Environmental Monitoring Program and Quality Assurance/Quality Control Plan

Rankin Inlet, Nunavut

Water Licence No. 3AM-GRA1015

Updated by:

Government of Nunavut
Community and Government Services
P.O. Box 490
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Date: September 2015

Document Management

	Description	Prepared by	Date
1	*Updated* Environmental Monitoring Program and QA/QC Plan	GN-CGS	September 2015
2	Revised Environmental Monitoring Program and QA/QC Plan	Nuna Burnside	April 2010
3	Original Environmental Monitoring Program and QA/QC Plan	Nuna Burnside	December 2008
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1. Introduction

The Environmental Monitoring Program and Quality Assurance/Quality Control (QA/QC) Plan for the Government of Nunavut, Community and Government Services (GN-CGS), Rankin Inlet was prepared as a requirement of Nunavut Water Board (NWB) Licence No. NWB3GRA0207, issued December 2002 and expired November 30, 2007. This Plan applies specifically to the Water Supply Facility and the Sewage Treatment Facility operated by Government of Nunavut, Community and Government Services (GN-CGS). This Plan has been updated for the Renewal of NWB Licence No. 3AM-GRA1015, issued June 9, 2010 and expires November 27, 2015. Although this plan was prepared as a condition of the past Licence, it reflects the current condition of water and sewage facilities, and outlines the Environmental Monitoring Program and QA/QC Plan for the Renewal Application currently being processed. It is recommended that this document be included as a condition of the new Licence.

2. Hamlet of Rankin Inlet

The Hamlet of Rankin Inlet is located on the west coast of Hudson Bay, at 62°49'N, 92°05'W. It is 96 air-km southwest of Chesterfield Inlet and 1088 air-km east of Yellowknife (Appendix A – Figure 1). The Hamlet has grown substantially in the past 10 years, with a 2015 population of approximately 2864 residents. Economic activities now include government, commercial fishing, transportation/communications, carvings/handicrafts, trapping, hunting, and tourism.

Rankin Inlet is affected by arctic air masses, and experiences a maritime Arctic climate characterized by short cool summers, and long cold winters. The Rankin Inlet area receives an average of 18.1 cm of rainfall and 107 cm of snowfall annually. July mean high and low temperatures are 14.9°C and 5°C, respectively. January mean high and low temperatures are -28.3°C and -35.5°C, respectively. Winds are generally north-west.

The Government of Nunavut, Department of Community and Government Services (GN-CGS) provides water supply and sewage disposal services for the Hamlet of Rankin Inlet. Water and wastewater systems include the following facilities and services:

- A water intake plant, which draws water from Nipissar Lake and provides treatment by chlorination;
- Seasonal resupply pipeline from Char River to Nipissar Lake; and
- A waste water treatment plant, which provides primary treatment of sewage with use of a mechanical screen and a Monster Auger.

Solid waste collection for the residents, businesses and institutions are provided by the Hamlet of Rankin Inlet. The Solid Waste Disposal facility, which includes a bulky metals deposit area and a waste oil and liquid waste storage area is authorized under a separate Water Licence held by the Hamlet of Rankin Inlet. Refer to Licence No. 3BM-RAN1214 for more information.

Site locations can be found in Appendix A – Figure 2.

3. Environmental Monitoring and Quality Assurance/Quality Control Plan

3.1. Monitoring and Regulatory Requirement

Part H of the Water Licence No. 3AM-GRA1015 issued to the GN-CGS outlines Conditions Applying to the Monitoring Program. As per Part H, Item 9 and 10, the GN-CGS is required to submit to the NWB a Quality Assurance/Quality Control (QA/QC) Plan. The submission of the QA/QC Plan shall include a covering letter from an accredited laboratory confirming acceptance of the Plan for analyses to be performed under this Licence.

3.2. Purpose of Plan

The purpose of this document is to provide guidance to ensure that the monitoring program samples collected in the field are done so with a high degree of quality, in order to confirm that they accurately reflect the physical and chemical nature of the matrix being tested.

The Water Supply Facility and Sewage Treatment Facility operate under Nunavut Water Board Licence 3AM-GRA1015 (the Licence) issued on June 9, 2010 and expires November 27, 2015, including Amendment No. 1 issued December 23, 2014 (Appendix B, C and D). A renewal/amendment application is in progress. The Licence requires the GN-CGS to conduct a monitoring program, which includes regular water quality sampling and reporting. The Licence requires a Monitoring and Quality Assurance/Quality Control Plan (QA/QC Plan). The QA/QC Plan has been prepared to achieve the following objectives:

- To ensure that the collection of all samples taken in the field follows procedures and controls to maintain a high quality and ensure that the results obtained represent both the physical and chemical nature of the water at the sampling locations;
- To ensure best management practices (BMP) are used throughout the sampling program; and
- To ensure all samples are delivered promptly to an accredited laboratory for analysis.

This document describes the procedures and controls to be used by GN-CGS operations staff when conducting environmental sampling under the monitoring program.

Although the QA/QC Plan is submitted to the Nunavut Water Board (NWB) as a condition of the Licence, it is intended to be read, understood, and implemented by GN-CGS operations personnel responsible for environmental quality monitoring. The Licence requires GN-CGS personnel to adhere to these procedures, which should be applied to all water quality samples taken by the GN-CGS.

Quality Assurance (QA) and Quality Control (QC) are vitally important components of environmental management for the GN-CGS in Rankin Inlet.

3.3. Quality Assurance and Quality Control

Quality Assurance (QA) is a set of operating principles that, if strictly followed during sample collection and analysis, will produce data of known and defensible quality (Wilson, 1995). As such the accuracy of the analytical results can be stated with a high level of confidence. A high level of quality assurance can be achieved by applying the following principles:

- Personnel involved in water sampling and analysis are well trained;
- Facilities and equipment required for sampling are suitable, well maintained, and always kept clean;
- Standard procedures are developed and implemented for the collection, transportation and analysis of samples, based on recognized best management practices (BMP);
- Laboratory and field instruments are calibrated according to manufacturer recommendations or recognized as good operating practice;
- Supplies used in sampling and analysis are of consistent high quality and are not expired;
- Quality Control (QC) procedures are developed and implemented based on good operating practices to assess quality of analytical data and provide warning of unacceptable errors;
- Remedial action is promptly implemented when deficiencies are identified; and
- Results of the monitoring program are reported in the Annual Report as required in the Water Licence. The Annual Report must be submitted by March 31st of the year following the calendar year for which the report has been submitted.

Quality Control (QC) is a set of specific procedures used to measure the quality of the data produced and correct deficiencies in the sampling or analyses, as they occur. Quality control is used by the analyst and sampler to achieve standards of measurement for the three principles components of quality: precision, accuracy and reliability.

3.4. Lab Accreditation

All analyses shall be conducted by laboratories that are accredited by accredited by the Canadian Association for Laboratory Accreditation (CALA), formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL), for the monitoring program for the Licence.

Ideally, the same laboratory will be used for sample analysis for each sampling event, to ensure consistency in methodology and reporting. Although all accredited laboratories should be able to provide the same result for a particular sample, some variation is expected, which is why consistent laboratory services are recommended.

Analytical methods and accreditation are usually dictated by the guideline criteria being followed. In most cases, the guideline criteria are the Canadian Environmental Quality Guidelines (CCME, 2007). These guidelines specify bottles, hold times, preservatives, sampling protocols, as well as lab accreditation, and analytical methodologies. Prior to any sampling, this information should be reviewed to ensure consistency with regulation and standards.

3.5. Lab Information

The laboratory the GN-CGS uses to analyze the samples to fulfil the Monitoring Program requirements is ALS Environmental (Winnipeg). Their contact information is as follows:

ALS Environmental (Winnipeg)
1329 Niakwa Road East, Unit 12
Winnipeg, MB
R2J 3T4
Phone: (204) 255-9720

Appendix E includes a copy of ALS Environmental (Winnipeg)'s CALA Certificate of Accreditation and a list of the parameters for which they are certified (Scope of Accreditation).

ALS Environmental (Winnipeg) subcontracts the Total Phenols tests to ALS Environmental (Waterloo). Their contact information is as follows:

ALS Environmental (Waterloo)
60 Northland Road, Unit 1
Waterloo, ON
N2V 2B8
Phone: (519) 886-6910

Appendix F includes a copy of ALS Environmental (Waterloo)'s CALA Certificate of Accreditation and a list of the parameters for which they are certified (Scope of Accreditation).

4. Field Sampling

4.1 Sampling Procedures

All sampling, sample preservation and analyses is to be conducted in accordance with methods described in the current edition of Standard Methods for the Examination of Water and Wastewater (American Public Health Association, American Water Works Association, and Water Environment Federation, most current edition).

To obtain meaningful results from the analyses, the following six factors are of particular importance:

i) Sample collection as per schedule and location;
ii) Correct usage of container/sample bottle for parameter being tested;
iii) Correct labelling of sample bottles and filling out record/field sheet;
iv) Correct procedure for field sampling;
v) Proper and timely shipment of samples to the laboratory; and
vi) Timely delivery of samples to the laboratory from the air cargo facility.

4.2. Sample Collection

Effluent and surface water sampling is conducted to provide the GN-CGS with effective environmental management information and to monitor regulatory compliance.

Sample collection must follow the specifics dictated by the CALA laboratory selected to do the analysis. These should conform to the protocols outlined in the Canadian Environmental Quality Guidelines (CCME, 2007). Exact sampling protocols need to be confirmed for each sampling event. Staff training is a necessary component to ensure quality monitoring.

4.2.1. Sampling Location and Frequency

The Monitoring Program created by Water Licence No. 3AM-GRA1015 includes specific requirements regarding sampling locations, sampling frequency, parameters to be analyzed, and effluent quality. The Monitoring Program is summarized in Table 1.

Table 1: 3AM-GRA1015 Monitoring Program Locations

Monitoring Program Station Number	Description	Status	Frequency
GRA-1	Raw Water Supply from Nipissar Lake prior to treatment	Daily, Monthly, Annually; Annually (spring freshet)	Active (Volume) (Quality)
GRA-2	Point of discharge in Prairie Bay (within 20 m of discharge pipe outfall approximately 5 m below surface)	Quarterly	Inactive (Quality)
GRA-3	Effluent Discharge from Sewage Treatment Facility	Quarterly	Active (Quality)
GRA-4	Sludge removal from the Sewage Treatment Facility	Monthly	Active (Volume)
GRA-5	Water Level gauge in Nipissar Lake	Monthly (during periods of open water)	Active (Water Level)
GRA-6	Char River Water pumped to Nipissar Lake	Daily, Monthly, Annually; Annually (spring freshest)	New (Volume/Quality)
GRA-7	Lower Landing Lake	Annually (spring freshest)	New (Water Quality)

The sampling stations will be clearly identified in the field by posted signs. All signs shall be in the Official Languages of Nunavut, and shall be located and maintained to the satisfaction of an AANDC Inspector. Each sampling location must have its Global Positioning System (GPS) coordinates determined. This task should be completed prior to the first sampling to be completed under this QA/QC Plan. Samples shall be taken at the same location on each sampling occasion, unless the Inspector has approved a new location. Additional sampling and analysis may be requested by an AANDC Inspector.

4.2.2. Parameters

As per Part H, Item 4 of the Licence, the following parameters shall be sampled at least once quaterly at Monitoring Program Station GRA-1:

- Biochemical Oxygen Demand (BOD_5)
- Total Suspended Solids
- Conductivity
- Oil and Grease (visual)
- Magnesium
- Sodium
- Total Cadmium
- Total Cobalt
- Total Chromium
- Total Copper
- Total Aluminum
- Fecal Coliforms
- pH
- Nitrate-Nitrite
- Total Phenols
- Calcium
- Potassium
- Sulphate
- Total Zinc
- Total Iron
- Total Nickel
- Total Lead
- Total Arsenic

As per Part H, Item 14 of the Licence, the following parameters shall be sampled once annually in the summer at Monitoring Program Stations GRA-1, GRA-6 and GRA-7:

- Biochemical Oxygen Demand (BOD_5)
- Total Suspended Solids
- Conductivity
- Oil and Grease
- Magnesium
- Sodium
- Chloride
- Total Hardness
- Ammonia Nitrogen
- Total Cadmium
- Total Aluminum
- Total Chromium
- Total Copper
- Total Arsenic
- TPH (Total Petroleum Hydrocarbons)
- BTEX (Benzene, Toluene, Ethylbenzene, Xylene)
- pH
- Nitrate-Nitrite
- Total Phenols
- Calcium
- Potassium
- Sulphate
- Total Mercury
- Total Alkalinity
- Total Zinc
- Total Iron
- Total Manganese
- Total Nickel
- Total Lead

4.2.3. Sampling Equipment

Dedicated latex or nitrile gloves (i.e., one pair per sample) are to be used during sample handling. Any sampling equipment used, such as sampling poles (see photo below), are to be cleaned with soap and water after each sample is collected to prevent cross-contamination.

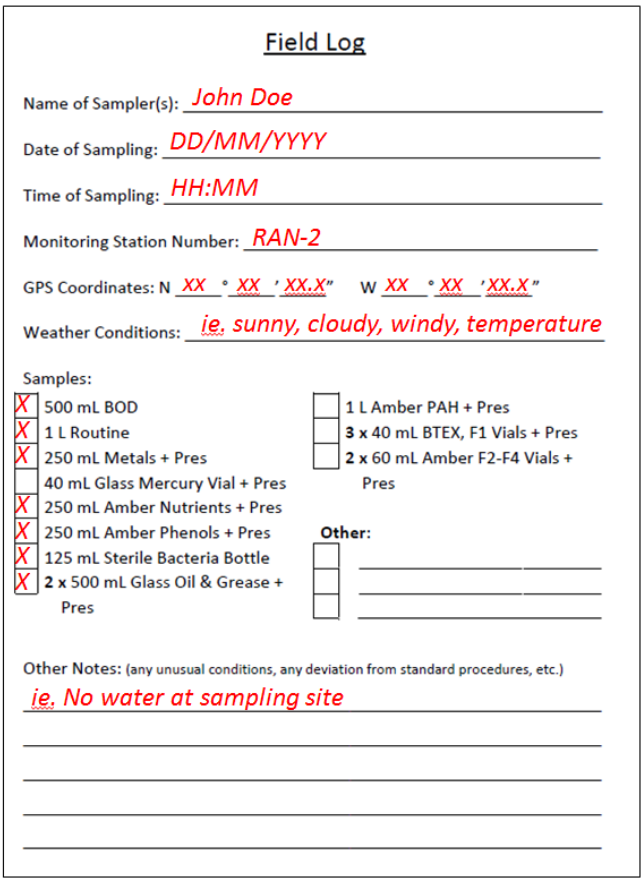
Figure 3: Sampling Pole

4.2.4. Field Sampling Log

The individual collecting the samples shall record the following at each location at the time of sampling:

- Date of sampling;
- Time of sampling;
- Weather conditions;
- Monitoring Station Number (i.e. GRA-3, etc.);
- Sampler shall also indicate if sample used preservatives;
- Any unusual conditions; and
- Any deviation from standard procedures.

A Field Log should be filled-out for every sampling location and kept on file. See below for a sample Field Log.



Field Log

Name of Sampler(s): John Doe

Date of Sampling: DD/MM/YYYY

Time of Sampling: HH:MM

Monitoring Station Number: RAN-2

GPS Coordinates: N XX ° XX ' XX.X" W XX ° XX ' XX.X"

Weather Conditions: ie, sunny, cloudy, windy, temperature

Samples:

- [X] 500 mL BOD
- [X] 1 L Routine
- [X] 250 mL Metals + Pres
- [ ] 40 mL Glass Mercury Vial + Pres
- [X] 250 mL Amber Nutrients + Pres
- [X] 250 mL Amber Phenols + Pres
- [X] 125 mL Sterile Bacteria Bottle
- [X] **2 x** 500 mL Glass Oil & Grease + Pres
- [ ] 1 L Amber PAH + Pres
- [ ] **3 x** 40 mL BTEX, F1 Vials + Pres
- [ ] **2 x** 60 mL Amber F2-F4 Vials + Pres

Other:

- [ ] _____
- [ ] _____
- [ ] _____

Other Notes: (any unusual conditions, any deviation from standard procedures, etc.)

ie, No water at sampling site

Figure 4: Sample Field Log

A copy of the Field Log to be completed during sampling can be found in Appendix G.

4.2.5. Sampling Planning

To understand what sample containers, sampling techniques, and preservation methods are required, GN-CGS personnel will review what parameters will be analyzed in the laboratory as outlined in Section 4.2.2. A selected CALA laboratory will be contacted and provided with the list of sampling parameters and comparative guidelines to be used. The lab will then supply the appropriate bottles with preservatives, chain of custody documents, and handling procedures.

4.2.6. Sample Container Selection

Sample containers vary in size and material of construction depending on the specific type of analysis to be conducted. Sample containers to be used shall be obtained directly from the laboratory, which shall provide new containers specific for the sampling program. The laboratory will provide the correct sizes and types of bottles based on the parameters required. The laboratory shall be contacted at least one month prior to the sampling event in order to ensure that containers are available for sampling and shipped to location.

4.2.7. General Procedures for Sample Collection

General procedures for sample collection are outlined below. Different laboratories have slightly different bottle requirements and sample handling protocols. Sampling technicians must receive site specific training and laboratory procedures must take precedence over other protocols.

- Sample Locations and Sampling Frequency – The location and frequency of each sampling option has been carefully selected, and is part of site design and layout, as well as the Water Board Licence. Sampling will follow their requirements. Diversions must be recorded and submitted to the Water Board for approval.
- Preparation – Approximately one month prior to the sampling event the laboratory will be notified and the required bottles, blanks, and materials assembled. Plans for rapid return of the samples prepared.
- Field Collection – At each sampling station the specified samples will be collected.
- Handling Storage and Transportation – Appropriate personal protective equipment (gloves, safety glasses, etc.) will be used when handling samples. Samples will be stored a 4°C and protected from freezing until delivered to the laboratory. Chain of custody for sampling, storage, and delivery must be maintained. Laboratory sample sheets will be filled in as per laboratory protocols.
- Delivery to Laboratory – Samples will be delivered to the laboratory in the laboratory dictated method and within the hold times specified. Preplanning for rapid transport and delivery will usually be required.

Surface Water Sampling Procedures

All of the samples taken will be grab samples. Samples will normally be taken from natural lakes, streams, treatment ponds, or process streams. Where possible, samples shall be taken from just below the surface to avoid floating debris, which may contaminate the sample.

Freshwater Streams, Surface Drainage, and Wetlands

The samples shall be collected as close to the middle of the stream where water flows freely and is free of debris. Samples shall be collected upstream of the sampler. After getting into position, the sampler shall wait to allow any stirred sediment that occurred from entering the stream to settle or wash away. The sample bottle shall be partially filled with the water to be sampled and rinsed with the lid in place. Rinse water shall be emptied downstream of the sampling point, so that stream sediments remain undisturbed.

Prior to sampling for oil/grease, bacteria, and for any bottles containing preservative, the bottles shall not be rinsed.

If possible, bottles shall be plunged into the stream to a depth of approximately half the total stream depth, and allow it to fill with the mouth of the bottle facing upstream. Where stream is too shallow to allow for sample bottle to be filled completely, without disturbing bottom sediment of the streambed, the sampler may use a smaller container that has been properly rinsed to transfer sample to the larger bottle. Do not use a smaller sample bottle containing preservatives.

When taking the sample, sufficient room shall be left to allow for the addition of preservatives, if required.

Lakes or Ponds

Surface sampling shall be collected using the same procedures as streams. Sample bottles shall be plunged to approximately 150 mm (6 inches) below the water surface.

