (MTBE)	ug/L	ND	2.0	N/A	6148613
Styrene	ug/L	ND	1.0	N/A	6148613
Tetrachloroethylene	ug/L	ND	1.0	N/A	6148613
Toluene	ug/L	ND	1.0	N/A	6148613
Trichloroethylene	ug/L	ND	1.0	N/A	6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VOLATILE ORGANICS BY GC/MS (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Trichlorofluoromethane (FREON 11)	ug/L	ND	8.0	N/A	6148613
Vinyl Chloride	ug/L	ND	0.50	2.0	6148613
o-Xylene	ug/L	ND	1.0	N/A	6148613
p+m-Xylene	ug/L	ND	2.0	N/A	6148613
Total Xylenes	ug/L	ND	1.0	1.0	6148613
Total Trihalomethanes	ug/L	ND	1.0	N/A	6148613
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	98			6148613
D4-1,2-Dichloroethane	%	117			6148613
D8-Toluene	%	99			6148613

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

ATLANTIC RBCA HYDROCARBONS (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	ND	0.0010	N/A	6153411
Toluene	mg/L	ND	0.0010	N/A	6153411
Ethylbenzene	mg/L	ND	0.0010	N/A	6153411
Total Xylenes	mg/L	ND	0.0020	N/A	6153411
C6 - C10 (less BTEX)	mg/L	ND	0.010	N/A	6153411
>C10-C16 Hydrocarbons	mg/L	ND	0.050	N/A	6148915
>C16-C21 Hydrocarbons	mg/L	ND	0.050	N/A	6148915
>C21-<C32 Hydrocarbons	mg/L	ND	0.10	N/A	6148915
Modified TPH (Tier1)	mg/L	ND	0.10	N/A	6146630
Reached Baseline at C32	mg/L	NA	N/A	N/A	6148915
Hydrocarbon Resemblance	mg/L	NA	N/A	N/A	6148915
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	85			6148915
n-Dotriacontane - Extractable	%	101			6148915
Isobutylbenzene - Volatile	%	93			6153411

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
PCBs					
Aroclor 1016	ug/L	ND	0.050	N/A	6156517
Aroclor 1221	ug/L	ND	0.050	N/A	6156517
Aroclor 1232	ug/L	ND	0.050	N/A	6156517
Aroclor 1248	ug/L	ND	0.050	N/A	6156517
Aroclor 1242	ug/L	ND	0.050	N/A	6156517
Aroclor 1254	ug/L	ND	0.050	N/A	6156517
Aroclor 1260	ug/L	ND	0.050	N/A	6156517
Calculated Total PCB	ug/L	ND	0.050	N/A	6146342
Surrogate Recovery (%)					
Decachlorobiphenyl	%	93			6156517

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

RESIN AND FATTY ACIDS BY GC-MS (WATER)

BV Labs ID		JVQ871			
Sampling Date		2019/05/25 18:15			
COC Number		715274-01-01			
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	RDL	MDL	QC Batch
Calculated Parameters					
Total Fatty Acids	mg/L	ND	0.072	N/A	6172548
Total Resin Acids	mg/L	ND	0.060	N/A	6172548
Fatty Acids					
9,10-Dichlorostearic acid	mg/L	ND	0.0060	N/A	6172548
Decanoic Acid (C10)	mg/L	ND	0.0060	N/A	6172548
Docosanoic acid (C22)	mg/L	ND	0.0060	N/A	6172548
Dodecanoic acid (C12)	mg/L	ND	0.0060	N/A	6172548
Eicosanoic acid (C20)	mg/L	ND	0.0060	N/A	6172548
Hexadecanoic acid (C16)	mg/L	ND	0.0060	N/A	6172548
Linoleic acid (C18:2)	mg/L	ND	0.0060	N/A	6172548
Linolenic acid (C18:3)	mg/L	ND	0.0060	N/A	6172548
Octadecanoic acid (C18)	mg/L	ND	0.0060	N/A	6172548
Oleic acid (C18:1)	mg/L	ND	0.0060	N/A	6172548
Tetradecanoic acid (C14)	mg/L	ND	0.0060	N/A	6172548
Undecanoic acid (C11)	mg/L	ND	0.0060	N/A	6172548
Resin Acids					
12,14-Dichlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172548
12-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172548
14-Chlorodehydroabietic acid	mg/L	ND	0.0060	N/A	6172548
Abietic acid	mg/L	ND	0.0060	N/A	6172548
Dehydroabietic acid	mg/L	ND	0.0060	N/A	6172548
Isopimaric acid	mg/L	ND	0.0060	N/A	6172548
Neoabietic acid	mg/L	ND	0.0060	N/A	6172548
Palustric acid	mg/L	ND	0.0060	N/A	6172548
Pimaric acid	mg/L	ND	0.0060	N/A	6172548
Sandaracopimaric acid	mg/L	ND	0.0060	N/A	6172548

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVQ871							
Sampling Date		2019/05/25 18:15							
COC Number		715274-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Dioxins & Furans									
2,3,7,8-Tetra CDD *	pg/L	ND	1.11	9.48	N/A	1.00	1.11		6170521
1,2,3,7,8-Penta CDD *	pg/L	ND	0.960	9.48	N/A	1.00	0.960		6170521
1,2,3,4,7,8-Hexa CDD *	pg/L	ND	1.24	9.48	N/A	0.100	0.124		6170521
1,2,3,6,7,8-Hexa CDD *	pg/L	ND	1.08	9.48	N/A	0.100	0.108		6170521
1,2,3,7,8,9-Hexa CDD *	pg/L	ND	1.05	9.48	N/A	0.100	0.105		6170521
1,2,3,4,6,7,8-Hepta CDD *	pg/L	ND	1.05	9.48	N/A	0.0100	0.0105		6170521
Octa CDD *	pg/L	1.38	1.03	94.8	N/A	0.000300	0.000414		6170521
Total Tetra CDD *	pg/L	ND	1.11	9.48	N/A			0	6170521
Total Penta CDD *	pg/L	ND	0.960	9.48	N/A			0	6170521
Total Hexa CDD *	pg/L	ND	1.11	9.48	N/A			0	6170521
Total Hepta CDD *	pg/L	ND	1.05	9.48	N/A			0	6170521
2,3,7,8-Tetra CDF **	pg/L	ND	1.08	9.48	N/A	0.100	0.108		6170521
1,2,3,7,8-Penta CDF **	pg/L	ND	1.09	9.48	N/A	0.0300	0.0327		6170521
2,3,4,7,8-Penta CDF **	pg/L	ND	1.09	9.48	N/A	0.300	0.327		6170521
1,2,3,4,7,8-Hexa CDF **	pg/L	ND	1.12	9.48	N/A	0.100	0.112		6170521
1,2,3,6,7,8-Hexa CDF **	pg/L	ND	0.929	9.48	N/A	0.100	0.0929		6170521
2,3,4,6,7,8-Hexa CDF **	pg/L	ND	1.05	9.48	N/A	0.100	0.105		6170521
1,2,3,7,8,9-Hexa CDF **	pg/L	ND	1.17	9.48	N/A	0.100	0.117		6170521
1,2,3,4,6,7,8-Hepta CDF **	pg/L	ND	0.878	9.48	N/A	0.0100	0.00878		6170521
1,2,3,4,7,8,9-Hepta CDF **	pg/L	ND	0.999	9.48	N/A	0.0100	0.00999		6170521
Octa CDF **	pg/L	ND	1.13	94.8	N/A	0.000300	0.000339		6170521
Total Tetra CDF **	pg/L	ND	1.08	9.48	N/A			0	6170521
Total Penta CDF **	pg/L	ND	1.09	9.48	N/A			0	6170521
Total Hexa CDF **	pg/L	ND	1.06	9.48	N/A			0	6170521
Total Hepta CDF **	pg/L	ND	0.935	9.48	N/A			0	6170521

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

DIOXINS AND FURANS BY HRMS (WATER)

BV Labs ID		JVQ871							
Sampling Date		2019/05/25 18:15							
COC Number		715274-01-01				TOXIC EQUIVALENCY		# of	
	UNITS	CARIBOU SEA WATER CH-BOF 2-2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/L						3.33		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	90							6170521
C13-1234678 HeptaCDF **	%	89							6170521
C13-123678 HexaCDD *	%	109							6170521
C13-123678 HexaCDF **	%	72							6170521
C13-12378 PentaCDD *	%	68							6170521
C13-12378 PentaCDF **	%	51							6170521
C13-2378 TetraCDD *	%	69							6170521
C13-2378 TetraCDF **	%	57							6170521
C13-OCDD *	%	92							6170521

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

GENERAL COMMENTS

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

Package 1	9.0°C

Sample received past the recommended holding time for BOD testing.

