APPENDIX E.5.8

Sampling Program – Quality Assurance and Quality Control Plan

Baffinland Iron Mines Corporation

Sampling Program – Quality Assurance and Quality Control Plan

BAF-PH1-830-P16-0001

Rev 3

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TRACK CHANGES TABLE

Index of Major Changes/Modifications in Revision 3

Item No.	Description of Change	Relevant Section
1	Updated roles & responsibilities to ensure format consistency with the Project's other management plans.	Section 3.0
2	Updated Baffinland's Corporate Policies section to ensure format consistency with the Project's other management plans.	Section 2.0
3	Updated groundwater sampling protocols to reflect current monitoring program.	Section 4.3.4
4	Updated training requirements for environmental staff involved with environmental monitoring programs.	Section 11.0

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1 INTRODUCTION

As required by Baffinland Iron Mines Corporation's (Baffinland) Type 'A' Water Licence No. 2AM-MRY1325 – Amendment No. 1 (Type 'A' Water Licence), issued by the Nunavut Water Board (NWB), the Sampling Program – Quality Assurance and Quality Control Plan (this Plan) has been updated to reflect current operations at the Mary River Project (the Project). This Plan is a living document and will be revised, as required, based on changes to operations, QA/QC procedures and protocols. Updates to this Plan will be completed in accordance with the Project's water licences issued by the NWB, Commercial Lease – Q13C301 (Commercial Lease) between Baffinland and the QIA, the Project Certificate No. 005 (Project Certificate) issued by the Nunavut Impact Review Board (NIRB), applicable regulations (e.g. Metal & Diamond Mining Effluent Regulations; MDMER) and any subsequent requirements which may be issued.

In accordance with the Type 'A' Water Licence, this QA/QC Plan has been prepared following the general recommendations presented in *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "A" Licensees in Meeting SNP Requirements and for Submission of a QA/QC Plan* (INAC, 1996).

1.1 PURPOSE AND SCOPE

The purpose of this Plan is to identify Baffinland's framework for accurate and effective QA/QC management by providing instruction for standardised field sampling and laboratory analytical procedures.

For the purposes of this report, QA/QC is defined as:

- ***Quality Assurance*** - System of activities used to achieve quality control.
- ***Quality Control*** - Set of best practice methods and procedures used to ensure quality of data in terms of precision, accuracy and reliability.

The QA/QC best practices outlined in this management plan are designed to provide guidance to field staff and analytical laboratories in order to maintain a high level of confidence in the water quality, soil, sediment and benthic data generated from Project Sites.

1.2 REGULATORY REQUIREMENTS

This Plan is regulated by the NWB and is subject to Baffinland's Type 'A' Water Licence 2AM-MRY1325, as amended, which provides specific terms and conditions for the management of QA/QC for the Project's water quality monitoring programs. To provide a more comprehensive QA/QC framework for the Project's aquatic ecosystem monitoring programs, other applicable requirements have been included in this Plan, such as the MDMER and sediment quality and benthic invertebrate monitoring components of the Project's Aquatic Effects Monitoring Plan (AEMP).

1.3 RELATIONSHIPS TO OTHER MANAGEMENT PLANS

This Plan is intended for use in conjunction with the following Plans:

- Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039)
- Environmental Protection Plan (BAF-PH1-830-P16-0008)
- Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010)
- Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026)
- Roads Management Plan (BAF-PH1-830-P16-0023)

2 BAFFINLAND'S CORPORATE POLICIES

Baffinland's Sustainable Development Policy (BAF-PH1-800-POL-0002) identifies Baffinland's commitment internally and to the public to operate in a manner that is environmentally responsible, safe, fiscally responsible and respectful of the cultural values and legal rights of the Inuit. The Sustainable Development Policy is provided in Appendix A.

Baffinland's Health, Safety and Environment Policy (BAF-PH1-800-POL-0001) is the Company's commitment to achieve a safe, health and environmentally responsible workplace. The policy is provided in Appendix A.

All employees and contractors are expected to comply with the contents of both policies.

3 ROLES AND RESPONSIBIITIES

3.1.1 SENIOR DIRECTOR – HEALTH, SAFETY, ENVIRONMENT, SECURITY AND TRAINING

- Reports to the Chief Executive Officer
- Provides general operational oversight for programs related to health, safety, environment, security and training.

3.1.2 MANAGER – HEALH, SAFETY, ENVIRONMENT AND SECURITY

- Reports to the Senior Director – Health, Safety, Environment, Security and Training
- Provides operational oversight and leadership for health, safety, environment and security related activities and programs.

3.1.3 ENVIRONMENTAL SUPERINTENDENT

- Reports to the Manager – Health, Safety, Environment and Security
- Serves as the onsite lead for all environmental monitoring programs.
- Responsible for ensuring this Plan is up-to-date and reflects current Project operations and regulatory requirements.

3.1.4 ENVIRONMENTAL COORDINATOR

- Reports to the Environmental Superintendent
- Responsible for ensuring environmental monitoring programs adhere to this Plan.
- Reviewing this Plan with all environmental technicians and providing the necessary training as required.
- Conducting in-field audits of sampling methodology and QA/QC analysis on samples and data collected.
- Management of field notes, analytical results and environmental database.

3.1.5 ENVIRONMENTAL TECHNICIAN

- Reports to the Environmental Coordinator
- Responsible for being familiar with this Plan and adhering to the relevant protocols while conducting environmental monitoring programs and managing samples.

4 WATER SAMPLE COLLECTION

4.1 GENERAL

The samples will be collected following the general recommendations presented in *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "A" Licensees in Meeting SNP Requirements and for Submission of a QA/QC Plan* (INAC, 1996).

A summary of recommended water sample containers, sample volumes, sample preservatives and maximum sample holding times is presented in Table 9.1. Laboratory parameters such as pH, turbidity, BOD, nitrite, nitrate, total phosphorus, faecal coliforms, chlorophyll-a and pheophytin typically have maximum sample storage times varying from four (4) to 72 hours. Sampling programs and associated logistics will be planned ahead of time to ensure samples collected are analyzed within the appropriate holding time. Similarly, every effort will be made to prevent inadvertent freezing of water samples (due to on-site climatic conditions) which could affect analytical results for parameters. Exceptions to these protocols will be documented.

Required water sample analyses for each of the Project's water quality monitoring stations are documented in the following documents:

- Type 'A' Water Licence
- MDMER
- Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039)

4.2 WATER QUALITY MONITORING LOCATIONS

This Plan addresses the collection of water quality samples at the Project, including the:

1. Collection of surface water samples from Project area lakes, streams and rivers.
2. Collection of groundwater samples from piezometer monitoring wells.
3. Collection of effluent samples from Project water treatment facilities (e.g. sewage, oily water, etc.).
4. Collection of drinking water samples from camp potable water sources.
5. Collection of stormwater/runoff samples from ore processing and stockpiling facilities.
6. Collection of stormwater/runoff samples from waste rock management facilities.
7. Collection of stormwater/runoff samples from mining areas (e.g. Deposit No. 1).
8. Collection of stormwater samples from Project fuel and waste containment areas.
9. Collection of stormwater from sumps at maintenance shops.
10. Collection of surface water samples downstream of Project areas (e.g. landfills, quarries, etc.)
11. Collection of surface water samples representative of general site drainage before, during and after construction at Project areas.

Locations and sampling frequency for designated water quality monitoring stations are presented in the Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026), Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039), Roads Management Plan (BAF-PH1-830-P16-0023) and the Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010).

4.3 WATER SAMPLING METHODS AND EQUIPMENT

4.3.1 GENERAL SAMPLING PROCEDURES

General water sampling procedures are as follows:

1. Sampler will wear a fresh pair of disposable nitrile gloves for each sampling event.
2. A new sample bottle(s) will be used at each monitoring station. Sample bottles will not be re-used.
3. Sampling will be carried out by either: i) rinsing the sample bottle with source water three (3) times before immersing the sample bottle to fill it (after which preservative is added, as required), or ii) if the sample bottles are provided pre-charged with preservatives then it is generally convenient to transfer water samples from the source to the sample bottle using a large transfer bottle. The transfer bottle will be provided by the lab and will be rinsed in the source water three (3) times before filling the sample bottle. Different transfer bottles will be used for different sample types (e.g. sewage effluent, hydrocarbon impacted stormwater) and will be replaced on a regular basis.
4. Rinse water will be disposed of so that it does not contaminate the source water where the sample will be collected (e.g. downstream of the sampling location, or on the shore or berm edge).
5. Bottles labeled as “certified sterile” do not need to be rinsed.
6. For samples requiring preservatives, the sample bottle will be filled to the top (or to the indicator line marked on the bottle), the preservative will be added and the bottle securely sealed. Note that for some volatile contaminants (e.g. BTEX), the sample bottle must be filled with zero headspace.
7. Care will be taken to avoid disturbance of sediments and inclusion of disturbed suspended solids in the sample.
8. Sample details (e.g. date, sample ID and analysis) will be clearly marked on the bottle in permanent ink.
9. For dissolved metals analyses, the water sample will be filtered in the field while sampling using a 0.45µm disposable filter and syringe. A fresh syringe and filter must be used at each monitoring station. In the event that the sample cannot be filtered in the field, the sample will be promptly filtered at the on-site lab. Such exceptions will be documented in the field notes.
10. All samples will be sealed by ensuring their lids are tightly secured before placing the bottles into the coolers. Glass bottles will be protected with bubble wrap or other cushioning material.
11. All field parameters, notes, photo references and general observations shall be recorded in a notebook or log sheet to later be uploaded to Baffinland’s environmental database.
12. All samples will be placed in an iced cooler as soon as possible after collection.

4.3.1.1 SAMPLE PRESERVATION

Sample bottles and preservative will be stored under clean conditions on site. Sample bottles will have the appropriate volume of preservative added in the field immediately after sample collection to minimize chemical alterations. Alternatively, sample bottles will be supplied by the analytical laboratory with preservatives already added. Ensure that the preservative container does not come in contact with the sample or inside of the sample bottle/lid. If a water sample requires filtration (e.g., analysis of dissolved metals), preservative must be added following filtration.

4.3.2 LAKE SAMPLING

For water quality monitoring in lakes, a depth sampler will be used (e.g. a 'Van Dorn' or 'Kemmerer'). Generally, depth samplers consist of a clear polycarbonate sample tube with two spring mounted rubber bungs, one located at each end. The depth sampler is lowered to the correct depth attached to a cord, whereupon a metal weight is released. The weight slides down the cord and strikes a release mechanism button which releases the two bungs and seals both ends of the tube. The water sample is then pulled back to the surface.

Depth samplers that are used will be suitable for collection of water samples for ultra-low metals analyses (e.g. have acrylic or PVC construction and silicone seals).

For depth sampling, the following considerations will be taken into account to ensure sample QA/QC:

1. Sampling station locations will be dependent upon the monitoring program objectives and the lake dimensions. When sampling from a watercraft all efforts will be made to anchor the boat stationary. Map coordinates for lake sampling stations will be recorded using a handheld GPS unit.
2. A vertical stratification profile (if required), profiling in-situ water quality measurements (e.g. pH, temperature, dissolved oxygen, conductivity and turbidity), will be determined using a water quality multi-meter (e.g. YSI Sonde) equipped with a long cord with metre intervals marked on it.
3. Depending upon the purpose of the monitoring program, water quality samples may be collected from the different stratified layers. The depth sampler must be slowly lowered in the 'open' position until it reaches the required depth.
4. The depth sampler will be held at this depth temporarily to allow flushing of water inside the apparatus.
5. The metal weight (messenger) will be released (to activate the closing mechanism) and the depth sampler will be pulled back to the surface. Field measurements can be taken at depth.
6. When collecting samples close to the lake bed care must be taken to ensure that the depth sampler does not disturb lake bed sediments. When possible, staff will reference the station's recorded depth from previous years to gain an understanding of station's depth.
7. Depending upon the lake area and depth, multiple sampling stations will likely be required to adequately characterize lake water quality.

4.3.3 RIVER SAMPLING

Depending upon the size of the water body, river sampling methods are the same as those presented in Sections 4.3.1 and 4.3.2. To avoid inclusion of floating detritus in the sample, the sample bottle must be fully immersed in the water column. Care will be taken to ensure that disturbed sediments are not included in the sample.

For river sampling, the additional following considerations will be taken into account to ensure sample QA/QC:

1. Grasp the bottle well below the neck and remove the lid, taking care not to touch the inside of the lid.
2. Facing upstream, plunge the bottle beneath the surface of the water to a depth of 20 cm (if possible) with the opening facing downward, then tilt the bottle opening upward into the current to fill.
3. Once the bottle is full, remove the bottle from the water in one motion by forcing the opening upward and into the current and seal the bottle securely.

When selecting water quality monitoring station locations on rivers, care will be taken where a tributary joins a river, since complete mixing of the two waters may not be achieved within several hundred metres downstream of the confluence (or further). When in doubt, vertical profile monitoring across the river's width using a field parameter such as pH, temperature or conductivity will be used to assess if complete mixing has occurred.

4.3.4 GROUNDWATER SAMPLING

Groundwater at the Project will be monitored using drive-point piezometers, HDPE tubing and peristaltic pumps. Groundwater wells will be established by advancing drive-point piezometers by hand to the depth of refusal (e.g. permafrost) or other known confining layer, both in the known or assumed up-gradient (e.g. reference) and down-gradient (e.g. exposure) area of interest. Consideration must be given to the depth of the active layer, therefore groundwater samples will be collected during late August to early September, such that samples are near the depth of the active layer (approx. 1 to 2 metres). Where hydrocarbon impacts are known or suspected, samples will be collected across various depths to assess for the presence of, and capture, potential non-aqueous phase liquids (NAPL). Sampling procedures outlined in this section consider the shallow and discontinuous nature of high arctic groundwater regimes observed at the Project.

General groundwater sampling procedures are as follows:

1. Installation of the piezometer/groundwater well will be completed the day before the sampling date. This will ensure the groundwater well has sufficient time to charge and fill up with groundwater.

2. Before sampling a well, the well will be purged for the appropriate volume, outlined in the sampling program documentation. A YSI flow cell will be used to during the purge to gauge when parameters (e.g. pH, conductivity, turbidity) have stabilized.
3. Groundwater samples will be collected, preserved, stored and submitted for analysis as outlined in Section 4.3.1.
4. A field notebook will be used document the groundwater sampling program, including any deviations from established protocols.

4.3.5 METAL & DIAMOND MINING EFFLUENT REGULATIONS (MDMER)

Water samples from stations that fall under MDMER must be taken from a designated sampling port which the mine does no longer exercise control over the quality of discharge. Samples taken from these designated ports can be composite samples or grab samples.

The general sampling procedures of Section 4.3.1 should be followed, and the additional considerations will be taken into account to ensure MDMER QA/QC is met:

1. MDMER sampling should be performed by trained personnel, and if possible a second person should be present for verification purposes.
2. Notification must be given ahead of time to a certified laboratory to ensure MDMER acute lethality and sub-lethal toxicity samples can be analysed.
3. In-situ water quality monitoring will accompany all external samples taken (refer to Section 4.3.6)
4. After collecting samples and preserving as needed, a chain of custody (COC) seal shall be applied to each bottle cap.
5. All sampling activities, notes, flow volumes, photo references and general observations shall be kept in a dedicated MDMER field log book.
6. MDMER samples shall be sent to the certified laboratory with their own COC and should not be combined with samples from other monitoring programs.

For more information and technical guidance, Environment and Climate Change Canada's 2001 *Guidance Document for the Sampling and Analysis of Metal Mining Effluents* should be consulted.

4.3.6 SAMPLING FOR TOXICITY TESTING

Sampling for lethal toxicity testing is a condition of the Type 'A' Water Licence for various monitoring programs. Sub-lethal toxicity testing is a condition of Environmental Effects Monitoring (EEM) under the Metal & Diamond Mining Effluent Regulations (MDMER). Depending upon the objectives of the toxicity testing, variables that will require confirmation prior to testing include:

- Type of effluent sample to be collected (e.g. instantaneous grab sample vs. composite sample)
- Type of dilution water to be used by the certified laboratory (e.g. standard synthetic laboratory dilution water, receiving water collected upstream of the discharge, etc.).
- Preferred test organism (e.g. *Daphnia magna* and/or Rainbow Trout)

Details concerning laboratory methods are presented in Appendix D. For further details concerning acute lethality testing refer to Environment Canada (2002) and USEPA (2002). For further details concerning sub-lethal testing refer to Environment Canada (2012).

4.3.7 IN-SITU WATER QUALITY

Measurement of field parameters (e.g. temperature, pH, conductivity, redox potential, or dissolved oxygen, etc.), where warranted, will be carried out for each sample at the time of sampling. The required set of field parameters will vary according to sample type and monitoring objectives. The exact methods used for monitoring field parameters will depend upon the type of monitoring probes being used. Environmental staff will read and be familiar with the instruction manual for the equipment being used on site, and follow manufacturer's instructions for specifics on proper calibration, use, storage, and maintenance.

Environmental staff will rinse the monitoring probe three (3) times with the water to be monitored before immersing the probe in the water. Environmental staff will ensure that the probe being used has had sufficient time to equilibrate in the water before the reading is taken. This is generally regarded as the point at which the reading has stabilized.

Field parameter data will be recorded in the appropriate program field form designed for this purpose and saved electronically. A copy of the data will be retained on site.

4.3.7.1 MONITORING PROBE CALIBRATION

Monitoring probes will be stored and calibrated in accordance with manufacturers' instructions. All probes will be calibrated regularly per sampling program requirements and a written record of the calibration results will be maintained on site. Environmental staff will ensure that calibration solutions are of the correct specification and that they have not passed their expiry date (if applicable). Monitoring probes will be stored as per manufacturers' recommendations.

5 SEDIMENT & SOIL SAMPLE COLLECTION

For a complete list of the required sample analyses at pre-established sediment monitoring stations refer to the Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039). Sediment and soil sampling programs and associated logistics will be planned ahead of time to ensure samples collected are analyzed within the appropriate holding time. A summary of recommended sediment and soil sample containers, sample volumes, and maximum sample holding times is presented in Table 9.1. Field observations and any exceptions to established protocols (e.g. exceedance of holding time) will be documented.

5.1 SEDIMENT & SOIL MONITORING LOCATIONS

This Plan addresses the collection of sediment and soil samples at the Project, including the:

1. Collection of sediment samples from Project area lakes, streams and rivers.

2. Collection of soil samples from Project fuel and waste facilities.
3. Collection of soil samples from Project landfarm facilities.
4. Collection of soil samples to inform remediation and reclamation projects.
5. Collection of soil samples to evaluate spills and releases.

5.2 SEDIMENT & SOIL SAMPLING METHODS AND EQUIPMENT

Sediment samples specified under the Project's Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039) are characterised by the following procedures.

5.2.1 GENERAL SAMPLING PROCEDURES

Generally, sampling procedures will consist of the following:

1. Sampler will wear a fresh pair of disposable nitrile gloves for each sampling event.
2. A fresh sample bottle(s) will be used at each monitoring station. Sample bottles will not be re-used.
3. Sample details (e.g. date, sample ID and analysis) will be clearly marked on the sample jar in permanent ink.
4. All samples will be sealed by ensuring their lids are tightly secured before placing the bottles into the coolers.
5. All samples will be placed in an iced cooler as soon as possible after collection.

5.2.2 RIVER AND GRAB SAMPLING

The collection of river and grab samples will follow the general procedures stated in Section 5.2.1 and will entail the following additional QA/QC considerations:

1. Sampling station locations will be dependent upon the monitoring program objectives and the sample location.
2. A clean spatula or spoon will be utilized to obtain a representative sample of the sediment for analyses.
3. If composite samples are required by the monitoring program, a sterile container will be utilised to deposit and homogenize the subsamples, until the composite sample is fully mixed. The composite sample will then be transferred to the identified sample jars by alternating aliquots.
4. The quantity and holding time of samples obtained will depend on the prescribed analysis.

5.2.3 LAKE SAMPLING

For monitoring of sediment character and quality in lakes, a depth sampler will be used. The preferred sample apparatus for lake sediment samples are gravity percussion corers, since they allow for retrieval and analysis of sediment profiles. A *Petite Ponar* can also be used but will not provide sediment profiles. Generally, forms of gravity percussion corers consist of a clear polycarbonate sample core tube attached to a weighted upper head assembly and a seal mechanism. The top two centimeters of sediment from the core samples will be retained for laboratory analysis unless sampling objectives state otherwise.