4.2.8. Sample Identification

All samples collected are to be labelled according to standard identification procedures (Name of sampler, time and date of sampling, sample identifier, sampling method and type of sample). **Sample labels shall be water-resistant, and prepared prior to going into the field.**

The individual samples will be labelled with the following information:

- Sample ID # and name;
- Date and time of collection;
- Parameter to be analyzed;
- Preservatives;
- Project number identifier; and
- Bottle number 1 of ___.

4.2.9. Sample Preservation

To obtain good results from a sampling program, time is critical. All samples are to be shipped to the laboratory that has been contracted to carry out the analysis the same day as they are collected. Samples must be protected from breakage, and shall be shipped in an insulated cooler that can be provided by the laboratory. **If samples cannot be shipped until the next day, due to unavoidable events such as weather or mechanical problems with transport aircraft, all samples must be stored in a refrigerator at 4°C.** Samples must not be frozen.

In all cases where samples cannot be delivered to the lab on the same day, specific preservatives must be added to the samples to prevent chemical changes that may alter the concentration of the parameters of interest. The samples must be preserved within two hours of sampling. Usually, samples can be preserved away from the field at the end of the site visit. In most cases, the laboratory can fill the bottles with preservative, and then ship them to the Hamlet to be filled and sent back for analysis.

4.2.10. Sample Transportation

The main objective of the sampler is to minimize any chemical changes to the sample between the time it is collected and delivery to the laboratory. Heat, light and agitation can all impact the water chemistry and the samples shall be protected from these effects. Effluent and surface water samples shall be stored and transported at a temperature of 4°C. Coolers and ice packs need to be available and are usually provided by the laboratory. All samples are to be placed in clean coolers for transportation to the laboratory. Upon arrival at the laboratory, samples shall be refrigerated as soon as possible.

4.3. Sample Handling

All water samples are to be collected in laboratory-supplied containers with the proper preservative, where applicable. All sample containers are to be tightly sealed and properly labelled with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles are to be cleaned with soap and water after sampling and dried off prior to placing the samples in the cooler. The samples are to be stored on ice in a cooler until delivery to the laboratory. A Chain of Custody form is to be filled out completely and is used to track the samples and placed in the cooler with the samples, in a plastic bag. The last page of the Chain of Custody is to be kept on file for record.

The following checks are generally performed by the laboratory upon receipt:

i. Verification of the integrity and condition of all sample coolers;
ii. Verification of the integrity and condition of all sample containers;
iii. Checks for leakage, cracked or broken closures or containers, evidence of grossly contaminated container exteriors or shipping cooler interiors, and obvious odours, etc.;
iv. Verification of receipt of complete documentation for each container;
v. Verification that sample identification numbers on sample transmittal forms corresponds to sample identification numbers on the sample containers; and
vi. Verifications that holding times were met and samples were kept cool during transit.

The samples are transported/submitted under Chain of Custody documentation. Included on a Chain of Custody form is the client information, the sample information, the analyses requested, the relevant regulations, the turnaround time for the analytical results, comments, and temperature of the samples at the time they arrived in the laboratory. An example of a Chain of Custody form is included in Appendix H. The copy page of the Chain of Custody form should be kept on file with the completed Field Logs.

4.4. Sample Collection Summary

Sampling should be done using the following method:

i. Label all bottles prior to going to sampling sites;
ii. Begin sampling at the "cleanest" sampling site;
iii. Complete Field Log at each sampling site;
iv. Put on new pair of gloves at each sampling site;
v. Face bottles upstream when collecting samples;
vi. Fill bottles partially with water and rinse with lid in place, empty water downstream, repeat 3 times;
vii. Do not rinse bottles when sampling for oil & grease, bacteria or if bottles contain preservatives;
viii. Plunge bottle to half depth of water or 15 cm below surface for deeper water, avoid floating debris;
ix. If preservatives are to be added, leave room so there is no overflow;
x. If preservative is already in the bottle, fill slowly so not to wash out preservative;
xi. Put bottles in cooler with ice/icepacks;
xii. Place Chain of Custody (COC) form in plastic bag and put in cooler;
xiii. Send samples to lab as soon as possible;
xiv. Call the lab to notify lab that sample was shipped, waybill # and time it will be arriving; and
xv. Wash your hands when you are done handling samples.

As a general recommendation, please refrain from using insect repellant, disinfection hand gel or other chemical products before and during sample collection. Also refrain from smoking during sample collection.

5. Quality Control

Most commercial laboratories undertake QA/QC procedures with the volume of sample sent for analysis. Reports are usually provided with the Certificates of Analysis. It is recommended that the suggested QA/QC protocols by the laboratory be followed.

To ensure that the monitoring program maintains accepted quality control, field blanks and duplicate samples may be suggested by the laboratory. These samples are collected and analyzed for the sample parameters as the monitoring program in the licence as part of a quality control check on monitoring activities.

The Field Blanks shall accompany the sampler into the field, labelled as field blanks, preserved in the field and submitted to the laboratory with the field samples.

5.1. Replicate or Duplicate Samples

Replicate or duplicate sampling involves collecting more than one sample for a given sampling station subject to specific analysis. Standard procedures used for the routine sampling shall be applied. The replicate or duplicate samples are useful in identifying problems with accuracy and sampling methods.

Once per operating season for each active monitoring station a set of duplicate samples will be taken, representing as many of the routine analysis as possible. Where possible this shall be carried out in conjunction with the sampling undertaken by an AANDC Inspector.

6. Laboratory Analysis/Reporting

The laboratory will perform the analysis of all samples as outlined herein. The results shall be received by the GN-CGS within the time frame agreed to with the laboratory. The results shall contain the limits of detection used for analysis of each parameter as supplied by the laboratory.

The laboratory results are compared to the limits of the Water Licence for each parameter, and/or to other comparative criteria such as the Canadian Environment Water Quality Guidelines. A copy of these guidelines is included in Appendix I.

As a condition of NWB Licence (Appendix B), the GN-CGS is required to submit an Annual Report to the NWB, no later than March 31st of the year following the calendar year reported. Among other requirements, the Annual Report is required to include tabular summaries of all analytical data generated under the Monitoring Program.

7. Glossary

The following definitions that are relevant to this Plan include:

Quality Assurance (QA): is the definitive program for laboratory operation that specifies the measures required to produce defensible data of known precision and accuracy. QA includes quality control and quality assessment activities.

Quality Control (QC): is a set of measures within a sample analysis methodology to assure that the process is in control.

Quality Assessment: is a process to determine the quality of the laboratory measurements through internal and external QC evaluations. It includes performance evaluation samples, laboratory inter-comparisons samples and performance audits.

Trip Blank is a sample of clean water that was prepared by the analytical laboratory and shipped to the sample site in the cooler along with the empty sample bottles. This trip blank sample remains unopened and is transported back to the laboratory with the monitoring program samples. The trip blanks is analyzed by the laboratory along with the monitoring program samples. The purpose of the trip blank is the assess contamination introduced during shipping and field handling procedures.

CALA refers to the Canadian Association for Laboratory Accreditation, formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL).

Chain of Custody Documentation refers to the documentation that accompanies samples sent to an analytical laboratory. It is a legal document which ensures that the sample taken at a specific site is the same sample received in the laboratory. It also provides information on the sample condition and integrity as received by the laboratory.

8. Summary

This Environmental Monitoring Program and QA/QC Plan has been prepared specifically for the Water Supply and Sewage Treatment Facility, in the Hamlet of Rankin Inlet, operated by Government of Nunavut, Community and Government Services (GN-CGS).

Appropriate training for site staff is necessary as part of the implementation of this Plan. This document should be reviewed and updated annually, and whenever the NWB Water Licence is amended or new relevant legislation issued.

9. References

Canadian Council of Ministers of the Environment (CCME), 2007. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Summary table. Updated September, 2007. In: Canadian environmental quality guidelines, 1999, Canadian Council of the Environment, Winnipeg.

Canadian Council of Ministers of the Environment (CCME), 2007. Canadian soil quality guidelines for the protection of environmental and human health: Summary tables. Updated September, 2007. In: Canadian environmental quality guidelines, 1999, Canadian Council of the Environment, Winnipeg.

Canadian Council of Ministers of the Environment, 2006, Canadian Environmental Quality Guidelines.

Nunavut Water Board, September 2000, Guidelines for the Discharge of Domestic Wastewater in Nunavut.

Nunavut Water Board, June 2010. GN-CGS Water Licence No. 3AM-GRA1015. Gjoa Haven, Nunavut.

Nunavut Water Board, December 2014. GN-CGS Water Licence No. 3AM-GRA1015 Amendment No. 1. Gjoa Haven, Nunavut.

Nunavut Water Board, May 2015. GN-CGS Water Licence No. 3AM-GRA1015. Gjoa Haven, Nunavut.

Nuna Burnside Engineering and Environmental Ltd. (2008). Sewage Treatment Facility Operations and Maintenance (O&M), Hamlet of Rankin Inlet. Government of Nunavut, 2008.

Nuna Burnside Engineering and Environmental Ltd. (2008). Water Supply Facility Operations and Maintenance (O&M), Hamlet of Rankin Inlet. Government of Nunavut, 2008.

Nuna Burnside Engineering and Environmental Ltd. (2010). *Revised* Environmental Monitoring Program and Quality Assurance/Quality Control Plan, Hamlet of Rankin Inlet. Government of Nunavut, 2010.

Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "B" Licencees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan, Department of Indian and Northern Affairs Canada, July 1996.

Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water Works Association, and Water Environment Federation, 22nd Edition, 2012.

Wilson, Neal. 1995. Soil Water and Ground Water Sampling. CRC Press: New York, USA.

Appendix A: Figures

Map Reference:
Map Art Publishing

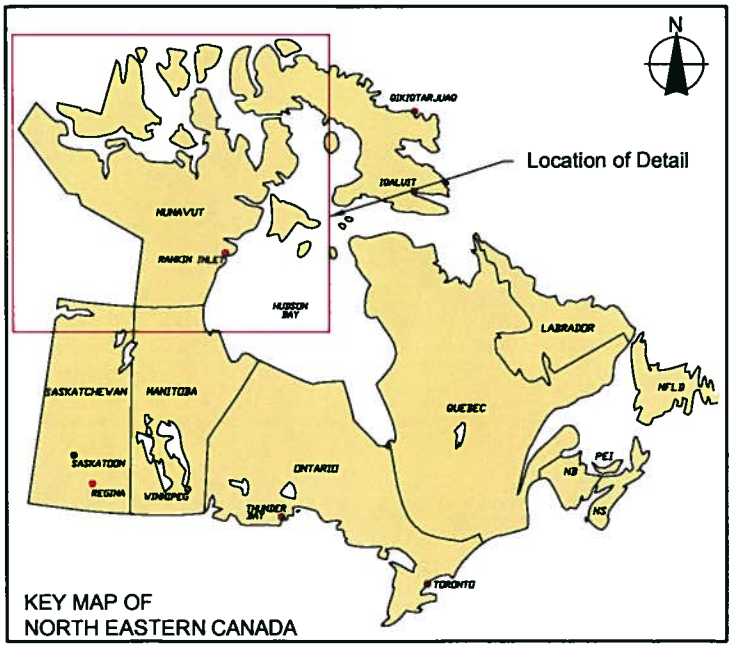


FIGURE 1 - SITE LOCATION MAP

HAMLET OF RANKIN INLET
HAMLET OF RANKIN INLET, NUNAVUT

ENVIRONMENTAL EMERGENCY CONTINGENCY PLAN

December 2008
Project Number: N-O14850

Prepared by: C. Sheppard

Verified by: J. Walls

BURNSIDE

N-O14850 ENVIRONMENTAL EMERGENCY - HAMLET SL.dwg

Plot Time: Dec 08, 2008 - 2:11pm

Figure 2: Map of Facilities

Appendix B: Nunavut Water Board Licence No. 3AM-GRA1015

P.O. BOX 119
GJOA HAVEN, NU X0B 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File No: 3AM-GRA1015

June 14, 2010

Honorable Chuck Strahl, P.C., M.P.
Minister of Indian Affairs & Northern Development
and Federal Interlocutor for Metis and Non-Status Indians
21st Floor, 10 Wellington
Gatineau, Quebec K1A 0H4

By Courier, Email and Regular Mail

Subject: Licence 3AM-GRA1015 – Government of Nunavut, Community and Government Services; Rankin Inlet Water Use, Nunavut;

Dear Minister:

Please find enclosed, Licence 3AM-GRA1015, duly issued by the Nunavut Water Board (NWB). This Licence authorizes the Government of Nunavut, Department of Community and Government Services, to the use of water for a Municipal Undertaking.

In accordance with section 56 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, the Licence requires your approval and as such the NWB submits the attached Decision and Licence for your consideration.

Should you have any questions or require clarification on the above or wish to discuss further, please contact the undersigned in writing.

Sincerely,

Thomas Kabloona
Nunavut Water Board
Chair

C.c. Kivalliq Distribution List
NWB Public Registry

WATER LICENCE NO: 3AM-GRA1015

For

Government of Nunavut
Department of
Community and Government Services

Hamlet of Rankin Inlet, Nunavut

NUNAVUT WATER BOARD

LICENCE NO: 3AM-GRA1015

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NUNAVUT WATER BOARD

WATER LICENCE No. 3AM-GRA1015

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

GOVERNMENT OF NUNAVUT, DEPARTMENT OF COMMUNITY AND GOVERNMENT SERVICES

(Licensee)

P.O. BAG 002, GOVERNMENT OF NUNAVUT
RANKIN INLET, NUNAVUT X0C 0G0

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water or dispose of waste for a period subject to restrictions and conditions contained within this Licence:

Licence Number/Type:	3AM-GRA1015 TYPE "A"
Water Management Area:	NUNAVUT 06
Location:	RANKIN INLET, KIVALLIQ REGION, NUNAVUT LATITUDE 62°49'24"N, LONGITUDE 92°06'53"W
Classification:	MUNICIPAL UNDERTAKING
Purpose:	DIRECT USE OF WATER
Quantity of Water use not to Exceed:	EIGHT HUNDRED AND FIFTY THOUSAND (850,000) CUBIC METRES PER ANNUM
Date of Licence Issuance:	JUNE 09, 2010
Expiry of Licence:	MAY 31, 2015

This Licence, issued and recorded at Gjoa Haven, Nunavut, includes and is subject to the annexed conditions.

Thomas Kabloona,
Nunavut Water Board
Chair

APPROVED BY:

Minister of Indian and Northern Affairs Canada

DATE LICENCE APPROVED:

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. SCOPE

a. This Licence allows for the use of Water and operation of the Water Supply Facilities, Utilidor and Sewage Treatment Facility by the Government of Nunavut, Department of Community and Government Services for a municipal undertaking at the Hamlet of Rankin Inlet, Nunavut (Latitude 62°49'24"N and Longitude 92°06'53"W);

b. This Licence is issued subject to conditions contained herein with respect to the taking of Water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the Act, or other statutes imposing more stringent conditions relating to the quantity, type or manner under which any such Waste may be so deposited, this Licence shall be deemed to be subject to such requirements; and

c. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with all applicable legislation, guidelines and directives.

2. DEFINITIONS

In this Licence: 3AM-GRA1015

"Act" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"Amendment" means a change to original terms and conditions of this licence requiring correction, addition or deletion of specific terms and conditions of the licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

"Appurtenant undertaking" means an undertaking in relation to which a use of waters or a deposit of waste is permitted by a licence issued by the Board;

"Board" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement*;

"**Calendar Quarter**" means divisions of the calendar year, comprised of three month intervals from January to December, inclusive (January – March, April – June, July – September and October – December);

"Effluent" means treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond or a treatment plant;

"Engineer" means a professional engineer registered to practice in Nunavut in accordance with the Engineering, Geological and Geophysical Act (Nunavut) S.N.W.T. 1998, c.38, s.5;

"Hazardous Waste" means waste classified as "hazardous" by Nunavut Territorial or Federal legislation, or as "dangerous goods" under the *Transportation of Dangerous Goods Act*;

"Inspector" means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

"Licensed Facilities" means the Water Supply Facilities, Utilidor and Sewage Treatment Facility;

"Licensee" means the holder of this Licence;

"Modification" means an alteration to a physical work that introduces new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion, and changes to the operating system that are consistent with the terms of this Licence and do not require amendment;

"Monitoring Program" means a monitoring program established to collect data on surface water and groundwater quality to assess impacts to the freshwater aquatic environment of an appurtenant undertaking;

"Nunavut Land Claims Agreement" (NLCA) means the "*Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*", including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"**Sewage**" means all toilet wastes and greywater;

"**Sewage Treatment Facility**" means the facility designed to receive sewage from the Utilidor, designed to provide primary treatment via a rotating drum screen, and discharge Sewage to the marine environment in Prairie Bay as described in the Application for a Water Licence dated March 19, 2009;

"**Utilidor**" means the piped distribution system designed to transport treated water from the Water Supply Facilities to structures and dwellings in Rankin Inlet and the piped collection system designed to collect sewage from structures and dwellings and transport to the Sewage Treatment Facility, as described in the Application for a Water Licence dated March 19, 2009;

"Waste" means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

"Water" means water as defined in section 4 of the Act;

"Water Supply Facilities" means the areas and associated infrastructure at Nipissar Lake including the Lake, intake lines, pumphouse, underground pipeline and Williamson Lake water tank, as described in the Application for Water Licence dated March 19, 2009;

3. ENFORCEMENT

a. Failure to comply with this Licence will be a violation of the Act, subjecting the Licensee to the enforcement measures and the penalties provided for in the Act.

b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the Act.

c. For the purpose of enforcing this Licence and with respect to the use of Water and deposit or Discharge of Waste by the Licensee, Inspectors appointed under the Act, hold all powers, privileges and protections that are conferred upon them by the Act or by other applicable law.

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report with the Board for review, no later than March 31st of the year following the calendar year being reported, which shall contain the following information collected during that period:

    a. Tabular summaries of all data generated under the Monitoring Program;
    b. The monthly and annual quantities of fresh water obtained from all sources;
    c. The monthly and annual quantities of wastes removed for disposal from Licensed Facilities;
    d. The current estimated volume of Nipissar Lake based on water elevation determined at Monitoring Program Station GRA-5;
    e. A summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;
    f. A list of unauthorized discharges and summary of follow-up actions taken;
    g. Any revisions to approved Plans and Manuals as required by Part B, Item 11, submitted in the form of an Addendum;
    h. A summary of abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
    i. A summary of any studies, reports and plans requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned; and
    j. Any other details on water use or waste disposal requested by the Board by November 1st of the year being reported.

2. The Licensee shall submit to the Board for review, a quarterly report for all tests and

monitoring conducted during each Calendar Quarter, no later than forty five (45) days following the quarter being reported, which shall contain the following information:

a. Tabular summaries of all data generated under the Monitoring Program;
b. Monthly quantities of fresh water obtained from all sources;
c. Quarterly sampling results from Monitoring Program Station GRA-3; and
d. The current estimated volume of Nipissar Lake based on water elevation determined at Monitoring Program Station GRA-5.

3. The Licensee shall comply with the Monitoring Program described in this Licence and any amendments to the Monitoring Program as may be made from time to time, pursuant to the conditions of this Licence.

4. The Monitoring Program and compliance dates specified in the Licence may be modified at the discretion of the Board.

5. Metres, devices or other such methods used for measuring the volumes of water used and waste discharged, shall be installed, operated and maintained by the Licensee to the satisfaction of an Inspector.

6. The Licensee shall, within ninety (90) days after the first visit by the Inspector following approval of this Licence, post the necessary signs, to identify the stations of the Monitoring Program. All signage postings shall be in the Official Languages of Nunavut.

7. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

8. In the event that a Plan is not found acceptable to the Board, the Licensee shall, within thirty (30) days of notification by the Board provide a revised version to the Board for review or approval in writing.

9. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board.

10. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

11. The Licensee shall review the Plans referred to in this Licence as required by changes in operation and/or technology and modify the Plans or Manuals accordingly. Revisions to the Plans or Manuals are to be submitted in the form of an Addendum to be included with the Annual Report required by Part B, Item 1(g), complete with a revisions list detailing

where significant content changes are made.

12. The Licensee shall immediately report to the 24-Hour Spill Report Line (867-920-8130) any spills of Waste, which are reported to, or observed by the Licensee, within the municipal boundaries or in the areas of the Water Supply Facilities, Utilidor or Sewage Treatment Facility.

13. The Licensee shall ensure a copy of this Licence is maintained at the municipal office and at the site of operation at all times.

14. Any communication with respect to this Licence shall be made in writing to the attention of:

    Manager of Licensing
    Nunavut Water Board
    P. O. Box 119
    Gjoa Haven, NU X0B 1J0
    Telephone: (867) 360-6338
    Fax: (867) 360-6369
    Email: licensing@nunavutwaterboard.org

15. Any notice made to an Inspector shall be made in writing to the attention of:

    Water Resources Officer
    Nunavut District, Nunavut Region
    P.O. Box 100
    Iqaluit, NU X0A 0H0
    Telephone: (867) 975-4295
    Fax: (867) 979-6445

16. The Licensee shall submit one (1) paper copy and one (1) electronic copy of all reports, studies, and Plans to the Board or as otherwise requested by the Board. Reports or studies submitted to the Board by the Licensee shall include an executive summary in English and Inuktitut.

17. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the Board, is received by the Board and maintain on file a copy of the acknowledgment of receipt issued by the Manager of Licensing.

18. This Licence is assignable as provided for in Section 44 of the Act.

19. The expiry or cancellation of this Licence does not relieve the Licensee from any obligation imposed by the Licence, or any other regulatory requirement.

PART C: CONDITIONS APPLYING TO WATER USE AND MANAGEMENT

1. The Licensee shall obtain all fresh water from Nipissar Lake at Monitoring Station GRA-1 using the Water Supply Facilities, or as otherwise approved by the Board in writing.

2. The annual quantity of water used for all purposes shall not exceed eight hundred and fifty thousand (850,000) cubic metres per annum or as otherwise approved by the Board in writing.

3. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw water at a rate such that fish do not become impinged on the screen.

4. The Licensee shall submit to the Board for review by December 31, 2010, as-built drawings stamped and signed by an Engineer confirming compliance with the DFO guideline "Freshwater Intake End of Pipe Fish Screen Guideline".

5. The Licensee shall not remove any material from below the ordinary high water mark of any water body unless otherwise approved by the Board in writing.

6. The Licensee shall not cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

7. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

8. The Licensee shall submit to the Board for review by December 31, 2010, a Sustainability Assessment Report for Nipissar Lake. The Report shall include and address the following:

    a. Findings of the water use audit and leak detection survey;
    b. Detailed assessment of current and projected water volumes to be withdrawn from Nipissar Lake against total annual recharge (ie. Water Balance);
    c. Evaluation of impacts on Nipissar Lake due to current water taking and future needs;
    d. Recommendations, including remedial engineering of the facilities and alternative water sources as required to address impacts on Nipissar Lake; and
    e. A schedule to address the recommendations of the report, that is consistent with the conservation and utilization of waters and provides for the optimum benefit from those waters for the residents of Nunavut.

9. The Licensee shall maintain the Water Supply Facilities to the satisfaction of the Inspector.

10. The Licensee shall, within sixty (60) days following approval of the Licence, install and maintain a water level gauge in Nipissar Lake at Monitoring Program Station GRA-5, or as otherwise approved by the Board.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL AND MANAGEMENT

1. The Licensee shall direct all Sewage to the Sewage Treatment Facility or as otherwise approved by the Board.

2. The Licensee shall provide to the Board by December 31, 2010, written documentation that the Licensee is authorized to deposit sewage sludge and solid waste to a licensed waste disposal facility.

3. The Licensed Facilities shall be maintained and operated in such a manner as to prevent structural failure.

4. The Licensee shall maintain the Licensed Facilities to the satisfaction of an Inspector.

5. The Licensee shall remove from the site, all Hazardous Wastes, waste oil and non-combustible waste generated through the course of the operation, for disposal at a licensed waste disposal facility.

6. The Licensee shall maintain records of all Waste removed from site and records of confirmation of proper disposal of removed Waste. These records shall be made available to an Inspector upon request.

PART E: CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION

1. The Licensee shall submit to the Board, for approval in writing, construction drawings signed and stamped by an Engineer registered in Nunavut prior to the construction of any dams, dykes or structures intended to contain, withhold, divert or retain water or wastes.

2. The Licensee may, without written approval from the Board, carry out Modifications provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

    a. The Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications to include:
        i. A description of the facilities and/or works to be constructed;
        ii. The proposed location of the structure(s);
        iii. Identification of any potential impacts to the receiving environment;
        iv. A description of any monitoring required, including sampling locations, parameters measured and frequencies of sampling;
        v. Schedule for construction;
        vi. Drawings of engineered structures signed and stamped by a Professional Engineer; and
        vii. Proposed sediment and erosion control measures.

b. Such Modifications do not place the Licensee in contravention of the Licence or the Act;
c. The Board has not, within sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days;
d. The Board has not rejected the proposed Modifications;

3. Modifications for which any of the conditions referred to above have not been met can be carried out only with written approval from the Board.

4. The Licensee shall provide as-built plans and drawings of the construction and/or modifications referred to in Part E of this Licence within ninety (90) days of completion of the Construction or Modification. These plans and drawings shall be signed and stamped by an Engineer.

PART F: CONDITIONS APPLYING TO OPERATIONS AND MAINTENACE

1. The Board has approved the Plan entitled "Water Supply Facility Operation and Maintenance (O&M) Plan, Hamlet of Rankin Inlet, Department of Community and Government Services, Government of Nunavut" revised April 2010.

2. The Board has approved the Plan entitled "Sewage Treatment Facility Operation and Maintenance (O&M) Plan, Hamlet of Rankin Inlet, Department of Community and Government Services, Government of Nunavut" revised April 2010.

3. The Board has approved the Plan entitled "Environmental Emergency Contingency Plan, Hamlet of Rankin Inlet, Department of Community and Government Services, Government of Nunavut" revised April 2010. The Licensee shall submit to the Board for review, within thirty (30) days of approval of this Licence, an addendum to the Plan to address the following:

   a. Confirm the position which acts as the Spill Response Coordinator under Section 3.1 Spill Response Team, and the contact information;
   b. On-site quantities of chemicals used (chlorine, fluorine and others) ;
   c. A map detailing Government of Nunavut, Department of Community and Government Services fuel storage locations and spill kit locations;
   d. A revision to Section 4.0 (2) of the Plan to refer to the INAC Manager of Field Operations rather than Water Resources as the contact in the event of a spill;
   e. A revision to Appendix 2 of the Plan to refer to the NT-NU Spill Report Form;
   f. The on-site location of MSDS, current of 3 years; and
   g. A revision to the contact list in Appendix A of the Plan to include Fisheries and Oceans Canada, Kivalliq Inuit Association, Government of Nunavut, Department of Environment and the local Hunters and Trappers Organization.

4. If, during the period of this Licence, an unauthorized Discharge of Waste and or Effluent occurs, or if such Discharge is foreseeable, the Licensee shall:

   a. Employ as required, the approved Environmental Emergency Contingency Plan;
   b. Report the incident immediately via the 24-Hour Spill Reporting Line (867) 920-8130 and to the Inspector at (867) 975-4295; and
   c. For each spill occurrence, submit a detailed report to the Inspector, no later than thirty (30) days after initially reporting the event, which includes the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain, clean up and restore the spill site.

PART G: CONDITIONS APPLYING TO ABANDONMENT, RESTORATION AND CLOSURE

1. The Licensee shall submit to the Board for approval in writing, an Abandonment and Restoration Plan at least six (6) months prior to abandoning any facilities or upon submission of the final design drawings for the construction of new facilities to replace existing ones. Where applicable, the Plan shall include information on the following:

   a. Water intake facilities;
   b. The waste treatment and sewage treatment sites and facilities;
   c. Petroleum and chemical storage areas;
   d. Any site affected by waste spills;
   e. Leachate prevention;
   f. An implementation schedule;
   g. Maps delineating all disturbed areas, and site facilities;
   h. Consideration of altered drainage patterns;
   i. Type and source of cover materials;
   j. Future area use;
   k. Hazardous wastes; and
   l. A proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment.

2. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

3. In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.

4. Areas that have been contaminated by hydrocarbons shall be reclaimed to meet objectives as outlined in the Government of Nunavut's Environmental Guideline for Site Remediation, January 2002. The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.

5. The Licensee shall complete the restoration work within the time schedule specified in an approved Abandonment and Restoration Plan, or as subsequently revised and approved by the Board.

6. The Licensee shall complete all restoration work prior to the expiry of this Licence.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall maintain Monitoring Program Stations at the following locations:

Monitoring Program Station Number	Description	Frequency	Status
GRA-1	Raw water supply prior to treatment	Monthly	Active (Volume)
GRA-2	Point of discharge in Prairie Bay (within 20 m of discharge pipe outfall approximately 5 m below the surface)	N/A	Inactive
GRA-3	Effluent discharge from Sewage Treatment Facility	Quarterly	Active (Quality)
GRA-4	Sludge removed from the Sewage Treatment Facility	Monthly	Active (Volume)
GRA-5	Water level gauge in Nipissar Lake	Monthly (during periods of open water)	Active (Water Level)

2. The Licensee shall measure and record in cubic metres, the monthly and annual quantities of water extracted for all purposes at Monitoring Program Station GRA-1.

3. The Licensee shall provide the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where sources of water are utilized for all purposes and at all Monitoring Program Stations.

4. The Licensee shall sample at least once during a Calendar Quarter at Monitoring Program Station GRA-3 and analyze for the following parameters:

BOD_5	Faecal Coliforms
pH	Conductivity
Total Suspended Solids	Ammonia Nitrogen
Nitrate – Nitrite	Oil and Grease (visual)

Total Phenols	Sulphate
Sodium	Potassium
Magnesium	Calcium
Total Arsenic	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel
Total Zinc	

5. The Licensee shall measure and record in cubic metres, the monthly and annual volumes of sludge removed from the Sewage Treatment Facility at Monitoring Program Station GRA-4.

6. The Licensee shall record water elevation monthly, during periods of open water at Monitoring Program Station GRA-5.

7. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board.

8. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

9. The Licensee shall within ninety (90) days following approval of the Licence, submit to the Board for review, a revised "Environmental Monitoring Program and Quality Assurance/Quality Control Plan, Hamlet of Rankin Inlet, Department of Community and Government Services, Government of Nunavut". The revised Plan shall include:

    a. All monitoring requirements listed under Part H of the Licence;
    b. The retention of additional sampling for analysis of parameters that is not required by this Licence but included under the current Plan is encouraged;
    c. A covering letter from an accredited laboratory confirming acceptance of the Quality Assurance/ Quality Control (QA/QC) Plan for analyses to be performed under this Licence.

10. The Licensee shall annually review the QA/QC Plan referred to in Part J, Item 9 and modify it as necessary. Revised QA/QC Plans shall be submitted to the Board with a current approval letter from an accredited lab and shall meet the standards set out in Part H, Item 7 and Part H, Item 8 of the Licence.

11. The Licensee shall include all of the data and information required by the Monitoring Program in the Licensee's Annual Report, as required per Part B, Item 1(a) or as otherwise requested by an Inspector.

12. Modifications to the Monitoring Program may be made only upon written approval of the Board.

Appendix C: Nunavut Water Board Licence Amendment No. 1 – Licence No. 3AM-GRA1015

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File No. 3AM-GRA1015 / Amendment No. 1

December 23, 2014

John Kusugak,
Regional Director, Kivalliq Region
Government of Nunavut,
Department of Community and Government Services
P.O. BAG 002, GN,
Rankin Inlet, NU X0C 0G0

Email: JKusugak@gov.nu.ca

Joe Acorn, P.Eng
Project Manager
Stantec Architecture Ltd.
4910 53 Street, P.O. Box 1777
Yellowknife, NWT X1A 2P4

Email: Joe.Acorn@stantec.com

Subject: **Licence No. 3AM-GRA1015 – Hamlet of Rankin Inlet;**
Amendment No. 1 – Seasonal Replenishment of Nipissar Lake

Dear Mr. Kusugak and Mr. Acorn,

Please find attached, Amendment No. 1 to Licence No. 3AM-GRA1015 Type "A" issued to the Government of Nunavut, Community and Government Services (GN-CGS or Licensee) and as issued by the Nunavut Water Board (NWB) (**Motion 2014-23-P10-03**) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA).

The terms and conditions of the original Licence related to the use of Waters and deposit of Waste remain an integral part of this approval. Please note that the Amendment as issued, must be approved by the Minister of Aboriginal Affairs and Northern Development Canada pursuant to s. 56 of the NWNSRTA and accordingly, the NWB has forwarded the issued Amendment to the Minister for his consideration under a separate cover.

The NWB recommends that the Licensee consult the accompanying "Reasons for Decision Including Record of Proceedings" and all comments received by interested persons on the Application during the licensing process.

Sincerely,

Thomas Kabloona
Nunavut Water Board
Chair

TK/kk/pb

Enclosure: Licence No. **3AM-GRA1015 – Amendment No. 1**
Comments - AANDC, DFO

Cc: Distribution - Kivalliq

NUNAVUT WATER BOARD

3AM-GRA1015 Type "A"
LICENCE AMENDMENT No. 1

Licensee:	**GOVERNMENT OF NUNAVUT, DEPARTMENT OF COMMUNITY AND GOVERNMENT SERVICES**
Licence Issued:	**June 9, 2010**
Minister Approval of Licence:	**July 28, 2010**
Licence Expiry:	**May 31, 2015**
Amendment No. 1 Issuance:	**December 23, 2014**

Pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, with respect to an application for an amendment dated August 14, 2012 (with additional information provided on October 6, 2012 and August 12, 2013), made by Stantec Architecture Ltd. on behalf of the Government of Nunavut, Community and Government Services for the Hamlet of Rankin Inlet's Municipal Type "A" Water Licence 3AM-GRA1015, and the Reasons for Decision issued by the Nunavut Water Board following the Public Hearing held with respect to the Application, the Nunavut Water Board hereby issues Amendment No. 1 to Licence 3AM-GRA1015 as follows:

NUNAVUT WATER BOARD
WATER LICENCE 3AM-GRA1015 - AMENDMENT NO.1

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

GOVERNMENT OF NUNAVUT, COMMUNITY AND GOVERNMENT SERVICES

(Licensee)

P.O. BAG 002, GOVERNMENT OF NUNAVUT
RANKIN INLET, NUNAVUT X0C 0G0

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use Water or dispose of Waste for a period, subject to restrictions and conditions contained within this Licence amendment:

Licence Number/Type:	3AM-GRA1015 TYPE "A"
Water Management Area:	WILSON WATERSHED (13)
Location:	RANKIN INLET, KIVALLIQ REGION, NUNAVUT LATITUDE 62º49'24'' N, LONGITUDE 92º06'53'' W
Classification:	MUNICIPAL UNDERTAKING
Purpose:	USE OF WATERS
Quantity of Water use not to Exceed:	2,330 CUBIC METERS PER DAY FROM NIPISSAR LAKE, 3,485 CUBIC METERS PER DAY FROM CHAR RIVER TO NIPISSAR LAKE
License Issuance:	JUNE 9, 2010
Expiry of Licence:	MAY 31, 2015

This Licence Amendment No.1, issued and recorded at Gjoa Haven, Nunavut on December 23, 2014.

Thomas Kabloona,
Nunavut Water Board
Chair

APPROVED BY: **Minister of Aboriginal Affairs and Northern Development Canada**

DATE:

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

2. Definitions

Amend **"Water Supply Facilities"**

"Water Supply Facilities" means the areas and associated infrastructure at the Char River exiting the Lower Landing Lake including the water intake and pipeline extending from the Char River to Nipissar Lake as described in the Application for Water Licence Amendment dated August 14, 2012 and associated documents; Nipissar Lake including intake lines, pump-houses, underground pipeline and the Williamson Lake water tank.

PART C: CONDITIONS APPLYING TO WATER USE AND MANAGEMENT

Insert
Item 11 The Licensee shall submit to the Board for approval in writing, prior to March 31, 2015, a Water Pumping Adaptive Management Plan, that shall include the following:

a. Details of seasonal hydrological monitoring of Char River;
b. Details of Char River, Lower Landing Lake and Nipissar Lake water chemistry monitoring and assessment of impacts on Nipissar Lake water quality/chemistry due to the transfer of water from Char River;
c. In-stream flow objectives for Char River including a flow based low cut-off limit of 10% of the instantaneous flow and 0.5m minimum flow depth in the Char River, at which point no further Water is authorized to be withdrawn from the Char River;
d. Details of Char River on-going viability assessment in meeting pumping objectives and water use requirements;
e. Mitigation options and procedures for occurrences when flow is insufficient to meet pumping objectives and consumption requirements.

Insert
Item 12 The Licensee may, withdraw fresh Water from the Char River, exiting the Lower Landing Lake at Monitoring Station GRA-6, and pump to Nipissar Lake annually in accordance with the approved Water Pumping Adaptive Management Plan as submitted under Part C, Item 11.

Insert
Item 13 The daily quantity of Water pumped from the Char River to Nipissar Lake shall not exceed three thousand, four hundred and eighty-five (3,485) cubic metres per day, to be withdrawn in accordance with the approved Water Pumping Adaptive Management Plan, as submitted under Part C, Item 11. Withdrawal of water shall not exceed 10 % of the instantaneous flow of Char River.

Insert
Item 14 The Licensee shall submit to the Board for approval in writing, a revised Water Pumping Adaptive Management Plan, within ninety (90) days of completion of the 2015 hydrological field study, to include actual field flow data analysis. The Licensee shall annually review the Water Pumping Adaptive Management Plan and modify it as necessary. Revised Plans shall be submitted to the Board within the Annual Reports.

Insert
Item 15 The Licensee shall cease water pumping activities from Char River to Nipissar Lake should the In-stream flow objectives for Char River, as per the Water Pumping Adaptive Management Plan and restrictions imposed in Part C, Item 13, not be met.

PART F: CONDITIONS APPLYING TO OPERATIONS AND MAINTENACE

Amend
Item 1 The Board has approved the Plan entitled "Addendum to Operations and Maintenance (O&M) Plan for the Water Supply Facility, Char River, Rankin Inlet, Nunavut", prepared for the Government of Nunavut, Department of Community and Government Services, by Stantec Architecture Ltd., dated May 2014.