Sample JVQ871 [CARIBOU SEA WATER CH-BOF 2-2] : Elevated reporting limits for trace metals due to sample matrix.

Results relate only to the items tested.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6148613	ASL	Matrix Spike	4-Bromofluorobenzene	2019/05/30		99	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		120	%	70 - 130
			D8-Toluene	2019/05/30		96	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		110	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		109	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		109	%	70 - 130
			Ethylene Dibromide	2019/05/30		112	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		91	%	70 - 130
			1,2-Dichloroethane	2019/05/30		112	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		102	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		108	%	70 - 130
			1,2-Dichloropropane	2019/05/30		106	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		87	%	70 - 130
			cis-1,3-Dichloropropene	2019/05/30		111	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		121	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		87	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		102	%	70 - 130
			Bromoform	2019/05/30		104	%	70 - 130
			Bromomethane	2019/05/30		100	%	60 - 140
			Carbon Tetrachloride	2019/05/30		105	%	70 - 130
			Chlorobenzene	2019/05/30		92	%	70 - 130
			Chloroethane	2019/05/30		90	%	60 - 140
			Chloroform	2019/05/30		102	%	70 - 130
			Chloromethane	2019/05/30		94	%	60 - 140
			Dibromochloromethane	2019/05/30		108	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		106	%	70 - 130
			Ethylbenzene	2019/05/30		94	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		103	%	70 - 130
			Styrene	2019/05/30		99	%	70 - 130
			Tetrachloroethylene	2019/05/30		97	%	70 - 130
			Toluene	2019/05/30		97	%	70 - 130
			Trichloroethylene	2019/05/30		98	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		93	%	60 - 140
			Vinyl Chloride	2019/05/30		91	%	60 - 140
			o-Xylene	2019/05/30		94	%	70 - 130
			p+m-Xylene	2019/05/30		92	%	70 - 130
6148613	ASL	Spiked Blank	4-Bromofluorobenzene	2019/05/30		101	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		97	%	70 - 130
			1,1-Dichloroethane	2019/05/30		108	%	70 - 130
			1,1-Dichloroethylene	2019/05/30		113	%	70 - 130
			1,1,1-Trichloroethane	2019/05/30		111	%	70 - 130
			1,1,2-Trichloroethane	2019/05/30		103	%	70 - 130
			1,1,2,2-Tetrachloroethane	2019/05/30		103	%	70 - 130
			Ethylene Dibromide	2019/05/30		104	%	70 - 130
			1,2-Dichlorobenzene	2019/05/30		93	%	70 - 130
			1,2-Dichloroethane	2019/05/30		106	%	70 - 130
			cis-1,2-Dichloroethylene	2019/05/30		100	%	70 - 130
			trans-1,2-Dichloroethylene	2019/05/30		109	%	70 - 130
			1,2-Dichloropropane	2019/05/30		105	%	70 - 130
			1,3-Dichlorobenzene	2019/05/30		91	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,3-Dichloropropene	2019/05/30		104	%	70 - 130
			trans-1,3-Dichloropropene	2019/05/30		108	%	70 - 130
			1,4-Dichlorobenzene	2019/05/30		90	%	70 - 130
			Benzene	2019/05/30		93	%	70 - 130
			Bromodichloromethane	2019/05/30		101	%	70 - 130
			Bromoform	2019/05/30		99	%	70 - 130
			Bromomethane	2019/05/30		95	%	60 - 140
			Carbon Tetrachloride	2019/05/30		108	%	70 - 130
			Chlorobenzene	2019/05/30		94	%	70 - 130
			Chloroethane	2019/05/30		91	%	60 - 140
			Chloroform	2019/05/30		101	%	70 - 130
			Chloromethane	2019/05/30		92	%	60 - 140
			Dibromochloromethane	2019/05/30		104	%	70 - 130
			Methylene Chloride(Dichloromethane)	2019/05/30		101	%	70 - 130
			Ethylbenzene	2019/05/30		99	%	70 - 130
			Methyl t-butyl ether (MTBE)	2019/05/30		101	%	70 - 130
			Styrene	2019/05/30		102	%	70 - 130
			Tetrachloroethylene	2019/05/30		101	%	70 - 130
			Toluene	2019/05/30		99	%	70 - 130
			Trichloroethylene	2019/05/30		101	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2019/05/30		96	%	60 - 140
			Vinyl Chloride	2019/05/30		87	%	60 - 140
			o-Xylene	2019/05/30		98	%	70 - 130
			p+m-Xylene	2019/05/30		96	%	70 - 130
6148613	ASL	Method Blank	4-Bromofluorobenzene	2019/05/30		98	%	70 - 130
			D4-1,2-Dichloroethane	2019/05/30		111	%	70 - 130
			D8-Toluene	2019/05/30		100	%	70 - 130
			1,1-Dichloroethane	2019/05/30	ND, RDL=2.0		ug/L	
			1,1-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,1,1-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2-Trichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2019/05/30	ND, RDL=0.50		ug/L	
			Ethylene Dibromide	2019/05/30	ND, RDL=0.20		ug/L	
			1,2-Dichlorobenzene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloroethane	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,2-Dichloroethylene	2019/05/30	ND, RDL=0.50		ug/L	
			1,2-Dichloropropane	2019/05/30	ND, RDL=0.50		ug/L	
			1,3-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			cis-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	
			trans-1,3-Dichloropropene	2019/05/30	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,4-Dichlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Benzene	2019/05/30	ND, RDL=1.0		ug/L	
			Bromodichloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Bromoform	2019/05/30	ND, RDL=1.0		ug/L	
			Bromomethane	2019/05/30	ND, RDL=0.50		ug/L	
			Carbon Tetrachloride	2019/05/30	ND, RDL=0.50		ug/L	
			Chlorobenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Chloroethane	2019/05/30	ND, RDL=8.0		ug/L	
			Chloroform	2019/05/30	ND, RDL=1.0		ug/L	
			Chloromethane	2019/05/30	ND, RDL=8.0		ug/L	
			Dibromochloromethane	2019/05/30	ND, RDL=1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2019/05/30	ND, RDL=3.0		ug/L	
			Ethylbenzene	2019/05/30	ND, RDL=1.0		ug/L	
			Methyl t-butyl ether (MTBE)	2019/05/30	ND, RDL=2.0		ug/L	
			Styrene	2019/05/30	ND, RDL=1.0		ug/L	
			Tetrachloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Toluene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichloroethylene	2019/05/30	ND, RDL=1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2019/05/30	ND, RDL=8.0		ug/L	
			Vinyl Chloride	2019/05/30	ND, RDL=0.50		ug/L	
			o-Xylene	2019/05/30	ND, RDL=1.0		ug/L	
			p+m-Xylene	2019/05/30	ND, RDL=2.0		ug/L	
			Total Xylenes	2019/05/30	ND, RDL=1.0		ug/L	
			Total Trihalomethanes	2019/05/30	ND, RDL=1.0		ug/L	
6148613	ASL	RPD	1,1-Dichloroethane	2019/05/30	NC		%	40
			1,1-Dichloroethylene	2019/05/30	NC		%	40
			1,1,1-Trichloroethane	2019/05/30	NC		%	40
			1,1,2-Trichloroethane	2019/05/30	NC		%	40
			1,1,2,2-Tetrachloroethane	2019/05/30	NC		%	40
			Ethylene Dibromide	2019/05/30	NC		%	40
			1,2-Dichlorobenzene	2019/05/30	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloroethane	2019/05/30	NC		%	40
			cis-1,2-Dichloroethylene	2019/05/30	NC		%	40
			trans-1,2-Dichloroethylene	2019/05/30	NC		%	40
			1,2-Dichloropropane	2019/05/30	NC		%	40
			1,3-Dichlorobenzene	2019/05/30	NC		%	40
			cis-1,3-Dichloropropene	2019/05/30	NC		%	40
			trans-1,3-Dichloropropene	2019/05/30	NC		%	40
			1,4-Dichlorobenzene	2019/05/30	NC		%	40
			Benzene	2019/05/30	NC		%	40
			Bromodichloromethane	2019/05/30	NC		%	40
			Bromoform	2019/05/30	NC		%	40
			Bromomethane	2019/05/30	NC		%	40
			Carbon Tetrachloride	2019/05/30	NC		%	40
			Chlorobenzene	2019/05/30	NC		%	40
			Chloroethane	2019/05/30	NC		%	40
			Chloroform	2019/05/30	NC		%	40
			Chloromethane	2019/05/30	NC		%	40
			Dibromochloromethane	2019/05/30	NC		%	40
			Methylene Chloride(Dichloromethane)	2019/05/30	NC		%	40
			Ethylbenzene	2019/05/30	NC		%	40
			Methyl t-butyl ether (MTBE)	2019/05/30	NC		%	40
			Styrene	2019/05/30	NC		%	40
			Tetrachloroethylene	2019/05/30	NC		%	40
			Toluene	2019/05/30	NC		%	40
			Trichloroethylene	2019/05/30	NC		%	40
			Trichlorofluoromethane (FREON 11)	2019/05/30	NC		%	40
			Vinyl Chloride	2019/05/30	NC		%	40
			o-Xylene	2019/05/30	NC		%	40
			p+m-Xylene	2019/05/30	NC		%	40
			Total Xylenes	2019/05/30	NC		%	40
			Total Trihalomethanes	2019/05/30	NC		%	40
6148620	ZZH	Matrix Spike	Total Chemical Oxygen Demand	2019/05/30		81	%	80 - 120
6148620	ZZH	QC Standard	Total Chemical Oxygen Demand	2019/05/30		103	%	80 - 120
6148620	ZZH	Spiked Blank	Total Chemical Oxygen Demand	2019/05/30		105	%	80 - 120
6148620	ZZH	Method Blank	Total Chemical Oxygen Demand	2019/05/30	ND, RDL=20		mg/L	
6148620	ZZH	RPD	Total Chemical Oxygen Demand	2019/05/30	12		%	25
6148701	MLW	QC Standard	Carbonaceous BOD	2019/06/04		111	%	80 - 120
6148701	MLW	Spiked Blank	Carbonaceous BOD	2019/06/04		138 (1)	%	80 - 120
6148701	MLW	Method Blank	Carbonaceous BOD	2019/06/04	ND, RDL=2.0		mg/L	
6148701	MLW	RPD	Carbonaceous BOD	2019/06/04	3.5		%	25
6148915	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/30		92	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		117	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/30		96	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/30		87	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/30		98	%	70 - 130
6148915	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/30		92	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		115	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/30		111	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/30		101	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/30		115	%	70 - 130
6148915	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/30		90	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/30		105	%	70 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C10-C16 Hydrocarbons	2019/05/30	ND, RDL=0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/30	ND, RDL=0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/30	ND, RDL=0.10		mg/L	
6148915	BCD	RPD	>C10-C16 Hydrocarbons	2019/05/30	NC		%	40
			>C16-C21 Hydrocarbons	2019/05/30	11		%	40
			>C21-<C32 Hydrocarbons	2019/05/30	NC		%	40