Sediment lake sampling procedures will follow the general procedures stated in Section 5.2.1 and the following additional QA/QC considerations for a gravity percussion corer:

1. Sampling station locations will be dependent upon the monitoring program objectives and the lake dimensions. When sampling from a watercraft all efforts will be made to anchor the boat stationary. Map coordinates for all lake sampling station locations will be recorded using a handheld GPS unit.
2. The corer will be positioned perpendicular to the water surface prior to release. The penetration depth of the core tube is affected by the depth of water, angle of corer deployment and substrate type.
3. Once the corer is embedded in the substrate, the stainless steel messenger will be sent down the corer rope to release the ball-type seal. This seal creates a vacuum in the core tube, retaining the sampled sediment.
4. Upon retrieval, the bottom of the core tube will be plugged using an extruding plug prior to breaking the air-water interface. This procedure will prevent sample loss.
5. An extruding apparatus will be used to force the extruding plug through the core tube moving the sediment sample to the end of tube allowing the top two centimetres to be scooped out and placed in a clean stainless steel bowl for sample homogenisation.
6. Multiple core samples (generally three or more) are required per sample station to obtain the required sample volume. The multiple core samples are homogenized in the stainless steel bowl, removing any excess water or debris.
7. The sample containers will be filled by alternating aliquots between each of the containers.
8. After the top two centimeters are retained, the remaining, unused sediments within the core tube will be placed into a bucket and only released once all core sampling is complete at that particular station.
9. Depending upon the lake area and depth, multiple sampling stations will likely be required to adequately characterize lake sediment quality.

6 BENTHIC INVERTEBRATES SAMPLE COLLECTION

For a complete list of required analyses at pre-established monitoring stations, see Baffinland's Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039). Samples will be submitted to an analytical laboratory for processing and taxonomic identification. Laboratory methods for benthic invertebrate samples will be in accordance with guidance provided by EC, 2012. Field observations and parameters if warranted should be recorded during the collection of benthic invertebrate samples.

6.1 BENTHIC INVERTEBRATE MONITORING LOCATIONS

This Plan addresses the collection of benthic invertebrate samples at the Project, including the:

- Collection of benthic invertebrate samples from Project area and reference lakes, streams and rivers to determine potential mine related effects on benthic invertebrate communities.

6.2 BENTHIC INVERTEBRATE SAMPLING METHODS AND EQUIPMENT

Benthic Invertebrate samples follow the same general procedures outlined in Section 5.2.1. Benthic invertebrates can be collected from either depositional (lake) or erosional (stream) sample locations. A *Petite Ponar* is utilised when sampling depositional environments while a *Surber sampler* is utilised when sampling erosional environments. For a complete list of depositional and erosional sample methods refer to the Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039). Benthic invertebrate samples will be carefully sieved through 500 µm mesh. All materials, including invertebrates, retained by the mesh will be transferred to labelled plastic jars and fixed with 10% buffered formalin. Fixed and labelled samples will be shipped to an analytical laboratory for processing and archiving.

7 QA/QC

For monitoring of QA/QC during sample collection and shipping, a set of QA/QC samples will be routinely submitted for analysis from prescribed sampling programs. Sampling programs will each have separate QA/QC samples submitted with the regular water samples. Descriptions of the QA/QC samples that will be used are presented on Table 7.1. Ten percent of all samples will consist of field blanks, travel blanks and field duplicates. For example, a monitoring program with 30 samples would consist of 27 monitoring samples and 3 QA/QC samples. Equipment blanks, if required, are performed on an as needed basis to ensure sampling equipment is properly maintained and free of contaminants, and do not count towards the ten percent of QA/QC samples.

7.1 SAMPLING PROGRAMS WITH MULTIPLE SAMPLING STATIONS

For sampling programs with multiple sampling locations (SNP, AEMP), QA/QC samples will be performed randomly to avoid bias, and care will be taken to ensure that the same stations are not sampled repeatedly for QA/QC samples.

7.2 SAMPLING PROGRAMS WITH LIMITED SAMPLING STATIONS

Sampling programs with limited sampling stations (e.g. MDMER) will require at least one QA/QC sample per sampling round. A field duplicate, field blank or travel blank must be taken during each sampling session. This may result in over sampling for QA/QC, but will ensure there is sufficient data to identify any anomalies.

7.3 QA/QC ANALYSIS

In the interest of transparency, the analytical laboratories will also be instructed to report the results of their own in-house QA/QC testing (e.g. results of random replicate analyses of submitted samples).

The results of QA/QC analyses will be routinely reviewed by Baffinland or their designate, and any anomalous results will be promptly investigated with the assistance of the analytical laboratory. Once the reason for the anomalous results is identified, Baffinland will ensure that operating procedures of field staff and/or the analytical laboratory will be altered in order to address the issue. Compliance monitoring and data management for water license sampling will be conducted by Baffinland, with the assistance of a designate as required.

TABLE 7-1 – QA/QC SAMPLE TYPES – PURPOSE, DESCRIPTION AND FREQENCY

QA/QC Sample Type	Purpose	Description	Frequency	Prepared By
Field blank	Identification of potential contaminants arising from sample collection. The field blank bottle is filled with laboratory deionized water in the field and is handled in the same way as regular sample bottles. The bottle is then submitted as a routine sample.	Bottle contains prefilled deionized water. Bottle is handled the same as one would handle the samples.	Ten percent of all samples collected will be QA/QC.	Analytical laboratory
Travel blank	Identification of potential contaminants arising from sample storage, shipping and laboratory handling. The travel blank accompanies the samples to the laboratory but is not taken out into the field, or opened.	Sealed bottle containing deionized water provided by analytical laboratory.	Ten percent of all samples collected will be QA/QC.	Analytical laboratory
Blind Field duplicate	Assesses sample variability and precision of laboratory analytical methods. Collected from a randomly selected location, split from a homogenized sample and analyzed separately in the laboratory. The duplicate samples are handled and analyzed in an identical manner in the laboratory.	Duplicate sample selected at random. A large sterile bottle is used to collect the water. Water is then poured equally into two sets of pre-labelled bottles. Duplicate samples labelled with a unique ID such that the analytical laboratory cannot determine the matching sample ID.	Ten percent of all samples collected will be QA/QC.	Field Staff
Equipment blank	Assesses cross contamination from field water sampling equipment (e.g. Kemmerer). Rinse deionized water through water sampling equipment and transfer to sample bottles.	Bottle contains deionized water that has been rinsed through the sampling equipment.	Collected prior and after completion of sampling program (if required/ as needed). Not included in the ten percent calculation of other QA/QC samples.	Field Staff

8 SAMPLE MANAGEMENT

8.1 SAMPLE LABELING

Accurate sample labelling is essential for subsequent interpretation of field data. Ensure that labels are legible and written with permanent ink (pen, marker, etc.). For a complete list of the predetermined sample labels at monitoring stations, please refer to the Type 'A' Water Licence and Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039).

A consistent format for identifying samples must be followed if a predetermined sample label does not exist in order to facilitate accurate sample tracking and to ensure sample labels are interpreted in the same manner by all personnel involved in the program.

Samples must be uniquely identified with the following information:

- Sample ID
- Collection date and time
- Project identifier
- Company name

8.2 SAMPLE STORAGE AND HANDLING

Physical, chemical and biochemical reactions may take place in the sample container between the time of sample collection and laboratory analysis. Samples will be placed in iced coolers and shipped to the analytical laboratory as soon as possible after collection, consulting stipulated analytical holding times, to minimize these changes. Samples that are not shipped offsite the same day that they are collected will be refrigerated until they are ready to be shipped offsite in coolers. Coolers and sample bottles will be kept clean and free of debris to prevent sample contamination during shipment. Care will be taken to ensure that bottles are stored upright and are packed securely within the cooler; glass bottles should be wrapped in bubble wrap. Preferably, leak-proof ice packs will be used for cooling the samples. If loose ice is used, ice should be securely sealed in plastic bags to prevent leakage of melt water.

Biological samples (e.g. benthic invertebrates) preserved using formalin or Lugol's solution can be held at room temperature until submission to the analytical laboratory.

8.3 SAMPLE SUBMISSION AND CHAIN OF CUSTODY

A chain of custody (COC) form will accompany all samples being submitted to ensure that the required analyses are completed, and to confirm receipt of samples by the laboratory (see example form presented in Appendix B). Prior to shipment, samples should be carefully prepared for shipping and sample bottles listed on the COC must be reconciled with what has physically been placed in the shipping container. The collection of samples that are time sensitive needs to coincide with shipping schedules, travel time to the laboratory, and laboratory business hours. A record of all COCs submitted for analysis must be kept on site. Information on the COC form will include:

1. Project name and project assignment number.
2. Address of analytical laboratory, name of contact person and contact details.
3. Contact details and name of sampler.
4. Date and time of sampling.
5. Whether the sample has been filtered, or whether laboratory filtration is required.
6. List of sample I.D.'s, sample type (e.g. lake water, sewage effluent, etc.), number of sample bottles per sample and analysis requested.
7. Urgency of analysis (e.g. rush or normal). For rush samples the analytical laboratory should be notified ahead of time.
8. Whether sample contains preservative and if so, what preservative and when it was added.
9. Submission date and time.
10. Comments on any unusual conditions and other important information.

9 LABORATORY ANALYSIS

9.1 LABORATORY ACCREDITATION

Laboratory analysis of samples is performed by an on-site accredited analytical laboratory and an off-site accredited analytical laboratory. The on-site laboratory is operated by ALS Canada LTD. and is located at the Mine Site. A select set of basic analytical parameters (e.g. pH, TSS, turbidity etc.), are performed by the on-site laboratory. The off-site laboratory, ALS Environmental, located in Waterloo, ON, run by ALS Canada Ltd. performs the majority of analyses required. Toxicity testing is performed by Aquatox Testing & Consulting Inc, located in Guelph, ON. Details of ALS analytical laboratory licencing and accreditation are presented in Appendix C.

9.2 ANALYTICAL DETECTION LIMITS

ALS Limits of Reporting (LORs) are established using rigorous experimental and statistical procedures that begin with the determination of the Method Detection Limit (MDL) at 99% confidence. When detected at or above the MDL, ALS test results are considered to be qualitatively accurate, and a parameter can be reported with 99% confidence as being present in the sample.

It should be noted that on occasion, a loss of analytical sensitivity can be encountered due to excessively high concentrations of parameters within a sample or lack of provided sample matrix. If this is encountered, Baffinland or their designate will work with the analytical laboratory to try and resolve the problem and new samples will be taken if required. The detection limits on ALS analytical reports contains the LOR. The LOR may be the MDL as calculated, or a higher value. Required analytical laboratory detection limits are provided in Appendix D.

9.3 LABORATORY ANALYTICAL METHODS

Analytical methods used by the analytical laboratories for water analyses generally conform to the standard methods outlined in *Standard Methods for the Examination of Water and Wastewater* (APHA et al, 1989). Standard analytical methods for available analyses through ALS Environmental are provided in Appendix D.

9.4 ANALYTICAL LABORATORY QA/QC PROCEDURES

ALS Environmental adheres to a designated QA/QC Management System which includes documentation and document control, staff training and internal audits. The practices exceed accreditation requirements for high confidence in data reliability utilising but not limited to:

- Use of calibration verification standards and drift control standards.
- Use of surrogate standards and internal standards.
- Replicate analyses and blanks on submitted samples.

- Use of standard reference materials (SRM's) and matrix spikes.
  Standards Data Quality objectives are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal

Further details on the analytical laboratories in-house QA/QC protocols are presented in Appendix E.

9.5 SUMMARY OF ANALYTICAL PROCEDURES

TABLE 9-1 – ANALYTES, WATER & SOIL SAMPLE VOLUMES, PRESERVATIVES & HOLDING TIMES

Inorganics	Analysis[1]	Water Container	Water Preservation	Additional Notes	Soil Container	Water / Soil Holding Time
ROUTINE INORGANICS AND PHYSICALS	Acidity and Alkalinity	0.5-1 L Plastic			125-250 mL Jar or Bag	14 Days / NA
	Anions (Br, Cl, SO4, F) and Electrical Conductivity	0.5-1 L Plastic			125-250 mL Jar or Bag	28 Days ^{7}/ Unlimited
	Bromate^{19}, Chlorate and Chlorite	125 mL Plastic	EDA (Ethylenediamine)		NA	28 Days (Chlorite 14 Days) / NA
	BOD, Colour and Turbidity	0.5-1 L Plastic			NA	2-4 Days ^{8} / NA
	COD and Phenols (4AAP)	125-250 mL Glass	1:1 Sulfuric Acid (H_2SO_4)		NA	28 Days / NA
	Cyanide, Total ,Weak Acid Dissociable,Free	145 mL Plastic	6N NaOH		125-250 mL Jar or Bag	14 Days / 14 Days
	Dissolved Oxygen	300 mL BOD bottle	1 each; $MnSO_4$ & alkaline iodide azide pillows		NA	8 Hours^{20} / NA
	Dissolved or Total Inorganic Carbon (DIC or TIC)	125-250 mL Glass	.	Field Filter for Dissolved	125-250 mL Jar or Bag	14 Days / 28 Days
	Dissolved or Total Organic Carbon (DOC or TOC)	125-250 mL Glass	1:1 Sulfuric Acid (H_2SO_4)	Field Filter for Dissolved	125-250 mL Jar or Bag	28 Days / 28 Days
	Flashpoint	2 x 100-250 mL Amber Glass		Zero Headspace	125-250 mL Jar	7 Days / 7 Days
	pH	0.5-1 L Plastic			125-250 mL Jar or Bag	0.25 Hours / 30 Days ^{9}
	Solids (TS, TSS, TDS)	0.5-1 L Plastic			NA	7 Days / NA
	Sulfide	125 - 150 mL Plastic	Zinc Acetate & 6N NaOH		125-250 mL Jar or Bag	7 Days / 7 Days
	Sulfite	125 mL Plastic			NA	0.25 Hours / NA
NUTRIENTS	Ammonia Nitrogen	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)		125-250 mL Jar or Bag	28 Days / 72 Hours
	Nitrate or Nitrite Nitrogen (and Ammonia unpreserved)	0.5-1 L Plastic			NA	2-7 Days ^{10} / 72 Hours
	Nitrogen, Kjeldahl, Organic, Total or Dissolved	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)	Field Filter for Dissolved	NA	28 Days / NA
	Nutrients, Available (N,P,K,S)	NA			125-250 mL Jar or Bag	NA / 3 Days ^{11}
	Phosphorus, Reactive (orthophosphate)	0.5-1 L Plastic			NA	2-7 Days ^{12} / NA
	Phosphorus, Total Dissolved	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)	Field Filter for Dissolved	NA	28 Days / NA
	Phosphorus, Total	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)		NA	28 Days / NA
METALS	Chromium VI (Hexavalent)	125 mL Plastic	50 % NaOH (BC MoE) or 6N NaOH + Ammonium Buffer (OMoE)		125-250 mL Jar or Bag	28 Days / 30 Days
	Mercury, Methyl	250 mL FLPE	1:1 Hydrochloric Acid (HCl)^{21}	Field Filter for Dissolved	125-250 mL Jar or Bag	6 Months / 28 Days
	Mercury, Total or Dissolved	40 mL Glass Vial	1:1 Hydrochloric Acid (HCl)	Field Filter for Dissolved	125-250 mL Jar or Bag	28 Days / 28 Days
	Metals, Total or Dissolved	125-250 mL Plastic	1:3 Nitric Acid (HNO_3) to pH<2	Field Filter for Dissolved	125-250 mL Jar or Bag	6 Months / 6 Months
Organics						
HYDRO-CARBONS	F1, Volatile Organic Compounds (VOCs), THMs, 1,4-Dioxane, Volatile Petroleum Hydrocarbons (VPH)	2 or 3 x 40 mL Glass Vials ^{2}	Sodium Bisulfate ^{4}	Zero Headspace	Field Methanol Kit ^{6}	14 Days / 40 Days ^{13}
		2 or 3 x 40 mL Glass Vials ^{2}	Sodium Bisulfate ^{4}	Zero Headspace	Hermetic Sampler kit ^{6}	14 Days / 48 Hours
	CCME CWS F1, BTEX	2 or 3 x 40 mL Glass Vials ^{2}	Sodium Bisulfate ^{4}	Zero Headspace	125 - 500 mL Jar	14 Days / 7 Days
	CCME CWS F2-F4	2 x 60 mL Amber Glass Vials ^{3}	Sodium Bisulfate		125 - 500 mL Jar	14 Days ^{14}/ 14 Days
	EPH or LEPH/HEPH	2 x 250 mL Amber Glass with Septa Cap	Sodium Bisulfate		125 - 500 mL Jar	14 Days / 14 Days
	Polycyclic Aromatic Hydrocarbons (PAHs)	2 x 0.25 - 1 L Amber Glass ^{5}	Sodium Bisulfate		125 - 500 mL Jar	14 Days / 14 Days
	Oil & Grease or Mineral Oil & Grease	2 x 0.25 - 1 L Glass	1:1 HCl or H_2SO_4		125 - 500 mL Jar	28 Days / 28 Days
TRACE ORGANICS	Alcohols	2 x 40 mL Glass Vials		Zero Headspace	125 - 500 mL Jar	7 Days / 7 Days
	Alkanolamines (MEA, DEA, DIPA)	250 mL Amber Glass			125 - 500 mL Jar	7 Days / 14 Days
	AOX	40 - 250 mL Amber Glass	1:3 Nitric Acid (HNO_3) to pH<2		125 - 500 mL Jar	6 months ^{15} / 28 Days
	C1 - C5 Gases	3 x 40 mL Blue Septa Vials	Sodium Bisulfate ^{4}	Zero Headspace	NA	14 Days / NA
	Dioxins and Furans, PBDE and PBB	2 x 1 L Amber Glass			125 - 500 mL Jar	Unlimited / Unlimited
	Formaldehyde/Aldehydes	2 x 40 mL Amber Glass Vials ^{2}	Ammonium Chloride+Copper Sulfate	Zero Headspace	125 - 500 mL Jar	7 Days / 5 Days
	Glycols	2 x 40 mL Amber Glass Vials			125 - 500 mL Jar	7 Days / 14 Days
	Hormones and Steroids	1 L Plastic			NA	28 Days / NA
	Naphthenic Acids	2 x 250 mL Amber Glass			125 - 500 mL Jar	14 Days / 14 Days
	Nitroaromatics and Nitrosamines (Explosives)	1 L Amber Glass			125 - 500 mL Jar	7 Days / 14 Days
	Nonylphenol & Ethoxylates, Bisphenol A (BPA)	1 L Amber Glass			125 - 500 mL Jar	28 Days / 14 Days
	PCB	2 x 0.25 - 1 L Amber Glass			125 - 500 mL Jar	Unlimited / Unlimited ^{16}
	Perfluorinated Chemicals (PFCs), PFOS, PFOA	1 L Plastic (PTFE free)			125-250 mL Jar or Bag	14 Days / 14 Days
	Phenolics, Chlorinated and Non-Chlorinated	2 x 0.5 - 1 L Amber Glass	Ascorbic Acid & Sodium Bisulfate ^{4}		125 - 500 mL Jar	14 Days / 14 Days
	Priority Pollutants (EPA 625 list) or SVOCs	2 x 1 L Amber Glass			125 - 500 mL Jar	7 Days / 14 Days ^{17}
	Resin Acids & Fatty Acids	2 x 0.5 - 1 L Amber Glass	Ascorbic Acid & NaOH		125 mL Jar	14 Days / 14 Days
	Sulfolane	2 x 0.5 - 1 L Amber Glass	Sodium Bisulfate ^{4}		125 mL Jar	14 Days / 14 Days
PESTICIDE RESIDUES	Carbamate Pesticides	1 L Amber Glass	Use Sodium Thiosulfate if chlorinated		125 - 500 mL Jar	7 Days / 14 Days

Inorganics	Analysis[1]	Water Container	Water Preservation	Additional Notes	Soil Container	Water / Soil Holding Time
	Glyphosate / AMPA	1 L Plastic	Use Sodium Thiosulfate if chlorinated		125 - 500 mL Jar	14 Days / 14 Days
	Herbicides, Acidic	2 x 1 L Amber Glass	Sodium Bisulfate [4]		125 - 500 mL Jar	14 Days / 14 Days
	Organochlorine or Organophosphate Pesticides	2 x 1 L Amber Glass			125 - 500 mL Jar	7 Days / 14 Days
	Soil Sterilant Scan	1 L Amber Glass			250 g Poly Bag	7 Days / 14 Days
Micro						
MICRO-BIOLOGICAL	Coliforms-Fecal, Total, E-coli & HPC	100 - 300 mL Sterilized Plastic	Sodium Thiosulfate		500 mL Sterilized Jar	24-48 Hours [18] (24 - HPC) / NA
	Microtox	1 L Amber Glass			125-250 mL Jar or Bag	3 Days / 3 Days

1. Additional analyses with the same container type and preservation may be possible - consult the lab for details.

2. The number of 40 mL glass vials required (2 or 3) for BTEX & VOC varies by lab based on instrumentation. Consult the lab for details.

3. Please fill to the top of the marked line on the 60 mL Amber Glass Vials.

4. Use Sodium Thiosulfate instead of Sodium Bisulfate if sample is chlorinated.

5. OMoE has no preservation requirement for PAHs. 2 X 250 mL Amber Glass required for BC MoE and OMoE. For AB and SK and for Alkylated PAHs, ALS requires 2 x 1 L Amber Glass.

6. Soil sampling options depend on soil location and condition of soil. Field Methanol Kit consists of one 5g TerraCore® sampler or similar sampling device, two pre-weighed 40 mL glass vials with methanol preservative and a 125mL soil jar for moisture. Hermetic sampler kit consists of a T-handle, two 5g hermetic samplers and a 125mL soil jar for moisture. One additional parameter, such as metals or hydrocarbons can also be obtained from the 125mL soil jar.