Amend
Item 3 The Board has approved the Plan entitled "Spill Contingency Plan for Water Supply and Sewage Treatment Facilities Rankin Inlet, Nunavut", prepared for: the Government of Nunavut, Department of Community and Government Services, by Stantec Architecture Ltd., dated May 2014.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

Amend
Item 1 The Licensee shall maintain Monitoring Program Stations at the following locations:

Monitoring Program Station Number	Description	Frequency	Status
GRA-1	Raw water supply from Nipissar Lake prior to treatment	Daily, Monthly, Annually; Annually (spring freshet)	Active (Volume) (Quality)
GRA-2	Point of discharge in Prairie Bay (within 20	Quarterly	Inactive (Quality)

	m of discharge pipe outfall approximately 5 m below the surface)		
GRA-3	Effluent discharge from Sewage Treatment Facility	Quarterly	Active (Quality)
GRA-4	Sludge removed from the Sewage Treatment Facility	Monthly	Active (Volume)
GRA-5	Water level gauge in Nipissar Lake	Monthly (during periods of open water)	Active (Water Level)
GRA-6	Char River Water pumped to Nipissar Lake	Daily, Monthly, Annually; Annually (spring freshet)	New (Volume/Quality)
GRA-7	Lower Landing Lake	Annually (spring freshet)	New (Water Quality)

Amend
Item 2 The Licensee shall measure by instrument and record in cubic metres, the daily, monthly and annual quantities of Water extracted for all purposes at Monitoring Program Station GRA-1, and from the Char River exiting Lower Landing Lake at Monitoring Program Station GRA-6.

Insert
Item 13 The Licensee shall, during water pumping activities from Char River to Nipissar Lake, record daily the total Water flow within the Char River to ensure the Licensee adheres to the Part C, Items 13, 14 and 15 of the Licence, and "Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada", (DFO 2013, or more recent).

Insert
Item 14 The Licensee shall sample annually during spring freshet, at Monitoring Program Stations GRA-1, GRA-6 and GRA-7 and analyze for the following parameters in accordance with the Canadian Council of Ministers of the Environment (CCME, 2013) Water Quality Guidelines for the Protection of Freshwater Aquatic Life:

pH	Conductivity
Total Suspended Solids	Ammonia Nitrogen
Nitrate – Nitrite	Oil and Grease (visual)
Total Phenols	Sulphate
Total Hardness	Total Alkalinity
Sodium	Potassium
Magnesium	Calcium

Chloride	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel
Total Zinc	Total Phosphorous
Total Aluminum	Total Manganese
Total Cobalt	Total Arsenic

Total Petroleum Hydrocarbons (TPH)
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)

All remaining terms and conditions of Licence 3AM-GRA1015 Type "A" dated June 9, 2010 shall continue to apply.

Appendix D: Nunavut Water Board Short Term Renewal Licence – Licence No. 3AM-GRA1015

Ministre des Affaires autochtones
et du développement du Nord

Minister of Aboriginal Affairs and
Northern Development

Ottawa, Canada K1A 0H4

MAY 30 2015

Mr. Thomas Kabloona
Chair
Nunavut Water Board
PO Box 119
GJOA HAVEN NU X0B 1J0

Dear Mr. Kabloona:

Thank you for your letter of May 20, 2015, conveying the short-term renewal of type A water licence 3AM-GRA1015 for the Hamlet of Rankin Inlet.

I am pleased to inform you that I have approved the water licence as recommended by the Nunavut Water Board. The signed original is enclosed.

Sincerely,

Bernard Valcourt, PC, QC, MP

Encl.

Canada

NUNAVUT WATER BOARD
WATER LICENCE RENEWAL (SHORT TERM)

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

GOVERNMENT OF NUNAVUT, COMMUNITY AND GOVERNMENT SERVICES
(Licensee)

P.O. BAG 002, GOVERNMENT OF NUNAVUT
RANKIN INLET, NUNAVUT X0C 0G0
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water or dispose of waste for a period subject to restrictions and conditions contained within this Licence amendment:

Licence Number/Type:	3AM-GRA1015 TYPE "A"
Water Management Area:	WILSON WATERSHED (13)
Location:	RANKIN INLET, KIVALLIQ REGION, NUNAVUT LATITUDE 62°49'24" N, LONGITUDE 92°06'53" W
Classification:	MUNICIPAL UNDERTAKING
Purpose:	USE OF WATERS
Quantity of Water use not to Exceed:	2,330 CUBIC METERS PER DAY FROM NIPISSAR LAKE, 3,485 CUBIC METERS PER DAY FROM CHAR RIVER TO NIPISSAR LAKE
Licence Issuance:	JUNE 9, 2010
Expiry of Licence:	MAY 31, 2015 (PLUS A MAXIMUM OF 180 DAYS), TO EXPIRE ON NOVEMBER 27, 2015

This Short Term Renewal Licence issued and recorded at Gjoa Haven, Nunavut, includes and is subject to the annexed conditions.

All remaining terms and conditions of Licence No. 3AM-GRA1015 Type "A" dated June 9, 2010, and Licence Amendment No. 1 dated December 23, 2014, shall continue to apply.

This Short Term Renewal Licence is issued and recorded at Gjoa Haven, Nunavut on May 19, 2015.

Thomas Kabloona,
Nunavut Water Board
Chair

APPROVED BY: **The Honourable Bernard Valcourt**
Minister of Aboriginal Affairs and Northern Development Canada

DATE LICENCE APPROVED: MAY 30 2015

3AM-GRA1015 - SHORT TERM RENEWAL LICENCE

Licensee:	**GOVERNMENT OF NUNAVUT, COMMUNITY AND GOVERNMENT SERVICES**
Licence No:	**3AM-GRA1015 Type "A"**
Licence Issued:	**June 9, 2010**
Minister Approval of Licence:	**July 28, 2010**
Amendment No. 1 Issuance:	**December 23, 2014**
Minister Approval of Amendment No. 1	**January 25, 2015**
Short Term Renewal Issuance	**May 20, 2015**
Short Term Renewal Expiry	**November 27, 2015**

Pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada* and the *Nunavut Waters* and the *Nunavut Surface Rights Tribunal Act*, with respect to an application for short term renewal licence received from Government of Nunavut, Community and Government Services (GN-CGS or Applicant or Licensee) on March 26, 2015 for the Hamlet of Rankin Inlet and the Reasons for Decision issued by the Nunavut Water Board (NWB) on that application, the NWB hereby issues this Short Term Renewal to Licence No. 3AM-GRA1015 as follows:

NUNAVUT WATER BOARD
WATER LICENCE RENEWAL (SHORT TERM)

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

GOVERNMENT OF NUNAVUT, COMMUNITY AND GOVERNMENT SERVICES

(Licensee)

P.O. BAG 002, GOVERNMENT OF NUNAVUT
RANKIN INLET, NUNAVUT X0C 0G0

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water or dispose of waste for a period subject to restrictions and conditions contained within this Licence amendment:

Licence Number/Type:	3AM-GRA1015 TYPE "A"
Water Management Area:	WILSON WATERSHED (13)
Location:	RANKIN INLET, KIVALLIQ REGION, NUNAVUT LATITUDE 62º49'24'' N, LONGITUDE 92º06'53'' W
Classification:	MUNICIPAL UNDERTAKING
Purpose:	USE OF WATERS
Quantity of Water use not to Exceed:	2,330 CUBIC METERS PER DAY FROM NIPISSAR LAKE, 3,485 CUBIC METERS PER DAY FROM CHAR RIVER TO NIPISSAR LAKE
Licence Issuance:	JUNE 9, 2010
Expiry of Licence:	MAY 31, 2015 (PLUS A MAXIMUM OF 180 DAYS), TO EXPIRE ON NOVEMBER 27, 2015

This Short Term Renewal Licence issued and recorded at Gjoa Haven, Nunavut, includes and is subject to the annexed conditions.

All remaining terms and conditions of Licence No. 3AM-GRA1015 Type "A" dated June 9, 2010, and Licence Amendment No. 1 dated December 23, 2014, shall continue to apply.

This Short Term Renewal Licence is issued and recorded at Gjoa Haven, Nunavut on May 19, 2015.

Thomas Kabloona,
Nunavut Water Board
Chair

APPROVED BY:

The Honourable Bernard Valcourt
Minister of Aboriginal Affairs and Northern Development Canada

DATE LICENCE APPROVED: _____

Appendix E: ALS Environmental (Winnipeg) CALA Certification of Accreditation and Scope of Accreditation

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

ALS Environmental (Winnipeg)
ALS Canada Ltd.
1329 Niakwa Road East. Unit 12
Winnipeg, Manitoba

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Accreditation No.:	A1442
Issued On:	December 23, 2014
Accreditation Date:	January 3, 2005
Expiry Date:	June 22, 2017

President & CEO

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 1442
Laboratory Name: ALS Environmental (Winnipeg)
Parent Institution: ALS Canada Ltd.
Address: 1329 Niakwa Road East Unit 12 Winnipeg MB R2J 3T4
Contact: Ms. Kayla Harold
Phone: (204) 255-9745
Fax: (204) 255-9721
Email: kayla.harold@alsglobal.com; linda.neimor@ALSGlobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: March 24, 2015
Valid To: June 22, 2017

Scope of Accreditation

Air (Inorganic)
Radon - Air (142)
WP-TM-1801; modified from EPA 402-R-92-004
ELECTRET RADON MONITOR
Radon

Air (Mycology)
Mould - Air (163)
WP-TM-1704; modified from ASTM D7391
DIRECT MICROSCOPIC EXAMINATION
Biocontaminant Identification
Biocontaminant Quantification

Air (Mycology)
Mould - Air (AGAR Strips) (055)
WP-TM-1703; modified from INTRO. TO FOOD-BOURNE FUNGI
MICROSCOPE
Biocontaminant Identification
Biocontaminant Quantitation

Food
Yeast and Mould - Food (168)
WP-TM-1211; MFHPB-22
POUR PLATE
Mould
Yeast

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Food (Microbiology)
Coliforms - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (153)
WP-TM-1210; MFHPB-19
MOST PROBABLE NUMBER
Escherichia coli (E.coli)
Fecal Coliforms
Total Coliforms

Food (Microbiology)
Coliforms - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (157)
WP-TM-1209; MFHPB-31
POUR PLATE
Total Coliforms

Food (Microbiology)
Heterotrophic Plate Count - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (152)
WP-TM-1208; MFHPB-18
POUR PLATE
Heterotrophic Plate Count

Food (Microbiology)
Listeria - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (151)
WP-TM-1202; AOAC 997.03
VISUAL IMMUNOPRECIPITATE ASSAY
Listeria monocytogenes

Food (Microbiology)
Listeria - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (156)
WP-TM-1201; MFHPB-30
SPREAD PLATE
Listeria monocytogenes

Food (Microbiology)
Listeria - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (158)
WP-TM-1203; MFLP-34
VISUAL IMMUNOPRECIPITATE ASSAY
Listeria monocytogenes

Food (Microbiology)
Salmonella - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (154)
WP-TM-1204; MFHPB-20
SPREAD PLATE
Salmonella

Food (Microbiology)
Salmonella - Meat, Poultry and Egg Products (160)
WP-TM-1206; USDA MLG 4
SPREAD PLATE
Salmonella

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Food (Microbiology)
Staphylococcus - Dairy Products (Except Unpasturized Milk for Payment Purposes) & Meat and Edible Meat Offal (Milk Powder, Egg, Cheese, Butter, Evaporated Milk, Meat) (155)
WP-TM-1207; MFHPB-21
SPREAD PLATE
Staphylococcus aureus

Solids (Biology)
Benthic Organisms - Sediment (075)
WP-TM-1301; modified from SM 10500
MICROSCOPE EXAMINATION
Benthos Enumeration
Benthos Identification

Solids (Inorganic)
Metals - TCLP Leachate - Waste (149)
NA-TM-1002/NA-TM-1700; EPA 1311 (LEACH) and modified from EPA 200.2 (ANALYSIS)
ICP/MS - TCLP
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Selenium
Silver
Strontium
Thallium
Tin
Uranium
Vanadium
Zinc
Zirconium

Solids (Inorganic)
Total Mercury (TCLP Leachate) - Waste (162)
WP-TM-1007/WP-WI-3007/NA-TM-1700; EPA 1311 (LEACH) and modified from EPA 1631E I(ANALYSIS)
COLD VAPOUR ATOMIC FLUORESCENCE - TCLP
Mercury

Solids (Inorganic)
Total Mercury - Soil (128)
WP-TM-1007/NA-TP-2004/WP-WI-3007; modified from EPA 1631E
COLD VAPOUR ATOMIC FLUORESCENCE - DIGESTION
Mercury

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Solids (Inorganic)
Total Metals - Solids (131)
NA-TM-1002/NA-TP-2004; modified from EPA 200.2
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Thallium
Thorium
Tin
Titanium
Uranium
Vanadium
Zinc

Solids (Organic)
Glycols - Soil (145)
WP-TM-1102; modified from ASTM D3695-82
GC/FID
Diethylene Glycol
Ethylene Glycol
Propylene Glycol
Tetraethylene Glycol
Triethylene Glycol

Solids (Organic)
Petroluem Hydrocarbons (PHC) - Soil (148)
NA-TP-2100/NA-TM-1100; modified from CCME TIER 1
GC/FID
F2: C10-C16
F3: C16-C34
F4: C34-C50

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Solids (Organic)
Petroluem Hydrocarbons (PHC) - Soil (150)
NA-TP-2100/NA-TM-1100; modified from CCME TIER 1
GRAVIMETRIC - TUMBLER
F4: Gravimetric

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Soil (045)
WP-TM-0801; modified from EPA SW-846 3550A
GC/ECD - EXTRACTION
Arochlor 1016
Arochlor 1221
Arochlor 1232
Arochlor 1248
Arochlor 1262
Arochlor 1268
Aroclor 1242
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Soil (051)
NA-TP-2103/WP-TP-2102; modified from EPA SW-846 3550C and EPA SW-846 8270D
GC/MS - SHAKE EXTRACTION
1-Methylnaphthalene
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b&j) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Chrysene
Dibenzo (a,h) anthracene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Phenanthrene
Pyrene
Quinoline

Solids (Organic)
Volatile Fatty Acids - Soil (129)
WP-TM-1105; modified from ASTM D3695-
GC/MS - WATER EXTRACTION
Acetic Acid
Butyric Acid
Caproic Acid
Formic Acid
Isobutyric Acid
Isovaleric Acid

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Propionic Acid
Valeric Acid

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (141)
NA-WI-3006/NA-TM-1102; modified from EPA 5021A and EPA 8260C
GC/MS - METHANOL EXTRACTION/HEADSPACE

1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
2-Chlorotoluene
2,2-Dichloro-propane
4-Chlorotoluene
4-Isopropyltoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropylbenzene

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl n-butyl ketone
Methyl t-butyl ether
n-Butylbenzene
Naphthalene
o-xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

Solids (Organic)
Volatile Petroleum Hydrocarbons (PHC) - Soil (140)
NA-WI-3006/NA-TM-1102; CCME PHC - PERFORMANCE BASED MODIFICATION
GC/FID - METHANOL EXTRACTION/HEADSPACE
F1: C6-C10

Tissue (Inorganic)
Total Mercury - Tissue (082)
NA-TP-2003/WP-TM-1008/WP-TM-1007; modified from EPA 1631E
COLD VAPOUR ATOMIC FLUORESCENCE - DIGESTION
Mercury

Tissue (Inorganic)
Total Metals - Tissue (070)
NA-TP-2003/NA-TM-1002; modified from EPA 200.3 and 200.8
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is sub)ect to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Rubidium
Selenium
Silver
Sodium
Strontium
Tellurium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

Water (Inorganic)
Acidity - Water (111)
WP-TM-1003; modified from SM 2310 B
TITRIMETRIC
Acidity as CaCO3 - LR

Water (Inorganic)
Alkalinity - Water (001)
WP-TM-1001; modified from SM 2320 B
TITRIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic)
Ammonia - Water (135)
WP-TM-1011/WP-WI-3005; modified from SM 4500-NH3 F
COLORIMETRIC - DISCRETE ANALYZER
Ammonia

Water (Inorganic)
Anions - Water (134)
NA-TM-1001; modified from EPA 300.1
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Water (Inorganic)
Biochemical Oxygen Demand (BOD) - Water (015)
WP-TM-1015; modified from SM 5210 B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic)
Carbon - Water (038)
WP-TM-1024; modified from SM 5310 B
AUTO IR ANALYZER
Inorganic Carbon
Total Carbon

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic)
Chemical Oxygen Demand (COD) - Water (060)
WP-TM-1017; modified from SM 5220D and HACH
COLOR - DIGESTION
COD

Water (Inorganic)
Chlorine - Water (147)
WP-TM-1013; modified from SM 4500-CL G
COLORIMETRIC
Free Chlorine
Total Chlorine

Water (Inorganic)
Colour - Water (136)
WP-TM-1010/WP-WI-3005; modified from SM 2120-COLOR
COLORIMETRIC - DISCRETE ANALYZER
True Colour

Water (Inorganic)
Conductivity - Water (003)
WP-TM-1001; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic)
Cyanide - Water (018)
WP-TM-1006; modified from SM 4500-CN- O
COLOR - DISTILLATION
Cyanide (SAD)
Cyanide (WAD)

Water (Inorganic)
Dissolved and Extractable Metals - Water (056)
NA-TP-2002/NA-TM-1002; modified from EPA 200.8
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium

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Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Sulfur
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic)
Dissolved Oxygen - Water (088)
WP-TM-1018; modified from SM 4500-O- C
IODOMETRIC - AZIDE MODIFICATION
Dissolved Oxygen

Water (Inorganic)
Mercury (Total and Dissolved) - Water (081)
WP-TM-1007/WP-TM-1008/WP-WI-3007/NA-TP-2002/NA-TP-2001; modified from EPA 1631E
CVAFS - BrCl DIGESTION
Mercury

Water (Inorganic)
Nitrate plus Nitrite - Water (007)
WP-TM-1025; modified from SM 4500-NO3- I
FIA COLORIMETRIC
Nitrate plus Nitrite

Water (Inorganic)
pH - Water (019)
WP-TM-1001; modified from SM 4500-H+ B
pH METER
pH

Water (Inorganic)
Phosphorus - Water (024)
WP-TM-1004; modified from SM 4500-P H
FIA COLORIMETRIC - DIGESTION
Dissolved Phosphate
Phosphate
Total Dissolved Phosphorus
Total Inorganic Phosphorus
Total Phosphorus

Water (Inorganic)
Phosphorus - Water (164)
WP-TM-1016; modified from SM 4500-P BANDE
COLORIMETRIC - DISCRETE ANALYZER
Dissolved Phosphate
Phosphate

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Water (Inorganic)
Phosphorus - Water (165)
WP-TM-1016; modified from SM 4500-P BANDE
COLORIMETRIC - DISCRETE ANALYZER - DIGESTION
Total Dissolved Phosphorus
Total Inorganic Phosphorus
Total Phosphorus

Water (Inorganic)
Silica - Water (137)
WP-TM-1012/WP-WI-3005; modified from SM 4500-SIO2
COLORIMETRIC - DISCRETE ANALYZER
Reactive Silica

Water (Inorganic)
Solids - Water (014)
WP-TM-1014; modified from SM 2540 B, C, D
GRAVIMETRIC
Total Dissolved Solids
Total Solids
Total Suspended Solids
Volatile Suspended Solids

Water (Inorganic)
Total Kjeldahl Nitrogen (TKN) - Water (012)
WP-TM-1019; modified from SM 4500-NORG D
AUTO COLOR - DIGESTION
Total Kjeldahl Nitrogen

Water (Inorganic)
Total Metals - Water (057)
NA-TP-2001/NA-TM-1002; modified from EPA SW-846 3015 and SM 3030 E
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium

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Silicon
Silver
Sodium
Strontium
Sulfur
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic)
Turbidity - Water (068)
WP-TM-1009; modified from SM 2130 B
TURBIDIMETRIC
Turbidity

Water (Inorganic)
UV Absorbance/Transmittance - Water (166)
WP-TM-1027; modified from SM 5910 B
SPECTROPHOTOMETRIC
UV Absorbance
UV Transmittance

Water (Microbiology)
Coliforms - Water (026)
WP-TM-1219; modified from SM 9221 A, B, C
MOST PROBABLE NUMBER
Escherichia coli (E.Coli)
Fecal Coliforms
Total Coliforms