6148971	BAN	Matrix Spike	Total Aluminum (Al)	2019/05/31		103	%	80 - 120
			Total Antimony (Sb)	2019/05/31		110	%	80 - 120
			Total Arsenic (As)	2019/05/31		98	%	80 - 120
			Total Barium (Ba)	2019/05/31		102	%	80 - 120
			Total Beryllium (Be)	2019/05/31		100	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		104	%	80 - 120
			Total Boron (B)	2019/05/31		NC	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		98	%	80 - 120
			Total Calcium (Ca)	2019/05/31		106	%	80 - 120
			Total Chromium (Cr)	2019/05/31		97	%	80 - 120
			Total Cobalt (Co)	2019/05/31		100	%	80 - 120
			Total Copper (Cu)	2019/05/31		98	%	80 - 120
			Total Iron (Fe)	2019/05/31		106	%	80 - 120
			Total Lead (Pb)	2019/05/31		104	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120
			Total Manganese (Mn)	2019/05/31		101	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		105	%	80 - 120
			Total Nickel (Ni)	2019/05/31		102	%	80 - 120
			Total Phosphorus (P)	2019/05/31		104	%	80 - 120
			Total Potassium (K)	2019/05/31		104	%	80 - 120
			Total Selenium (Se)	2019/05/31		96	%	80 - 120
			Total Silver (Ag)	2019/05/31		101	%	80 - 120
			Total Sodium (Na)	2019/05/31		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/31		103	%	80 - 120
			Total Thallium (Tl)	2019/05/31		105	%	80 - 120
			Total Tin (Sn)	2019/05/31		105	%	80 - 120
			Total Titanium (Ti)	2019/05/31		99	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		101	%	80 - 120
			Total Zinc (Zn)	2019/05/31		100	%	80 - 120
6148971	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/31		101	%	80 - 120
			Total Antimony (Sb)	2019/05/31		107	%	80 - 120
			Total Arsenic (As)	2019/05/31		99	%	80 - 120
			Total Barium (Ba)	2019/05/31		100	%	80 - 120
			Total Beryllium (Be)	2019/05/31		99	%	80 - 120
			Total Bismuth (Bi)	2019/05/31		105	%	80 - 120
			Total Boron (B)	2019/05/31		98	%	80 - 120
			Total Cadmium (Cd)	2019/05/31		96	%	80 - 120
			Total Calcium (Ca)	2019/05/31		107	%	80 - 120
			Total Chromium (Cr)	2019/05/31		99	%	80 - 120
			Total Cobalt (Co)	2019/05/31		101	%	80 - 120
			Total Copper (Cu)	2019/05/31		99	%	80 - 120
			Total Iron (Fe)	2019/05/31		107	%	80 - 120
			Total Lead (Pb)	2019/05/31		103	%	80 - 120
			Total Magnesium (Mg)	2019/05/31		110	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2019/05/31		102	%	80 - 120
			Total Molybdenum (Mo)	2019/05/31		102	%	80 - 120
			Total Nickel (Ni)	2019/05/31		99	%	80 - 120
			Total Phosphorus (P)	2019/05/31		105	%	80 - 120
			Total Potassium (K)	2019/05/31		102	%	80 - 120
			Total Selenium (Se)	2019/05/31		97	%	80 - 120
			Total Silver (Ag)	2019/05/31		100	%	80 - 120
			Total Sodium (Na)	2019/05/31		102	%	80 - 120
			Total Strontium (Sr)	2019/05/31		106	%	80 - 120
			Total Thallium (Tl)	2019/05/31		107	%	80 - 120
			Total Tin (Sn)	2019/05/31		106	%	80 - 120
			Total Titanium (Ti)	2019/05/31		98	%	80 - 120
			Total Uranium (U)	2019/05/31		113	%	80 - 120
			Total Vanadium (V)	2019/05/31		102	%	80 - 120
			Total Zinc (Zn)	2019/05/31		101	%	80 - 120
6148971	BAN	Method Blank	Total Aluminum (Al)	2019/05/31	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/05/31	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/05/31	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/05/31	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/05/31	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/05/31	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/05/31	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/05/31	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/05/31	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/05/31	ND, RDL=100		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2019/05/31	ND, RDL=1.0		ug/L	
			Total Silver (Ag)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/05/31	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/05/31	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/05/31	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/05/31	ND, RDL=5.0		ug/L	
6148971	BAN	RPD	Total Aluminum (Al)	2019/05/31	4.3		%	20
6149403	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6149403	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/31		102	%	80 - 120
6149403	CCR	Method Blank	Total Mercury (Hg)	2019/05/31	ND, RDL=0.013		ug/L	
6149403	CCR	RPD	Total Mercury (Hg)	2019/05/31	NC		%	20
6151063	AM6	QC Standard	Total Suspended Solids	2019/06/03		100	%	80 - 120
6151063	AM6	Method Blank	Total Suspended Solids	2019/06/03	ND, RDL=1.0		mg/L	
6151063	AM6	RPD	Total Suspended Solids	2019/06/03	0		%	20
6151065	LGE	Matrix Spike	D10-Anthracene	2019/06/01		90	%	50 - 130
			D14-Terphenyl	2019/06/01		70 (2)	%	50 - 130
			D8-Acenaphthylene	2019/06/01		85	%	50 - 130
			1-Methylnaphthalene	2019/06/01		81	%	50 - 130
			2-Methylnaphthalene	2019/06/01		84	%	50 - 130
			Acenaphthene	2019/06/01		87	%	50 - 130
			Acenaphthylene	2019/06/01		84	%	50 - 130
			Anthracene	2019/06/01		79	%	50 - 130
			Benzo(a)anthracene	2019/06/01		76	%	50 - 130
			Benzo(a)pyrene	2019/06/01		61	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		75	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		36 (3)	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		60	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		69	%	50 - 130
			Chrysene	2019/06/01		96	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		40 (3)	%	50 - 130
			Fluoranthene	2019/06/01		88	%	50 - 130
			Fluorene	2019/06/01		95	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		33 (3)	%	50 - 130
			Naphthalene	2019/06/01		84	%	50 - 130
			Perylene	2019/06/01		31 (3)	%	50 - 130
			Phenanthrene	2019/06/01		96	%	50 - 130
			Pyrene	2019/06/01		86	%	50 - 130
6151065	LGE	Spiked Blank	D10-Anthracene	2019/06/01		105	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		100	%	50 - 130
			1-Methylnaphthalene	2019/06/01		93	%	50 - 130
			2-Methylnaphthalene	2019/06/01		95	%	50 - 130
			Acenaphthene	2019/06/01		100	%	50 - 130
			Acenaphthylene	2019/06/01		98	%	50 - 130
			Anthracene	2019/06/01		93	%	50 - 130
			Benzo(a)anthracene	2019/06/01		86	%	50 - 130
			Benzo(a)pyrene	2019/06/01		94	%	50 - 130
			Benzo(b)fluoranthene	2019/06/01		106	%	50 - 130
			Benzo(g,h,i)perylene	2019/06/01		96	%	50 - 130
			Benzo(j)fluoranthene	2019/06/01		95	%	50 - 130
			Benzo(k)fluoranthene	2019/06/01		101	%	50 - 130
			Chrysene	2019/06/01		107	%	50 - 130
			Dibenz(a,h)anthracene	2019/06/01		96	%	50 - 130
			Fluoranthene	2019/06/01		99	%	50 - 130
			Fluorene	2019/06/01		109	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2019/06/01		94	%	50 - 130
			Naphthalene	2019/06/01		95	%	50 - 130
			Perylene	2019/06/01		90	%	50 - 130
			Phenanthrene	2019/06/01		111	%	50 - 130
			Pyrene	2019/06/01		98	%	50 - 130
6151065	LGE	Method Blank	D10-Anthracene	2019/06/01		108	%	50 - 130
			D14-Terphenyl	2019/06/01		106	%	50 - 130
			D8-Acenaphthylene	2019/06/01		99	%	50 - 130
			1-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			2-Methylnaphthalene	2019/06/01	ND, RDL=0.050		ug/L	
			Acenaphthene	2019/06/01	ND, RDL=0.010		ug/L	
			Acenaphthylene	2019/06/01	ND, RDL=0.010		ug/L	
			Anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(a)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(b)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(g,h,i)perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(j)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Benzo(k)fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Chrysene	2019/06/01	ND, RDL=0.010		ug/L	
			Dibenz(a,h)anthracene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluoranthene	2019/06/01	ND, RDL=0.010		ug/L	
			Fluorene	2019/06/01	ND, RDL=0.010		ug/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Indeno(1,2,3-cd)pyrene	2019/06/01	ND, RDL=0.010		ug/L	
			Naphthalene	2019/06/01	ND, RDL=0.20		ug/L	
			Perylene	2019/06/01	ND, RDL=0.010		ug/L	
			Phenanthrene	2019/06/01	ND, RDL=0.010		ug/L	
			Pyrene	2019/06/01	ND, RDL=0.010		ug/L	
6151065	LGE	RPD	1-Methylnaphthalene	2019/06/01	NC		%	40
			2-Methylnaphthalene	2019/06/01	NC		%	40
			Acenaphthene	2019/06/01	NC		%	40
			Acenaphthylene	2019/06/01	NC		%	40
			Anthracene	2019/06/01	NC		%	40
			Benzo(a)anthracene	2019/06/01	NC		%	40
			Benzo(a)pyrene	2019/06/01	NC		%	40
			Benzo(b)fluoranthene	2019/06/01	NC		%	40
			Benzo(g,h,i)perylene	2019/06/01	NC		%	40
			Benzo(j)fluoranthene	2019/06/01	NC		%	40
			Benzo(k)fluoranthene	2019/06/01	NC		%	40
			Chrysene	2019/06/01	NC		%	40
			Dibenz(a,h)anthracene	2019/06/01	NC		%	40
			Fluoranthene	2019/06/01	13		%	40
			Fluorene	2019/06/01	NC		%	40
			Indeno(1,2,3-cd)pyrene	2019/06/01	NC		%	40
			Naphthalene	2019/06/01	NC		%	40
			Perylene	2019/06/01	NC		%	40
			Phenanthrene	2019/06/01	NC		%	40
			Pyrene	2019/06/01	12		%	40
6153411	THL	Matrix Spike [JVQ871-12]	Isobutylbenzene - Volatile	2019/06/02		90	%	70 - 130
			Benzene	2019/06/02		106	%	70 - 130
			Toluene	2019/06/02		108	%	70 - 130
			Ethylbenzene	2019/06/02		112	%	70 - 130
			Total Xylenes	2019/06/02		109	%	70 - 130
6153411	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/06/02		103	%	70 - 130
			Benzene	2019/06/02		117	%	70 - 130
			Toluene	2019/06/02		118	%	70 - 130
			Ethylbenzene	2019/06/02		118	%	70 - 130
			Total Xylenes	2019/06/02		117	%	70 - 130
6153411	THL	Method Blank	Isobutylbenzene - Volatile	2019/06/02		102	%	70 - 130
			Benzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Toluene	2019/06/02	ND, RDL=0.0010		mg/L	
			Ethylbenzene	2019/06/02	ND, RDL=0.0010		mg/L	
			Total Xylenes	2019/06/02	ND, RDL=0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/06/02	ND, RDL=0.010		mg/L	
6153411	THL	RPD	Benzene	2019/06/02	NC		%	40
			Toluene	2019/06/02	NC		%	40
			Ethylbenzene	2019/06/02	NC		%	40