7. 4 Days hold time for Electrical Conductivity only as per Ontario MISA.

8. 3 Days hold time for British Columbia as per BC Ministry of Environment (BC MoE), 4 Days hold time as per OMoE.

9. pH in water should be taken in the field as per BC MoE, 4 Days hold time for Ontario MISA and 28 Days hold time for OMoE. 30 Days hold time as received for pH in soil as per OMoE. One year hold time once soil is dried.

10. 3 Days hold time as per BC MoE, 5 Days hold time as per Ontario MISA and 7 Days hold time as per OMoE.

11. 3 Days hold time until received. Unlimited hold time once soil is dried.

12. 3 Days hold time as per BC MoE and 7 Days hold time as per OMoE.

13. 40 Days hold time as per BC MoE and 14 Days hold time as per OMoE. Recovered methanol extract from laboratory has a 40 Days hold time as per OMoE.

14. 40 Days hold time as per OMoE.

15 14 Days hold time as per Ontario MISA.

16. 14 Days hold time as per OMoE. Consult lab for container size if limited sample volume is available.

17. 14 Days hold time for water and 60 Days hold time for soil as per OMoE. Ontario labs require 2 x 250 mL Amber Glass + 500 mL Amber Glass.

18. 30 Hours hold time as per BC Drinking Water Regulation and 48 Hours as per OMoE.

19. Bromate alone does not require preservative.

20. 15 Minutes hold time as per OMoE - Field measurement by meter is recommended.

21. Use 1:1 Sulfuric Acid (H_2SO_4) for preservation of marine or brackish samples.

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10 DATA MANAGEMENT AND REPORTING

10.1 DATA MANAGEMENT

All sample data collected by Baffinland or designate consultants from the various environmental programs required on Project sites will be stored electronically in a spreadsheet database (Microsoft Excel) or using alternative software designed specifically for environmental data management.

QA/QC measures relating to data validation will include the following**:**

1. Designation of a suitable person to act as the Database Manager (DM).
2. Upon receipt, laboratory analytical data will be reviewed by the DM to check for completeness, typos, outlying values, etc. The analytical laboratory will be immediately notified of any anomalous results.
3. At a suitable frequency (e.g. once per month) the spreadsheet database should be updated by the DM using: i) results provided in electronic format by the analytical laboratories, and ii) copies of the field parameter monitoring records forwarded from site
4. The DM will be responsible for ensuring that a third party (e.g. another staff member) carries out a QA/QC check on a minimum of ten percent of newly entered data.

11 TRAINING

Environment personnel performing environmental monitoring programs will be required to understand and be proficient in the protocols outlined in this Plan. Training will involve Environmental Coordinators conducting routine reviews of this Plan with environmental personnel and leading in-field training sessions. Environmental personnel will also be trained and proficient in the operation, calibration and maintenance of any necessary sampling equipment (e.g. YSI).

12 REFERENCES

1. APHA *et al*, 1989. Standard Methods for the Examination of Water and Wastewater; AHPA, AWWA and WPCF, 17th ed.
2. Environment Canada (EC). 2019 Metal and Diamond Mining Effluent Regulations. http://laws-lois.justice.gc.ca
3. Environment Canada (EC). 2001 Guidance Document for the Sampling and Analysis of Metal Mining Effluent. http://publications.gc.ca/collections/Collection/En49-24-1-39E.pdf
4. Environment Canada (EC). 2012. Metal mining technical guidance for Environmental Effects Monitoring. ISBN 978-1-100-20496-3.
5. Environment Canada, 2002. Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring. http://www.ec.gc.ca/eem/English/MetalMining/Guidance/default.cfm.
6. INAC, 1996. Quality Assurance (QA) and Quality Control (QC) Guidelines for Use by Class "A" Licenses in Meeting SNP Requirements and for Submission of a QA/QC Plan. Prepared by Department of Indian and Northern Affairs Canada Water Resources Division and the Northwest Territories Water Board, July 1996.
7. Nunavut Water Board, 2013. Baffinland Iron Mines Corp. – Class A Water License No: 2AM-MRY1325. Issued by the Nunavut Water Board, 2013.
8. USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms; 5th Ed., USEPA, ref. No. EPA-821-R-02-012.

APPENDIX A

Baffinland Corporate Policies

Baffinland Iron Mines Corporation

Health, Safety and Environment Policy

BAF-PH1-800-POL-0001

Rev 3

Approved by: **Brian Penney**

Title: **Chief Executive Officer**

Date: **May 3rd, 2019**

Signature:

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
05/07/15	0	EM	TP	For Use
03/07/16	1	JS	BP	Minor edits
04/20/18	2	TS	SA/BP	Minor edits
05/03/19	3	TS	BP	Minor edits

This Baffinland Iron Mines Corporation Policy on Health, Safety and Environment is a statement of our commitment to achieving a safe, healthy and environmentally responsible workplace. We will not compromise this policy for the achievement of any other organizational goals.

We implement this Policy through the following commitments:

- Continual improvement of safety, occupational health and environmental performance
- Meeting or exceeding the requirements of regulations and company policies
- Integrating sustainable development principles into our decision-making processes
- Maintaining an effective Health, Safety and Environmental Management System
- Sharing and adopting improved technologies and best practices to prevent injuries, occupational illnesses and environmental impacts
- Engaging stakeholders through open and transparent communication.
- Efficiently using resources, and practicing responsible minimization, reuse, recycling and disposal of waste.
- Reclamation of lands to a condition acceptable to stakeholders.

Our commitment to provide the leadership and action necessary to accomplish this policy is exemplified by the following principles:

- As evidenced by our motto "Safety First, Always" and our actions Health and Safety of personnel and protection of the environment are values not priorities.
- All injuries, occupational illnesses and environmental impacts can be prevented.
- Employee involvement and active contribution through courageous leadership is essential for preventing injuries, occupational illnesses and environmental impacts.
- Working in a manner that is healthy, safe and environmentally sound is a condition of employment.
- All operating exposures can be safeguarded.
- Training employees to work in a manner that is healthy, safe and environmentally sound is essential.
- Prevention of personal injuries, occupational illnesses and environmental impacts is good business.
- Respect for the communities in which we operate is the basis for productive relationships.

We have a responsibility to provide a safe workplace and utilize systems of work to meet this goal. All employees must be clear in understanding the personal responsibilities and accountabilities in relation to the tasks we undertake.

The health and safety of all people working at our operation and responsible management of the environment are core values to Baffinland. In ensuring our overall profitability and business success every Baffinland and business partner employee working at our work sites is required to adhere to this Policy.

Brian Penney
Chief Executive Officer
May 2019

Baffinland Iron Mines Corporation

SUSTAINABLE DEVELOPMENT POLICY

BAF-PH1-800-POL-0002

Rev 1

Approved By: **Brian Penney**
Title: **Chief Executive Officer**
Date: **March 7, 2016**
Signature:

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
05/07/15	0	EM	TP	For Use
03/07/16	1	JS	BP	Minor edits

At Baffinland Iron Mines Corporation (Baffinland), we are committed to conducting all aspects of our business in accordance with the principles of sustainable development & corporate responsibility and always with the needs of future generations in mind. Baffinland conducts its business in accordance with the Universal Declaration of Human Rights and ArcelorMittal's Human Rights Policy which applies to all employees and affiliates globally.

Everything we do is underpinned by our responsibility to protect the environment, to operate safely and fiscally responsibly and with utmost respect for the cultural values and legal rights of Inuit. We expect each and every employee, contractor, and visitor to demonstrate courageous leadership in personally committing to this policy through their actions. The Sustainable Development and Human Rights Policy is communicated to the public, all employees and contractors and it will be reviewed and revised as necessary on a regular basis. These four pillars form the foundation of our corporate responsibility strategy:

1. Health and Safety
2. Environment
3. Upholding Human Rights of Stakeholders
4. Transparent Governance

1.0 HEALTH AND SAFETY

- We strive to achieve the safest workplace for our employees and contractors; free from occupational injury and illness, where everyone goes home safe everyday of their working life. Why? Because our people are our greatest asset. Nothing is as important as their health and safety. Our motto is "Safety First, Always".
- We report, manage and learn from injuries, illnesses and high potential incidents to foster a workplace culture focused on safety and the prevention of incidents.
- We foster and maintain a positive culture of shared responsibility based on participation, behaviour, awareness and promoting active courageous leadership. We allow our employees and contractors the right to stop any work if and when they see something that is not safe.

2.0 ENVIRONMENT

- Baffinland employs a balance of the best scientific and traditional Inuit knowledge to safeguard the environment.
- Baffinland applies the principles of pollution prevention, waste reduction and continuous improvement to minimize ecosystem impacts, and facilitate biodiversity conservation.
- We continuously seek to use energy, raw materials and natural resources more efficiently and effectively. We strive to develop more sustainable practices.
- Baffinland ensures that an effective closure strategy is in place at all stages of project development to ensure reclamation objectives are met.

3.0 UPHOLDING HUMAN RIGHTS OF STAKEHOLDERS

- We respect human rights, the dignity of others and the diversity in our workforce. Baffinland honours and respects the unique cultural values and traditions of Inuit.
- Baffinland does not tolerate discrimination against individuals on the basis of race, colour, gender, religion, political opinion, nationality or social origin, or harassment of individuals freely employed.
- Baffinland contributes to the social, cultural and economic development of sustainable communities in the North Baffin Region.
- We honour our commitments by being sensitive to local needs and priorities through engagement with local communities, governments, employees and the public. We work in active partnership to create a shared understanding of relevant social, economic and environmental issues, and take their views into consideration when making decisions.
- We expect our employees and contractors, as well as community members, to bring human rights concerns to our attention through our external grievance mechanism and internal human resources channels. Baffinland is committed to engaging with our communities of interest on our human rights impacts and to reporting on our performance.

4.0 TRANSPARENT GOVERNANCE

- Baffinland will take steps to understand, evaluate and manage risks on a continuing basis, including those that may impact the environment, employees, contractors, local communities, customers and shareholders.
- Baffinland endeavours to ensure that adequate resources are available and that systems are in place to implement risk-based management systems, including defined standards and objectives for continuous improvement.
- We measure and review performance with respect to our safety, health, environmental, socio-economic commitments and set annual targets and objectives.
- Baffinland conducts all activities in compliance with the highest applicable legal & regulatory requirements and internal standards.
- We strive to employ our shareholder's capital effectively and efficiently and demonstrate honesty and integrity by applying the highest standards of ethical conduct.

4.1 FURTHER INFORMATION

Please refer to the following policies and documents for more information on Baffinland's commitment to operating in an environmentally and socially responsible manner:

Health, Safety and Environment Policy
Workplace Conduct Policy
Inuktitut in the Workplace Policy
Site Access Policy
Hunting and Fishing (Harvesting) Policy
Annual Report to Nunavut Impact Review Board

ArcelorMittal Canada Sustainability and Corporate Responsibility Report

If you have questions about Baffinland's commitment to upholding human rights, please direct them to contact@baffinland.com.

Brian Penney
Chief Executive Officer
March 2016

APPENDIX B

COC Example Forms

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report	
Company:		
Contact:		
Phone:		
	Company address below will appear on the final report	
Street:		
City/Province:		
Postal Code:		
Invoice To	Same as Report To	☐ YES ☐ NO
	Copy of Invoice with Report	☐ YES ☐ NO
Company:		
Contact:		

Report Format / Distribution

Select Report Format: ☐ PDF ☐ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4-20%]	☐	**1 Business day [E - 100%]**	☐
3 day [P3-25%]	☐	**Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]**	☐
2 day [P2-50%]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Project Information

ALS Account # / Quote #:

Job #:

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler:

ALS Sample # (lab use only)	**Sample Identification and/or Coordinates** (This description will appear on the report)	**Date** (dd-mmm-yy)	**Time** (hh:mm)	**Sample Type**	**NUMBER OF CONTAINERS**														**SAMPLES ON HOLD**	**SUSPECTED HAZARD (see Special Instructions)**

Drinking Water (DW) Samples^1 (client use)

Are samples taken from a Regulated DW System?

☐ YES ☐ NO

Are samples for human consumption/ use?

☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No ☐	
Ice Packs	☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INIITIAL COOLER TEMPERATURES ºC				FINAL COOLER TEMPERATURES ºC			

SHIPMENT RELEASE (client use)			**INITIAL SHIPMENT RECEPTION (lab use only)**			**FINAL SHIPMENT RECEPTION (lab use only)**		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

[1] If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX C

Analytical Laboratory Accreditation and Licencing

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 17025:2017.
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 April 2017).

Accreditation No.: A3149
Issued On: October 3, 2018
Accreditation Date: January 3, 2005
Expiry Date: April 2, 2021

Andrew M. Adams
President & CEO

CALA

This certificate is the property of the Canadian Association for Laboratory Accreditation Inc. and must be returned on request; reproduction must follow policy in place at date of issue. For the specific tests to which this accreditation applies, please refer to the laboratory's scope of accreditation at www.cala.ca

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: Ms. Amanda Lumsden
Phone: (519) 886-6910
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Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: December 18, 2018
Valid To: April 2, 2021

Scope of Accreditation

Air (Inorganic)

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

Air (Organic)

Reduced Sulphur Compounds - Air (201)
WT-TM-1704; modified from ASTM 5504-12
GC-SCD - PASSIVATE CANISTER
2-Ethylthiophene
2-Methylthiophene
2,5-Dimethylthiophene
3-Methylthiophene
Butyl(t) mercaptan
Carbon disulfide
Carbonyl sulfide
Diethyl disulfide
Diethyl sulfide
Dimethyl disulfide
Dimethyl sulfide
Ethyl mercaptan
Ethyl methyl sulfide
Hydrogen Sulfide

Isobutyl mercaptan
Isopropyl mercaptan
Methyl mercaptan
n-Butyl mercaptan
Propyl mercaptan
sec-Butyl mercaptan
Tetrahydrothiophene
Thiophene

Air (Organic)
Volatile Organic Compounds (VOC) - Air (202)
WT-TM-1701; modified from EPA TO-15
GC-MS - PASSIVATE CANISTER
1,1-Dichloroethane
1,1-Dichloroethene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trimethylbenzene
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Butadiene
1,3-Dichlorobenzene
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
1,4-Dioxane (p-dioxane)
2-Chlorotoluene
2-Ethyltoluene
2-Hexanone (MBK)
2-Methylbutane
2-Methylpentane
3-Methylhexane
3-Methylpentane
4-Ethyltoluene
4-Isopropyltoluene
Acetone
Acetonitrile
Acrolein
Acrylonitrile
Aliphatic >C10-C12
Aliphatic >C12-C16
Aliphatic C6-C8
Aliphatic >C8-C10
Allyl chloride
Aromatic >C10-C12
Aromatic >C10-C16
Aromatic C6-C8
Aromatic >C8-C10
Benzene

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Benzyl chloride
Bromodichloromethane
Bromoform
Bromomethane
Butane
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chlorodifluoromethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-dichloroethene
cis-1,3-Dichloropropene
Cyclohexane
Dibromochloromethane
Dibromomethane
Dichlorodifluoromethane
Ethanol
Ethyl acetate
Ethylbenzene
F1
F2
Freon 113
Freon 114
Hexachlorobutadiene
Isooctane
Isoprene
Isopropyl alcohol
Isopropylbenzene
m,p-Xylene
Methyl ethyl ketone (MEK)
Methyl isobutyl ketone (MIBK)
Methyl methacrylate
Methylene chloride
n-Decane
n-Heptane
n-Hexane
n-Pentane
n-Propylbenzene
Naphthalene
Nonane
o-Xylene
Octane
Propylene
Styrene
t-Butyl alcohol
t-Butyl methyl ether (MTBE)
Tetrachloroethylene
Tetrahydrofuran
Toluene
Total C>10-C12
Total C>12-C16

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Total C>8-C10
Total C6-C8
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl acetate
Vinyl bromide
Vinyl chloride

Air (Organic)
Volatile Organic Compounds (VOC) - Air (203)
WT-TM-1700; modified from EPA TO-17
GC-MS - SORBENT TUBE
1,1-Dichloroethane
1,1-Dichloroethene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Butadiene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
1,4-Dioxane (p-dioxane)
2-Chlorotoluene
2-Methylnaphthalene
2,2-Dichloropropane
4-Chlorotoluene
4-Ethyltoluene
4-Isopropyltoluene
4-Phenylcyclohexene
Acetone
Allyl chloride
Benzene
Benzyl chloride
Bromochloromethane
Bromodichloromethane
Bromoform
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
cis-1,2-dichloroethene
cis-1,3-Dichloropropene
Cyclohexane

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Decamethylcyclopentasiloxane
Decamethyltetrasiloxane
Decane
Dibromochloromethane
Dichlorodifluoromethane
Dodecamethylcyclohexasiloxane
Dodecamethylpentasiloxane
Ethyl acetate
Ethylbenzene
Heptane
Hexachloro-1,3-butadiene
Hexamethylcyclotrisiloxane
Hexamethyldisiloxane
Hexane
Isooctane
Isopropyla lcohol
m,p-Xylene
Methylene chloride
n-Butylbenzene
n-Propylbenzene
Naphthalene
Nonane
o-Xylene
Octamethylcyclotetrasiloxane
Octamethyltrisiloxane
Octane
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethene
Tetrahydrofuran
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl chloride

Biosolids (Microbiology)
Escherichia coli (E. coli) - Biosolids (087)
WT-TM-1200; modified from ON MOECC 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 (NP2EO)
Nonylphenol Ethoxylates
Nonylphenol Monoethoxylates (NP1EO)
Nonylphenols
Octylphenol
Octylphenol Diethoxylate

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Octylphenol Monoethoxylate

Serum (Organic)
Perfluorinated Compounds (PFC) - Biomaterials [Serum] (196)
WT-TM-1565; J. ANALY. TOXICOL. 34: 400-410
LC-MS/MS

Perfluoro Decanesulfonate
Perfluoro Dodecanoic Acid
Perfluoro Hexanesulfonate
Perfluoro Nonanoic Acid
Perfluoro Octanesulfonate
Perfluoro Octanoic Acid
Perfluoro Tetradecanoic Acid
Perfluoro Undecanoic Acid

Soil
Particle Size Analysis (PSA) - Solids [Soil] (156)
WT-TM-1034; modified from SOIL SAMPLING & METHODS OF ANALYSIS CAN. SOCIETY OF SOIL SCIENCE (1993)
SEIVE

Particle Size

Soil
Perchlorate - Solids [Soil] (176)
WT-TM-1505; modified from EPA 6850
LC-MS/MS

Perchlorate

Soil
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Solids [Soil] (175)
WT-TM-1567; modified from ON MOECC E3506
LC-MS/MS

10:2 Fluorotelomer sulfonic acid (10:2 FTS)
4:2 Fluorotelomer sulfonic acid (4:2 FTS)
6:2 Fluorotelomer sulfonic acid (6:2 FTS)
8:2 Fluorotelomer sulfonic acid (8:2 FTS)
N-Ethyl perfluorooctane sulfonamide (EtFOSA)
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)
N-Ethyl perfluorooctanesulfonamidoethanol (EtFOSE)
N-Methyl perfluorooctane sulfonamide (MeFOSA)
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)
Perfluorobutane sulfonic acid (PFBs)
Perfluorobutanoic acid (PFBA)
Perfluorodecanesulfonate (PFDS)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptane sulfonic acid (PFHpS)
Perfluoroheptanoic acid (PFHpA)
Perfluorohexane sulfonic acid (PFHxS)
Perfluorohexanoic acid (PFHxA)
Perfluorononanoic acid (PFNA)
Perfluorooctane sulfonamide (PFOSA)
Perfluorooctane sulfonic acid (PFOS)
Perfluorooctanoic acid (PFOA)
Perfluoropentane sulfonic acid (PFPeS)
Perfluoropentanoic acid (PFPeA)

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Perfluorotetradecanoic acid (PFTeDA)
Perfluorotridecanoic acid (PFTrDA)
Perfluoroundecanoic acid (PFUndA)

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

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

Soil (Organic)
Pesticides - Soil (208)
WT-TM-1589; modified from ON MOECC E3501
LC-MS/MS
Atrazine
Atrazine-2-hydroxy
Atrazine-desethyl
Atrazine-desethyl-desisopropyl
Atrazine-desisopropyl
Azoxystrobin
Boscalid
Bromacil
Carbaryl
Chlorantraniliprole
DCPMU
Diuron
Fludioxonil
Imidacloprid
Linuron
Metalaxyl
Myclobutanil
Propiconazole
Pyraclostrobin
Simazine
Tebuthiuron
Trifloxystrobin
Triticonazole

Soil (Organic)
Phenoxy Acid Herbicides - Soil (210)
WT-TM-1591; modified from ON MOECC E3552
LC-MS/MS
2,4-D
2,4-DB
2,4,5-T
2,4,5-TP
Bromoxynil
Clopyralid
Dicamba
Dichlorprop
Dinoseb