Water (Microbiology)
Coliforms - Water (039)
NA-TM-1300; modified from SM 9223 B and IDEXX
MOST PROBABLE NUMBER (QUANTI-TRAY)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology)
Coliforms - Water (079)
WP-TM-1217; modified from HACH 10029 and SM 9222 B
MEMBRANE FILTRATION (mCOLIBLUE)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology)
Cryptosporidium and Giardia - Water (053)
WP-TM-1212; modified from EPA 1623
IMS/FA - FILTRATION
Cryptosporidium Enumeration
Giardia Enumeration

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Water (Microbiology)
Fecal (Thermotolerant) Coliforms - Water (025)
WP-TM-1214; modified from SM 9222 D
MEMBRANE FILTRATION (mFC)
Fecal (Thermotolerant) Coliforms

Water (Microbiology)
Fecal (Thermotolerant) Coliforms - Water (167)
NA-TM-1300; modified from SM 9223 B
MOST PROBABLE NUMBER (QUANTI-TRAY)
Fecal (Thermotolerant) Coliforms

Water (Microbiology)
Heterotrophic Plate Count (HPC) - Water (041)
WP-TM-1216; modified from SM 9215 B
POUR PLATE
Heterotrophic Plate Count (HPC)

Water (Microbiology)
Legionella - Water (118)
WP-TM-1213; modified from ISO 11731 and SM 9260 J
MEMBRANE FILTRATION
Legionella-enumeration

Water (Microbiology)
Microcystins - Water (090)
WP-TM-1104; modified from TOXICON/ENVIROLOGIX
ELISA
Microcystins

Water (Microbiology)
Phytoplankton and Zooplankton - Water (076)
WP-TM-0102; modified from SM 10200
MICROSCOPE EXAMINATION
Phytoplankton Enumeration
Phytoplankton Identification
Zooplankton Enumeration
Zooplankton Identification

Water (Microbiology)
Pseudomonas aeruginosa - Water (093)
WP-TM-1215; modified from SM 9213 E
MEMBRANE FILTRATION (mPAC)
Pseudomonas aeruginosa

Water (Microbiology)
Total Coliforms - Water (078)
WP-TM-1218; modified from SM 9222 B
MEMBRANE FILTRATION (mENDO)
Total Coliforms

Water (Organic)
Alcohols and Glycols - Water (146)
WP-TM-1102; modified from ASTM D3695-82
GC/FID
Acetone
Diethylene Glycol
Ethanol
Ethylene Glycol
Isobutanol

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Isopropanol
Methanol
n-Butanol
n-Pentanol
Propylene Glycol
Sec-Butanol
Tetraethylene Glycol
Triethylene Glycol

Water (Organic)
Chlorophyll - Water (085)
WP-TM-1021; modified from SM 10200 H
ACETONE EXTRACTION - SPEC
Chlorophyll-a
Pheophytin

Water (Organic)
Chlorophyll A - Water (144)
WP-TM-1022; SM 10200H
FLUORESCENCE
Chlorophyll

Water (Organic)
Haloacetic Acids (HAA) - Water (124)
WP-TM-1103; modified from EPA 552.2
GC/ECD - LIQUID/LIQUID PARTITION
Bromochloroacetic Acid
Dibromoacetic Acid
Dichloroacetic Acid
Monobromoacetic Acid
Monocloroacetic Acid
Trichloroacetic Acid

Water (Organic)
Petroleum Hydrocarbons (PHC) - Water (132)
NA-TM-1104/NA-TP-2100; modified from EPA 3511 and EPA 8015D
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Water (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Water (066)
NA-TP-2103/WP-TP-2101; modified from EPA SW-846 3510B and EPA SW-846 8270D
GC/MS
1-Methylnaphthalene
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo(b&j)fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Chrysene
Dibenzo (a,h) anthracene

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Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Phenanthrene
Pyrene
Quinoline

Water (Organic)
Total PCBs - Water (074)
WP-TM-0706; modified from EPA 8082A
GC/ECD - EXTRACTION
Arochlor 1016
Arochlor 1221
Arochlor 1232
Arochlor 1248
Arochlor 1262
Arochlor 1268
Aroclor 1242
Aroclor 1254
Aroclor 1260
Total PCB

Water (Organic)
Volatile Fatty Acids - Water (130)
WP-TM-1105; modified from ASTM D3695
GC/MS
Acetic Acid
Butyric Acid
Caproic Acid
Formic Acid
Isobutyric Acid
Isovaleric Acid
Propionic Acid
Valeric Acid

Water (Organic)
Volatile Organic Compounds (VOC) - Water (139)
NA-WI-3006/NA-TM-1102; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene

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1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
2-Chlorotoluene
2,2-Dichloro-propane
4-Chlorotoluene
4-Isopropyltoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromodichloromethane - Formation Potential
Bromoform
Bromoform - Formation Potential
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Carbon Tetrachloride - Formation Potential
Chlorobenzene
Chlorodibromomethane
Chlorodibromomethane - Formation Potential
Chloroethane
Chloroform
Chloroform - Formation Potential
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropylbenzene
m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl n-butyl ketone
Methyl t-butyl ether
n-Butylbenzene
Naphthalene
o-xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Tetrachloroethylene - Formation Potential
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene

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Trichlorofluoromethane
Vinyl Chloride

Water (Organic)
Volatile Petroleum Hydrocarbons (VPH) - Water (138)
NA-TM-1102/NA-WI-3006; modified from EPA 5021A and EPA 8015D
GC/FID - HEADSPACE
F1: C6-C10
TVH (C5-C10)

Water (Toxicology)
Daphnia magna - Wastewater (017)
WP-TM-1401; EPS 1/RM/11 and EPS 1/RM/14
ACUTE LETHALITY (SURVIVAL)
Daphnia LC50 (48 h)
Single Concentration (48h)

Water (Toxicology)
Microtox - Liquid Phase - Wastewater (050)
WP-TM-1403; EPS 1/RM/24
BIOLUMINESCENCE
Microtox (30min.)
Microtox (5min.)
Microtox IC50 (15 min)

Water (Toxicology)
Rainbow Trout - pH Stabilization - Wastewater (161)
WP-TM-1402; EPS 1/RM/13 and EPS 1/RM/50
ACUTE LETHALITY (SURVIVAL)
Single Concentration (96h) - pH Stabilized
Trout LC50 (96 h) - pH Stabilized

Water (Toxicology)
Rainbow Trout - Wastewater (049)
WP-TM-1402; EPS 1/RM/9 and EPS 1/RM/13
ACUTE LETHALITY (SURVIVAL)
Single Concentration (96h)
Trout LC50 (96 h)

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Appendix F: ALS Environmental (Waterloo) CALA Certification of Accreditation and Scope of Accreditation

Canadian Association for Laboratory Accreditation Inc.

CALA

Certificate of Accreditation

ALS Environmental (Waterloo)
ALS Canada Ltd.
60 Northland Rd., Unit 1
Waterloo, Ontario

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Accreditation No.: A3149
Issued On: July 24, 2014
Accreditation Date: January 3, 2005
Expiry Date: January 21, 2017

President & CEO

ilac-MRA CALA

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 3149
Laboratory Name: ALS Environmental (Waterloo)
Parent Institution: ALS Canada Ltd.
Address: 60 Northland Rd. Unit 1 Waterloo ON N2V 2B8
Contact: Mr. Jonathan Fisher
Phone: (519) 886-6910
Fax: (519) 886-9047
Email: ALSWT.Quality@alsglobal.com; linda.neimor@ALSGlobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: May 8, 2015
Valid To: January 21, 2017

Scope of Accreditation

Air (Inorganic)
Fixed Gases - Air (180)
WT-TM-1703; modified from EPA 3C and ASTM D1946-90
- GC/FID & TCD
- Carbon Dioxide
- Carbon Monoxide
- Methane
- Nitrogen
- Oxygen

Biosolids (Microbiology)
Escherichia coli (E. coli) - Biosolids (087)
WT-TM-1200; modified from MOE/LSB-E3433
- MEMBRANE FILTRATION (mFC-BCIG)
- Escherichia coli (E. coli)

Biosolids (Organic)
Nonylphenol and Nonylphenol Ethoxylates - Biosolids (165)
WT-TM-1554; modified from JOURNAL OF CHROMATOGRAPHY A,849 (1999) 467-482
- LC/MS - EXTRACTION
- Bisphenol A
- Nonylphenol Diethoxylate
- Nonylphenol Monoethoxylates
- Nonylphenols
- Nonylphenols Ethoxylates
- Octylphenol
- Octylphenol Diethoxylate
- Octylphenol Monoethoxylate

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Oil (Organic)
Total PCBs - Oil (053)
WT-TM-1306; modified from EPA 8082-M and SW-846 3580 A and SW-846 3600 C and SW-846 8082A
GC/ECD - EXTRACTION
Total PCB

Soil
Particle Size - Soil (156)
WT-TM-1034; modified from SOIL SAMPLING and METHODS OF ANALYSIS - CAN. SOCIETY OF SOIL SCIENCE (1993)
SEIVE
Particle Size

Soil
Perchlorate - Soil (176)
WT-TM-1505; modified from EPA 6860
LC-MS/MS
Perchlorate

Soil
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Soil (175)
WT-TM-1557; modified from JOURNAL OF CHROMATOGRAPHY A. 1093 (2005), 89-97
LC-MS/MS
Perfluorooctane Sulfonate (PFOS)
Perfluorooctanoic Acid (PFOA)

Soil (Inorganic)
Hexavalent Chromium - Soil (158)
WT-TM-1035; modified from EPA 1636 and EPA 3060
ION CHROMATOGRAPHY
Chromium (Hexavalent)

Soil (Inorganic)
Phenols - Soil (170)
WT-TM-1027; modified from EPA 9066
COLORIMETRIC
Total Phenolics

Soil (Organic)
Alkylated PAH's - Soil (177)
WT-TM-1114, WT-TM-1309; modified from EPA SW-846 3500C and EPA SW-846 8270D
GC/MS - EXTRACTION
Acenaphthene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
benzo(e)pyrene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Biphenyl
C1-acenaphthenes
C1-Benzofluoroanthenes/Benzo(a)pyrenes
C1-Biphenyl
C1-Chrysenes

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C1-Dibenzothiopenes
C1-Fluoranthenes/Pyrenes
C1-Fluorenes
C1-Naphthalenes
C1-Phenanthrenes/Anthracene
C2-Benzofluoroanthenes/Benzo(a)pyrenes
C2-Biphenyl
C2-Chrysenes
C2-Dibenzothiopenes
C2-Fluoranthenes/Pyrenes
C2-Fluorenes
C2-Naphthalenes
C2-Phenanthrenes/Anthracene
C3-Chrysenes
C3-Dibenzothiopenes
C3-Fluoranthenes/Pyrenes
C3-Fluorenes
C3-Naphthalenes
C3-Phenanthrenes/Anthracene
C4-Dibenzothiopenes
C4-Fluoranthenes/Pyrenes
C4-Naphthalenes
C4-Phenanthrenes/Anthracene
Chrysene
Dibenzo (a,h) anthracene
Dibenzothiopene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Perylene
Phenanthrene
Pyrene
Quinoline
Retene

Solids (Inorganic)
Ammonia - Soil (096)
WT-TM-1013; modified from EPA 350.1
COLORIMETRIC
Ammonia

Solids (Inorganic)
Anions - Soil, Sludge (041)
NA-TM-1001, WT-TP-2013; modified from EPA 300
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulphate

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Solids (Inorganic)
Anions - Solid Waste (136)
NA-TM-1001, NA-TM-1700; EPA 1311 (LEACH) and modified from EPA 300.0 (ANALYSIS)
ION CHROMATOGRAPHY - TCLP
Fluoride
Nitrate
Nitrite

Solids (Inorganic)
Conductivity - Soil (109)
WT-TM-1028; modified from SM 2510 B and EPA 9050A
CONDUCTIVITY METER
Conductivity (25°C)

Solids (Inorganic)
Cyanide - Soil (079)
NA-TM-1003, WT-TP-2011; modified from SM 4500-CN E, G (SAD), 4500-CN I (WAD), modified from ISO/DIS 14403 and ASTM D7237
AUTO COLOR - DIGESTION
Cyanide (Free)
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Mercury - Soil, Sludge, Compost (050)
WT-TM-1018; modified from SW-846 7471B and EPA 245.2
CVAAS
Mercury

Solids (Inorganic)
Mercury - Solid Waste (139)
NA-TM-1700, WI-TM-1018; EPA 1311 (LEACH) and modified from EPA 7470A (ANALYSIS)
COLD VAPOUR AA - SPECTROMETRIC - TCLP
Mercury

Solids (Inorganic)
Metals - Soil, Sludge, Compost, Sediment (006)
NA-TM-1002, NA-TP-2004; modified from EPA 6020A and EPA 3050B and modified from 200.2, BC SALM (BC MOE)
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum

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Nickel
Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

Solids (Inorganic)
Metals - Solid Waste (138)
NA-TM-1700, NA-TM-1002; EPA 1311 (LEACH) and modified from EPA 6020A (ANALYSIS)
ICP/MS - TCLP
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Iron
Lead
Lithium
Magnesium
Manganese
Potassium
Selenium
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Zinc
Zirconium

Solids (Inorganic)
Oil and Grease - Soil, Sludge (031)
WT-TM-1100; modified from SM 5520 B, D, E, F and EPA 8015
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Total Oil and Grease (Solvent Extractables)

Solids (Inorganic)
pH - Soil (107)
WT-TM-1028; modified from SM 4500-H B
pH METER
pH

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Solids (Inorganic)
Solids - Soils, Sludge, Compost, Sediment (028)
WT-TM-1011; modified from SM 2540 B, E, G
GRAVIMETRIC
Fixed Solids
Total Solids
Volatile Solids

Solids (Inorganic)
Total and Free Cyanide - Solid Waste (140)
NA-TM-1700, NA-TM-1003; EPA 1311 (LEACH) and modified from EPA 4500-CN I ASTM D7237 EPA SO/DIS 14403 (ANALYSIS)
COLORIMETRIC - TCLP
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Total Kjeldahl Nitrogen (TKN) - Soil (100)
WT-TM-1023; modified from SM 4500-NORG
COLORIMETRIC - DIGESTION
Total Kjeldahl Nitrogen

Solids (Inorganic)
Total Organic Carbon (TOC) - Soil (034)
WT-TM-1005; modified from CSSS METHOD 21.2
WET OXIDATION-REDOX
Total Organic Carbon (TOC)

Solids (Inorganic)
Totol Phosphorus - Soil/Sludge (039)
WT-TM-1020; modified from SM 4500-P E, F
AUTO COLOR - DIGESTION
Total Phosphorus

Solids (Organic)
1,4-Dioxane - Soil (173)
WT-TM-1407; modified from SW-846 8260C and EPA 5021A
GC/MS - HEADSPACE
1,4-Dioxane

Solids (Organic)
Base Neutral Acid Extractables (BNA) - Soil, Sediment, Sludge (016)
WT-TM-1101/WT-TM-1300; modified from EPA SW-846 3500C and EPA SW-846 8270D
GC/MS - EXTRACTION
1-Chloronaphthalene
1-Methylnaphthalene
1,2-dichlorobenzene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
1,4-dichlorobenzene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Nitrophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-Tetrachlorophenol
2,3,5-Trichlorophenol

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2,3,5,6-Tetrachlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene
3,3'-Dichlorobenzidene
4-Bromophenyl Phenyl Ether
4-Chloro-3-Methylphenol
4-chloroaniline
4-Chlorophenyl Phenyl Ether
4-Nitrophenol
4,6-Dinitro-o-Cresol
5-Nitroacenaphthylene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzyl Butyl Phthalate
Biphenyl
Bis (2-Chlorethoxy) Methane
Bis (2-Chloroethyl) Ether
Bis (2-Chloroisopropyl) Ether
Bis (2-ethylhexyl) Phthalate
Camphene
Chrysene
Di-n-Butylphthalate
Di-n-Octylphthalate
Dibenzo (a,h) anthracene
Diethyl Phthalate
Dimethyl Phthalate
Diphenyl Ether
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3 - cd) pyrene
Indole
Isophorone
m/p-cresol
N-Nitrosodi-n-propylamine
Naphthalene
Nitrobenzene

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o-Cresol
p-chloroaniline
Pentachlorophenol
Perylene
Phenanthrene
Phenol
Pyrene
Quinoline
Total Diphenylamine

Solids (Organic)
Base Neutral Acid Extractables (BNA) - Solid Waste (141)
NA-TM-1700, WT-TM-1300, WT-TM-1101; EPA 1311 (LEACH) and modified from EPA SW-846 8270 (ANALYSIS)
GC/MS - TCLP
2-Methylphenol
2,3,4,6-Tetrachlorophenol
2,4-Dichlorophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
3/4-Methylphenol
Benzo (a) pyrene
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroethane
Nitrobenzene
Pentachlorophenol

Solids (Organic)
F1 (C6-C10) - Soil (110)
NA-TM-1102; CCME TIER 1 and modified from EPA 5021A, EPA 8260C
GC/FID - HEADSPACE
F1: C6-C10

Solids (Organic)
Glycols - Soil, Sediment, Sludge (089)
WT-TM-1601; modified from EPA 8015B - MODIFIED
GC/FID
1,2 - Propylene Glycol
1,3 - Propylene Glycol
Diethylene Glycol
Ethylene Glycol
Triethylene Glycol

Solids (Organic)
Organochlorine Pesticides (OCP) - Soil (020)
WT-TM-1102/WT-TM-1302; modified from EPA SW-846 3500 C and SW-846 8270D
GC/MS - EXTRACTION
Aldrin
alpha-BHC
alpha-Chlordane
beta-BHC
Chlordane
delta-BHC
Dieldrin
Endosulfan I

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Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
gamma-Chlordane
Heptachlor
Heptachlor Epoxide
Lindane
Mirex
o,p'-DDD
o,p'-DDE
o,p'-DDT
Oxychlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT
p,p'-Methoxychlor

Solids (Organic)
Pesticides - Soil (150)
WT-TM-1107, WT-TM-1302; modified from EPA SW-846 8270 and SW-846 3500 C
GC/MS - EXTRACTION
2,4-D
2,4,5-T
2,4,5-TP
Alachlor
Ametryn
Atrazine
Atrazine Desethyl
Azinphos-methyl
Bendiocarb
Bromoxynil
Carbaryl
Carbofuran
Chlorpyrifos
Cyanazine
Diazinon
Dicamba
Diclofop-methyl
Dimethoate
Dinoseb
Malathion
MCPA
Mecoprop
Metolachlor
Metribuzin
Parathion
Phorate
Picloram
Prometon
Prometryne
Propazine
Simazine
Temephos

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Terbufos
Terbutryn
Triallate
Trifluralin

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (065)
WT-TM-1307/WT-TM-1111; CCME TIER 1 and MOE: DECPH E3398
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Solids (Organic)
Petroleum Hydrocarbons (PHC) F4 - Soil (071)
WT-TM-1307; CCME TIER 1 and MOE: DECPH E3398
GRAVIMETRIC
F4: Gravimetric

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Soil (018)
WT-TM-1105/WT-TM-1301; modified from EPA SW-846 3500 C and SW-846 8270D
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Solid Waste (137)
NA-TM-1700, WT-TM-1301, WT-TM-1105; EPA 1311 (LEACH) and modified from EPA SW-846 8270 (ANALYSIS)
GC/MS - TCLP
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Pyridine - Solid Waste (167)
WT-TM-1600, NA-TM-1700; modified from EPA SW-846 8260B
GC/MS
Pyridine

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (112)
NA-TM-1102; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromomethane
1,2-Dichlorobenzene
1,2-Dichloroethane