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Xylenes	2019/06/02	NC		%	40
			C6 - C10 (less BTEX)	2019/06/02	NC		%	40
6153709	SSV	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2019/06/04		99	%	80 - 120
6153709	SSV	QC Standard	Total Kjeldahl Nitrogen (TKN)	2019/06/04		102	%	80 - 120
6153709	SSV	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04		103	%	80 - 120
6153709	SSV	Method Blank	Total Kjeldahl Nitrogen (TKN)	2019/06/04	ND, RDL=0.10		mg/L	
6153709	SSV	RPD	Total Kjeldahl Nitrogen (TKN)	2019/06/04	0		%	20
6154726	GTO	Matrix Spike	Sulphide	2019/06/03		90	%	80 - 120
6154726	GTO	Spiked Blank	Sulphide	2019/06/03		101	%	80 - 120
6154726	GTO	Method Blank	Sulphide	2019/06/03	ND, RDL=0.020		mg/L	
6154726	GTO	RPD	Sulphide	2019/06/03	NC		%	20
6156517	RGE	Matrix Spike	Decachlorobiphenyl	2019/06/05		96	%	30 - 130
			Aroclor 1254	2019/06/05		109	%	70 - 130
6156517	RGE	Spiked Blank	Decachlorobiphenyl	2019/06/05		74	%	30 - 130
			Aroclor 1254	2019/06/05		103	%	70 - 130
6156517	RGE	Method Blank	Decachlorobiphenyl	2019/06/05		65	%	30 - 130
			Aroclor 1016	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1221	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1232	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1248	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1242	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1254	2019/06/05	ND, RDL=0.050		ug/L	
			Aroclor 1260	2019/06/05	ND, RDL=0.050		ug/L	
6156517	RGE	RPD [JVQ871-09]	Aroclor 1016	2019/06/05	NC		%	40
			Aroclor 1221	2019/06/05	NC		%	40
			Aroclor 1232	2019/06/05	NC		%	40
			Aroclor 1248	2019/06/05	NC		%	40
			Aroclor 1242	2019/06/05	NC		%	40
			Aroclor 1254	2019/06/05	NC		%	40
			Aroclor 1260	2019/06/05	NC		%	40
6156641	NRG	Matrix Spike [JVQ871-15]	Nitrogen (Ammonia Nitrogen)	2019/06/04		110	%	80 - 120
6156641	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/06/04		115	%	80 - 120
6156641	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/06/05	ND, RDL=0.050		mg/L	
6156641	NRG	RPD [JVQ871-15]	Nitrogen (Ammonia Nitrogen)	2019/06/04	NC		%	20
6157072	AM6	QC Standard	Volatile Suspended Solids	2019/06/04		98	%	80 - 120
6157072	AM6	Method Blank	Volatile Suspended Solids	2019/06/04	ND, RDL=2.0		mg/L	
6157072	AM6	RPD	Volatile Suspended Solids	2019/06/04	9.5		%	25
6157791	BB3	Matrix Spike	Total Nitrogen (N)	2019/06/03		101	%	80 - 120
6157791	BB3	Spiked Blank	Total Nitrogen (N)	2019/06/03		99	%	80 - 120
6157791	BB3	Method Blank	Total Nitrogen (N)	2019/06/03	ND, RDL=0.020		mg/L	
6157791	BB3	RPD	Total Nitrogen (N)	2019/06/03	3.0		%	20
6158894	NRG	Matrix Spike	Total Phosphorus	2019/06/06		110	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6158894	NRG	Spiked Blank	Total Phosphorus	2019/06/06		103	%	80 - 120
6158894	NRG	Method Blank	Total Phosphorus	2019/06/06	ND, RDL=0.020		mg/L	
6158894	NRG	RPD	Total Phosphorus	2019/06/06	NC		%	25
6158927	SSI	Matrix Spike	Dissolved Organic Carbon (C)	2019/06/05		95	%	85 - 115
6158927	SSI	Spiked Blank	Dissolved Organic Carbon (C)	2019/06/05		98	%	80 - 120
6158927	SSI	Method Blank	Dissolved Organic Carbon (C)	2019/06/05	ND, RDL=0.50		mg/L	
6158927	SSI	RPD	Dissolved Organic Carbon (C)	2019/06/05	NC		%	15
6159669	LHA	Matrix Spike	Total Cyanide (CN)	2019/06/07		78 (4)	%	80 - 120
6159669	LHA	Spiked Blank	Total Cyanide (CN)	2019/06/07		97	%	80 - 120
6159669	LHA	Method Blank	Total Cyanide (CN)	2019/06/07	ND, RDL=0.0050		mg/L	
6159669	LHA	RPD	Total Cyanide (CN)	2019/06/07	NC		%	20
6163938	KMC	Matrix Spike	Total Organic Carbon (C)	2019/06/07		98	%	85 - 115
6163938	KMC	Spiked Blank	Total Organic Carbon (C)	2019/06/07		99	%	80 - 120
6163938	KMC	Method Blank	Total Organic Carbon (C)	2019/06/07	ND, RDL=0.50		mg/L	
6163938	KMC	RPD	Total Organic Carbon (C)	2019/06/07	3.7		%	15
6165901	KD9	Matrix Spike	Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		94	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		92	%	80 - 120
6165901	KD9	Spiked Blank	Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorate (ClO3-)	2019/05/31		88	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
			Dissolved Chlorite (CLO2-)	2019/05/31		85	%	80 - 120
6165901	KD9	Method Blank	Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorate (ClO3-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
			Dissolved Chlorite (CLO2-)	2019/05/31	ND, RDL=0.10		mg/L	
6167153	EMT	QC Standard	Turbidity	2019/06/10		114	%	80 - 120
6167153	EMT	Spiked Blank	Turbidity	2019/06/10		98	%	80 - 120
6167153	EMT	Method Blank	Turbidity	2019/06/10	ND, RDL=0.10		NTU	
6167153	EMT	RPD	Turbidity	2019/06/10	0		%	20
6170521	OBC	Spiked Blank	C13-1234678 HeptaCDD	2019/06/11		123	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/11		99	%	30 - 130
			C13-123678 HexaCDD	2019/06/11		127	%	30 - 130
			C13-123678 HexaCDF	2019/06/11		88	%	30 - 130
			C13-12378 PentaCDD	2019/06/11		87	%	30 - 130
			C13-12378 PentaCDF	2019/06/11		66	%	30 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			C13-2378 TetraCDD	2019/06/11		92	%	30 - 130
			C13-2378 TetraCDF	2019/06/11		80	%	30 - 130
			C13-OCDD	2019/06/11		116	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/11		90	%	80 - 140
			1,2,3,7,8-Penta CDD	2019/06/11		100	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2019/06/11		85	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2019/06/11		97	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2019/06/11		93	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2019/06/11		85	%	80 - 140
			Octa CDD	2019/06/11		81	%	80 - 140
			2,3,7,8-Tetra CDF	2019/06/11		101	%	80 - 140
			1,2,3,7,8-Penta CDF	2019/06/11		126	%	80 - 140
			2,3,4,7,8-Penta CDF	2019/06/11		119	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2019/06/11		113	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2019/06/11		120	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2019/06/11		123	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2019/06/11		122	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2019/06/11		105	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2019/06/11		99	%	80 - 140
			Octa CDF	2019/06/11		86	%	80 - 140
6170521	OBC	RPD	2,3,7,8-Tetra CDD	2019/06/12	4.3		%	35
			1,2,3,7,8-Penta CDD	2019/06/12	12		%	35
			1,2,3,4,7,8-Hexa CDD	2019/06/12	9.0		%	35
			1,2,3,6,7,8-Hexa CDD	2019/06/12	1.0		%	35
			1,2,3,7,8,9-Hexa CDD	2019/06/12	8.2		%	35
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	28		%	35
			Octa CDD	2019/06/12	0		%	35
			2,3,7,8-Tetra CDF	2019/06/12	16		%	35
			1,2,3,7,8-Penta CDF	2019/06/12	3.1		%	35
			2,3,4,7,8-Penta CDF	2019/06/12	14		%	35
			1,2,3,4,7,8-Hexa CDF	2019/06/12	2.6		%	35
			1,2,3,6,7,8-Hexa CDF	2019/06/12	0		%	35
			2,3,4,6,7,8-Hexa CDF	2019/06/12	4.8		%	35
			1,2,3,7,8,9-Hexa CDF	2019/06/12	2.5		%	35
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	4.7		%	35
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	1.0		%	35
			Octa CDF	2019/06/12	0		%	35
6170521	OBC	Method Blank	C13-1234678 HeptaCDD	2019/06/12		107	%	30 - 130
			C13-1234678 HeptaCDF	2019/06/12		96	%	30 - 130
			C13-123678 HexaCDD	2019/06/12		118	%	30 - 130
			C13-123678 HexaCDF	2019/06/12		82	%	30 - 130
			C13-12378 PentaCDD	2019/06/12		77	%	30 - 130
			C13-12378 PentaCDF	2019/06/12		61	%	30 - 130
			C13-2378 TetraCDD	2019/06/12		85	%	30 - 130
			C13-2378 TetraCDF	2019/06/12		79	%	30 - 130
			C13-OCDD	2019/06/12		113	%	30 - 130
			2,3,7,8-Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			1,2,3,7,8-Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			1,2,3,4,7,8-Hexa CDD	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,6,7,8-Hexa CDD	2019/06/12	ND, EDL=1.02		pg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2019/06/12	ND, EDL=0.995		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	
			Octa CDD	2019/06/12	ND, EDL=1.16 (5)		pg/L	
			Total Tetra CDD	2019/06/12	ND, EDL=1.08		pg/L	
			Total Penta CDD	2019/06/12	ND, EDL=1.10		pg/L	
			Total Hexa CDD	2019/06/12	ND, EDL=1.13 (5)		pg/L	
			Total Hepta CDD	2019/06/12	ND, EDL=1.13		pg/L	
			2,3,7,8-Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,7,8-Penta CDF	2019/06/12	ND, EDL=1.18		pg/L	
			2,3,4,7,8-Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			1,2,3,4,7,8-Hexa CDF	2019/06/12	ND, EDL=1.13		pg/L	
			1,2,3,6,7,8-Hexa CDF	2019/06/12	ND, EDL=0.939		pg/L	
			2,3,4,6,7,8-Hexa CDF	2019/06/12	ND, EDL=1.06		pg/L	
			1,2,3,7,8,9-Hexa CDF	2019/06/12	ND, EDL=1.18		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2019/06/12	ND, EDL=1.09		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2019/06/12	ND, EDL=1.24		pg/L	
			Octa CDF	2019/06/12	ND, EDL=1.16		pg/L	
			Total Tetra CDF	2019/06/12	ND, EDL=1.18		pg/L	
			Total Penta CDF	2019/06/12	ND, EDL=1.19		pg/L	
			Total Hexa CDF	2019/06/12	ND, EDL=1.07		pg/L	
			Total Hepta CDF	2019/06/12	ND, EDL=1.16		pg/L	
6172548	LZ3	Matrix Spike	9,10-Dichlorostearic acid	2019/06/01		96	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		90	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		85	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		92	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		98	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		85	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		87	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		94	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		94	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		92	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		91	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		102	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		111	%	50 - 130