MCPA
MCPB
Mecoprop
Picloram
Triclopyr

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

Solids (Inorganic)
Anions - Solids (136)
NA-TM-1001, NA-TM-1700; modified from EPA 1311 (PREPARATION) and EPA 300.1 (ANALYSIS)
ION CHROMATOGRAPHY - TCLP
Fluoride
Nitrate
Nitrite

Solids (Inorganic)
Anions - Solids [Sludge, Soil] (041)
NA-TM-1001, WT-TP-2013; modified from EPA 300.1
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate-N
Nitrite
Sulphate

Solids (Inorganic)
Conductivity - Solids [Soil] (109)
WT-TM-1010; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25˚C)

Solids (Inorganic)
Cyanide - Solids [Soil] (079)
NA-TM-1003, WT-TP-2011; modified from ASTM D7237-10 and EPA 9013A and ISO 14403 and SM 4500-CN- I
AUTO COLOR - DIGESTION
Cyanide, Free
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Hot Water Soluble Boron - Solids [Soil] (186)
NA-TP-2010, WT-TM-1026; modified from EPA 6010C and SOIL SAMPLING & METHODS OF ANALYSIS, CARTER, 2008
ICP/OES
Boron (Hot Water Soluble)

Solids (Inorganic)
Mercury - Solids (139)
NA-TM-1005, NA-TM-1700; modified from EPA 1311 (PREPARATION) and EPA 1631E (ANALYSIS)
COLD VAPOUR AA - SPECTROMETRIC - TCLP
Mercury

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Solids (Inorganic)
Mercury - Solids [Compost, Sludge, Soil] (050)
NA-TM-1005, NA-TP-2004; modified from EPA 1631E and EPA 200.2
CVAAS
Mercury

Solids (Inorganic)
Metals - Solids (138)
NA-TM-1700, NA-TM-1002; modified from EPA 1311 (PREPARATION) and 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
Uranium
Zinc
Zirconium

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

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

Solids (Inorganic)
Metals - Solids [Soil] (187)
WT-TM-1026, WT-TP-1012; modified from EPA 6010C and SOIL SAMPLING & METHODS OF ANALYSIS, CARTER 2ND EDITION, 2008, CHAP. 15.2.2
ICP/OES - FIXED RATIO EXTRACTION
Calcium
Magnesium
Sodium

Solids (Inorganic)
Moisture - Solids [Soil] (188)
WT-TM-1115; REFERENCE METHOD FOR THE CANADA-WIDE STANDARD FOR PERTROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD & ADDENDUM. CCME DECEMBER 2000. NO. 1310
GRAVIMETRIC
Percent Moisture

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

Solids (Inorganic)
pH - Solids [Soil] (107)
WT-TM-1001; modified from SM 4500-H+ B
pH METER
pH

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

Solids (Inorganic)
Total and Free Cyanide - Solids (140)
NA-TM-1700, NA-TM-1003; modified from ASTM D7237-10 (ANALYSIS) and EPA 1311 (PREPARATION) and ISO 14403 (ANALYSIS) and SM 4500-CN- I (ANALYSIS)
COLORIMETRIC - TCLP
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Total Organic Carbon (TOC) - Solids [Soil] (034)
WT-TM-1005; modified from SOIL SAMPLING & METHODS OF ANALYSIS, CARTER METHOD 21.3.2
WET OXIDATION-REDOX
Organic Carbon

Solids (Organic)
1,4-Dioxane - Solids [Soil] (173)
WT-TM-1406; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,4-Dioxane (p-dioxane)

Solids (Organic)
Base Neutral Acid Extractables (BNA) - Solids (141)
NA-TM-1700, WT-TM-1300, WT-TM-1101; modified from EPA 1311 (PREPARATION) and EPA 8270 (ANALYSIS)
GC/MS - TCLP
2-Methylphenol (o-Cresol)
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)
Base Neutral Acid Extractables (BNA) - Solids [Sediment, Sludge, Soil] (016)
WT-TM-1101/WT-TM-1300; modified from EPA 3570C and EPA 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-methyl phenol
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
Benzylbutyl phthalate
Biphenyl
Bis(2-chlorethoxy)methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl) phthalate
Camphene
Chrysene
Di-n-butyl phthalate
Di-n-octyl phthalate
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)
Energetics - Solids [Soil] (195)
WT-TM-1608; modified from EPA 8330A and EPA 8330B and U.S. EPA: EPA
HPLC/UV - EXTRACTION
1,3-Dinitrobenzene (1,3-DNB)
1,3,5-Trinitrobenzene (1,3,5-TNB)
2-Amino-4,6-dinitrotoluene (2-A-4,6-DNT)
2-Nitrotoluene (2-NT)
2,4-Dinitrotoluene (2,4-DNT)
2,4,6-Trinitrotoluene (2,4,6-TNT)
2,6-Dinitrotoluene (2,6-DNT)
3-Nitrotoluene (3-NT)
3,5-Dinitroaniline (3,5-DNA)
4-Amino-2,6-dinitrotoluene (4-A-DNT)
4-Nitrotoluene (4-NT)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
Methyl-2,4,6-trinitrophenylnitramine
Nitrobenzene
Nitroglycerin
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
Pentaerythritol tetranitrate (PETN)

Solids (Organic)
Extractable Petroleum Hydrocarbons (EPH) - Solids [Soil] (110)
WT-TM-1406; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and EPA 5021A and EPA 8260C
GC/FID - HEADSPACE
F1: C6-C10

Solids (Organic)
Organochlorine (OC) Pesticides - Solids [Soil] (020)
WT-TM-1102/WT-TM-1302; modified from EPA 3570C and EPA 8270D
GC/MS - EXTRACTION
Aldrin
alpha-BHC
alpha-Chlordane
beta-BHC
Chlordane
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
gamma-Chlordane

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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 - Solids [Soil] (150)
WT-TM-1107, WT-TM-1302; modified from EPA 3570C and EPA 8270
GC/MS - EXTRACTION
Alachlor
Ametryn
Atrazine
Atrazine, desethyl
Azinphos-methyl
Bendiocarb
Bromoxynil
Carbaryl
Carbofuran
Chlorpyrifos
Cyanazine
Diazinon
Diclofop-methyl
Dimethoate
Malathion
Metolachlor
Metribuzin
Parathion
Phorate
Prometon
Prometryne
Propazine
Simazine
Temephos
Terbufos
Terbutryn
Triallate
Trifluralin

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Solids [Soil] (065)
NA-TM-1100, WT-TM-1307; CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

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Solids (Organic)
Petroleum Hydrocarbons (PHC) - Solids [Soil] (071)
NA-TM-1100; CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD
GRAVIMETRIC
F4: Gravimetric

Solids (Organic)
Phenols - Solids [Soil] (204)
WT-TM-1593; modified from EPA 600/SR-97/027
LC-MS/MS
Phenol

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

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Solids [Soil] (018)
WT-TM-1105/WT-TM-1301; modified from EPA 3570C and EPA 8270D
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Pyridine - Solids (167)
WT-TM-1600, NA-TM-1700; modified from EPA 1311 (PREPARATION) and EPA 8260B (ANALYSIS)
GC/MS
Pyridine

Solids (Organic)
Sulfolane - Solids [Soil] (206)
WT-TM-1572; IN-HOUSE
LC-MS/MS
Sulfolane

Solids (Organic)
Volatile Organic Compounds (VOC) - Solids (182)
WT-TM-1017, WT-TM-1406; modified from EPA 1311 (PREPARATION) and EPA 8260 (ANALYSIS)
GC/MS - HEADSPACE - TCLP
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,4-Dichlorobenzene
Benzene
Carbon tetrachloride
Chloroform
Dichloromethane
Ethylbenzene
m,p-Xylene

Methyl ethyl ketone
o-Xylene
Tetrachloroethylene
Toluene

Solids (Organic)
Volatile Organic Compounds (VOC) - Solids [Soil] (112)
WT-TM-1406; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE

1,1-Dichloroethane
1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromomethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Hexanone (MBK)
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

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trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

Tissue (Organic)
Perfluorinated Compounds (PFC) - Tissue (198)
WT-TM-1568; modified from ANALYTICA CHIMICA ACTA (2008) 619:221-230
LC-MS/MS

2-(N-ethylperfluoro-1-Octanesulfonamide)-EtOH (N-EtFOSE)
2-(N-methylperfluoro-1-Octanesulfonamide)-Etoh (N-MeFOSE)
N-Ethylperfluoro-1-Octanesulfonamide (N-EtFOSA)
N-Methylperfluoro-1-Octanesulfonamide (N-MeFOSE)
Perfluoro Decanesulfonate (PFDS)
Perfluoro Heptanesulfonate (PFHpS)
Perfluoro Octanesulfonamide (PFOSA)
Perfluorobutanesulfonate (PFBS)
Perfluorobutanoic acid (PFBA)
Perfluorodecanoic acid (PFDA)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptanoic acid (PFHpA)
Perfluorohexanesulfonate (PFHxS)
Perfluorohexanoci Acid (PFHxA)
Perfluorononanoic acid (PFNA)
Perfluorooctane sulfonate (PFOS)
Perfluorooctanoic acid (PFOA)
Perfluoropentanoic acid (PFPeA)
Perfluorotetradecanoic acid (PFTeDA)
Perfluorotridecanoic acid (PFTrDA)

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 300.1
ION CHROMATOGRAPHY

Bromide
Chloride
Fluoride
Nitrate

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Nitrite
Sulfate

Water (Inorganic) OSDWA †
Biochemical Oxygen Demand (BOD) - Water (001)
WT-TM-1002; modified from SM 5210 B
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 †
Chlorate and Chlorite - Water (211)
WT-TM-1044; EPA 300.1
ION CHROMATOGRAPHY
Chlorate
Chlorite

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

Water (Inorganic) OSDWA †
Colour - Water (097)
WT-TM-1014; modified from SM 2120 C
COLORIMETRIC
Apparent Colour
True Colour

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

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

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

Water (Inorganic) OSDWA †
Cyanide - Water [Wastewater] (004)
NA-TM-1003; modified from ASTM D7237-10 and ISO 14403 and SM 4500-CN- I
COLOR - DISTILLATION
Cyanide, Free
Cyanide (SAD)
Cyanide (WAD)

Water (Inorganic) OSDWA †
Dissolved Metals - Water (005)
NA-TM-1002, NA-TP-2002; modified from EPA 3030B and EPA 6020A
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium

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Zinc
Zirconium

Water (Inorganic) OSDWA †
Hexavalent Chromium - Water (157)
WT-TM-1035; modified from EPA 3060A and EPA 7199
ION CHROMATOGRAPHY
Hexavalent Chromium

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

Water (Inorganic) OSDWA †
Mercury - Water [Wastewater] (049)
NA-TM-1005; modified from EPA 1631E
COLD VAPOUR AA - SPECTROMETRIC
Mercury

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

Water (Inorganic) OSDWA †
Phenols - Water (009)
WT-TM-1027; modified from EPA 9066
COLORIMETRIC
Total Phenolics

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

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

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

Water (Inorganic)
Thiocyanate - Water (189)
WT-TM-1037; modified from SM 4500-CN- M
COLORIMETRIC - DISCRETE ANALYZER
Thiocyanate

Water (Inorganic) OSDWA †
Total Kjeldahl Nitrogen (TKN) - Water (099)
WT-TM-1041; modified from SM 4500-NORG D
COLORIMETRIC - DIGESTION
Total Kjeldahl Nitrogen

Water (Inorganic) OSDWA †
Total Metals - Water [Wastewater] (032)
NA-TM-1002, NA-TP-2001; modified from EPA 200.2 and EPA 6020B
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus

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

Water (Inorganic) OSDWA †
Total Phosphorus - Water (011)
WT-TM-1025; modified from SM 4500-P E and SM 4500-P F
AUTO COLOR - DIGESTION
Total Phosphorus

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

Water (Inorganic)
UV Transmittance - Water (190)
WT-TM-1033; modified from SM 5910
COLORIMETRIC
Transmittance, UV (254nm)

Water (Inorganic)
Volatile Organic Acids - Water (191)
WT-TM-1031; modified from SM 5560 C
DISTILLATION - TITRATION
Volatile Organic Acids (As Acetic)

Water (Microbiology) OSDWA †
Coliforms - Water (183)
NA-TM-1300; modified from SM 9215 E and SM 9223 B
MOST PROBABLE NUMBER (QUANTI-TRAY)
Escherichia coli (E. coli)
Total Coliforms

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

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

Water (Microbiology) OSDWA †
Fecal (Thermotolerant) Coliforms - Water (185)
NA-TM-1300; modified from SM 9215 E and SM 9223 B
MOST PROBABLE NUMBER (QUANTI-TRAY)
Fecal (Thermotolerant) Coliforms

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-1200; 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-1406; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,4-Dioxane (p-dioxane)

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

Water (Organic) OSDWA †
Base Neutral Acid Extractables (BNA) - Water [Wastewater] (015)
WT-TM-1101/WT-TM-1300; modified from EPA 3510C and EPA 8270
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

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2,3,4,6-tetrachlorophenol
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-methyl phenol
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
Benzylbutyl phthalate
Biphenyl
Bis(2-chlorethoxy)methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl) phthalate
Camphene
Chrysene
Di-n-butyl phthalate
Di-n-octyl phthalate
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

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Naphthalene
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 ON MOECC E3503
LC-MS/MS - EXTRACTION
Diquat
Paraquat

Water (Organic)
Energetics - Water (194)
WT-TM-1608; modified from EPA 8330A and EPA 8330B and U.S. EPA: EPA
HPLC/UV - EXTRACTION
1,3-Dinitrobenzene (1,3-DNB)
1,3,5-Trinitrobenzene (1,3,5-TNB)
2-Amino-4,6-dinitrotoluene (2-A-4,6-DNT)
2-Nitrotoluene (2-NT)
2,4-Dinitrotoluene (2,4-DNT)
2,4,6-Trinitrotoluene (2,4,6-TNT)
2,6-Dinitrotoluene (2,6-DNT)
3-Nitrotoluene (3-NT)
3,5-Dinitroaniline (3,5-DNA)
4-Amino-2,6-dinitrotoluene (4-A-DNT)
4-Nitrotoluene (4-NT)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
Methyl-2,4,6-trinitrophenylnitramine
Nitrobenzene
Nitroglycerin
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
Pentaerythritol tetranitrate (PETN)

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

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

Water (Organic) OSDWA †
Haloacetic Acids (HAA) - Water (163)
WT-TM-1604; modified from EPA 552.3
GC/ECD
Bromochloroacetic acid

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Bromodichloroacetic acid
Chlorodibromoacetic acid
Dalapon (2,2-Dichloropropionic Acid)
Dibromoacetic acid
Dichloroacetic acid
Monobromoacetic acid
Monochloroacetic acid
Tribromoacetic acid
Trichloroacetic acid

Water (Organic) OSDWA †
Hydrocarbons - Water (062)
WT-TM-1602; modified from EPA REGION 1, 2002
GC/FID - HEADSPACE
Ethane
Ethene
Methane

Water (Organic) OSDWA †
Neonicotinoids - Water (200)
WT-TM-1569; JOURNAL OF CHROMATOGRAPHY B, 879 (2011) 117-12
LC-MS/MS
Acetamiprid
Clothianidin
Imidacloprid
Nitenpyram
Sulfoxaflor
Thiacloprid
Thiamethoxam

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; modified from JOURNAL OF CHROMATOGRAPHY A.849 (1999) 467-482
LC-MS/MS - EXTRACTION
Bisphenol A
Nonylphenol Diethoxylate (NP2EO)
Nonylphenol Ethoxylates
Nonylphenol Monoethoxylates (NP1EO)
Nonylphenols
Octylphenol
Octylphenol Diethoxylate
Octylphenol Monoethoxylate

Water (Organic) OSDWA †
Organochlorine (OC) Pesticides - Water [Wastewater] (019)
WT-TM-1102/WT-TM-1302; modified from EPA 3510C and EPA 8270
GC/MS - EXTRACTION
A -BHC
a - Chlordane
Aldrin
beta-BHC
delta-BHC

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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

Water (Organic) OSDWA †

Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Water (174)
WT-TM-1557; ON MOECC E3457

LC-MS/MS
10:2 Fluorotelomer sulfonic acid (10:2 FTS)
4:2 Fluorotelomer sulfonic acid (4:2 FTS)
6:2 Fluorotelomer sulfonic acid (6:2 FTS)
8:2 Fluorotelomer sulfonic acid (8:2 FTS)
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)
N-Ethylperfluorooctane sulfonamide (EtFOSA)
N-Ethylperfluorooctane sulfonamidoethanol (EtFOSE)
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)
N-Methylperfluorooctane sulfonamide (MeFOSA)
N-Methylperfluorooctane sulfonamidoethanol (MeFOSE)
Perfluorobutane sulfonic acid (PFBs)
Perfluorobutanoic acid (PFBA)
Perfluorodecanesulfonate (PFDS)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptane sulfonic acid (PFHpS)
Perfluoroheptanoic acid (PFHpA)
Perfluorohexane sulfonic acid (PFHxS)
Perfluorohexanoic acid (PFHxA)
Perfluorononanoic acid (PFNA)
Perfluorooctane sulfonamide (PFOSA)
Perfluorooctane sulfonic acid (PFOS)
Perfluorooctanoic acid (PFOA)
Perfluoropentane sulfonic acid (PFPeS)
Perfluoropentanoic acid (PFPeA)
Perfluorotetradecanoic acid (PFTeDA)
Perfluorotridecanoic acid (PFTrDA)
Perfluoroundecanoic acid (PFUndA)

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Water (Organic) OSDWA †
Pesticides - Water (023)
WT-TM-1107/WT-TM-1109-/WT-TM-1302; modified from EPA 3510C and EPA 8270
GC/MS - EXTRACTION
2,4-dichlorophenoxyacetic acid
2,4-DP
2,4-TP
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
Ethalfluralin
Fluazifop-p-butyl
Malathion
MCPA
Mecoprop
Metolachlor
Metribuzin
Parathion (ethyl)
Phorate
Picloram
Prometryne
Simazine
Temephos
Terbufos
Triallate
Trifluralin

Water (Organic) OSDWA †
Pesticides - Water (207)
WT-TM-1589; modified from ON MOECC E3501
LC-MS/MS
Atrazine
Atrazine-2-hydroxy
Atrazine-desethyl
Atrazine-desethyl-desisopropyl
Atrazine-desisopropyl
Azoxystrobin
Boscalid
Bromacil
Carbaryl
Chlorantraniliprole

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Clothianidin
DCPMU
Diuron
Fludioxonil
Imidacloprid
Iprodione
Linuron
Metalaxyl
Myclobutanil
Propiconazole
Pyraclostrobin
Simazine
Tebuthiuron
Trifloxystrobin
Triticonazole

Water (Organic)
Pesticides - Water (213)
WT-TM-1575; IN-HOUSE
LC-MS/MS
Chlorothalonil
Chlorothalonil-4-Hydroxy

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (068)
NA-TM-1112; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and EPA 3511
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (069)
WT-TM-1112; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and ON MOECC E3421
GRAVIMETRIC
F4G: C34-C50

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (111)
WT-TM-1406; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and EPA 5021A and EPA 8260
GC/FID - HEADSPACE
F1: C6-C10

Water (Organic)
Phenoxy Acid Herbicides - Water (209)
WT-TM-1591; modified from ON MOECC E3552
LC-MS/MS
2,4-DB
2,4-Dichlorophenoxyacetic acid
2,4,5-TP
2,4,5-Trichlorophenoxyacetic acid
Bromoxynil
Clopyralid
Dicamba
Dichlorprop

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Dinoseb
MCPA
MCPB
Mecoprop
Picloram
Triclopyr

Water (Organic) OSDWA †
Polychlorinated Biphenyls (PCB) - Water [Wastewater] (017)
WT-TM-1105/WT-TM-1301; modified from EPA 3510C and EPA 8270
GC/MS - EXTRACTION

Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Water (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Water (214)
WT-TM-1103, WT-TM-1311; modified from EPA 3510 and EPA 3570 and EPA 8270
GC/MS - EXTRACTION

1,3-Dinitropyrene
1,6-Dinitropyrene
1,8-Dinitropyrene
3-Methylcholanthrene
7-H-dibenzo(c,g)carbazole
Benzo(e)pyrene
Dibenz(a,h)acridine
Dibenz(a,j)acridine
Dibenzo(a,e)pyrene
Dibenzo(a,h)pyrene
Dibenzo(a,i)pyrene

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
Epicoprostanol
Equilenin
Equilin
Ergosterol

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Estradiol-3-benzoate
Estriol
Estrone
Mestranol
Norethindrone
Norgestrel
Progesterone
Stigmasterol
Testosterone

Water (Organic)
Sulfolane - Water (205)
WT-TM-1572; IN-HOUSE
LC-MS/MS
Sulfolane

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

Water (Organic) OSDWA †
Volatile Organic Compounds (VOC) - Water (113)
WT-TM-1406; 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 (DBCP)
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 (MBK)
2,2-Dichloropropane
4-Chlorotoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane

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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
m/p-xylene
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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APPENDIX D