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1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Hexanone
Acetone (2-Propanone)
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromochloromethane
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexane
m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl t-butyl ether
Methylene Chloride
o-xylene
Styrene
Tetrachloroethane
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

Solids (Organic)
Volatile Organic Compounds (VOC) - Solid Waste (182)
WT-TM-1017, NA-TM-1002; EPA 1311 (LEACH) and modified from EPA SW-846 8260 (ANALYSIS)
GC/MS - HEADSPACE - TCLP
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,4-Dichlorobenzene
Benzene
Carbon tetrachloride
Chloroform
Dichloromethane
Ethylbenzene
m&p-xylene

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Methyl ethyl ketone
o-xylene
Tetrachloroethylene
Toluene

Swab (Organic)
Polychlorinated Biphenyls - Swabs (164)
WT-TM-1105, WT-TM-1301; EPA SW-846 3500C and EPA SW-846 8270D
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Tissue (Inorganic)
Mercury - Tissue (147)
WT-TM-1018, NA-TP-2003; modified from SW 846 7471
COLD VAPOUR AA - SPECTROMETRIC
Mercury

Tissue (Inorganic)
Metals - Tissue (152)
NA-TM-1002, NA-TP-2003; modified from EPA 200.3
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Selenium
Silver
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

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Water (Inorganic) OSDWA †
Alkalinity - Water (070)
WT-TM-1012; modified from SM 2320 B
MANUAL TITRATION
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA †
Alkalinity - Water (094)
WT-TM-1032; modified from EPA 310.2
COLORIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA †
Ammonia - Water (095)
WT-TM-1013; modified from EPA 350.1
COLORIMETRIC
Ammonia
Ammonia + ammonium

Water (Inorganic) OSDWA †
Anions - Water, Wastewater (003)
NA-TM-1001; modified from EPA 300.0
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Water (Inorganic) OSDWA †
Biochemical Oxygen Demand (BOD) - Water (001)
WT-TM-1002; modified from SM 5210B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic) OSDWA †
Bromate - Water (114)
WT-TM-1503, WT-TM-1505; modified from EPA 6850
LC-MS/MS - EXTRACTION
Bromate

Water (Inorganic) OSDWA †
Carbon - Water (047)
WT-TM-1024; modified from SM 5310 B
IR - COMBUSTION
Organic Carbon

Water (Inorganic) OSDWA †
Chemical Oxygen Demand (COD) - Water (035)
WT-TM-1006; modified from SM 5220 D
REFLUX - COLORIMETRIC
COD

Water (Inorganic) OSDWA †
Chlorine - Water (074)
WT-TM-1021; modified from SM 4500-CL G and EPA 330.5
COLORIMETRIC
Free Chlorine

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Total Chlorine

Water (Inorganic) OSDWA †
Colour - Water (097)
WT-TM-1014; modified from SM2120 C
COLORIMETRIC
Apparent Colour
True Colour

Water (Inorganic) OSDWA †
Conductivity - Water (048)
WT-TM-1010; modified from SM 2510 B and EPA 9050A
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic) OSDWA †
Conductivity - Water (108)
WT-TM-1028; modified from SM 2510 B
PC TITRATE
Conductivity (25°C)

Water (Inorganic) OSDWA †
Cyanate - Water (161)
WT-TM-1036; modified from SM 4500 CN L / 4500NH3 D
SELECTIVE ION ELECTRODE
Cyanate

Water (Inorganic) OSDWA †
Cyanide - Water, Wastewater (004)
NA-TM-1003; modified from SM 4500-CN B, C, E, I
COLOR - DISTILLATION
Cyanide (Free)
Cyanide (SAD)
Cyanide (WAD)

Water (Inorganic) OSDWA †
Dissolved Metals - Water (005)
NA-TM-1002; modified from EPA 200.8 and EPA 6020A
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel

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Phosphorus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic) OSDWA †
Hexavalent Chromium - Water (157)
WT-TM-1035; modified from EPA 1636 and EPA 7199
ION CHROMATOGRAPHY
Chromium (Hexavalent)

Water (Inorganic) OSDWA †
Hydrogen Sulphide - Water (012)
WT-TM-1003; modified from SM 4500-S2, D, E, F
COLORIMETRIC
Hydrogen Sulfide

Water (Inorganic) OSDWA †
Mercury - Water, Wastewater (049)
WT-TM-1018; modified from EPA 7470A and EPA 245.2
COLD VAPOUR AA - SPECTROMETRIC
Mercury

Water (Inorganic) OSDWA †
Oil and Grease - Water (033)
WT-TM-1100; modified from SM 5520 B, D, E, F and EPA 1664
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Total Oil and Grease

Water (Inorganic) OSDWA †
Perchlorate - Water (168)
WT-TM-1505; modified from EPA 6850
LC-MS/MS - EXTRACTION
Perchlorate

Water (Inorganic) OSDWA †
pH - Water (026)
WT-TM-1001; modified from SM 4500-H B
pH - METER
pH

Water (Inorganic) OSDWA †
pH - Water (106)
WT-TM-1028; modified from SM 4500-H B
PC TITRATE
pH

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Water (Inorganic) OSDWA †
Phenols - Water (009)
WT-TM-1027; modified from SM 5530 B, D and EPA 9066
COLORIMETRIC
Total Phenolics

Water (Inorganic) OSDWA †
Phosphorus (Low Level) - Water (098)
WT-TM-1025; modified from SM 4500-P B, F
COLORIMETRIC
Phosphate

Water (Inorganic) OSDWA †
Solids - Water (010)
WT-TM-1011; modified from SM 2540 D, E
GRAVIMETRIC
Total Suspended Solids
Volatile Suspended Solids

Water (Inorganic) OSDWA †
Solids - Water (056)
WT-TM-1011/NA-TM-1004; modified from SM 2540 B, C, E
GRAVIMETRIC
Total Dissolved Solids
Total Solids
Volatile Solids

Water (Inorganic) OSDWA †
Tannin and Lignin - Water (124)
WT-TM-1015; modified from SM 5550 B
COLORIMETRIC
Tannins & Lignins

Water (Inorganic)
Tannin and Lignin - Water (181)
WT-TM-1015; modified from SM 5550 B
COLORIMETRIC - DISCRETE ANALYZER
Tannin and Lignin

Water (Inorganic) OSDWA †
Total Kjeldahl Nitrogen (TKN) - Water (099)
WT-TM-1023; modified from SM 4500-NORG D
COLORIMETRIC - DIGESTION
Total Kjeldahl Nitrogen

Water (Inorganic) OSDWA †
Total Metals - Water, Wastewater (032)
NA-TM-1002; modified from EPA 200.8 and EPA 6020
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium

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Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic) OSDWA †
Total Phosphorus - Water (011)
WT-TM-1020; modified from SM 4500-P E, F
AUTO COLOR - DIGESTION
Total Phosphorus

Water (Inorganic) OSDWA †
Turbidity - Water (024)
WT-TM-1004; modified from SM 2130 B
TURBIDIMETRIC
Turbidity

Water (Microbiology) OSDWA †
Coliforms - Water (155)
WT-TM-1200; modified from MOE/LSB MICROMFDC-E3407
MEMBRANE FILTRATION (DC)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology) OSDWA †
Escherichia coli (E. coli) - Water (052)
WT-TM-1200; modified from ONTARIO MOE COMPARISON EVALUATION and SM 9222D
MEMBRANE FILTRATION (mFC-BCIG)
Escherichia coli (E. coli)

Water (Microbiology) OSDWA †
Fecal (Thermotolerant) Coliforms - Water (051)
WT-TM-1200; modified from SM 9222 D
MEMBRANE FILTRATION (m FC)
Fecal (Thermotolerant) Coliforms

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Water (Microbiology) OSDWA †
Fecal Streptococci - Water (088)
WT-TM-1202; modified from SM 9230 C
MEMBRANE FILTRATION (mENTEROCOCCUS)
Fecal Streptococci

Water (Microbiology) OSDWA †
Heterotrophic Plate Count (HPC) - Water (030)
WT-TM-1200; modified from SM 9215 D
MEMBRANE FILTRATION
Heterotrophic Plate Count (HPC)

Water (Microbiology) OSDWA †
Pseudomonas aeruginosa - Water (091)
WT-TM-1202; modified from SM 9213 E
MEMBRANE FILTRATION (mPAC)
Pseudomonas aeruginosa

Water (Microbiology) OSDWA †
Total Coliforms - Water (002)
WT-TM-1200; modified from SM 9222 B
MEMBRANE FILTRATION (m Endo)
Background Counts
Total Coliforms

Water (Organic) OSDWA †
1,4-Dioxane - Water (172)
WT-TM-1407; modified from SW-846 8260C and EPA 5021A
GC/MS - HEADSPACE
1,4-Dioxane

Water (Organic) OSDWA †
Aldicarb and Diuron - Water (135)
WT-TM-1502; modified from MOE E3438 and E3436
LC-MS/MS - EXTRACTION
Aldicarb
Diuron

Water (Organic)
Alkylated PAH's - Water (178)
WT-TM-1114, WT-TM-1309; modified from EPA SW-846-8270 and EPA SW-846 3500C
GC/MS - EXTRACTION
Acenaphthene
Acenaphthene
Acenaphthylene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
benzo(e)pyrene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Biphenyl
C1-acenaphthenes
C1-Benzofluoroanthenes/Benzo(a)pyrenes
C1-Biphenyl

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C1-Chrysenes
C1-Dibenzothiopenes
C1-Fluoranthenes/Pyrenes
C1-Fluorenes
C1-Naphthalenes
C1-Phenanthrenes/Anthracene
C2-Benzofluoroanthenes/Benzo(a)pyrenes
C2-Biphenyl
C2-Chrysenes
C2-Dibenzothiopenes
C2-Fluoranthenes/Pyrenes
C2-Fluorenes
C2-Naphthalenes
C2-Phenanthrenes/Anthracene
C3-Chrysenes
C3-Dibenzothiopenes
C3-Fluoranthenes/Pyrenes
C3-Fluorenes
C3-Naphthalenes
C3-Phenanthrenes/Anthracene
C4-Dibenzothiopenes
C4-Fluoranthenes/Pyrenes
C4-Naphthalenes
C4-Phenanthrenes/Anthracene
Chrysene
Dibenzo (a,h) anthracene
Dibenzothiopene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Perylene
Phenanthrene
Phenanthrene
Pyrene
Quinoline
Retene

Water (Organic) OSDWA †
Base Neutral Acid Extractables (BNA) - Water, Wastewater (015)
WT-TM-1101/WT-TM-1300; modified from EPA SW-846-8270 and EPA SW-846 3500C
GC/MS - EXTRACTION
1-Chloronaphthalene
1-Methylnaphthalene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Nitrophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-tetrachlorophenol

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2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,4-dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-trichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene
3,3'-Dichlorobenzidene
4-Bromophenyl Phenyl Ether
4-Chloro-3-Methylphenol
4-chloroaniline
4-Chlorophenyl Phenyl Ether
4-Nitrophenol
4,6-Dinitro-o-Cresol
5-Nitroacenaphthylene
Acenaphthene
Acenaphthylene
Acrdine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzyl Butyl Phthalate
Biphenyl
Bis (2-Chlorethoxy) Methane
Bis (2-Chloroethyl) Ether
Bis (2-Chloroisopropyl) Ether
Bis (2-ethylhexyl) Phthalate
Camphene
Chrysene
Di-n-Butylphthalate
Di-n-Octylphthalate
Dibenzo (a,h) anthracene
Diethyl Phthalate
Dimethyl Phthalate
Diphenyl Ether
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3 - cd) pyrene
Indole
Isophorone
m/p-cresol
N-Nitrosodi-n-propylamine
Naphthalene

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Nitrobenzene
o-Cresol
p-chloroaniline
Pentachlorophenol
Perylene
Phenanthrene
Phenol
Pyrene
Quinoline
Total Diphenylamine

Water (Organic) OSDWA †
Diquat and Paraquat - Water (134)
WT-TM-1506; modified from MDS SCIEX APPLICATION NOTE DIQUAT and PARAQUAT
LC-MS/MS - EXTRACTION
Diquat
Paraquat

Water (Organic) OSDWA †
Formaldehyde - Water (162)
WT-TM-1603; modified from EPA 556.1
GC/ECD
Formaldehyde

Water (Organic) OSDWA †
Glycols - Water (090)
WT-TM-1601; modified from EPA 8015B - MODIFIED
GC/FID
1,2 - Propylene Glycol
1,3 - Propylene Glycol
Diethylene Glycol
Ethylene Glycol
Triethylene Glycol

Water (Organic) OSDWA †
Glyphosate - Water (133)
WT-TM-1504; modified from MOE-GLYMS-E3500
LC-MS/MS - EXTRACTION
Glyphosate

Water (Organic) OSDWA †
Haloacetic Acids - Water (163)
WT-TM-1604; modified from EPA 552.3
GC/ECD
Bromoacetic Acid (BAA)
Bromochloroacetic Acid
Bromodichloroacetic Acid
Chloroacetic Acid (CAA)
Chlorodibromoacetic Acid
Dalapon (2,2-Dichloropropionic Acid)
Dibromoacetic Acid (DBAA)
Dichloroacetic Acid (DCAA)
Tribromoacetic acid (TBAA)
Trichloroacetic Acid (TCAA)

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Water (Organic) OSDWA †
Hydrocarbons - Water (062)
WT-TM-1602; modified from EPA 600 and EPA R-98/128
GC/FID - HEADSPACE
Ethane
Ethene
Methane

Water (Organic) OSDWA †
Nitrilotriacetic Acid (NTA) - Water (036)
WT-TM-1007; modified from EPA 430.1
COLORIMETRIC
Nitrilotriacetic Acid (NTA)

Water (Organic) OSDWA †
Nonylphenol and Nonylphenol Ethoxylates - Water (116)
WT-TM-1521; IN-HOUSE
LC-MS/MS - EXTRACTION
Bisphenol A
Nonylphenol Diethoxylate
Nonylphenol Monoethoxylates
Nonylphenols
Nonylphenols Ethyoxylates
Octylphenol
Octylphenol Diethoxylate
Octylphenol Monoethoxylate

Water (Organic) OSDWA †
Organochlorine Pesticides (OC) - Water, Wastewater (019)
WT-TM-1102/WT-TM-1302; modified from EPA SW-846 8270 and EPA SW-846 3500C
GC/MS - EXTRACTION
A -BHC
a - Chlordane
Aldrin
beta-BHC
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
g - Chlordane
Heptachlor
Heptachlor Epoxide
Lindane (gamma-BHC)
Mirex
o,p' - DDT
o,p'-DDD
o,p'-DDE
Oxychlordane
p,p' - DDT
p,p' Methoxychlor
p,p'-DDD
p,p'-DDE

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Water (Organic)
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Water (174)
WT-TM-1557; modified from JOURNAL OF CHROMATOGRAPHY A.1093 (2005), 89-97
LC-MS/MS
Perfluorooctane Sulfonate (PFOS)
Perfluorooctanoic Acid (PFOA)

Water (Organic) OSDWA †
Pesticides - Water (023)
WT-TM-1107/WT-TM-1109-/WT-TM-1302; modified from EPA SW-846 8270 and EPA SW-846 3500C
GC/MS - EXTRACTION
2,4-dichlorophenoxyacetic acid
2,4,5-trichlorophenoxyacetic acid
Alachlor
Atrazine
Azinphos-methyl
Bendiocarb
Bromoxynil
Carbaryl
Carbofuran
Chlorpyrifos (ethyl)
Cyanazine
De-ethylated atrazine
Diazinon
Dicamba
Diclofop-methyl (as free acid)
Dimethoate
Dinoseb
Malathion
Metolachlor
Metribuzin
Parathion (ethyl)
Phorate
Picloram
Prometryne
Simazine
Temephos
Terbufos
Triallate
Trifluralin

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (068)
WT-TM-1307/WT-TM-1112; modified from MOE:DECPH E3421
GC/FID - EXTRACTION
F2 (C10-C16)
F3 (C16-C34)
F4 (C34-C50)

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (069)
WT-TM-1307/WT-TM-1112; modified from MOE:DECPH E3421
GRAVIMETRIC
F4G (C34-C50)

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Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (111)
NA-TM-1102; modified from EPA 8260 and EPA EPA 5021A
GC/FID - HEADSPACE
F1 (C6-C10)

Water (Organic) OSDWA †
Polychlorinated Biphenyls (PCB) - Water, Wastewater (017)
WT-TM-1105/WT-TM-1301; modified from EPA SW-846-8270 and EPA SW-846 3500B
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Water (Organic)
Steroids and Hormones - Water (166)
WT-TM-1555; modified from JOURNAL OF CHROMATOGRAPHY B 879 (2011), 2998-3004
LC/MS - EXTRACTION
17a-Dihydroequilin
17a-Estradiol
17a-Ethinylestradiol
17b-Estradiol
Anderosterone
Androstendion
beta-Sitosterol
beta-Stigmastanol
Betamethasone
Campesterol
Cholestanol
Cholesterol
Coprostanol
Desmosterol
Desogestrel
Epi-coprostanol
Equilenin
Equilin
Ergosterol
Estradiol-3-benzoate
Estriol
Estrone
Mestranol
Norethindrone
Norgestrel
Progesterone
Stigmasterol
Testosterone

Water (Organic) OSDWA †
Tetraethyl Lead - Water (159)
WT-TM-1308; modified from EPA 3510C and EPA 8270D
GC/MS - DIGESTION
Teraethyl lead

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Water (Organic) OSDWA †

Volatile Organic Compounds - Water (113)

NA-TM-1102; modified from EPA 8260C and EPA 5021A

GC/MS - HEADSPACE

1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2- Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-Chloropropane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-TrimethylBenzene
1,4-Dichlorobenzene
2-Chlorotoluene
2-Hexanone
2,2-Dichloropropane
4-Chlorotoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropylbenzene
Isopropyltoluene
Isopropyltoluene
m/p-xylene

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Methyl ethyl ketone
Methyl isobutyl ketone
Methyl t-butyl ether
n-Butylbenzene
n-Propylbenzene
Naphthalene
o-xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Appendix G: Field Log

Field Log

Name of Sampler(s): _____

Date of Sampling: _____

Time of Sampling: _____

Monitoring Station Number: _____

GPS Coordinates: N _____°_____’_____” W _____°_____’_____”

Weather Conditions: _____

Samples:

- ☐ 500 mL BOD
- ☐ 1 L Routine
- ☐ 250 mL Metals + Pres
- ☐ 40 mL Glass Mercury Vial + Pres
- ☐ 250 mL Amber Nutrients + Pres
- ☐ 250 mL Amber Phenols + Pres
- ☐ 125 mL Sterile Bacteria Bottle
- ☐ **2 x** 500 mL Glass Oil & Grease + Pres
- ☐ 1 L Amber PAH + Pres
- ☐ **3 x** 40 mL BTEX, F1 Vials + Pres
- ☐ **2 x** 60 mL Amber F2-F4 Vials + Pres

Other:

- ☐ _____
- ☐ _____
- ☐ _____

Other Notes: (any unusual conditions, any deviation from standard procedures, etc.)

_____

_____

_____

_____

_____

Appendix H: Chain of Custody Form

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

Report To	**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	Email 1:	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Email 2:	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone: Fax:	Email 3:	**Analysis Request**
Invoice To Same as Report ? ☐ Yes ☐ No	**Client / Project Information**	Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report? ☐ Yes ☐ No	Job #:	
Company:	PO / AFE:	
Contact:	LSD:	
Address:		
Phone: Fax:	Quote #:	
Lab Work Order # (lab use only)	**ALS Contact:**	**Sampler:**

Sample #	**Sample Identification** (This description will appear on the report)	**Date** (dd-mmm-yy)	**Time** (hh:mm)	**Sample Type**	Number of Containers

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature: °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

Appendix I: Canadian Environmental Quality Guidelines

Canadian Water Quality Guidelines for the Protection of Aquatic Life

SUMMARY TABLE

Update 7.0
September 2007

Summary of Canadian water quality guidelines for the protection of aquatic life.