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			12-Chlorodehydroabietic acid	2019/06/01		106	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		111	%	50 - 130
			Abietic acid	2019/06/01		NC	%	50 - 130
			Dehydroabietic acid	2019/06/01		NC	%	50 - 130
			Isopimaric acid	2019/06/01		NC	%	50 - 130
			Neoabietic acid	2019/06/01		68	%	50 - 130
			Palustric acid	2019/06/01		67	%	50 - 130
			Pimaric acid	2019/06/01		102	%	50 - 130
			Sandaracopimaric acid	2019/06/01		101	%	50 - 130
6172548	LZ3	Spiked Blank	9,10-Dichlorostearic acid	2019/06/01		94	%	50 - 130
			Decanoic Acid (C10)	2019/06/01		94	%	50 - 130
			Docosanoic acid (C22)	2019/06/01		88	%	50 - 130
			Dodecanoic acid (C12)	2019/06/01		94	%	50 - 130
			Eicosanoic acid (C20)	2019/06/01		96	%	50 - 130
			Hexadecanoic acid (C16)	2019/06/01		99	%	50 - 130
			Linoleic acid (C18:2)	2019/06/01		89	%	50 - 130
			Linolenic acid (C18:3)	2019/06/01		86	%	50 - 130
			Octadecanoic acid (C18)	2019/06/01		105	%	50 - 130
			Oleic acid (C18:1)	2019/06/01		99	%	50 - 130
			Tetradecanoic acid (C14)	2019/06/01		94	%	50 - 130
			Undecanoic acid (C11)	2019/06/01		103	%	50 - 130
			12,14-Dichlorodehydroabietic acid	2019/06/01		114	%	50 - 130
			12-Chlorodehydroabietic acid	2019/06/01		108	%	50 - 130
			14-Chlorodehydroabietic acid	2019/06/01		110	%	50 - 130
			Abietic acid	2019/06/01		94	%	50 - 130
			Dehydroabietic acid	2019/06/01		128	%	50 - 130
			Isopimaric acid	2019/06/01		115	%	50 - 130
			Neoabietic acid	2019/06/01		63	%	50 - 130
			Palustric acid	2019/06/01		74	%	50 - 130
			Pimaric acid	2019/06/01		107	%	50 - 130
			Sandaracopimaric acid	2019/06/01		105	%	50 - 130
6172548	LZ3	Method Blank	Total Fatty Acids	2019/06/01	ND, RDL=0.072		mg/L	
			Total Resin Acids	2019/06/01	ND, RDL=0.060		mg/L	
			9,10-Dichlorostearic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Decanoic Acid (C10)	2019/06/01	ND, RDL=0.0060		mg/L	
			Docosanoic acid (C22)	2019/06/01	ND, RDL=0.0060		mg/L	
			Dodecanoic acid (C12)	2019/06/01	ND, RDL=0.0060		mg/L	
			Eicosanoic acid (C20)	2019/06/01	ND, RDL=0.0060		mg/L	
			Hexadecanoic acid (C16)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linoleic acid (C18:2)	2019/06/01	ND, RDL=0.0060		mg/L	
			Linolenic acid (C18:3)	2019/06/01	ND, RDL=0.0060		mg/L	
			Octadecanoic acid (C18)	2019/06/01	ND, RDL=0.0060		mg/L	