Laboratory Analytical Methods

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Water-Field Tests			
Temperature, Client	Result supplied by Client	-50	Deg. C
Misc.-Field Tests			
Air volume	HYGIENE METHOD	0	
Waste-Sample Preparation			
Final pH	EPA 1311	0.10	pH units
Initial pH	EPA 1311	0.10	pH units
Water-Physical Tests			
Colour, Apparent	APHA 2120	2.0	CU
Colour, True	APHA 2120C	2.0	CU
Conductivity	APHA 2510 B	3.0	umhos/cm
Hardness (as CaCO3)	APHA 2340 B	0.50	mg/L
pH	APHA 4500 H-Electrode	0.10	pH units
Total Dissolved Solids	APHA 2540C	10	mg/L
Total Dissolved Solids	APHA 2540C	20	mg/L
Total Suspended Solids	APHA 2540 D-Gravimetric	2.0	mg/L
Turbidity	APHA 2130 B	0.10	NTU
Tissue-Physical Tests			
% Moisture	Puget Sound WQ Authority, Apr 1997	2.0	%
Soil-Physical Tests			
% Moisture	CCME PHC in Soil - Tier 1 (mod)	0.10	
% Moisture	CCME PHC in Soil - Tier 1 (mod)	0.25	%
Conductivity	MOEE E3138	0.0040	mS/cm
Grain Size Curve	ASTM D422-63		
Loss on Ignition @ 375 C	CSSS (1978) p. 160	1.0	%
Organic Matter	CSSS (1978) p. 160	1.0	%
pH	MOEE E3137A	0.10	pH units
pH (1:2 CaCl2)	CSSS 16.3 - 1:2 Extraction w/0.01M CaCl2	0.10	pH
pH (1:2 soil:water)	CSSS 16.2 - PH OF 1:2 WATER EXTRACT	0.10	pH
Soil-Particle Size			
% Clay	CSSS 55.3-Hydrometer	1.0	%
% Clay (<2um)	SSIR-51 Method 3.2.1	1.0	%
% Sand	CSSS 55.3-Hydrometer	1.0	%
% Sand (2.0mm - 0.05mm)	SSIR-51 Method 3.2.1	1.0	%
% Silt	CSSS 55.3-Hydrometer	1.0	%
% Silt (0.05mm - 2um)	SSIR-51 Method 3.2.1	1.0	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Texture	CSSS 55.3-Hydrometer		
Texture	SSIR-51 Method 3.2.1		
Dustfall-Particulates			
Fixed Insoluble Dustfall	BCMOE DUSTFALLS	0.10	mg/dm2.day
Total Insoluble Dustfall	BCMOE DUSTFALLS	0.10	mg/dm2.day
Volatile Insoluble Dustfall	BCMOE DUSTFALLS	0.10	mg/dm2.day
Air-Asbestos/Quartz/Other Fibres			
Cristobalite	NIOSH 7500		
Soil-Leachable Anions & Nutrients			
Ammonia as N	EPA 350.1	10	mg/kg
Bromide	EPA 300.1	1.0	ug/g
Chloride	EPA 300.0	5.0	ug/g
Chloride	EPA 300.1	20	ug/g
Fluoride	EPA 300.1	1.0	ug/g
Nitrate-N	EPA 300.0	1.0	ug/g
Nitrate-N	EPA 300.1	1.0	ug/g
Nitrite-N	EPA 300.0	1.0	ug/g
Nitrite-N	EPA 300.1	1.0	ug/g
Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS	0.080	ug/g
Sulphate	EPA 300.1	20	ug/g
Total Kjeldahl Nitrogen	CSSS (2008) 22.2.3	0.020	%
Water-Anions and Nutrients			
Acidity (as CaCO3)	APHA 2310 B modified	2.0	mg/L
Alkalinity, Bicarbonate (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Bicarbonate (as CaCO3)	EPA 310.2	10	mg/L
Alkalinity, Carbonate (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Carbonate (as CaCO3)	EPA 310.2	10	mg/L
Alkalinity, Hydroxide (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Hydroxide (as CaCO3)	EPA 310.2	10	mg/L
Alkalinity, Total (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Total (as CaCO3)	EPA 310.2	10	mg/L
Unionized ammonia	CALCULATION	0.050	mg/L
Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC	0.010	mg/L
Bromate	EPA 6850	0.30	ug/L
Bromide (Br)	EPA 300.1 (mod)	0.10	mg/L
Chlorate	EPA 300.1 (mod)	0.050	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Chloride (Cl)	EPA 300.1 (mod)	0.50	mg/L
Chlorite	EPA 300.1 (mod)	0.050	mg/L
Fluoride (F)	EPA 300.1 (mod)	0.020	mg/L
Nitrate and Nitrite as N	APHA 4110 B	0.10	mg/L
Nitrate (as N)	EPA 300.1 (mod)	0.020	mg/L
Nitrite (as N)	EPA 300.1 (mod)	0.0010	mg/L
Nitrite (as N)	EPA 300.1 (mod)	0.0050	mg/L
Nitrite (as N)	EPA 300.1 (mod)	0.010	mg/L
Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS	0.0030	mg/L
Phosphorus, Total	APHA 4500-P PHOSPHORUS	0.0030	mg/L
Sulfate (SO4)	EPA 300.1 (mod)	0.30	mg/L
Sulphide (as S)	APHA 4500S2D	0.018	mg/L
Sulphide (as H2S)	Calculation	0.020	mg/L
Total Kjeldahl Nitrogen	APHA 4500-Norg D	0.15	mg/L
Soil-Anions and Nutrients			
Nitrate and Nitrite as N	APHA 4110 B	1.0	ug/g
Water-Cyanides			
Cyanide, Free	ASTM 7237	0.0020	mg/L
Cyanide, Total	ISO 14403-2	0.0020	mg/L
Soil-Cyanides			
Cyanide, Weak Acid Diss	MOE 3015/APHA 4500CN I-WAD	0.050	ug/g
Water-Organic / Inorganic Carbon			
Dissolved Carbon Filtration Location	APHA 5310B		
Dissolved Organic Carbon	APHA 5310B	0.50	mg/L
Total Organic Carbon	APHA 5310B	0.50	mg/L
Soil-Organic / Inorganic Carbon			
Fraction Organic Carbon	CARTER 21.3.2	0.0010	g/g
Inorganic Carbon	CSSS (2008) P216-217	0.050	%
Inorganic Carbon (as CaCO3 Equivalent)	Calculation	0.40	%
Total Carbon by Combustion	CSSS (2008) 21.2	0.05	%
Total Organic Carbon	CARTER 21.3.2	0.10	%
Total Organic Carbon	CSSS (2008) 21.2	0.050	%
Water-Inorganic Parameters			
Chloramines	APHA 4500-Cl B	0.070	mg/L
Chlorine, Free	SM 4500-CL G, EPA 330.5	0.050	mg/L
Chlorine, Total	APHA 4500-CL G	0.050	mg/L
Silicon (as SiO2)-Total	Calculation	0.10	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Soil-Plant Available Nutrients			
Available Nitrate-N	Alberta Ag / APHA 4500 NO3F	2.0	mg/kg
Available Phosphate-P	Comm. Soil Sci. Plant Anal, 25 (5&6)	2.0	mg/kg
Available Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)	20	mg/kg
Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)	4.0	mg/kg
Soil-Saturated Paste Extractables			
% Saturation	CSSS 15.2-CALCULATION	1.0	%
Aluminum (Al)	Calculation	0.20	
Ammonia, Total (as N)	Calculation	1.0	
Boron (B)	Calculation	0.10	
Calcium (Ca)	CSSS CH15/EPA 6010B	5.0	mg/L
Calcium (Ca)	Calculation	0.50	
Calcium (Ca)	SW846 6010C	0.50	mg/L
Chloride (Cl)	CSSS 15.2.1; APHA 4500-Cl E	20	mg/L
Chloride (Cl)	Calculation	0.50	
Conductivity Sat. Paste	CSSS 15.2.1 & 15.3.1	0.010	dS/m
Iron (Fe)	Calculation	0.030	
Magnesium (Mg)	CSSS CH15/EPA 6010B	5.0	mg/L
Magnesium (Mg)	Calculation	0.10	
Magnesium (Mg)	SW846 6010C	0.50	mg/L
Manganese (Mn)	Calculation	0.0050	
Nitrate-N	Calculation	0.50	
Nitrite-N	Calculation	0.50	
Potassium (K)	CSSS CH15/EPA 6010B	5.0	mg/L
Potassium (K)	Calculation	0.10	
SAR	CSSS 15.4.4-Calculation	0.10	units
SAR	SW846 6010C	0.10	units
Sodium (Na)	CSSS CH15/EPA 6010B	5.0	mg/L
Sodium (Na)	Calculation	1.0	
Sodium (Na)	SW846 6010C	0.50	mg/L
Sulfate (SO4)	Calculation	0.50	
Sulfur (as SO4)	CSSS CH15/EPA 6010B	6.0	mg/L
Sulfur (as SO4)	Calculation	0.50	
Water-Bacteriological Tests			
E. Coli	SM 9222D	0	CFU/100 mL
Escherichia Coli	APHA 9223B	0	MPN/100 mL
Fecal Coliforms	SM 9222D	0	CFU/100 mL

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Heterotrophic Plate Count	SM 9215D	0	CFU/mL
Total Coliforms	APHA 9223B	0	MPN/100 mL
Total Coliforms	SM 9222B	0	CFU/100 mL
Soil-Bacteriological Tests			
E. Coli	E3433	10	CFU/g dwt
Fecal Coliform	SM 9222D	10	CFU/g dwt
Tissue-Metals			
Aluminum (Al)	EPA 200.3/6020B (mod)	0.60	mg/kg wwt
Aluminum (Al)-Total	EPA 200.3/6020B	5.0	mg/kg
Antimony (Sb)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Antimony (Sb)-Total	EPA 200.3/6020B	0.010	mg/kg
Arsenic (As)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Arsenic (As)-Total	EPA 200.3/6020B	0.030	mg/kg
Barium (Ba)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Barium (Ba)-Total	EPA 200.3/6020B	0.050	mg/kg
Beryllium (Be)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Beryllium (Be)-Total	EPA 200.3/6020B	0.010	mg/kg
Bismuth (Bi)	EPA 200.3/6020B (mod)	0.0040	mg/kg wwt
Bismuth (Bi)-Total	EPA 200.3/6020B	0.010	mg/kg
Boron (B)	EPA 200.3/6020B (mod)	0.40	mg/kg wwt
Boron (B)-Total	EPA 200.3/6020B	1.0	mg/kg
Cadmium (Cd)	EPA 200.3/6020B (mod)	0.0040	mg/kg wwt
Cadmium (Cd)-Total	EPA 200.3/6020B	0.010	mg/kg
Calcium (Ca)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Calcium (Ca)-Total	EPA 200.3/6020B	20	mg/kg
Cesium (Cs)	EPA 200.3/6020B (mod)	0.0040	mg/kg wwt
Cesium (Cs)-Total	EPA 200.3/6020B	0.0050	mg/kg
Chromium (Cr)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Chromium (Cr)-Total	EPA 200.3/6020B	0.20	mg/kg
Cobalt (Co)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Cobalt (Co)-Total	EPA 200.3/6020B	0.020	mg/kg
Copper (Cu)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Copper (Cu)-Total	EPA 200.3/6020B	0.20	mg/kg
Iron (Fe)	EPA 200.3/6020B (mod)	1.0	mg/kg wwt
Iron (Fe)-Total	EPA 200.3/6020B	5.0	mg/kg
Lead (Pb)	EPA 200.3/6020B (mod)	0.0080	mg/kg wwt
Lead (Pb)-Total	EPA 200.3/6020B	0.050	mg/kg
Lithium (Li)	EPA 200.3/6020B (mod)	0.10	mg/kg wwt
Lithium (Li)-Total	EPA 200.3/6020B	0.50	mg/kg
Magnesium (Mg)	EPA 200.3/6020B (mod)	2.0	mg/kg wwt
Magnesium (Mg)-Total	EPA 200.3/6020B	2.0	mg/kg
Manganese (Mn)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Manganese (Mn)-Total	EPA 200.3/6020B	0.050	mg/kg
Mercury (Hg)	EPA 200.3/1631E (mod)	0.0010	mg/kg wwt
Mercury (Hg)-Total	EPA 200.3, EPA 245.7	0.0050	mg/kg
Molybdenum (Mo)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Molybdenum (Mo)-Total	EPA 200.3/6020B	0.040	mg/kg
Nickel (Ni)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Nickel (Ni)-Total	EPA 200.3/6020B	0.20	mg/kg
Phosphorus (P)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Phosphorus (P)-Total	EPA 200.3/6020B	10	mg/kg
Potassium (K)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Potassium (K)-Total	EPA 200.3/6020B	20	mg/kg
Rubidium (Rb)-Total	EPA 200.3/6020B	0.050	mg/kg
Selenium (Se)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Selenium (Se)-Total	EPA 200.3/6020B	0.10	mg/kg
Silver (Ag)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Silver (Ag)-Total	EPA 200.3/6020B	0.0050	mg/kg
Sodium (Na)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Sodium (Na)-Total	EPA 200.3/6020B	20	mg/kg
Strontium (Sr)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Strontium (Sr)-Total	EPA 200.3/6020B	0.10	mg/kg
Sulfur (S)	EPA 200.3/6020B (mod)	20	mg/kg wwt
Tellurium (Te)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Tellurium (Te)-Total	EPA 200.3/6020B	0.020	mg/kg
Thallium (Tl)	EPA 200.3/6020B (mod)	0.0060	mg/kg wwt
Thallium (Tl)-Total	EPA 200.3/6020B	0.0020	mg/kg
Thorium (Th)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Tin (Sn)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Tin (Sn)-Total	EPA 200.3/6020B	0.10	mg/kg
Titanium (Ti)	EPA 200.3/6020B (mod)	0.030	mg/kg wwt
Titanium (Ti)-Total	EPA 200.3/6020B	0.50	mg/kg
Uranium (U)	EPA 200.3/6020B (mod)	0.0020	mg/kg wwt
Uranium (U)-Total	EPA 200.3/6020B	0.0020	mg/kg
Vanadium (V)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Vanadium (V)-Total	EPA 200.3/6020B	0.10	mg/kg
Zinc (Zn)	EPA 200.3/6020B (mod)	0.20	mg/kg wwt
Zinc (Zn)-Total	EPA 200.3/6020B	1.0	mg/kg
Zirconium (Zr)	EPA 200.3/6020B (mod)	0.60	mg/kg wwt
Zirconium (Zr)-Total	EPA 200.3/6020B	0.20	mg/kg

Soil-Metals

Parameter	Method Reference	Report D.L.	Units
Aluminum (Al)	EPA 200.2/6020A (mod)	50	mg/kg
Antimony (Sb)	EPA 200.2/6020A (mod)	1	mg/kg
Arsenic (As)	EPA 200.2/6020A (mod)	0.2	mg/kg
Arsenic (As)	EPA 200.2/6020A (mod)	1	mg/kg
Barium (Ba)	EPA 200.2/6020A (mod)	0.5	mg/kg
Barium (Ba)	EPA 200.2/6020A (mod)	1	mg/kg
Beryllium (Be)	EPA 200.2/6020A (mod)	0.5	mg/kg
Boron (B)	EPA 200.2/6020A (mod)	5	mg/kg
Boron (B), Hot Water Ext.	HW EXTR, EPA 6010B	0.10	ug/g
Cadmium (Cd)	EPA 200.2/6020A (mod)	0.5	mg/kg
Calcium (Ca)	EPA 200.2/6020A (mod)	50	mg/kg
Chromium (Cr)	EPA 200.2/6020A (mod)	1	mg/kg
Cobalt (Co)	EPA 200.2/6020A (mod)	1	mg/kg
Copper (Cu)	EPA 200.2/6020A (mod)	1	mg/kg

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Iron (Fe)	EPA 200.2/6020A (mod)	50	mg/kg
Lead (Pb)	EPA 200.2/6020A (mod)	1	mg/kg
Magnesium (Mg)	EPA 200.2/6020A (mod)	20	mg/kg
Manganese (Mn)	EPA 200.2/6020A (mod)	1	mg/kg
Mercury (Hg)	EPA 200.2/1631E (mod)	0.0050	mg/kg
Molybdenum (Mo)	EPA 200.2/6020A (mod)	1	mg/kg
Nickel (Ni)	EPA 200.2/6020A (mod)	1	mg/kg
Phosphorus (P)	EPA 200.2/6020A (mod)	50	mg/kg
Potassium (K)	EPA 200.2/6020A (mod)	100	mg/kg
Selenium (Se)	EPA 200.2/6020A (mod)	1	mg/kg
Silver (Ag)	EPA 200.2/6020A (mod)	0.2	mg/kg
Sodium (Na)	EPA 200.2/6020A (mod)	100	mg/kg
Thallium (Tl)	EPA 200.2/6020A (mod)	0.05	mg/kg
Thallium (Tl)	EPA 200.2/6020A (mod)	0.5	mg/kg
Uranium (U)	EPA 200.2/6020A (mod)	1	mg/kg
Vanadium (V)	EPA 200.2/6020A (mod)	1	mg/kg
Zinc (Zn)	EPA 200.2/6020A (mod)	5	mg/kg
Dustfall-Metals			
Aluminum (Al)-Total	EPA 6020A	0.0050	mg/dm2.day
Antimony (Sb)-Total	EPA 6020A	0.00010	mg/dm2.day
Arsenic (As)-Total	EPA 6020A	0.0050	mg/dm2.day
Barium (Ba)-Total	EPA 6020A	0.00080	mg/dm2.day
Beryllium (Be)-Total	EPA 6020A	0.00050	mg/dm2.day
Bismuth (Bi)-Total	EPA 6020A	0.00050	mg/dm2.day
Boron (B)-Total	EPA 6020A	0.010	mg/dm2.day
Cadmium (Cd)-Total	EPA 6020A	0.00050	mg/dm2.day
Calcium (Ca)-Total	EPA 6020A	0.080	mg/dm2.day
Cesium (Cs)-Total	EPA 6020A	0.000050	mg/dm2.day
Chromium (Cr)-Total	EPA 6020A	0.00050	mg/dm2.day
Cobalt (Co)-Total	EPA 6020A	0.00010	mg/dm2.day
Copper (Cu)-Total	EPA 6020A	0.0010	mg/dm2.day
Interval	EPA 6020A	1	days

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Interval	EPA SW846 7470A	1	days
Iron (Fe)-Total	EPA 6020A	0.0080	mg/dm2.day
Lead (Pb)-Total	EPA 6020A	0.000080	mg/dm2.day
Lithium (Li)-Total	EPA 6020A	0.0050	mg/dm2.day
Magnesium (Mg)-Total	EPA 6020A	0.0050	mg/dm2.day
Manganese (Mn)-Total	EPA 6020A	0.00030	mg/dm2.day
Mercury (Hg)-Total	EPA SW846 7470A	0.000050	mg/dm2.day
Molybdenum (Mo)-Total	EPA 6020A	0.000050	mg/dm2.day
Nickel (Ni)-Total	EPA 6020A	0.00050	mg/dm2.day
Phosphorus (P)-Total	EPA 6020A	0.050	mg/dm2.day
Potassium (K)-Total	EPA 6020A	0.050	mg/dm2.day
Rubidium (Rb)-Total	EPA 6020A	0.00010	mg/dm2.day
Selenium (Se)-Total	EPA 6020A	0.0010	mg/dm2.day
Silicon (Si)-Total	EPA 6020A	0.050	mg/dm2.day
Silver (Ag)-Total	EPA 6020A	0.000010	mg/dm2.day
Sodium (Na)-Total	EPA 6020A	0.050	mg/dm2.day
Strontium (Sr)-Total	EPA 6020A	0.00010	mg/dm2.day
Sulfur (S)-Total	EPA 6020A	0.50	mg/dm2.day
Tellurium (Te)-Total	EPA 6020A	0.00010	mg/dm2.day
Thallium (Tl)-Total	EPA 6020A	0.00010	mg/dm2.day
Thorium (Th)-Total	EPA 6020A	0.000050	mg/dm2.day
Tin (Sn)-Total	EPA 6020A	0.00010	mg/dm2.day
Titanium (Ti)-Total	EPA 6020A	0.010	mg/dm2.day
Tungsten (W)-Total	EPA 6020A	0.00010	mg/dm2.day
Uranium (U)-Total	EPA 6020A	0.000010	mg/dm2.day
Vanadium (V)-Total	EPA 6020A	0.0010	mg/dm2.day