	Freshwater		Marine	
Parameter[a]	Concentration ($\mu g \cdot L^{-1}$)	Date[b]	Concentration ($\mu g \cdot L^{-1}$)	Date[b]
Acenaphthene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Acridine [See Polycyclic aromatic hydrocarbons (PAHs)]				
Aldicarb	1[c]	1993	0.15[c]	1993
Aldrin + Dieldrin[d]	~~0.004~~[e,f]	1987		
Aluminium[d]	5–100[g]	1987		
Ammonia (total)	see factsheet	2001		
Ammonia (un-ionized)	19[h]	2001		
Aniline	2.2[i]	1993	Insufficient data	1993
Anthracene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Arsenic[j]	5.0[k]	1997	12.5[c]	1997
Atrazine	1.8[i]	1989		
Benz*(a)*anthracene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Benzene[j]	370[c, k]	1999	110[c]	1999
Benzo*(a)*pyrene [See Polycyclic aromatic hydrocarbons (PAHs)]				
2,2-Bis(*p*-chlorophenyl)-1,1,1-trichloroethane [See DDT (total)]				
Bromacil	5.0[c,i]	1997	Insufficient data	1997
Bromoform [See Halogenated methanes, Tribromomethane]				
Bromoxynil	5.0[i]	1993	Insufficient data	1993
Cadmium	0.017[c,l]	1996	0.12[i]	1996
Captan	1.3[c]	1991		
Carbaryl	0.20[i]	1997	0.32[c,i]	1997
Carbofuran	1.8[i]	1989		
Carbon tetrachloride [See Halogenated methanes, Tetrachloromethane]				
Chlordane[d]	~~0.006~~[e,f]	1987		
Chlorinated benzenes				
Monochlorobenzene	1.3[c,k]	1997	25[c,k]	1997
1,2-Dichlorobenzene	0.70[c,k]	1997	42[c,k]	1997
1,3-Dichlorobenzene	150[c,k]	1997	Insufficient data[k]	1997
1,4-Dichlorobenzene	26[c,k]	1997	Insufficient data[k]	1997
1,2,3-Trichlorobenzene	8.0[c,k]	1997	Insufficient data[k]	1997
1,2,4-Trichlorobenzene	24[c,k]	1997	5.4[c,k]	1997
1,3,5-Trichlorobenzene[d]	Insufficient data[k]	1997	Insufficient data[k]	1997

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration ($\mu g \cdot L^{-1}$)	Date[b]	Concentration ($\mu g \cdot L^{-1}$)	Date[b]
Chlorinated benzenes—Continued				
1,2,3,4-Tetrachlorobenzene	1.8[c,k]	1997	Insufficient data[k]	1997
1,2,3,5-Tetrachlorobenzene[d]	Insufficient data[k]	1997	Insufficient data[k]	1997
1,2,4,5-Tetrachlorobenzene[d]	Insufficient data[k]	1997	Insufficient data[k]	1997
Pentachlorobenzene	6.0[c,k]	1997	Insufficient data[k]	1997
Hexachlorobenzene[d]	Insufficient data[e,f,k]	1997	Insufficient data[k]	1997
Chlorinated ethanes				
1,2-Dichloroethane	100[c,i]	1991	Insufficient data	1991
1,1,1-Trichloroethane	Insufficient data	1991	Insufficient data	1991
1,1,2,2-Tetrachloroethane	Insufficient data	1991	Insufficient data	1991
Chlorinated ethenes				
1,1,2-Trichloroethene (Tichloroethylene; TCE)	21[c,i]	1991	Insufficient data	1991
1,1,2,2-Tetrachloroethene (Tetrachloroethylene; PCE)	111[c,i]	1993	Insufficient data	1993
Chlorinated methanes [See Halogenated methanes]				
Chlorinated phenols[d]				
Monochlorophenols	7	1987		
Dichlorophenols	0.2	1987		
Trichlorophenols	18	1987		
Tetrachlorophenols	1	1987		
Pentachlorophenol (PCP)	0.5	1987		
Chlorine, reactive [See Reactive chlorine species]				
Chloroform [See Halogenated methanes, Trichloromethane]				
4-Chloro-2-methyl phenoxy acetic acid [See MCPA]				
Chlorothalonil	0.18[c]	1994	0.36[c]	1994
Chlorpyrifos	0.0035	1997	0.002[c]	1997
Chromium				
Trivalent chromium (Cr(III))	8.9[c,k]	1997	56[c,k]	1997
Hexavalent chromium (Cr(VI))	1.0[k]	1997	1.5[k]	1997
Chrysene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Colour	Narrative	1999	Narrative	1999
Copper[d]	2–4[m]	1987		
Cyanazine	2.0[c,i]	1990		
Cyanide[d]	5 (as free CN)	1987		
DDAC (Didecyl dimethyl ammonium chloride)	1.5[c]	1999	Insufficient data	1999
DDT (total)[d] (2,2-Bis(*p*-chlorophenyl)-1,1,1-trichloroethane; dichloro diphenyl trichloroethane)	~~0.001~~[e,f]	1987		
Debris (litter/settleable matter)			Narrative[c]	1996

Continued.

	Freshwater		Marine	
Parameter[a]	**Concentration ($\mu g \cdot L^{-1}$)**	**Date**[b]	**Concentration ($\mu g \cdot L^{-1}$)**	**Date**[b]
Deltamethrin	0.0004	1997	Insufficient data	1997
Deposited bedload sediment [See Total particulate matter]				
Dibromochloromethane [See Halogenated methanes]				
Dicamba	10[c,i]	1993		
Dichlorobenzene [See Chlorinated benzenes]				
Dichlorobromomethane [See Halogenated methanes]				
Dichloro diphenyl trichloroethane [See DDT (total)]				
Dichloroethane [See Chlorinated ethanes]				
Dichloroethylene [See Chlorinated ethanes, 1,2-Dichloroethane]				
Dichloromethane [See Halogenated methanes]				
Dichlorophenols [See Chlorinated phenols]				
2,4-Dichlorophenoxyacetic acid [see Phenoxy herbicides]				
Diclofop-methyl	6.1	1993		
Didecyl dimethyl ammonium chloride [See DDAC]				
Diethylene glycol [See Glycols]				
Di(2-ethylhexyl) phthalate [See Phthalate esters]				
Diisopropanolamine (DIPA)[aa]	1600[c]	2005	Insufficient data	2005
Dimethoate	6.2[c]	1993	Insufficient data	1993
Di-*n*-butyl phthalate [See Phthalate esters]				
Di-*n*-octyl phthalate [See Phthalate esters]				
Dinoseb	0.05	1992		
Dissolved gas supersaturation	Narrative	1999	Narrative	1999
Dissolved oxygen	5500–9500[k,n]	1999	>8000 and Narrative[c,k]	1996
Endosulfan[d]	0.02	1987		
Endrin[d]	~~0.0023~~[e,f]	1987		
Ethylbenzene[j]	90[c,k]	1996	25[c,k]	1996
Ethylene glycol [See Glycols]				
Fluoranthene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Fluorene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Glycols				
Ethylene glycol	192 000[k]	1997	Insufficient data	1997
Diethylene glycol	Insufficient data[k]	1997	Insufficient data	1997
Propylene glycol	500 000[k]	1997	Insufficient data	1997
Glyphosate	65[c]	1989		

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration ($\mu g \cdot L^{-1}$)	Date[b]	Concentration ($\mu g \cdot L^{-1}$)	Date[b]
Halogenated methanes				
Monochloromethane (Methyl chloride)[d]	Insufficient data	1992	Insufficient data	1992
Dichloromethane (Methylene chloride)	98.1[c,i]	1992	Insufficient data	1992
Trichloromethane (Chloroform)	1.8[c,i]	1992	Insufficient data	1992
Tetrachloromethane (Carbon tetrachloride)	13.3[c,i]	1992	Insufficient data	1992
Monobromomethane (Methyl bromide)[d]	Insufficient data	1992	Insufficient data	1992
Tribromomethane (Bromoform)[d]	Insufficient data	1992	Insufficient data	1992
Dibromochloromethane[d]	Insufficient data	1992	Insufficient data	1992
Dichlorobromomethane[d]	Insufficient data	1992	Insufficient data	1992
HCBD [See Hexachlorobutadiene (HCBD)]				
Heptachlor (Heptachlor epoxide)[d]	~~0.01~~[e,f]	1987		
Hexachlorobenzene [See Chlorinated benzenes]				
Hexachlorobutadiene (HCBD)	1.3[c, k]	1999		
Hexachlorocyclohexane (Lindane)[d]	0.01	1987		
Hypochlorous acid [See Reactive chlorine species]				
Imidacloprid[aa]	0.23[c]	2007	0.65[c]	2007
Inorganic fluorides	120[c]	2002		
3-Iodo-2-propynyl butyl carbamate [See IPBC]				
IPBC (3-Iodo-2-propynyl butyl carbamate)	1.9[c]	1999		
Iron[d]	300	1987		
Lead[d]	1–7[o]	1987		
Lindane [See Hexachlorocyclohexane]				
Linuron	7.0[c]	1995	Insufficient data	1995
MCPA (4-Chloro-2-methyl phenoxy acetic acid; 2-methyl-4-chloro phenoxy acetic acid)	2.6[c]	1995	4.2[c]	1995
Mercury[v]				
Inorganic Mercury[v]	0.026	2003	0.016[c,w]	2003
Methylmercury[v]	0.004[c,w]	2003		
Methyl bromide [See Halogenated methanes, Monobromomethane]				
Methyl chloride [See Halogenated methanes, Monochloromethane]				
2-Methyl-4-chloro phenoxy acetic acid [See MCPA]				
Methylene chloride [See Halogenated methanes, Dichloromethane]				
Methyl *tertiary*-butyl ether [See MTBE]				
Metolachlor	7.8[c]	1991		
Metribuzin	1.0[c]	1990		
Molybdenum[j]	73[c]	1999		
Monobromomethane [See Halogenated methanes]				
Monochloramine [See Reactive chlorine species]				

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration ($\mu g \cdot L^{-1}$)	Date[b]	Concentration ($\mu g \cdot L^{-1}$)	Date[b]
Monochlorobenzene [See Chlorinated benzenes]				
Monochloromethane [See Halogenated methanes]				
Monochlorophenols [See Chlorinated phenols]				
MTBE (methyl *tertiary*-butyl ether)	10 000[c]	2003	5 000[c]	2003
Naphthalene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Nickel[d]	25–150[p]	1987		
Nitrate	13 000[c,u,y]	2003	16 000[c,u,y]	2003
Nitrite[d]	60[z]	1987		
Nonylphenol and its ethoxylates	1.0[c,t]	2002	0.7[c,t]	2002
Nutrients	Guidance Framework[x]	2004	Guidance Framework [aa,bb]	2007
Organotins				
Tributyltin	0.008[c]	1992	0.001[c]	1992
Tricyclohexyltin	Insufficient data	1992	Insufficient data	1992
Triphenyltin	0.022[c,i]	1992	Insufficient data	1992
Oxygen, dissolved [See Dissolved oxygen]				
PAHs [See Polycyclic aromatic hydrocarbons (PAHs)]				
PCBs [See Polychlorinated biphenyls (PCBs)(total)]				
PCE [See Chlorinated ethenes, 1,1,2,2-Tetrachloroethene]				
PCP [See Chlorinated phenols, Pentachlorophenol]				
Pentachlorobenzene [See Chlorinated benzenes]				
Pentachlorophenol [See Chlorinated phenols]				
Permethrin[aa]	0.004[c]	2006	0.001[c]	2006
pH[d]	6.5–9	1987	7.0–8.7 and Narrative	1996
Phenanthrene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Phenols (mono- & dihydric)	4.0[k]	1999		
Phenoxy herbicides[d, q]	4.0	1987		
Phosphorus	Guidance Framework[x]	2004	Guidance Framework[bb]	2007
Phthalate esters				
Di-*n*-butyl phthalate	19[c]	1993	Insufficient data	1993
Di(2-ethylhexyl) phthalate	16[c]	1993	Insufficient data	1993
Di-*n*-octyl phthalate	Insufficient data	1993	Insufficient data	1993
Picloram	29[c]	1990		
Polychlorinated biphenyls (PCBs) (total)[d]	~~0.001~~[e,f]	1987	~~0.01~~[e,f]	1991

Continued.

	Freshwater		Marine	
Parameter[a]	**Concentration ($\mu g \cdot L^{-1}$)**	**Date[b]**	**Concentration ($\mu g \cdot L^{-1}$)**	**Date[b]**
Polycyclic aromatic hydrocarbons (PAHs)				
Acenaphthene	5.8[c]	1999	Insufficient data	1999
Acridine	4.4[c]	1999	Insufficient data	1999
Anthracene	0.012[c]	1999	Insufficient data	1999
Benz*(a)*anthracene	0.018[c]	1999	Insufficient data	1999
Benzo*(a)*pyrene	0.015[c]	1999	Insufficient data	1999
Chrysene	Insufficient data	1999	Insufficient data	1999
Fluoranthene	0.04[c]	1999	Insufficient data	1999
Fluorene	3.0[c]	1999	Insufficient data	1999
Naphthalene	1.1[c]	1999	1.4[c]	1999
Phenanthrene	0.4[c]	1999	Insufficient data	1999
Pyrene	0.025[c]	1999	Insufficient data	1999
Quinoline	3.4[c]	1999	Insufficient data	1999
Propylene glycol [See Glycols]				
Pyrene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Quinoline [See Polycyclic aromatic hydrocarbons (PAHs)]				
Reactive chlorine species (hypochlorous acid and monochloramine)	0.5 and Narrative	1999	0.5 and Narrative	1999
Salinity			<10% fluctuation[c]	1996
Selenium[d]	1.0	1987		
Silver[d]	0.1	1987		
Simazine	10	1991		
Streambed substrate [See Total particulate matter]				
Styrene	72[c]	1999		
Sulfolane[aa]	50 000[c]	2005	Insufficient data	2005
Suspended sediments [See Total particulate matter]				
TCE [See Chlorinated ethenes, 1,1,2-Trichloroethene]				
Tebuthiuron	1.6[c]	1995	Insufficient data	1995
Temperature	Narrative[s]	1987	Not to exceed ±1°C and Narrative[c]	1996
Tetrachlorobenzene [See Chlorinated benzenes]				
Tetrachloroethane [See Chlorinated ethanes]				
Tetrachloroethene [See Chlorinated ethenes]				
Tetrachloroethylene [See Chlorinated ethenes, 1,1,2,2-Tetrachloroethene]				

Continued.

	Freshwater		Marine	
Parameter[a]	**Concentration ($\mu g \cdot L^{-1}$)**	**Date[b]**	**Concentration ($\mu g \cdot L^{-1}$)**	**Date[b]**
Tetrachloromethane [See Halogenated methanes]				
Tetrachlorophenols [See Chlorinated phenols]				
Thallium[j]	0.8	1999		
Toluene	2.0[c,j,k]	1996	215[c,k]	1996
Total particulate matter				
Deposited bedload sediment	Insufficient data	1999	Insufficient data	1999
Streambed substrate	Narrative	1999	Narrative	1999
Suspended sediments	Narrative	1999	Narrative	1999
Turbidity	Narrative	1999	Narrative	1999
Toxaphene[d]	~~0.008~~ [e,f]	1987		
Triallate	0.24[c]	1992		
Tribromomethane [See Halogenated methanes]				
Tributyltin [See Organotins]				
Trichlorobenzene [See Chlorinated benzenes]				
Trichloroethane [See Chlorinated ethanes]				
Trichloroethene [See Chlorinated ethenes]				
Trichloroethylene [See Chlorinated ethenes, 1,1,2-Trichloroethene]				
Trichloromethane [See Halogenated methanes]				
Trichlorophenols [See Chlorinated phenols]				
Tricyclohexyltin [See Organotins]				
Trifluralin	0.20[i]	1993		
Triphenyltin [See Organotins]				
Turbidity [See Total particulate matter]				
Zinc[d]	30	1987		

[a]Unless otherwise indicated, supporting documents are available from the National Guidelines and Standards Office, Environment Canada.

[b]The guidelines dated 1987 have been carried over from *Canadian Water Quality Guidelines* (CCREM 1987) and no fact sheet was prepared. The guidelines dated 1989 to 1997 were developed and initially published in CCREM 1987 as appendixes on the date indicated. They are published as fact sheets in this document. Other guidelines dated 1997 and those dated 1999 are published for the first time in this document.

[c]Interim guideline.

[d]No fact sheet created. For more information on this guideline, please refer to *Canadian Water Quality Guidelines* (CCREM 1987).

[e]This guideline (originally published in *Canadian Water Quality Guidelines* [CCREM 1987 + Appendixes] in 1987 or 1991 [PCBs in marine waters]) is no longer recommended and the value is withdrawn. A water quality guideline is not recommended. Environmental exposure is predominantly via sediment, soil, and/or tissue, therefore, the reader is referred to the respective guidelines for these media.

[f]This substance meets the criteria for Track 1 substances under the national CCME Policy for the Management of Toxic Substances (PMTS) (i.e., persistent, bioaccumulative, primarily the result of human activity, and CEPA-toxic or equivalent), and should be subject to virtual elimination strategies. Guidelines can serve as action levels or interim management objectives towards virtual elimination.

[g]Aluminium guideline= 5 $\mu g \cdot L^{-1}$ at pH <6.5
= 100 $\mu g \cdot L^{-1}$ at pH ≥6.5

[h]Ammonia guideline: Expressed as μg unionized ammonia$\cdot L^{-1}$. This would be equivalent to 15.2 μg ammonia-nitrogen$\cdot L^{-1}$. Guideline for total ammonia is temperature and pH dependent, please consult factsheet for more information.

[i]Guideline value slightly modified from CCREM 1987 + Appendixes due to re-evaluation of the significant figures.

[j]The technical document for the guideline is available from the Ontario Ministry of the Environment.

[k]Substance has been re-evaluated since CCREM 1987 + Appendixes. Either a new guideline has been derived or insufficient data existed to derive a new guideline.

[l]Cadmium guideline $= 10^{\{0.86[\log(\text{hardness})] - 3.2\}}$.

[m]Copper guideline
= 2 $\mu g \cdot L^{-1}$ at a water hardness of 0–120 $mg \cdot L^{-1}$ (soft to medium) as $CaCO_3$
= 3 $\mu g \cdot L^{-1}$ at a water harness of 120–180 $mg \cdot L^{-1}$ (hard) as $CaCO_3$
= 4 $\mu g \cdot L^{-1}$ at a water harness >180 $mg \cdot L^{-1}$ (very hard) as $CaCO_3$

[n]Dissolved oxygen for warm-water biota: early life stages = 6000 $\mu g \cdot L^{-1}$
other life stages = 5500 $\mu g \cdot L^{-1}$
for cold-water biota: early life stages = 9500 $\mu g \cdot L^{-1}$
other life stages = 6500 $\mu g \cdot L^{-1}$

[o]Lead guideline
= 1 $\mu g \cdot L^{-1}$ at a water harness of 0–60 $mg \cdot L^{-1}$ (soft) as $CaCO_3$
= 2 $\mu g \cdot L^{-1}$ at a water harness of 60–120 $mg \cdot L^{-1}$ (medium) as $CaCO_3$
= 4 $\mu g \cdot L^{-1}$ at a water harness of 120–180 $mg \cdot L^{-1}$ (hard) as $CaCO_3$
= 7 $\mu g \cdot L^{-1}$ at a water harness >180 $mg \cdot L^{-1}$ (very hard) as $CaCO_3$

[p]Nickel guideline
= 25 $\mu g \cdot L^{-1}$ at a water harness of 0–60 $mg \cdot L^{-1}$ (soft) as $CaCO_3$
= 65 $\mu g \cdot L^{-1}$ at a water harness of 60–120 $mg \cdot L^{-1}$ (medium) as $CaCO_3$
= 110 $\mu g \cdot L^{-1}$ at a water harness of 120–180 $mg \cdot L^{-1}$ (hard) as $CaCO_3$
= 150 $\mu g \cdot L^{-1}$ at a water harness >180 $mg \cdot L^{-1}$ (very hard) as $CaCO_3$

[q]The guideline of 4.0 $\mu g \cdot L^{-1}$ for phenoxy herbicides is based on data for ester formulations of 2,4-dichlorophenoxyacetic acid.