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Oleic acid (C18:1)	2019/06/01	ND, RDL=0.0060		mg/L	
			Tetradecanoic acid (C14)	2019/06/01	ND, RDL=0.0060		mg/L	
			Undecanoic acid (C11)	2019/06/01	ND, RDL=0.0060		mg/L	
			12,14-Dichlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			12-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			14-Chlorodehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Abietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Dehydroabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Isopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Neoabietic acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Palustric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Pimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
			Sandaracopimaric acid	2019/06/01	ND, RDL=0.0060		mg/L	
6181990	BBD	QC Standard	Salinity	2019/06/18		101	%	80 - 120
6181990	BBD	Method Blank	Salinity	2019/06/18	ND, RDL=2.0		N/A	
6181990	BBD	RPD [JVQ871-06]	Salinity	2019/06/18	0		%	25
6182160	SRM	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/06/18		101	%	80 - 120
6182160	SRM	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/06/18		107	%	80 - 120
6182160	SRM	Method Blank	Total Alkalinity (Total as CaCO3)	2019/06/18	ND, RDL=5.0		mg/L	
6182160	SRM	RPD	Total Alkalinity (Total as CaCO3)	2019/06/18	0.41		%	25
6182167	SRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/06/19		101	%	80 - 120
6182167	SRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/06/19		100	%	80 - 120
6182167	SRM	Method Blank	Dissolved Chloride (Cl-)	2019/06/19	ND, RDL=1.0		mg/L	
6182167	SRM	RPD	Dissolved Chloride (Cl-)	2019/06/19	3.0		%	25
6182168	SRM	Matrix Spike	Dissolved Sulphate (SO4)	2019/06/19		100	%	80 - 120
6182168	SRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/06/19		108	%	80 - 120
6182168	SRM	Method Blank	Dissolved Sulphate (SO4)	2019/06/19	ND, RDL=2.0		mg/L	
6182168	SRM	RPD	Dissolved Sulphate (SO4)	2019/06/19	5.3		%	25
6182169	SRM	Matrix Spike	Reactive Silica (SiO2)	2019/06/19		97	%	80 - 120
6182169	SRM	Spiked Blank	Reactive Silica (SiO2)	2019/06/19		101	%	80 - 120
6182169	SRM	Method Blank	Reactive Silica (SiO2)	2019/06/19	ND, RDL=0.50		mg/L	
6182169	SRM	RPD	Reactive Silica (SiO2)	2019/06/19	1.4		%	25
6182170	SRM	Spiked Blank	Colour	2019/06/18		98	%	80 - 120
6182170	SRM	Method Blank	Colour	2019/06/18	ND, RDL=5.0		TCU	
6182170	SRM	RPD	Colour	2019/06/18	NC		%	20
6182171	SRM	Matrix Spike	Orthophosphate (P)	2019/06/18		NC	%	80 - 120