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Zinc (Zn)-Total	EPA 6020A	0.0030	mg/dm2. day
Zirconium (Zr)-Total	EPA 6020A	0.00050	mg/dm2. day
Water-Total Metals			
Aluminum (Al)-Total	EPA 200.2/6020A (mod)	0.005	mg/L
Aluminum (Al)-Total	EPA 200.2/6020A (mod)	0.01	mg/L
Aluminum (Al)-Total	EPA 6020A	10	ug/L
Antimony (Sb)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Arsenic (As)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Arsenic (As)-Total	EPA 6020A	1	ug/L
Barium (Ba)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Barium (Ba)-Total	EPA 6020A	10	ug/L
Beryllium (Be)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Bismuth (Bi)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Boron (B)-Total	EPA 200.2/6020A (mod)	0.01	mg/L
Cadmium (Cd)-Total	EPA 200.2/6020A (mod)	0.000005	mg/L
Cadmium (Cd)-Total	EPA 6020A	0.1	ug/L
Calcium (Ca)	EPA 6020A	0.5	mg/L
Calcium (Ca)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Calcium (Ca)-Total	EPA 200.2/6020A (mod)	0.5	mg/L
Chromium (Cr)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Chromium (Cr)-Total	EPA 6020A	1	ug/L
Cobalt (Co)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Cobalt (Co)-Total	EPA 6020A	0.5	ug/L
Copper (Cu)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Copper (Cu)-Total	EPA 200.2/6020A (mod)	0.001	mg/L
Copper (Cu)-Total	EPA 6020A	1	ug/L
Iron (Fe)-Total	EPA 200.2/6020A (mod)	0.01	mg/L
Iron (Fe)-Total	EPA 6020A	50	ug/L
Lead (Pb)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Lead (Pb)-Total	EPA 6020A	1	ug/L
Lithium (Li)-Total	EPA 200.2/6020A (mod)	0.001	mg/L
Magnesium (Mg)	EPA 6020A	0.5	mg/L
Magnesium (Mg)-Total	EPA 200.2/6020A (mod)	0.005	mg/L
Magnesium (Mg)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Magnesium (Mg)-Total	EPA 200.2/6020A (mod)	0.1	mg/L
Manganese (Mn)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Manganese (Mn)-Total	EPA 6020A	0.001	mg/L
Mercury	EPA 1631E (mod)	0.10	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Mercury (Hg)-Total	EPA 1631E (mod)	0.0000050	mg/L
Molybdenum (Mo)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Molybdenum (Mo)-Total	EPA 6020A	0.5	ug/L
Nickel (Ni)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Nickel (Ni)-Total	EPA 6020A	1	ug/L
Phosphorus (P)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Phosphorus (P)-Total	EPA 6020A	0.05	mg/L
Potassium (K)	EPA 6020A	1	mg/L
Potassium (K)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Selenium (Se)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Selenium (Se)-Total	EPA 6020A	5	ug/L
Silicon (Si)-Total	EPA 200.2/6020A (mod)	0.1	mg/L
Silver (Ag)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Silver (Ag)-Total	EPA 6020A	0.05	ug/L
Sodium (Na)	EPA 6020A	0.5	mg/L
Sodium (Na)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Strontium (Sr)-Total	EPA 200.2/6020A (mod)	0.001	mg/L
Thallium (Tl)-Total	EPA 200.2/6020A (mod)	0.00001	mg/L
Thallium (Tl)-Total	EPA 6020A	0.06	ug/L
Tin (Sn)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Titanium (Ti)-Total	EPA 200.2/6020A (mod)	0.0003	mg/L
Tungsten (W)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Uranium (U)-Total	EPA 200.2/6020A (mod)	0.00001	mg/L
Uranium (U)-Total	EPA 6020A	5	ug/L
Vanadium (V)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Zinc (Zn)-Total	EPA 200.2/6020A (mod)	0.003	mg/L
Zinc (Zn)-Total	EPA 6020A	3	ug/L
Zirconium (Zr)-Total	EPA 200.2/6020A (mod)	0.0003	mg/L
Water-Total Metals (Undigested)			
Aluminum (Al)-Total	EPA SW-846 6020A	0.001	mg/L
Aluminum (Al)-Total	EPA SW-846 6020A	0.003	mg/L
Antimony (Sb)-Total	EPA SW-846 6020A	0.0001	mg/L
Arsenic (As)-Total	EPA SW-846 6020A	0.00003	mg/L
Arsenic (As)-Total	EPA SW-846 6020A	0.0001	mg/L
Barium (Ba)-Total	EPA SW-846 6020A	0.00005	mg/L
Beryllium (Be)-Total	EPA SW-846 6020A	0.0005	mg/L
Bismuth (Bi)-Total	EPA SW-846 6020A	0.0005	mg/L
Boron (B)-Total	EPA SW-846 6020A	0.01	mg/L
Cadmium (Cd)-Total	EPA SW-846 6020A	0.000005	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Cadmium (Cd)-Total	EPA SW-846 6020A	0.00001	mg/L
Calcium (Ca)-Total	EPA SW-846 6020A	0.02	mg/L
Calcium (Ca)-Total	EPA SW-846 6020A	0.05	mg/L
Chromium (Cr)-Total	EPA SW-846 6020A	0.0001	mg/L
Chromium (Cr)-Total	EPA SW-846 6020A	0.0005	mg/L
Cobalt (Co)-Total	EPA SW-846 6020A	0.00005	mg/L
Cobalt (Co)-Total	EPA SW-846 6020A	0.0001	mg/L
Copper (Cu)-Total	EPA SW-846 6020A	0.0002	mg/L
Copper (Cu)-Total	EPA SW-846 6020A	0.0005	mg/L
Iron (Fe)-Total	EPA SW-846 6020A	0.005	mg/L
Iron (Fe)-Total	EPA SW-846 6020A	0.03	mg/L
Lead (Pb)-Total	EPA SW-846 6020A	0.00003	mg/L
Lead (Pb)-Total	EPA SW-846 6020A	0.00005	mg/L
Lithium (Li)-Total	EPA SW-846 6020A	0.001	mg/L
Magnesium (Mg)-Total	EPA SW-846 6020A	0.005	mg/L
Magnesium (Mg)-Total	EPA SW-846 6020A	0.05	mg/L
Manganese (Mn)-Total	EPA SW-846 6020A	0.00007	mg/L
Molybdenum (Mo)-Total	EPA SW-846 6020A	0.00005	mg/L
Nickel (Ni)-Total	EPA SW-846 6020A	0.0001	mg/L
Nickel (Ni)-Total	EPA SW-846 6020A	0.0005	mg/L
Phosphorus (P)-Total	EPA SW-846 6020A	0.3	mg/L
Potassium (K)-Total	EPA SW-846 6020A	0.05	mg/L
Potassium (K)-Total	EPA SW-846 6020A	0.2	mg/L
Selenium (Se)-Total	EPA SW-846 6020A	0.00005	mg/L
Selenium (Se)-Total	EPA SW-846 6020A	0.001	mg/L
Silicon (Si)-Total	EPA SW-846 6020A	0.1	mg/L
Silver (Ag)-Total	EPA SW-846 6020A	0.00001	mg/L
Sodium (Na)-Total	EPA SW-846 6020A	0.02	mg/L
Sodium (Na)-Total	EPA SW-846 6020A	0.05	mg/L
Strontium (Sr)-Total	EPA SW-846 6020A	0.0001	mg/L
Thallium (Tl)-Total	EPA SW-846 6020A	0.00001	mg/L
Thallium (Tl)-Total	EPA SW-846 6020A	0.0001	mg/L
Tin (Sn)-Total	EPA SW-846 6020A	0.0001	mg/L
Titanium (Ti)-Total	EPA SW-846 6020A	0.01	mg/L
Uranium (U)-Total	EPA SW-846 6020A	0.00001	mg/L
Vanadium (V)-Total	EPA SW-846 6020A	0.001	mg/L
Zinc (Zn)-Total	EPA SW-846 6020A	0.001	mg/L
Zinc (Zn)-Total	EPA SW-846 6020A	0.003	mg/L

Water-Dissolved Metals

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Aluminum (Al)-Dissolved	APHA 3030B/6020A (mod)	0.005	mg/L
Aluminum (Al)-Dissolved	EPA SW-846 6020A	0.0006	mg/L
Aluminum (Al)-Dissolved	EPA SW-846 6020A	0.003	mg/L
Antimony (Sb)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Arsenic (As)-Dissolved	APHA 3030B/6020A (mod)	0.0001	mg/L
Arsenic (As)-Dissolved	EPA SW-846 6020A	0.00002	mg/L
Arsenic (As)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Barium (Ba)-Dissolved	EPA SW-846 6020A	0.00005	mg/L
Beryllium (Be)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Bismuth (Bi)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Boron (B)-Dissolved	EPA SW-846 6020A	0.01	mg/L
Cadmium (Cd)-Dissolved	APHA 3030B/6020A (mod)	0.00001	mg/L
Cadmium (Cd)-Dissolved	EPA SW-846 6020A	0.00001	mg/L
Calcium (Ca)-Dissolved	APHA 3030B/6020A (mod)	0.05	mg/L
Calcium (Ca)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Calcium (Ca)-Dissolved	EPA SW-846 6020A	0.02	mg/L
Calcium (Ca)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Chromium (Cr)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Cobalt (Co)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Copper (Cu)-Dissolved	APHA 3030B/6020A (mod)	0.0002	mg/L
Copper (Cu)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Copper (Cu)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Dissolved Mercury Filtration Location	EPA 1631E (mod)		
Dissolved Metals Filtration Location	APHA 3030B/6020A (mod)		
Iron (Fe)-Dissolved	APHA 3030B/6020A (mod)	0.01	mg/L
Iron (Fe)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Iron (Fe)-Dissolved	EPA SW-846 6020A	0.03	mg/L
Lead (Pb)-Dissolved	APHA 3030B/6020A (mod)	0.00005	mg/L
Lead (Pb)-Dissolved	EPA SW-846 6020A	0.000009	mg/L
Lead (Pb)-Dissolved	EPA SW-846 6020A	0.00005	mg/L
Lithium (Li)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Magnesium (Mg)-Dissolved	APHA 3030B/6020A (mod)	0.05	mg/L
Magnesium (Mg)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Magnesium (Mg)-Dissolved	EPA SW-846 6020A	0.005	mg/L
Magnesium (Mg)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Manganese (Mn)-Dissolved	APHA 3030B/6020A (mod)	0.0005	mg/L
Manganese (Mn)-Dissolved	EPA SW-846 6020A	0.00007	mg/L
Mercury (Hg)-Dissolved	EPA 1631E (mod)	0.0000050	mg/L
Molybdenum (Mo)-Dissolved	APHA 3030B/6020A (mod)	0.00005	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Molybdenum (Mo)-Dissolved	EPA SW-846 6020A	0.00005	mg/L
Nickel (Ni)-Dissolved	APHA 3030B/6020A (mod)	0.0005	mg/L
Nickel (Ni)-Dissolved	EPA SW-846 6020A	0.00009	mg/L
Nickel (Ni)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Potassium (K)-Dissolved	APHA 3030B/6020A (mod)	0.05	mg/L
Potassium (K)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Potassium (K)-Dissolved	EPA SW-846 6020A	0.2	mg/L
Selenium (Se)-Dissolved	APHA 3030B/6020A (mod)	0.00005	mg/L
Selenium (Se)-Dissolved	EPA SW-846 6020A	0.00004	mg/L
Selenium (Se)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Silicon (Si)-Dissolved	EPA SW-846 6020A	0.1	mg/L
Silver (Ag)-Dissolved	EPA SW-846 6020A	0.00001	mg/L
Sodium (Na)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Sodium (Na)-Dissolved	EPA SW-846 6020A	0.02	mg/L
Sodium (Na)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Strontium (Sr)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Thallium (Tl)-Dissolved	APHA 3030B/6020A (mod)	0.00001	mg/L
Thallium (Tl)-Dissolved	EPA SW-846 6020A	0.000002	mg/L
Thallium (Tl)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Tin (Sn)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Titanium (Ti)-Dissolved	EPA SW-846 6020A	0.01	mg/L
Uranium (U)-Dissolved	APHA 3030B/6020A (mod)	0.00001	mg/L
Uranium (U)-Dissolved	EPA SW-846 6020A	0.000007	mg/L
Uranium (U)-Dissolved	EPA SW-846 6020A	0.00001	mg/L
Vanadium (V)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Zinc (Zn)-Dissolved	APHA 3030B/6020A (mod)	0.001	mg/L
Zinc (Zn)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Zinc (Zn)-Dissolved	EPA SW-846 6020A	0.003	mg/L
Water-Speciated Metals			
Chromium, Hexavalent	EPA 7199	0.00050	mg/L
Soil-Speciated Metals			
Chromium, Hexavalent	SW846 3060A/7199	0.20	ug/g
Waste-TCLP Extractables			
2,3,4,6-Tetrachlorophenol	SW846 8270	0.0050	mg/L
2,4,5-Trichlorophenol	SW846 8270	0.0050	mg/L
2,4,6-Tribromophenol	SW846 8270	1	
2,4,6-Trichlorophenol	SW846 8270	0.0050	mg/L
2,4-Dichlorophenol	SW846 8270	0.0050	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
2,4-Dinitrotoluene	SW846 8270	0.0040	mg/L
2-Fluorobiphenyl	SW846 8270	1	
2-Methylphenol	SW846 8270	0.0050	mg/L
Aroclor 1242	SW846 8270	0.00020	mg/L
Aroclor 1248	SW846 8270	0.00020	mg/L
Aroclor 1254	SW846 8270	0.00020	mg/L
Aroclor 1260	SW846 8270	0.00020	mg/L
Benzo(a)pyrene	SW846 8270	0.00020	mg/L
Cresols (total)	SW846 8270	0.012	mg/L
Decachlorobiphenyl	SW846 8270	1	
Hexachlorobenzene	SW846 8270	0.0040	mg/L
Hexachlorobutadiene	SW846 8270	0.0040	mg/L
Hexachloroethane	SW846 8270	0.0040	mg/L
3&4-Methylphenol	SW846 8270	0.010	mg/L
Nitrobenzene	SW846 8270	0.0040	mg/L
Nitrobenzene d5	SW846 8270	1	
d14-Terphenyl	SW846 8270	1	
p-Terphenyl d14	SW846 8270	1	
Total PCBs	SW846 8270	0.00020	mg/L
Pentachlorophenol	SW846 8270	0.0050	mg/L
Pyridine	SW846 8260D	2.0	mg/L
Waste-TCLP Metals			
Arsenic (As)	EPA 6020B	0.05	mg/L
Barium (Ba)	EPA 6020B	0.5	mg/L
Cadmium (Cd)	EPA 6020B	0.005	mg/L
Chromium (Cr)	EPA 6020B	0.05	mg/L
Cobalt (Co)-Total	EPA 200.8	0.03	mg/L
Copper (Cu)-Total	EPA 200.8	0.5	mg/L
Lead (Pb)	EPA 6020B	0.05	mg/L
Mercury (Hg)	EPA 1631E	0.00010	mg/L
Molybdenum (Mo)-Total	EPA 200.8	0.05	mg/L
Nickel (Ni)-Total	EPA 200.8	0.1	mg/L
Thallium (Tl)-Total	EPA 200.8	5	mg/L
Uranium (U)	EPA 6020B	0.3	mg/L
Zinc (Zn)-Total	EPA 200.8	1	mg/L
Waste-TCLP VOCs			
1,1-Dichloroethylene	SW846 8260	0.025	mg/L
1,2-Dichlorobenzene	SW846 8260	0.025	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,2-Dichloroethane	SW846 8260	0.025	mg/L
1,4-Dichlorobenzene	SW846 8260	0.025	mg/L
4-Bromofluorobenzene	SW846 8260	1	
Benzene	SW846 8260	0.025	mg/L
Carbon tetrachloride	SW846 8260	0.025	mg/L
Chlorobenzene	SW846 8260	0.025	mg/L
Chloroform	SW846 8260	0.10	mg/L
Methyl Ethyl Ketone	SW846 8260	1.0	mg/L
Dichloromethane	SW846 8260	0.50	mg/L
Tetrachloroethylene	SW846 8260	0.025	mg/L
Trichloroethylene	SW846 8260	0.025	mg/L
Vinyl chloride	SW846 8260	0.050	mg/L
	Waste-Waste Characterizations		
Flash Point	ASTM D-93	30.0	Deg. C
	Water-Aggregate Organics		
BOD	APHA 5210 B	2.0	mg/L
COD	APHA 5220 D	10	mg/L
Oil and Grease, Total	APHA 5520 B	5.0	mg/L
Mineral Oil and Grease	APHA 5520 B	2.5	mg/L
Phenols (4AAP)	EPA 9066	0.0010	mg/L
	Soil-Aggregate Organics		
Oil and Grease, Total	APHA 5520 B	500	mg/kg
Phenols (4AAP)	EPA 9066	0.10	mg/kg
	Waste-Volatile Organic Compounds		
4-Bromofluorobenzene	SW846 8260	1	
Dichlorobromomethane	SW846 8260	0.025	mg/L
Bromoform	SW846 8260	0.025	mg/L
Dibromochloromethane	SW846 8260	0.025	mg/L
Chloroform	SW846 8260	0.10	mg/L
Total THMs	SW846 8260	0.18	mg/L
	Water-Volatile Organic Compounds		
1,1-dichloroethylene (vinylidene chlorid	SW846 8260	0.50	ug/L
1,2-Dichlorobenzene	SW846 8260	0.50	ug/L
1,2-Dichloroethane	SW846 8260	0.50	ug/L
1,4-Dichlorobenzene	SW846 8260	0.50	ug/L
1,4-Difluorobenzene	SW846 8260	1	%
1,4-Difluorobenzene	SW846 8260	1	
1,4-Difluorobenzene	SW846 8260 (511)	1	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,4-Difluorobenzene	SW846 8260 (HEADSPACE)	1	
4-Bromofluorobenzene	SW846 8260	1	%
4-Bromofluorobenzene	SW846 8260	1	
4-Bromofluorobenzene	SW846 8260 (511)	1	%
4-Bromofluorobenzene	SW846 8260 (HEADSPACE)	1	
Benzene	SW846 8260	0.50	ug/L
Benzene	SW846 8260 (511)	0.50	ug/L
Benzene	SW846 8260 (HEADSPACE)	0.5	ug/L
Carbon tetrachloride	SW846 8260	0.20	ug/L
Monochlorobenzene	SW846 8260	0.50	ug/L
Ethylbenzene	SW846 8260	0.50	ug/L
Ethylbenzene	SW846 8260 (511)	0.50	ug/L
Ethylbenzene	SW846 8260 (HEADSPACE)	0.5	ug/L
m+p-Xylenes	SW846 8260 (511)	0.40	ug/L
m/p-xylene	SW846 8260	1.0	ug/L
MTBE	SW846 8260	0.5	ug/L
Dichloromethane	SW846 8260	5.0	ug/L
o-Xylene	SW846 8260 (511)	0.30	ug/L
o-xylene	SW846 8260	0.50	ug/L
Tetrachloroethylene (perchloroethylene)	SW846 8260	0.50	ug/L
Toluene	SW846 8260	0.50	ug/L
Toluene	SW846 8260 (511)	0.50	ug/L
Toluene	SW846 8260 (HEADSPACE)	0.5	ug/L
Trichloroethylene	SW846 8260	0.50	ug/L
Vinyl chloride	SW846 8260	0.20	ug/L
Xylenes (Total)	SW846 8260	0.50	ug/L

Soil-Volatile Organic Compounds

Parameter	Method Reference	Report D.L.	Units
1,3-Dichloropropene (cis & trans)	SW8260B/SW8270C	0.0020	mg/kg

Water-Hydrocarbons

Parameter	Method Reference	Report D.L.	Units
2-Bromobenzotrifluoride	EPA 3511/CCME Tier 1	1	
2-Bromobenzotrifluoride	MOE DECPH-E3421/CCME TIER 1	1	
3,4-Dichlorotoluene	E3398/CCME TIER 1-HS	1	
3,4-Dichlorotoluene	E3421/CCME (HS)	1	
Chrom. to baseline at nC50	EPA 3511/CCME Tier 1		
Chrom. to baseline at nC50	MOE DECPH-E3421/CCME TIER 1		
F2-Naphth	CCME CWS-PHC, Pub #1310, Dec 2001-L	100	ug/L
F3-PAH	CCME CWS-PHC, Pub #1310, Dec 2001-L	250	ug/L
F2 (C10-C16)	EPA 3511/CCME Tier 1	100	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
F2 (C10-C16)	MOE DECPH-E3421/CCME TIER 1	100	ug/L
F3 (C16-C34)	EPA 3511/CCME Tier 1	250	ug/L
F3 (C16-C34)	MOE DECPH-E3421/CCME TIER 1	250	ug/L
F4 (C34-C50)	EPA 3511/CCME Tier 1	250	ug/L
F4 (C34-C50)	MOE DECPH-E3421/CCME TIER 1	250	ug/L
Total Hydrocarbons (C6-C50)	CCME CWS-PHC, Pub #1310, Dec 2001-L	250	ug/L
F1 (C6-C10)	E3398/CCME TIER 1-HS	25	ug/L
F1 (C6-C10)	E3421/CCME (HS)	100	ug/L
F1-BTEX	CCME CWS-PHC, Pub #1310, Dec 2001-L	100	ug/L
Soil-Hydrocarbons			
2-Bromobenzotrifluoride	CCME Tier 1	1	
3,4-Dichlorotoluene	E3398/CCME TIER 1-HS	1	
Chrom. to baseline at nC50	CCME Tier 1		
F2-Naphth	CCME CWS-PHC, Pub #1310, Dec 2001-S	10	ug/g
F3-PAH	CCME CWS-PHC, Pub #1310, Dec 2001-S	50	ug/g
F2 (C10-C16)	CCME Tier 1	10	ug/g
F3 (C16-C34)	CCME Tier 1	50	ug/g
F4 (C34-C50)	CCME Tier 1	50	ug/g
Total Hydrocarbons (C6-C50)	CCME CWS-PHC, Pub #1310, Dec 2001-S	50	ug/g
F1 (C6-C10)	E3398/CCME TIER 1-HS	5.0	ug/g
F1-BTEX	CCME CWS-PHC, Pub #1310, Dec 2001-S	10	ug/g
Tissue-Polycyclic Aromatic Hydrocarbons			
1-Methyl Naphthalene	CARB 429	0	ng/g
1-Methylnaphthalene-d10	CARB 429	1.0	%
2-Methyl Naphthalene	CARB 429	0	ng/g
2-Methylnaphthalene-D10	CARB 429	1.0	%
Acenaphthene	CARB 429	0	ng/g
Acenaphthylene	CARB 429	0	ng/g
Acenaphthylene d8	CARB 429	1.0	%
Anthracene	CARB 429	0	ng/g
Anthracene-D10	CARB 429	1.0	%
Benz(a)anthracene-D12	CARB 429	1.0	%
Benz(a)anthracene	CARB 429	0	ng/g
Benzo(a)pyrene	CARB 429	0	ng/g
Benzo(a)pyrene d12	CARB 429	1.0	%
Benzo(b)fluoranthene	CARB 429	0	ng/g
Benzo(b)fluoranthene-D12	CARB 429	1.0	%
Benzo(e)pyrene	CARB 429	0	ng/g