[r]The technical document for the guideline is available from British Columbia Ministry of Environment, Lands and Parks.

[s]Temperature: (for more information, see CCREM 1987)

Thermal Stratification: Thermal additions to receiving waters should be such that thermal stratification and subsequent turnover dates are not altered from those existing prior to the addition of heat from artificial origins.

Maximum Weekly Average Temperature: Thermal additions to receiving waters should be such that the maximum weekly average temperature is not exceeded.

Short-term Exposure to Extreme Temperature: Thermal additions to receiving waters should be such that the short-term exposures to maximum temperatures are not exceeded. Exposures should not be so lengthy or frequent as to adversely affect the important species.

[t]Expressed on a TEQ basis using NP TEFs, see Table 2 in factsheet.

[u]For protection from direct toxic effects; the guidelines do not consider indirect effects due to eutrophication.

[v]May not prevent accumulation of methylmercury in aquatic life, therefore, may not protect wildlife that consume aquatic life; see factsheet for details. Consult also the appropriate Canadian Tissue Residue Guideline for the Protection of Wildlife Consumers of Aquatic Biota.

[w]May not fully protect higher trophic level fish; see factsheet for details.

[x]Canadian Guidance Framework for Phosphorus is for developing phosphorus guidelines (does not provide guidance on other freshwater nutrients). It provides Trigger Ranges for Total Phosphorus (see Guidance Framework for Phosphorus factsheet):

ultra-oligotrophic <4 $\mu g \cdot L^{-1}$
oligotrophic 4-10 $\mu g \cdot L^{-1}$
mesotrophic 10-20 $\mu g \cdot L^{-1}$
meso-eutrophic 20-35 $\mu g \cdot L^{-1}$
eutrophic 35-100 $\mu g \cdot L^{-1}$
hyper-eutrophic >100 $\mu g \cdot L^{-1}$

[y]Guidelines are expressed in μg nitrate$\cdot L^{-1}$. These values are equivalent to 2900 μg nitrate-nitrogen$\cdot L^{-1}$, and 3600 μg nitrate-nitrogen$\cdot L^{-1}$, for freshwater and marine respectively.

[z]Guideline is expressed as μg nitrite-nitrogen$\cdot L^{-1}$. This value is equivalent to 197 μg nitrite$\cdot L^{-1}$.

[aa]Supporting documents are available from the Canadian Council of Ministers of the Environment at http://www.ccme.ca/publications/ceqg_rcqe.html?category_id=125

[bb]The Canadian Guidance Framework for the Management of Nearshore Marine Systems is for developing nutrient (phosphorus and nitrogen) guidelines for nearshore marine systems. Refer to factsheet for details

Reference

CCREM (Canadian Council of Resource and Environment Ministers). 1987. Canadian water quality guidelines. Prepared by the Task Force on Water Quality Guidelines.

Reference listing:

Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life: Summary table. Updated September, 2007. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

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Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health

SUMMARY TABLES

Update 7.0
September 2007

Table 1. Canadian Soil Quality Guidelines (mg·kg^{-1}).

Substance[y]	Year revised/ released[a]	Land Use and Soil Texture							
		Agricultural*		Residential/ parkland*		Commercial*		Industrial*	
		Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine
Arsenic (inorganic)	1997	12[b]		12[b]		12[b]		12[b]	
Barium	2003	750[c]		500[c]		2000[c]		2000[c]	
Benzene									
Surface[w]	2004	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]
Subsoil[w]	2004	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]
Surface[x]	2004	0.0095[t,u]	0.0068[t,u]	0.0095[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]
Subsoil[x]	2004	0.011[t,u]	0.0068[t,u]	0.011[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]	0.030[t,u]	0.0068[t,u]
Benzo*(a)*pyrene	1997	0.1[e]		0.7[f]		0.7[f]		0.7[f]	
Cadmium	1999	1.4[b]		10[g]		22[b]		22[b]	
Chromium									
Total chromium	1997	64[b]		64[b]		87[b]		87[b]	
Hexavalent chromium (VI)	1999	0.4[h]		0.4[h]		1.4[h]		1.4[h]	
Copper	1999	63[b]		63[b]		91[b]		91[b]	
Cyanide (free)	1997	0.9[b]		0.9[b]		8.0[b]		8.0[b]	
DDT (total)	1999	0.7[i]		0.7[i]		12[i,j]		12[i,j]	
Diisopropanolamine (DIPA)[z]	2006	180[b]		180[b]		180[b]		180[b]	
Ethylbenzene									
Surface	2004	0.082[t]	0.018[t,u]	0.082[t]	0.018[t,u]	0.082[t]	0.018[t,u]	0.082[t]	0.018[t,u]
Subsoil	2004	0.082[t]	0.018[t,u]	0.082[t]	0.018[t,u]	0.082[t]	0.018[t,u]	0.082[t]	0.018[t,u]
Ethylene glycol	1999	960[k]		960[k]		960[k]		960[k]	
Lead	1999	70[b]		140[b]		260[b]		600[b]	
Mercury (inorganic)	1999	6.6[b]		6.6[b]		24[b]		50[b]	
Naphthalene	1997	0.1[d]		0.6[h]		22[h]		22[h]	
Nickel	1999	50[l]		50[l]		50[l]		50[l]	
Nonylphenol (and its ethyloxylates)	2002	5.7[p]		5.7[p]		14[p]		14[p]	
Pentachlorophenol	1997	7.6[b]		7.6[b]		7.6[b]		7.6[b]	
Phenol	1997	3.8[b]		3.8[b]		3.8[b]		3.8[b]	
Polychlorinated biphenyls (PCBs)	1999	0.5[m]		1.3[l]		33[j,l]		33[j,l]	
Polychlorinated dibenzo-*p*-dioxins/ dibenzofurans (PCDD/Fs)	2002	4 ng TEQ·kg^{-1} [q]		4 ng TEQ·kg^{-1} [q]		4 ng TEQ·kg^{-1} [r]		4 ng TEQ·kg^{-1} [s]	
Propylene glycol	2006	Insufficient information[v]		Insufficient information[v]		Insufficient information[v]		Insufficient information[v]	
Selenium	2007	1[b]		1[b]		2.9[b]		2.9[b]	

Continued

Substance	Year revised/ released[a]	Land Use and Soil Texture							
		Agricultural*		Residential/ parkland*		Commercial*		Industrial*	
		Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine
Sulfolane[z]	2006	0.8[b]		0.8[b]		0.8[b]		0.8[b]	
Tetrachloroethylene	1997	0.1[e]		0.2[f]		0.5[f]		0.6[f]	
Thallium	1999	1[n]		1[o]		1[o]		1[o]	
Toluene									
Surface	2004	0.37[t]	0.08[t]	0.37[t]	0.08[t]	0.37[t]	0.08[t]	0.37[t]	0.08[t]
Subsoil	2004	0.37[t]	0.08[t]	0.37[t]	0.08[t]	0.37[t]	0.08[t]	0.37[t]	0.08[t]
Trichloroethylene	2006	0.01[b,u]		0.01[b,u]		0.01[b,u]		0.01[b,u]	
Uranium[z]	2007	23[t]		23[t]		33[t]		300[t]	
Vanadium	1997	130[l]		130[l]		130[i]		130[i]	
Xylenes									
Surface	2004	11[t]	2.4[t]	11[t]	2.4[t]	11[t]	2.4[t]	11[t]	2.4[t]
Subsoil	2004	11[t]	2.4[t]	11[t]	2.4[t]	11[t]	2.4[t]	11[t]	2.4[t]
Zinc	1999	200[l]		200[l]		360[l]		360[l]	

Notes: SQG_E = soil quality guideline for environmental health; SQG_{HH} = soil quality guideline for human health.

*For guidelines derived prior to 2004, differentiation between soil texture (coarse/fine) is not applicable.

[a]Guidelines released in 1997 were originally published in the working document entitled "Recommended Canadian Soil Quality Guidelines" (CCME 1997) and have been revised, edited, and reprinted here. Guidelines revised/released in 1999 are published here for the first time (see Table 2).

[b]Data are sufficient and adequate to calculate an SQG_{HH} and an SQG_E. Therefore the soil quality guideline is the lower of the two and represents a fully integrated *de novo* guideline for this land use, derived in accordance with the soil protocol (CCME 1996; 2006). The corresponding interim soil quality criterion (CCME 1991) is superseded by the soil quality guideline.

[c]Data are insufficient/inadequate to calculate an SQG_{HH}, a provisional SQG_{HH}, an SQG_E, or a provisional SQG_E. Therefore the interim soil quality criterion (CCME 1991) is retained as the soil quality guideline for this land use (see table 2).

[d]Data are sufficient and adequate to calculate only a provisional SQG_E. It is greater than the corresponding interim soil quality criterion (CCME 1991). Therefore, in consideration of receptors and/or pathways not examined, the interim soil quality criterion is retained as the soil quality guideline for this land use.

[e]Data are sufficient and adequate to calculate an SQG_{HH} and a provisional SQG_E. Both are greater than the corresponding interim soil quality criterion (CCME 1991). Therefore, in consideration of receptors and/or pathways not examined, the interim soil quality criterion is retained as the soil quality guideline for this land use.

[f]Data are sufficient and adequate to calculate an SQG_{HH} and a provisional SQG_E. Both are less than corresponding interim soil quality criterion (CCME 1991). Therefore the soil quality guideline supersedes the interim soil quality criterion for this land use.

[g]The soil–plant–human pathway was not considered in the guideline derivation. If produce gardens are present or planned, a site-specific objective must be derived to take into account the bioaccumulation potential (e.g., adopt the agricultural guideline as objective). The off-site migration check should be recalculated accordingly.

[h]Data are sufficient and adequate to calculate only a provisional SQG_E, which is less than the existing interim soil quality criterion (CCME 1991). Therefore the provisional soil quality guideline supersedes the interim soil quality criterion for this land use.

[i]Data are sufficient and adequate to calculate only an SQG_E. An interim soil quality criterion (CCME 1991) was not established for this land use, therefore the SQG_E becomes the soil quality guideline.

[j]In site-specific situations where the size and/or the location of commercial and industrial land uses may impact primary, secondary, or tertiary consumers, the soil and food ingestion guideline is recommended as the SQG_E.

[k]Data are sufficient and adequate to calculate only a provisional SQG_E.

[l]Data are sufficient and adequate to calculate only an SQG_E, which is less than the interim soil quality criterion (CCME 1991) for this land use. Therefore the SQG_E becomes the soil quality guideline, which supersedes the interim soil quality criterion for this land use.

[m]Data are sufficient and adequate to calculate only an SQG_E, which is greater than the interim soil quality criterion (CCME 1991) for this land use. Therefore the interim soil quality criterion (CCME 1991) is retained as the soil quality guideline for this land use.

[n]Data are sufficient and adequate to calculate a provisional SQG_{HH} and an SQG_E. The provisional SQG_{HH} is equal to the SQG_E and to the existing interim soil quality criterion (CCME 1991) and thus becomes the soil quality guideline, which supersedes the interim soil quality criterion for this land use.

[o]Data are sufficient and adequate to calculate a provisional SQG_{HH} and an SQG_E. The provisional SQG_{HH} is less than the SQG_E and thus becomes the soil quality guideline for this land use.

[p]Data are sufficient and adequate to calculate only an SQG_E. An interim soil quality criterion (CCME 1991) was not established for these substances, therefore, the SQG_E becomes the soil quality guideline.

[q]Data are sufficient and adequate to calculate only a provisional SQG_{HH}, which is less than the existing interim soil quality criterion (CCME 1991). Thus the provisional SQG_{HH} becomes the soil quality guideline, which supersedes the interim soil quality criterion for this land use.

[r]Data are sufficient and adequate to calculate only a provisional SQG_{HH}. An interim soil quality criterion (CCME 1991) was not established for this land use, therefore the provisional SQG_{HH} becomes the soil quality guideline.

[s]Data are sufficient and adequate to calculate only an SQG_{HH}. An interim soil quality criterion (CCME 1991) was not established for this land use, therefore the SQG_{HH} becomes the soil quality guideline.

[t]Data are sufficient and adequate to calculate an SQG_{HH} and an SQG_E. Therefore the soil quality guideline is the lower of the two and represents a fully integrated *de novo* guideline for this land use.

[u]This guideline value may be less than the common limit of detection in some jurisdictions. Contact jurisdictions for guidance.

[v]Data are sufficient and adequate to calculate only a preliminary SQG_{FWAL} (Soil Quality Guideline for freshwater aquatic life). This value is 6,210 $mg \cdot kg^{-1}$. See accompanying factsheet for further information.

[w]10^{-5} Incremental Risk

[x]10^{-6} Incremental Risk

[y]Unless otherwise indicated, supporting documents are available from the National Guidelines and Standards Office, Environment Canada.

[z]Supporting documents are available from the Canadian Council of Ministers of the Environment at http://www.ccme.ca/publications/ceqg_rcqe.html?category_id=125

References

CCME (Canadian Council of Ministers of the Environment). 1991. Interim Canadian environmental quality criteria for contaminated sites. CCME, Winnipeg.

———. 1996. A protocol for the derivation of environmental and human health soil quality guidelines. CCME, Winnipeg. [A summary of the protocol appears in Canadian environmental quality guidelines, Chapter 7, Canadian Council of Ministers of the Environment, 1999, Winnipeg.]

———. 1997. Recommended Canadian soil quality guidelines. CCME, Winnipeg.

———. 2006. A protocol for the derivation of environmental and human health soil quality guidelines. CCME, Winnipeg. [The protocol is available online through the CCME website at http://www.ccme.ca/publications/ceqg_rcqe.html?category_id=125]

Table 2. Interim remediation criteria for soil ($mg \cdot kg^{-1}$) that have not yet been replaced by Canadian Soil Quality Guidelines[1].

Parameter	Year released	Land use			
		Agricultural	Residential/ parkland	Commercial	Industrial
General Parameters					
Conductivity [dS/m]	1991	2	2	4	4
pH	1991	6 to 8	6 to 8	6 to 8	6 to 8
Sodium adsorption ratio	1991	5	5	12	12
Inorganic Parameters					
Antimony	1991	20	20	40	40
Beryllium	1991	4	4	8	8
Boron (hot water soluble)	1991	2	—	—	—
Cobalt	1991	40	50	300	300
Fluoride (total)	1991	200	400	2000	2000
Molybdenum	1991	5	10	40	40
Silver	1991	20	20	40	40
Sulphur (elemental)	1991	500	—	—	—
Tin	1991	5	50	300	300
Monocyclic Aromatic Hydrocarbons					
Chlorobenzene	1991	0.1	1	10	10
1,2-Dichlorobenzene	1991	0.1	1	10	10
1,3-Dichlorobenzene	1991	0.1	1	10	10
1,4-Dichlorobenzene	1991	0.1	1	10	10
Styrene	1991	0.1	5	50	50
Phenolic Compounds					
Chlorophenols[a] (each)	1991	0.05	0.5	5	5
Nonchlorinated[b] (each)	1991	0.1	1	10	10
Polycyclic Aromatic Hydrocarbons (PAHs)					
Benzo*(a)*anthracene	1991	0.1	1	10	10
Benzo*(b)*fluoranthene	1991	0.1	1	10	10
Benzo*(k)*fluoranthene	1991	0.1	1	10	10
Dibenz*(a,h)*anthracene	1991	0.1	1	10	10
Indeno(1,2,3-c,d)pyrene	1991	0.1	1	10	10
Phenanthrene	1991	0.1	5	50	50
Pyrene	1991	0.1	10	100	100
Chlorinated Hydrocarbons					
Chlorinated aliphatics[c] (each)	1991	0.1	5	50	50
Chlorobenzenes[d] (each)	1991	0.05	2	10	10
Hexachlorobenzene	1991	0.05	2	10	10
Hexachlorocyclohexane	1991	0.01	—	—	—
Miscellaneous Organic Parameters					
Nonchlorinated aliphatics (each)	1991	0.3	—	—	—
Phthalic acid esters (each)	1991	30	—	—	—
Quinoline	1991	0.1	—	—	—
Thiophene	1991	0.1	—	—	—

[1]**Notes:**

All values are in $mg \cdot kg^{-1}$ unless otherwise stated.

Guidelines released in 1991 were published in "Interim Canadian Environmental Quality Criteria for Contaminated Sites" (CCME, 1991).

These interim remediation criteria are considered generally protective of human and environmental health and were based on experience and professional judgement.

These interim criteria (CCME, 1991) should only be used when soil quality guidelines based on the CCME soil protocol (CCME, 1996; 2006) have not yet been developed for a given chemical. Also, because the interim remediation criteria were not developed using the soil protocol and its integral checks, they cannot be modified through the site specific remediation objective procedure.

[a]Chlorophenols include
- chlorophenol isomers (ortho, meta, para)
- dichlorophenols (2,6- 2,5- 2,4- 3,5- 2,3- 3,4-)
- trichlorophenols (2,4,6- 2,3,6- 2,4,5- 2,3,4- 3,4,5-)
- tetrachlorophenols (2,3,5,6- 2,3,4,5- 2,3,4,6-)

[b]Nonchlorinated phenolic compounds include
- 2,4-dimethylphenol
- 2,4-dinitrophenol
- 2-methyl 4,6-dinitrophenol
- nitrophenol (2-,4-)
- phenol
- cresol

[c]Aliphatic chlorinated hydrocarbons include
- chloroform
- dichloroethane (1,1- 1,2-), dichloroethene (1,1- 1,2-)
- dichloromethane
- 1,2-dichloropropane, 1,2-dichloropropene (cis and trans)
- 1,1,2,2-tetrachloroethane, tetrachloroethene
- carbon tetrachloride
- trichloroethane (1,1,1- 1,1,2-), trichloroethene

[d]Chlorobenzenes include
- all trichlorobenzene isomers
- all tetrachlorobenzene isomers
- pentachlorobenzene

References

CCME (Canadian Council of Ministers of the Environment). 1991. Interim Canadian environmental quality criteria for contaminated sites. CCME, Winnipeg.

———. 1996. A protocol for the derivation of environmental and human health soil quality guidelines. CCME, Winnipeg. [A summary of the protocol appears in Canadian environmental quality guidelines, Chapter 7, Canadian Council of Ministers of the Environment, 1999, Winnipeg.]

———. 2006. A protocol for the derivation of environmental and human health soil quality guidelines. CCME, Winnipeg. [The protocol is available online through the CCME website at http://www.ccme.ca/publications/ceqg_rcqe.html?category_id=125]

Reference listing:

Canadian Council of Ministers of the Environment. 2007. Canadian soil quality guidelines for the protection of environmental and human health: Summary tables. Updated September, 2007. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

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