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6182171	SRM	Spiked Blank	Orthophosphate (P)	2019/06/18		97	%	80 - 120
6182171	SRM	Method Blank	Orthophosphate (P)	2019/06/18	ND, RDL=0.010		mg/L	
6182171	SRM	RPD	Orthophosphate (P)	2019/06/18	0.12		%	25
6182172	SRM	Matrix Spike	Nitrate + Nitrite (N)	2019/06/18		95	%	80 - 120
6182172	SRM	Spiked Blank	Nitrate + Nitrite (N)	2019/06/18		95	%	80 - 120
6182172	SRM	Method Blank	Nitrate + Nitrite (N)	2019/06/18	ND, RDL=0.050		mg/L	
6182172	SRM	RPD	Nitrate + Nitrite (N)	2019/06/18	NC		%	25
6182173	SRM	Matrix Spike	Nitrite (N)	2019/06/18		95	%	80 - 120
6182173	SRM	Spiked Blank	Nitrite (N)	2019/06/18		99	%	80 - 120
6182173	SRM	Method Blank	Nitrite (N)	2019/06/18	ND, RDL=0.010		mg/L	
6182173	SRM	RPD	Nitrite (N)	2019/06/18	NC		%	20
6184783	EMT	QC Standard	pH	2019/06/19		100	%	97 - 103
6184783	EMT	RPD	pH	2019/06/19	0.76		%	N/A
6184788	EMT	Spiked Blank	Conductivity	2019/06/19		103	%	80 - 120
6184788	EMT	Method Blank	Conductivity	2019/06/19	1.4, RDL=1.0		uS/cm	
6184788	EMT	RPD	Conductivity	2019/06/19	0.0059		%	10

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) BOD Analysis: Second source QC recovery high. Reference Material recovery and all other QC acceptable.

(2) PAH sample contained sediment.

(3) Matrix Spike: results are outside acceptance limit. Probable matrix interference.

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

(5) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE

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

Brad Newman, Scientific Service Specialist

Harry (Peng) Liang, Senior Analyst

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Eric Dearman, Scientific Specialist

Mike MacGillivray, Scientific Specialist (Inorganics)

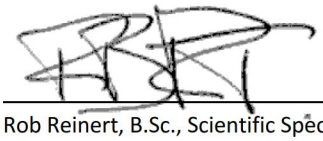
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Rosemarie MacDonald, Scientific Specialist (Organics)

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

VALIDATION SIGNATURE PAGE(CONT'D)

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



Rob Reinert, B.Sc., Scientific Specialist

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

Bureau Veritas Laboratories 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvlabs.com

Your Project #: B9E4405
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449982
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920962
Received: 2019/05/31, 09:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Primary Reference
Phenols in Pulp & Paper mill effluents	1	2019/06/03	2019/06/05	STL SOP-00121	MA.400–Phé 1.0 R3 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Your Project #: B9E4405
Your C.O.C. #: N-A

Attention: BEDFORD CUSTOMER SERVICE

Bureau Veritas Laboratories
200 Bluewater road
Bedford, NS
CANADA B4B 1G9

Report Date: 2019/06/21
Report #: R2449982
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: B920962
Received: 2019/05/31, 09:00

Encryption Key

Sophie Retailleau
Project Manager
21 Jun 2019 16:05:24

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Sophie Retailleau, Project Manager
Email: Sophie.RETAILLEAU@bvlabs.com
Phone# (514)448-9001 Ext:7066232

==========

This report has been generated and distributed using a secure automated process.
Lab BV has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5615		
Sampling Date		2019/05/25 18:15		
COC Number		N-A		
	Units	**JVQ871-13R\CARIBOU SEA WATER CH-BOF 2-2**	**RDL**	**QC Batch**
PHENOLS				
Total of Regl. P&P Phenols †	ug/L	<10	10	1994633
Phenol	ug/L	<1.0	1.0	1994633
2-Chlorophenol	ug/L	<1.0	1.0	1994633
3-Chlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorophenol	ug/L	<1.0	1.0	1994633
o-Cresol	ug/L	<1.0	1.0	1994633
m-Cresol	ug/L	<1.0	1.0	1994633
p-Cresol	ug/L	<1.0	1.0	1994633
Guaiacol	ug/L	<1.0	1.0	1994633
Catechol	ug/L	<1.0	1.0	1994633
Eugenol	ug/L	<1.0	1.0	1994633
Isoeugenol	ug/L	<1.0	1.0	1994633
6-Chlorovanillin	ug/L	<1.0	1.0	1994633
5,6-Dichlorovanillin	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorosyringol	ug/L	<1.0	1.0	1994633
2,4-Dimethylphenol	ug/L	<1.0	1.0	1994633
2,6-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,3-Dichlorophenol	ug/L	<1.0	1.0	1994633
3,4-Dichlorophenol	ug/L	<1.0	1.0	1994633
2,4 + 2,5-Dichlorophenol	ug/L	<1.0	1.0	1994633
2-Nitrophenol	ug/L	<2.0	2.0	1994633
4-Nitrophenol	ug/L	<10	10	1994633
2,4,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,6-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
2,3,4-Trichlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorophenol	ug/L	<1.0	1.0	1994633
4-Chloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
4,6-Dichloroguaiacol	ug/L	<1.0	1.0	1994633
2,3,5,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

PHENOLS BY GCMS (WATER)

Lab BV ID		GM5615		
Sampling Date		2019/05/25 18:15		
COC Number		N-A		
	Units	**JVQ871-13R\CARIBOU SEA WATER CH-BOF 2-2**	**RDL**	**QC Batch**
2,3,4,6-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
2,3,4,5-Tetrachlorophenol	ug/L	<1.0	1.0	1994633
4-Chlorocatechol	ug/L	<1.0	1.0	1994633
3,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
4,5-Dichlorocatechol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
4,5,6-Trichloroguaiacol	ug/L	<1.0	1.0	1994633
Pentachlorophenol	ug/L	<1.0	1.0	1994633
3,4,5-Trichlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachlorocatechol	ug/L	<1.0	1.0	1994633
Tetrachloroguaiacol	ug/L	<1.0	1.0	1994633
4,5-Dichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5-Trichloroveratrol	ug/L	<1.0	1.0	1994633
3,4,5,6-Tetrachloroveratrol	ug/L	<1.0	1.0	1994633
Surrogate Recovery (%)				
D6-Phenol	%	130	N/A	1994633
Tribromophenol-2,4,6	%	83	N/A	1994633
Trifluoro-m-cresol	%	101	N/A	1994633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

GENERAL COMMENTS

PHENOLS BY GCMS (WATER)

Un-rounded results are used in the total "Total Phenols (RFPP) " calculation. This total result is then rounded to two significant figures.

The total indicated is calculated only for the requested parameters.

Reported detection limits are modified according to the volume of sample received.