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Benzo(ghi)perylene	CARB 429	0	ng/g
Benzo(g,h,i)perylene d12	CARB 429	1.0	%
Benzo(k)fluoranthene	CARB 429	0	ng/g
Benzo(k)fluoranthene-D12	CARB 429	1.0	%
Biphenyl	CARB 429	0	ng/g
Chrysene	CARB 429	0	ng/g
Chrysene d12	CARB 429	1.0	%
Dibenz(a,h)anthracene-D14	CARB 429	1.0	%
Dibenzo(ah)anthracene	CARB 429	0	ng/g
Fluoranthene	CARB 429	0	ng/g
Fluoranthene d10	CARB 429	1.0	%
Fluorene	CARB 429	0	ng/g
Fluorene d10	CARB 429	1.0	%
Indeno(1,2,3,cd)pyrene-D12	CARB 429	1.0	%
Indeno(1,2,3 cd)pyrene	CARB 429	0	ng/g
Naphthalene	CARB 429	0	ng/g
Naphthalene d8	CARB 429	1.0	%
Perylene	CARB 429	0	ng/g
Perylene d12	CARB 429	1.0	%
Phenanthrene	CARB 429	0	ng/g
Phenanthrene d10	CARB 429	1.0	%
Pyrene	CARB 429	0	ng/g
Terphenyl d14(Surr.)	CARB 429	1.0	%

Soil-Polycyclic Aromatic Hydrocarbons

1-Methylnaphthalene	SW846 3510/8270	0.030	ug/g
2-Fluorobiphenyl	SW486 8270	1	%
2-Fluorobiphenyl	SW486 8270	1	
2-Fluorobiphenyl	SW846 3510/8270	1	%
2-Methylnaphthalene	SW846 3510/8270	0.030	ug/g
Acenaphthene	SW846 3510/8270	0.050	ug/g
Acenaphthylene	SW846 3510/8270	0.050	ug/g
Anthracene	SW846 3510/8270	0.050	ug/g
Benzo(a)anthracene	SW846 3510/8270	0.050	ug/g
Benzo(a)pyrene	SW486 8270	0.020	mg/kg
Benzo(a)pyrene	SW846 3510/8270	0.050	ug/g
Benzo(b)fluoranthene	SW846 3510/8270	0.050	ug/g
Benzo(g,h,i)perylene	SW846 3510/8270	0.050	ug/g
Benzo(k)fluoranthene	SW846 3510/8270	0.050	ug/g
Chrysene	SW846 3510/8270	0.050	ug/g

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
d12-Chrysene	SW486 8270	1	
Dibenzo(ah)anthracene	SW846 3510/8270	0.050	ug/g
Fluoranthene	SW846 3510/8270	0.050	ug/g
Fluorene	SW846 3510/8270	0.050	ug/g
Indeno(1,2,3-cd)pyrene	SW846 3510/8270	0.050	ug/g
Naphthalene	SW486 8270	0.050	mg/kg
Naphthalene	SW846 3510/8270	0.013	ug/g
p-Terphenyl d14	SW486 8270	1	%
p-Terphenyl d14	SW486 8270	1	
p-Terphenyl d14	SW846 3510/8270	1	%
Phenanthrene	SW846 3510/8270	0.046	ug/g
Pyrene	SW846 3510/8270	0.050	ug/g
Water-Trihalomethanes			
Total THMs	CALCULATION	0.0040	mg/L
Total THMs	CALCULATION	1.0	ug/L
Water-Haloacetic Acids			
2-Bromobutanoic Acid	EPA 552.3	1	%
Bromochloroacetic Acid	EPA 552.3	5.0	ug/L
Bromodichloroacetic Acid	EPA 552.3	1.0	ug/L
Chlorodibromoacetic Acid	EPA 552.3	1.0	ug/L
Dalapon	EPA 552.3	1.0	ug/L
Dibromoacetic Acid	EPA 552.3	1.0	ug/L
Dichloroacetic Acid	EPA 552.3	1.0	ug/L
Total Haloacetic Acids 5	CALCULATION	2.2	ug/L
Bromoacetic Acid	EPA 552.3	1.0	ug/L
Chloroacetic acid	EPA 552.3	1.0	ug/L
Tribromoacetic Acid	EPA 552.3	5.0	ug/L
Trichloroacetic Acid	EPA 552.3	1.0	ug/L
Soil-Glycols			
Diethylene Glycol	EPA 3550C, EPA 8015D	5.0	mg/kg
Ethylene Glycol	EPA 3550C, EPA 8015D	10	mg/kg
Propylene Glycol	EPA 3550C, EPA 8015D	10	mg/kg
Triethylene Glycol	EPA 3550C, EPA 8015D	10	mg/kg
Water-Semi-Volatile Organics			
1,2,3-Trichlorobenzene	SW846 8270	0.40	ug/L
1,2,4-Trichlorobenzene	SW846 8270	0.40	ug/L
1,2-Dichlorobenzene	SW846 8270	0.40	ug/L
1,3-Dichlorobenzene	SW846 8270	0.40	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,4-Dichlorobenzene	SW846 8270	0.40	ug/L
1-Chloronaphthalene	SW846 8270	0.40	ug/L
1-Methylnaphthalene	SW846 8270	0.40	ug/L
2,3,4,5-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,3,4,6-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,3,4-Trichlorophenol	SW846 8270	0.50	ug/L
2,3,5,6-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,3,5-Trichlorophenol	SW846 8270	0.50	ug/L
2,4,5-Trichlorophenol	SW846 8270	0.50	ug/L
2,4,6-Tribromophenol	SW846 8270	1	ug/L
2,4,6-Trichlorophenol	SW846 8270	0.50	ug/L
2,4-Dichlorophenol	SW846 8270	0.30	ug/L
2,4-Dimethylphenol	SW846 8270	0.50	ug/L
2,4-Dinitrophenol	SW846 8270	1.0	ug/L
2,4-Dinitrotoluene	SW846 8270	0.40	ug/L
2,6-Dichlorophenol	SW846 8270	0.50	ug/L
2,6-Dinitrotoluene	SW846 8270	0.40	ug/L
2-Chloronaphthalene	SW846 8270	0.40	ug/L
2-Chlorophenol	SW846 8270	0.30	ug/L
2-Fluorobiphenyl	SW846 8270	1	ug/L
4,6-Dinitro-2-methylphenol	SW846 8270	2.0	ug/L
2-Methylnaphthalene	SW846 8270	0.40	ug/L
2-Methylphenol	SW846 8270	0.50	ug/L
2-Nitrophenol	SW846 8270	0.50	ug/L
3,3'-Dichlorobenzidine	SW846 8270	0.40	ug/L
4-Bromophenyl phenyl ether	SW846 8270	0.40	ug/L
4-Chloro-3-methylphenol	SW846 8270	0.50	ug/L
4-Chloroaniline	SW846 8270	0.40	ug/L
4-Chlorophenyl phenyl ether	SW846 8270	0.40	ug/L
4-Nitrophenol	SW846 8270	0.50	ug/L
5-Nitroacenaphthene	SW846 8270	0.40	ug/L
Acenaphthene	SW846 8270	0.20	ug/L
Acenaphthylene	SW846 8270	0.20	ug/L
Anthracene	SW846 8270	0.20	ug/L
Benzo(a)anthracene	SW846 8270	0.20	ug/L
Benzo(a)pyrene	SW846 8270	0.050	ug/L
Benzo(b)fluoranthene	SW846 8270	0.20	ug/L
Benzo(ghi)perylene	SW846 8270	0.20	ug/L
Benzo(k)fluoranthene	SW846 8270	0.20	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Biphenyl	SW846 8270	0.40	ug/L
Bis(2-chloroethoxy)methane	SW846 8270	0.40	ug/L
Bis(2-chloroethyl)ether	SW846 8270	0.40	ug/L
Bis(2-chloroisopropyl)ether	SW846 8270	0.40	ug/L
Bis(2-ethylhexyl)phthalate	SW846 8270	1.0	ug/L
Butylbenzyl phthalate	SW846 8270	0.40	ug/L
Camphene	SW846 8270	0.40	ug/L
Chrysene	SW846 8270	0.20	ug/L
Cresols (total)	CALCULATION	0.75	ug/L
Di-n-butylphthalate	SW846 8270	1.0	ug/L
Di-n-octylphthalate	SW846 8270	0.40	ug/L
Dibenzo(a,h)anthracene	SW846 8270	0.20	ug/L
Dibenzofuran	SW846 8270	0.20	ug/L
Diethylphthalate	SW846 8270	0.20	ug/L
Dimethylphthalate	SW846 8270	0.20	ug/L
Diphenyl ether	SW846 8270	0.40	ug/L
Diphenylamine	SW846 8270	0.40	ug/L
Fluoranthene	SW846 8270	0.20	ug/L
Fluorene	SW846 8270	0.20	ug/L
Hexachlorobenzene	SW846 8270	0.040	ug/L
Hexachlorobutadiene	SW846 8270	0.20	ug/L
Hexachlorocyclopentadiene	SW846 8270	0.40	ug/L
Hexachloroethane	SW846 8270	0.40	ug/L
Indeno(1,2,3-cd)pyrene	SW846 8270	0.20	ug/L
Indole	SW846 8270	0.40	ug/L
Isophorone	SW846 8270	0.40	ug/L
3&4-Methylphenol	SW846 8270	0.50	ug/L
N-Nitroso-di-n-propylamine	SW846 8270	0.40	ug/L
N-Nitrosodimethylamine	MOE E3388	0	ng/L
N-Nitrosodimethylamine-d6	MOE E3388	1	%
Naphthalene	SW846 8270	0.20	ug/L
Nitrobenzene	SW846 8270	0.40	ug/L
Nitrobenzene d5	SW846 8270	1	ug/L
p-Terphenyl d14	SW846 8270	1	ug/L
Pentachlorophenol	SW846 8270	0.50	ug/L
Perylene	SW846 8270	0.20	ug/L
Phenanthrene	SW846 8270	0.20	ug/L
Phenol	SW846 8270	0.50	ug/L
Pyrene	SW846 8270	0.20	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Soil-Semi-Volatile Organics			
1,2,4-Trichlorobenzene	SW846 8270 (511)	0.05	mg/kg
1-Methylnaphthalene	SW846 8270 (511)	0.03	mg/kg
2,4+2,6-Dinitrotoluene	SW846 8270	0.50	ug/g
2,4,5-Trichlorophenol	SW846 8270 (511)	0.1	mg/kg
2,4,6-Tribromophenol	SW846 8270 (511)	1	%
2,4,6-Trichlorophenol	SW846 8270 (511)	0.1	mg/kg
2,4-Dichlorophenol	SW846 8270 (511)	0.1	mg/kg
2,4-Dimethylphenol	SW846 8270 (511)	0.1	mg/kg
2,4-Dinitrophenol	SW846 8270 (511)	1	mg/kg
2,4-Dinitrotoluene	SW846 8270 (511)	0.1	mg/kg
2,6-Dinitrotoluene	SW846 8270 (511)	0.1	mg/kg
2-Chlorophenol	SW846 8270 (511)	0.1	mg/kg
2-Fluorobiphenyl	SW846 8270 (511)	1	%
2-Methylnaphthalene	SW846 8270 (511)	0.03	mg/kg
3,3'-Dichlorobenzidine	SW846 8270 (511)	0.1	mg/kg
4-Chloroaniline	SW846 8270 (511)	0.1	mg/kg
Acenaphthene	SW846 8270 (511)	0.05	mg/kg
Acenaphthylene	SW846 8270 (511)	0.05	mg/kg
Anthracene	SW846 8270 (511)	0.05	mg/kg
Benzo(a)anthracene	SW846 8270 (511)	0.05	mg/kg
Benzo(a)pyrene	SW846 8270 (511)	0.05	mg/kg
Benzo(b)fluoranthene	SW846 8270 (511)	0.05	mg/kg
Benzo(ghi)perylene	SW846 8270 (511)	0.05	mg/kg
Benzo(k)fluoranthene	SW846 8270 (511)	0.05	mg/kg
Biphenyl	SW846 8270 (511)	0.05	mg/kg
Bis(2-chloroethyl)ether	SW846 8270 (511)	0.1	mg/kg
Bis(2-chloroisopropyl)ether	SW846 8270 (511)	0.1	mg/kg
Bis(2-ethylhexyl)phthalate	SW846 8270 (511)	0.1	mg/kg
Chrysene	SW846 8270 (511)	0.05	mg/kg
Dibenzo(a,h)anthracene	SW846 8270 (511)	0.05	mg/kg
Diethylphthalate	SW846 8270 (511)	0.1	mg/kg
Dimethylphthalate	SW846 8270 (511)	0.1	mg/kg
Fluoranthene	SW846 8270 (511)	0.05	mg/kg
Fluorene	SW846 8270 (511)	0.05	mg/kg
Indeno(1,2,3-cd)pyrene	SW846 8270 (511)	0.05	mg/kg
Naphthalene	SW846 8270 (511)	0.05	mg/kg
Nitrobenzene d5	SW846 8270 (511)	1	%
p-Terphenyl d14	SW846 8270 (511)	1	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Pentachlorophenol	SW846 8270 (511)	0.1	mg/kg
Phenanthrene	SW846 8270 (511)	0.05	mg/kg
Phenol	SW846 8270 (511)	0.1	mg/kg
Phenol d5	SW846 8270 (511)	1	%
Pyrene	SW846 8270 (511)	0.05	mg/kg
Sulfolane	ASTM D7599	0.050	ug/g
Soil-Phenolics			
2,4,6-Tribromophenol	SW846 8270	1	
Pentachlorophenol	SW846 8270	0.10	ug/g
Soil-Polychlorinated Biphenyls			
2-Fluorobiphenyl	EPA 8082	1	
Aroclor 1242	EPA 8082	0.010	mg/kg
Aroclor 1248	EPA 8082	0.010	mg/kg
Aroclor 1254	EPA 8082	0.010	mg/kg
Aroclor 1260	EPA 8082	0.010	mg/kg
d14-Terphenyl	EPA 8082	1	
Total PCBs	EPA 8082	0.020	mg/kg
Soil-Organochlorine Pesticides			
op-DDD	SW846 8270	0.020	mg/kg
o,p-DDE	SW846 8270	0.020	mg/kg
op-DDT	SW846 8270	0.020	mg/kg
pp-DDD	SW846 8270	0.020	mg/kg
pp-DDE	SW846 8270	0.020	mg/kg
pp-DDT	SW846 8270	0.020	mg/kg
d14-Terphenyl	SW846 8270	1	
Water-Herbicides			
2,4,5-T	MOE E3552	0.00010	mg/L
2,4,5-TP	MOE E3552	0.00010	mg/L
2,4-D	MOE E3552	0.00010	mg/L
2,4-D	MOE E3552	0.20	ug/L
2,4-Dichlorophenylacetic Acid	MOE E3552	1	
Bromoxynil	MOE E3552	0.00010	mg/L
Bromoxynil	MOE E3552	0.20	ug/L
Dicamba	MOE E3552	0.00010	mg/L
Dicamba	MOE E3552	0.20	ug/L
Dinoseb	MOE E3552	0.00010	mg/L
Glyphosate	MOE E3500	5.0	ug/L
MCPA	MOE E3552	0.00010	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
MCPA	MOE E3552	0.20	ug/L
Mecoprop	MOE E3552	0.00010	mg/L
Picloram	MOE E3552	0.00010	mg/L
Picloram	MOE E3552	0.20	ug/L
Water-Pesticides			
2,3,4,6-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,4,6-Tribromophenol	SW846 8270	1	ug/L
2,4,6-Trichlorophenol	SW846 8270	0.50	ug/L
2,4-Dichlorophenol	SW846 8270	0.30	ug/L
2-Fluorobiphenyl	SW846 8270	1	ug/L
Alachlor	SW846 8270	0.10	ug/L
Atrazine	SW846 8270	0.10	ug/L
Atrazine Desethyl	SW846 8270	0.10	ug/L
Atrazine & Metabolites	SW846 8270	0.20	ug/L
Azinphos-methyl	SW846 8270	0.10	ug/L
Carbaryl	SW846 8270	0.20	ug/L
Carbofuran	SW846 8270	0.20	ug/L
Chlorpyrifos	SW846 8270	0.10	ug/L
Diazinon	SW846 8270	0.10	ug/L
Diclofop-methyl	SW846 8270	0.20	ug/L
Dimethoate	SW846 8270	0.10	ug/L
Diquat	E3503	1.0	ug/L
Diuron	E3501	1.0	ug/L
Malathion	SW846 8270	0.10	ug/L
Metolachlor	SW846 8270	0.10	ug/L
Metribuzin	SW846 8270	0.10	ug/L
Paraquat	E3503	1.0	ug/L
Pentachlorophenol	SW846 8270	0.50	ug/L
Phorate	SW846 8270	0.10	ug/L
Prometryne	SW846 8270	0.10	ug/L
Simazine	SW846 8270	0.10	ug/L
Terbufos	SW846 8270	0.20	ug/L
Triallate	SW846 8270	0.10	ug/L
Trifluralin	SW846 8270	0.10	ug/L
Water-Dioxins and Furans			
OCDD	USEPA 1613B	0	pg/L
OCDF	USEPA 1613B	0	pg/L
1,2,3,4,6,7,8-HpCDD	USEPA 1613B	0	pg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,2,3,4,6,7,8-HpCDF	USEPA 1613B	0	pg/L
1,2,3,4,7,8,9-HpCDF	USEPA 1613B	0	pg/L
1,2,3,4,7,8-HxCDD	USEPA 1613B	0	pg/L
1,2,3,4,7,8-HxCDF	USEPA 1613B	0	pg/L
1,2,3,6,7,8-HxCDD	USEPA 1613B	0	pg/L
1,2,3,6,7,8-HxCDF	USEPA 1613B	0	pg/L
1,2,3,7,8,9-HxCDD	USEPA 1613B	0	pg/L
1,2,3,7,8,9-HxCDF	USEPA 1613B	0	pg/L
1,2,3,7,8-PeCDD	USEPA 1613B	0	pg/L
1,2,3,7,8-PeCDF	USEPA 1613B	0	pg/L
13C12-1,2,3,4,6,7,8-HpCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,6,7,8-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8,9-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDD	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8,9-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDD	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDF	USEPA 1613B	1.00	%
13C12-OCDD	USEPA 1613B	1.00	%
2,3,4,6,7,8-HxCDF	USEPA 1613B	0	pg/L
2,3,4,7,8-PeCDF	USEPA 1613B	0	pg/L
2,3,7,8-TCDD	USEPA 1613B	0	pg/L
2,3,7,8-TCDF	USEPA 1613B	0	pg/L
37Cl4-2,3,7,8-TCDD (Cleanup)	USEPA 1613B	1.0	%
Lower Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Total-TCDD	USEPA 1613B	0	pg/L
Total-HpCDD	USEPA 1613B	0	pg/L
Total-HpCDF	USEPA 1613B	0	pg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Total-HxCDD	USEPA 1613B	0	pg/L
Total-HxCDF	USEPA 1613B	0	pg/L
Total HpCDD # Homologues	USEPA 1613B		
Total HpCDF # Homologues	USEPA 1613B		
Total HxCDD # Homologues	USEPA 1613B		
Total HxCDF # Homologues	USEPA 1613B		
Total PeCDD # Homologues	USEPA 1613B		
Total PeCDF # Homologues	USEPA 1613B		
Total-PeCDD	USEPA 1613B	0	pg/L
Total-PeCDF	USEPA 1613B	0	pg/L
Total TCDD # Homologues	USEPA 1613B		
Total TCDF # Homologues	USEPA 1613B		
Total-TCDF	USEPA 1613B	0	pg/L
Upper Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L