Results relate only to the items tested.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
1994633	GDL	Spiked Blank	D6-Phenol	2019/06/04		107	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		95	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		105	%	50 - 130
			Phenol	2019/06/04		100	%	50 - 130
			2-Chlorophenol	2019/06/04		95	%	50 - 130
			3-Chlorophenol	2019/06/04		96	%	50 - 130
			4-Chlorophenol	2019/06/04		99	%	50 - 130
			o-Cresol	2019/06/04		104	%	50 - 130
			m-Cresol	2019/06/04		101	%	50 - 130
			p-Cresol	2019/06/04		101	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		95	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		105	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		95	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		106	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		100	%	50 - 130
			2-Nitrophenol	2019/06/04		94	%	50 - 130
			4-Nitrophenol	2019/06/04		92	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		94	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		107	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		109	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		102	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		108	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		95	%	50 - 130
			2,3,4,6-Tetrachlorophenol	2019/06/04		107	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		96	%	50 - 130
			Pentachlorophenol	2019/06/04		90	%	50 - 130
1994633	GDL	Spiked Blank DUP	D6-Phenol	2019/06/04		105	%	50 - 130
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04		98	%	50 - 130
			2-Chlorophenol	2019/06/04		93	%	50 - 130
			3-Chlorophenol	2019/06/04		95	%	50 - 130
			4-Chlorophenol	2019/06/04		93	%	50 - 130
			o-Cresol	2019/06/04		102	%	50 - 130
			m-Cresol	2019/06/04		100	%	50 - 130
			p-Cresol	2019/06/04		98	%	50 - 130
			2,4-Dimethylphenol	2019/06/04		91	%	50 - 130
			2,6-Dichlorophenol	2019/06/04		100	%	50 - 130
			3,5-Dichlorophenol	2019/06/04		91	%	50 - 130
			2,3-Dichlorophenol	2019/06/04		94	%	50 - 130
			3,4-Dichlorophenol	2019/06/04		100	%	50 - 130
			2,4 + 2,5-Dichlorophenol	2019/06/04		96	%	50 - 130
			2-Nitrophenol	2019/06/04		87	%	50 - 130
			4-Nitrophenol	2019/06/04		89	%	50 - 130
			2,4,6-Trichlorophenol	2019/06/04		97	%	50 - 130
			2,3,5-Trichlorophenol	2019/06/04		87	%	50 - 130
			2,3,6-Trichlorophenol	2019/06/04		98	%	50 - 130
			2,4,5-Trichlorophenol	2019/06/04		104	%	50 - 130
			2,3,4-Trichlorophenol	2019/06/04		95	%	50 - 130
			3,4,5-Trichlorophenol	2019/06/04		95	%	50 - 130
			2,3,5,6-Tetrachlorophenol	2019/06/04		88	%	50 - 130

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			2,3,4,6-Tetrachlorophenol	2019/06/04		103	%	50 - 130
			2,3,4,5-Tetrachlorophenol	2019/06/04		92	%	50 - 130
			Pentachlorophenol	2019/06/04		87	%	50 - 130
1994633	GDL	Method Blank	D6-Phenol	2019/06/04		99	%	50 - 130
			Total of Regl. P&P Phenols	2019/06/04	<5.0		ug/L	
			Tribromophenol-2,4,6	2019/06/04		91	%	50 - 130
			Trifluoro-m-cresol	2019/06/04		101	%	50 - 130
			Phenol	2019/06/04	<0.50		ug/L	
			2-Chlorophenol	2019/06/04	<0.50		ug/L	
			3-Chlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorophenol	2019/06/04	<0.50		ug/L	
			o-Cresol	2019/06/04	<0.50		ug/L	
			m-Cresol	2019/06/04	<0.50		ug/L	
			p-Cresol	2019/06/04	<0.50		ug/L	
			Guaiacol	2019/06/04	<0.50		ug/L	
			Catechol	2019/06/04	<0.50		ug/L	
			Eugenol	2019/06/04	<0.50		ug/L	
			Isoeugenol	2019/06/04	<0.50		ug/L	
			6-Chlorovanillin	2019/06/04	<0.50		ug/L	
			5,6-Dichlorovanillin	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorosyringol	2019/06/04	<0.50		ug/L	
			2,4-Dimethylphenol	2019/06/04	<0.50		ug/L	
			2,6-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,3-Dichlorophenol	2019/06/04	<0.50		ug/L	
			3,4-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2,4 + 2,5-Dichlorophenol	2019/06/04	<0.50		ug/L	
			2-Nitrophenol	2019/06/04	<1.0		ug/L	
			4-Nitrophenol	2019/06/04	<5.0		ug/L	
			2,4,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,6-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4-Trichlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorophenol	2019/06/04	<0.50		ug/L	
			4-Chloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,6-Dichloroguaiacol	2019/06/04	<0.50		ug/L	
			2,3,5,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,6-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			2,3,4,5-Tetrachlorophenol	2019/06/04	<0.50		ug/L	
			4-Chlorocatechol	2019/06/04	<0.50		ug/L	
			3,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			4,5-Dichlorocatechol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5,6-Trichloroguaiacol	2019/06/04	<0.50		ug/L	
			Pentachlorophenol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachlorocatechol	2019/06/04	<0.50		ug/L	
			Tetrachloroguaiacol	2019/06/04	<0.50		ug/L	
			4,5-Dichloroveratrol	2019/06/04	<0.50		ug/L	
			3,4,5-Trichloroveratrol	2019/06/04	<0.50		ug/L	

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			3,4,5,6-Tetrachloroveratrol	2019/06/04	<0.50		ug/L	

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.

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

VALIDATION SIGNATURE PAGE

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



Maria Dragna Apopei, B.Sc., Chemist

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

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

MAXXAM ANALYTICS
200 Bluewater Road
Bedford, Nova Scotia, B4B 1G9
(902) 420-0203
(902) 420-8612

Maxxam
A Bureau Veritas Group Company

Northern Pulp N.S.
Maxxam PM : Maryann Comeau

SUBCONTRACTING REQUEST FORM

To: Bedford to Montreal Subcontrac

Job# B9E4405

☐ Yes ☑ No International Sample/BioHazard (if yes, add copy of Movement Cert., heat treat is required prior to disposal)

☐ Yes ☑ No Special Protocol (if yes, Protocol _____)

Sample ID	Matrix	Test(s) Required	Container	Date Sampled	Date Required
JVQ871-13R\CARIBOU SEA WATER CH-BOF 2-2	W	Phenols in Pulp and Paper Mill Effluents	2-DPHE	2019/05/25 18:15	2019/06/20

	Temp. 1	Temp. 2	Temp. 3			
Cooler #1	3	3	1	Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #2				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO
Cooler #3				Custody Seal Present	YES	NO
				Custody Seal Intact	YES	NO
				Ice Present Upon Receipt	YES	NO

Receiving Location: Bedford to Montreal Subcontrac Job # _____

Relinquished by (Sign) Kg R (print) KIM GRAVE Date and Time 2019/05/30 12:57

Received by (Sign) KG (print) Jennie Davey Date and Time 2019/05/31 09:20

NOTES:

1) Please call us if due date cannot be met. Please reference Sample ID on your report.
2) Please advise us if your laboratory cannot perform the requested analysis or must subcontract to a 3rd party lab
3) Include copy of this completed form, Client COC & signed final report to **BClientSvcSubContr@maxxam.ca** and to **MComeau@maxxam.ca**

Reporting Requirements:

National: N001

Regional:

31-May-19 09:00
Sophie Retailleau
B920962

B920962_COC

Shipping Instructions

☐ Ship Immediately (highlight Yellow)
☐ Requires 9am
☐ Requires Sat. Delivery
☑ Regular Ship next available day
☑ Ship Cold
☐ Ship Room Temp
☐ Ship Frozen
☑ COC Must be Attached

Sender (Print) Kim Grave Initial KG

Shipping Department Checklist

☑ Correct Shipping location
☑ Correct Sample Ids (Paperwork vs Bottles)
☐ Yes ☐ No Special-Coolers, Ice, Tape-custody seal, Date&Sign
Date Shipped May 30/19 Number of coolers ____
Shipper (Print) _____ Initial _____