Waste-Dioxins and Furans

OCDD	USEPA 1613B	10	pg/L
OCDF	USEPA 1613B	10	pg/L
1,2,3,4,6,7,8-HpCDD	USEPA 1613B	5.0	pg/L
1,2,3,4,6,7,8-HpCDF	USEPA 1613B	5.0	pg/L
1,2,3,4,7,8,9-HpCDF	USEPA 1613B	5.0	pg/L
1,2,3,4,7,8-HxCDD	USEPA 1613B	5.0	pg/L
1,2,3,4,7,8-HxCDF	USEPA 1613B	5.0	pg/L
1,2,3,6,7,8-HxCDD	USEPA 1613B	5.0	pg/L
1,2,3,6,7,8-HxCDF	USEPA 1613B	5.0	pg/L
1,2,3,7,8,9-HxCDD	USEPA 1613B	5.0	pg/L
1,2,3,7,8,9-HxCDF	USEPA 1613B	5.0	pg/L
1,2,3,7,8-PeCDD	USEPA 1613B	5.0	pg/L
1,2,3,7,8-PeCDF	USEPA 1613B	5.0	pg/L
13C12-1,2,3,4,6,7,8-HpCDD	USEPA 1613B	1	%
13C12-1,2,3,4,6,7,8-HpCDF	USEPA 1613B	1	%
13C12-1,2,3,4,7,8-HxCDD	USEPA 1613B	1	%
13C12-1,2,3,4,7,8-HxCDF	USEPA 1613B	1	%
13C12-1,2,3,4,7,8,9-HpCDF	USEPA 1613B	1	%
13C12-1,2,3,6,7,8-HxCDD	USEPA 1613B	1	%
13C12-1,2,3,6,7,8-HxCDF	USEPA 1613B	1	%
13C12-1,2,3,7,8-PeCDD	USEPA 1613B	1	%
13C12-1,2,3,7,8-PeCDF	USEPA 1613B	1	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
13C12-1,2,3,7,8,9-HxCDF	USEPA 1613B	1	%
13C12-2,3,4,6,7,8-HxCDF	USEPA 1613B	1	%
13C12-2,3,4,7,8-PeCDF	USEPA 1613B	1	%
13C12-2,3,7,8-TCDD	USEPA 1613B	1	%
13C12-2,3,7,8-TCDF	USEPA 1613B	1	%
13C12-OCDD	USEPA 1613B	1	%
2,3,4,6,7,8-HxCDF	USEPA 1613B	5.0	pg/L
2,3,4,7,8-PeCDF	USEPA 1613B	5.0	pg/L
2,3,7,8-TCDD	USEPA 1613B	2.0	pg/L
2,3,7,8-TCDF	USEPA 1613B	2.0	pg/L
37Cl4-2,3,7,8-TCDD (Cleanup)	USEPA 1613B	1	%
Lower Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Total-TCDD	USEPA 1613B	2.0	pg/L
Total-HpCDD	USEPA 1613B	5.0	pg/L
Total-HpCDF	USEPA 1613B	5.0	pg/L
Total-HxCDD	USEPA 1613B	5.0	pg/L
Total-HxCDF	USEPA 1613B	5.0	pg/L
Total HpCDD # Homologues	USEPA 1613B		
Total HpCDF # Homologues	USEPA 1613B		
Total HxCDD # Homologues	USEPA 1613B		
Total HxCDF # Homologues	USEPA 1613B		
Total PeCDD # Homologues	USEPA 1613B		
Total PeCDF # Homologues	USEPA 1613B		
Total-PeCDD	USEPA 1613B	5.0	pg/L
Total-PeCDF	USEPA 1613B	5.0	pg/L
Total TCDD # Homologues	USEPA 1613B		
Total TCDF # Homologues	USEPA 1613B		
Total-TCDF	USEPA 1613B	2.0	pg/L
Upper Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L

Soil-Dioxins and Furans

% Moisture	USEPA 1613B	0.010	%
OCDD	USEPA 1613B	1.0	pg/g

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
OCDF	USEPA 1613B	1.0	pg/g
1,2,3,4,6,7,8-HpCDD	USEPA 1613B	0.40	pg/g
1,2,3,4,6,7,8-HpCDF	USEPA 1613B	0.40	pg/g
1,2,3,4,7,8,9-HpCDF	USEPA 1613B	0.40	pg/g
1,2,3,4,7,8-HxCDD	USEPA 1613B	0.40	pg/g
1,2,3,4,7,8-HxCDF	USEPA 1613B	0.40	pg/g
1,2,3,6,7,8-HxCDD	USEPA 1613B	0.40	pg/g
1,2,3,6,7,8-HxCDF	USEPA 1613B	0.40	pg/g
1,2,3,7,8,9-HxCDD	USEPA 1613B	0.40	pg/g
1,2,3,7,8,9-HxCDF	USEPA 1613B	0.40	pg/g
1,2,3,7,8-PeCDD	USEPA 1613B	0.40	pg/g
1,2,3,7,8-PeCDF	USEPA 1613B	0.40	pg/g
13C12-1,2,3,4,6,7,8-HpCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,6,7,8-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8,9-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDD	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8,9-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDD	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDF	USEPA 1613B	1.00	%
13C12-OCDD	USEPA 1613B	1.00	%
2,3,4,6,7,8-HxCDF	USEPA 1613B	0.40	pg/g
2,3,4,7,8-PeCDF	USEPA 1613B	0.40	pg/g
2,3,7,8-TCDD	USEPA 1613B	0.40	pg/g
2,3,7,8-TCDF	USEPA 1613B	0.40	pg/g
37Cl4-2,3,7,8-TCDD (Cleanup)	USEPA 1613B	1.0	%
Lower Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/g
Lower Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/g
Lower Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/g
Mid Point PCDD/F TEQ (NATO)	USEPA 1613B		pg/g
Mid Point PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/g
Mid Point PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/g
Percent Solids	USEPA 1613B	0.010	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Total-TCDD	USEPA 1613B	0.40	pg/g
Total-HpCDD	USEPA 1613B	0.40	pg/g
Total-HpCDF	USEPA 1613B	0.40	pg/g
Total-HxCDD	USEPA 1613B	0.40	pg/g
Total-HxCDF	USEPA 1613B	0.40	pg/g
Total HpCDD # Homologues	USEPA 1613B		
Total HpCDF # Homologues	USEPA 1613B		
Total HxCDD # Homologues	USEPA 1613B		
Total HxCDF # Homologues	USEPA 1613B		
Total PeCDD # Homologues	USEPA 1613B		
Total PeCDF # Homologues	USEPA 1613B		
Total-PeCDD	USEPA 1613B	0.40	pg/g
Total-PeCDF	USEPA 1613B	0.40	pg/g
Total TCDD # Homologues	USEPA 1613B		
Total TCDF # Homologues	USEPA 1613B		
Total-TCDF	USEPA 1613B	0.40	pg/g
Upper Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/g
Upper Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/g
Upper Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/g

Water-Plant Pigments

Chlorophyll a	EPA 445.0 ACET	0.10	ug/L
Phaeophytin a	EPA 445.0 ACET	0.10	ug/L

Water-Organic Parameters

Microcystin	ENVIROLOGIX QUANTIPLATE KIT CAT. EP022	0.20	ug/L
Nitrilotriacetic Acid (NTA)	EPA 430.1	0.20	mg/L

Soil-Organic Parameters

Bisphenol A	J. of Chrom. A849 (1999) 467-482	0.050	ug/g
Nonylphenol	J. of Chrom. A849 (1999) 467-482	0.25	ug/g
Nonylphenol Diethoxylates	J. of Chrom. A849 (1999) 467-482	0.063	ug/g
Nonylphenol Monoethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g
Octylphenol	J. of Chrom. A849 (1999) 467-482	0.25	ug/g
Octylphenol Diethoxylates	J. of Chrom. A849 (1999) 467-482	0.025	ug/g
Octylphenol Monoethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g
Total Nonylphenol Ethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g
Total Octylphenol Ethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g

Water-Radiological Parameters

Ra-226	EPA 903.1	0.010	Bq/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Misc.-Miscellaneous			
Special Request	SEE SUBLET LAB RESULTS		
Special Request	SPECIAL REQUEST		

Methodology

<table>
<tr><th>Product</th><th>Matrix</th><th>Product Description</th><th>Analytical Method Reference</th></tr>
<tr><td>625-511-WT</td><td>Soil</td><td>ABN-O.Reg 153/04 (July 2011)</td><td>SW846 8270 (511)</td></tr>
<tr><td colspan="4">Soil and sediment samples are dried by mixing with a desiccant prior to extraction. The extracts are dried, concentrated and exchanged into a solvent and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).</td></tr>
<tr><td>625-WT</td><td>Water</td><td>EPA 8270 Extractables</td><td>SW846 8270</td></tr>
<tr><td colspan="4">Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j) fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.
N-nitrosodiphenylamine is reported as diphenylamine. N-nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine. (EPA 8270D)</td></tr>
<tr><td>ACIDS-ONT-DW-WT</td><td>Water</td><td>O.Reg 170/03 Acids</td><td>SW846 8270</td></tr>
<tr><td colspan="4">Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.</td></tr>
<tr><td>ACY-TITR-TB</td><td>Water</td><td>Acidity</td><td>APHA 2310 B modified</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.</td></tr>
<tr><td>AG-DRY-MICR-CCMS-VA</td><td>Tissue</td><td>Silver in Tissue by CRC ICPMS (DRY)</td><td>EPA 200.3/6020B</td></tr>
<tr><td colspan="4">This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020B).
Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.</td></tr>
<tr><td>AIR VOLUME-ED</td><td>Misc.</td><td>Air volume (L)</td><td>HYGIENE METHOD</td></tr>
<tr><td colspan="4">NOTE: When air concentrations of analytes are reported, they are based on air sampling information (air volume, sampling time, sampling flow rate) supplied by the client.</td></tr>
<tr><td>ALK-AUTO-WT</td><td>Water</td><td>Automated Speciated Alkalinity</td><td>EPA 310.2</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.</td></tr>
</table>

Methodology

<table>
<tr><th>Product</th><th>Matrix</th><th>Product Description</th><th>Analytical Method Reference</th></tr>
<tr><td>ALK-SPEC-PCT-WT</td><td>Water</td><td>Automated Speciated Alkalinity</td><td>APHA 2320B</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.</td></tr>
<tr><td>ALK-WT</td><td>Water</td><td>Alkalinity, Total (as CaCO3)</td><td>EPA 310.2</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.</td></tr>
<tr><td>ALKANOL-LCMS-WT</td><td>Soil</td><td>Alkanolamines in soil</td><td>ASTM D7599</td></tr>
<tr><td colspan="4">Analytes are extracted from soil into HPLC grade water. Each compound is separated by HPLC and analyzed by Electro Spray Ionization MS/MS detection using Triple Quadrupole MS/MS detector. Internal standards are used for quantitation.
Results are expressed as dry weight.</td></tr>
<tr><td>ANIONS-WT</td><td>Soil</td><td>Anion Scan (IC)</td><td>EPA 300.1</td></tr>
<tr><td colspan="4">5 grams of soil is mixed with 50 mL of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.</td></tr>
<tr><td>B-HWS-R511-WT</td><td>Soil</td><td>Boron-HWE-O.Reg 153/04 (July 2011)</td><td>HW EXTR, EPA 6010B</td></tr>
<tr><td colspan="4">A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</td></tr>
<tr><td>BAP-WT</td><td>Soil</td><td>Benzo(a)pyrene</td><td>SW486 8270</td></tr>
<tr><td colspan="4">The procedure uses a mechanical shaking technique to extract a representative sub-sample with a mixture of methanol and toluene. The extract is analyzed by GC/MSD.</td></tr>
<tr><td>BIM-NO2-IC-L-WT</td><td>Water</td><td>Low Level Nitrite in Water by IC</td><td>EPA 300.1 (mod)</td></tr>
<tr><td colspan="4">This analysis is carried out procedures adapted from EPA 300.1 "Anions". Nitrite is determined by Ion Chromatography with conductivity and/or UV detection on a water sample.</td></tr>
<tr><td>BNA-TCLP-WT</td><td>Waste</td><td>BNAs for O. Reg 347</td><td>SW846 8270</td></tr>
<tr><td colspan="4">Samples are leached according to TCLP protocol and then the aqueous leachate is extracted and the resulting extracts are analyzed on GC/MSD</td></tr>
<tr><td>BOD-WT</td><td>Water</td><td>BOD</td><td>APHA 5210 B</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.</td></tr>
<tr><td>BR-IC-N-WT</td><td>Water</td><td>Bromide in Water by IC</td><td>EPA 300.1 (mod)</td></tr>
<tr><td colspan="4">Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</td></tr>
</table>

Methodology

Product	Matrix	Product Description	Analytical Method Reference
BROMATE-ONT-DW-WT	Water	Bromate in Water by LC/MS-MS	EPA 6850

An aliquot of sample is spiked with 18O-BrO3 internal standard and analyzed by LC/MS/MS.

This test procedure does not incorporate EDA preservation for bromate. Unpreserved bromate in water is stable for at least the 28 day recommended hold time, but samples that contain free chlorine or ozone could form additional bromate after the time of sampling (EPA 300.0 and 300.1).

BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

BTX-HS-WT	Soil	BTEX by Headspace	SW846 8260 (HEADSPACE)

BTX is s determined by extracting a soil or sediment sample as received with methanol and then analyzed by headspace-GC/MS.

BTX-HS-WT	Water	BTEX by Headspace	SW846 8260 (HEADSPACE)

BTX is determined by analyzing by headspace-GC/MS.

C-TIC-PCT-SK	Soil	Total Inorganic Carbon in Soil	CSSS (2008) P216-217

A known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.

C-TOC-CALC-SK	Soil	Total Organic Carbon Calculation	CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

CHL/A-ACET-FLUORO-WP	Water	Chlorophyll a by fluorometry	EPA 445.0 ACET

This analysis is done using procedures modified from EPA method 445.0. Chlorophyll a is determined by a 90 % acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CHLORATE-IC-WT	Water	Chlorate by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CHLORITE-IC-WT	Water	Chlorite by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Methodology

<table>
<tr><th>Product</th><th>Matrix</th><th>Product Description</th><th>Analytical Method Reference</th></tr>
<tr><td>CL-PASTE-COL-ED</td><td>Soil</td><td>Chloride in Soil (Paste) by Colorimetry</td><td>CSSS 15.2.1; APHA 4500-Cl E</td></tr>
<tr><td colspan="4">A soil extract produced by the saturated paste extraction procedure is analyzed for Chloride by Colourimetry.</td></tr>
<tr><td>CL-R511-WT</td><td>Soil</td><td>Chloride-O.Reg 153/04 (July 2011)</td><td>EPA 300.0</td></tr>
<tr><td colspan="4">5 grams of dried soil is mixed with 10 grams of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</td></tr>
<tr><td>CL2-FREE-WT</td><td>Water</td><td>Free Chlorine</td><td>SM 4500-CL G, EPA 330.5</td></tr>
<tr><td colspan="4">Chlorine (residual), as free or total, is analyzed using the DPD colourimetric method. The recommended hold time for these tests is 15 minutes; field testing is recommended for best results. Chlorine can be rapidly consumed by organic matter, if present, and dissipates rapidly into headspace.</td></tr>
<tr><td>CL2-TOTAL-WT</td><td>Water</td><td>Total Residual Chlorine</td><td>APHA 4500-CL G</td></tr>
<tr><td colspan="4">Chlorine (residual), as free or total, is analyzed using the DPD colourimetric method. The recommended hold time for these tests is 15 minutes; field testing is recommended for best results. Chlorine can be rapidly consumed by organic matter, if present, and dissipates rapidly into headspace.</td></tr>
<tr><td>CN-FREE-CFA-WT</td><td>Water</td><td>Free Cyanide in water by CFA</td><td>ASTM 7237</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.</td></tr>
<tr><td>CN-TOT-WT</td><td>Water</td><td>Cyanide, Total</td><td>ISO 14403-2</td></tr>
<tr><td colspan="4">Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference</td></tr>
<tr><td>CN-WAD-R511-WT</td><td>Soil</td><td>Cyanide (WAD)-O.Reg 153/04 (July 2011)</td><td>MOE 3015/APHA 4500CN I-WAD</td></tr>
<tr><td colspan="4">The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</td></tr>
<tr><td>COD-BF</td><td>Water</td><td>Chemical Oxygen Demand</td><td>APHA 5220 D</td></tr>
<tr><td colspan="4">The dichromate ion oxidizes COD material when the sample is digested and after digestion the sample is then analyzed on a spectrophotometer.</td></tr>
<tr><td>COD-T-WT</td><td>Water</td><td>Chemical Oxygen Demand</td><td>APHA 5220 D</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.</td></tr>
</table>

Methodology

<table>
<tr><th>Product</th><th>Matrix</th><th>Product Description</th><th>Analytical Method Reference</th></tr>
<tr><td>COLOUR-APPARENT-WT</td><td>Water</td><td>Colour</td><td>APHA 2120</td></tr>
<tr><td colspan="4">Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.</td></tr>
<tr><td>COLOUR-TRUE-WT</td><td>Water</td><td>Colour, True</td><td>APHA 2120C</td></tr>
<tr><td colspan="4">True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.</td></tr>
<tr><td>CR-CR6-IC-WT</td><td>Soil</td><td>Hexavalent Chromium in Soil</td><td>SW846 3060A/7199</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</td></tr>
<tr><td>CR-CR6-IC-WT</td><td>Water</td><td>Chromium +6</td><td>EPA 7199</td></tr>
<tr><td colspan="4">This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</td></tr>
<tr><td>CRESOL-SUM-CALC-WT</td><td>Water</td><td>Total Cresols</td><td>CALCULATION</td></tr>
<tr><td colspan="4">Total cresols represents the sum of o-cresol and m&p-cresol.</td></tr>
<tr><td>DDT&MET-WT</td><td>Soil</td><td>DDT and Metabolites</td><td>SW846 8270</td></tr>
<tr><td>DIQUAT-ONT-DW-WT</td><td>Water</td><td>Diquat in Water by LC/MS-MS</td><td>E3503</td></tr>
<tr><td colspan="4">An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.</td></tr>
<tr><td>DIURON-ONT-DW-WT</td><td>Water</td><td>Diuron in Drinking Water</td><td>E3501</td></tr>
<tr><td colspan="4">An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS</td></tr>
<tr><td>DOC-WT</td><td>Water</td><td>Dissolved Organic Carbon</td><td>APHA 5310B</td></tr>
<tr><td colspan="4">Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.</td></tr>
<tr><td>DUSTFALLS-INS.DM2-WT</td><td>Dustfall</td><td>Dustfalls Insoluble (mg/dm2.day)</td><td>BCMOE DUSTFALLS</td></tr>
<tr><td colspan="4">Dustfall analysis is carried out in accordance with procedures published by the B.C. Ministry of Environment Laboratory.</td></tr>
<tr><td>DX-1613B-HRMS-BU</td><td>Soil</td><td>Dioxins and Furans HR 1613B</td><td>USEPA 1613B</td></tr>
<tr><td colspan="4">Samples are extracted by Soxhlet. The extracts are prepared using column chromatography, reduced in volume and analyzed by isotope-dilution GC/HRMS</td></tr>
</table>

Methodology

<table>
<tr><th>Product</th><th>Matrix</th><th>Product Description</th><th>Analytical Method Reference</th></tr>
<tr><td>DX-1613B-HRMS-BU</td><td>Waste</td><td>Dioxins and Furans by method 1613B</td><td>USEPA 1613B</td></tr>
<tr><td colspan="4">Samples filtered if required. The solid portion is extracted by Soxhlet, the liquid portion is liquid/liquid extracted with dichloromethane. The extracts are prepared using column chromatography, reduced in volume and analyzed by isotope-dilution GC/HRMS.</td></tr>
<tr><td>DX-R511-HRMS-BU</td><td>Water</td><td>Dioxins and Furans</td><td>USEPA 1613B</td></tr>
<tr><td>EC-BF</td><td>Water</td><td>Conductivity</td><td>APHA 2510 B</td></tr>
<tr><td colspan="4">Water samples can be measured directly by immersing the conductivity cell into the sample.</td></tr>
<tr><td>EC-MF-WT</td><td>Water</td><td>E. coli</td><td>SM 9222D</td></tr>
<tr><td colspan="4">A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 ±0 .2 °C for 24 ± 2 h. Method ID: WT-TM-1200</td></tr>
<tr><td>EC-PASTE-ED</td><td>Soil</td><td>Conductivity Sat. Paste</td><td>CSSS 15.2.1 & 15.3.1</td></tr>
<tr><td colspan="4">A soil extract produced by the saturated paste extraction procedure is analyzed by conductivity meter.</td></tr>
<tr><td>EC-SCREEN-VA</td><td>Water</td><td>Conductivity Screen (Internal Use Only)</td><td>APHA 2510</td></tr>
<tr><td colspan="4">Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.</td></tr>
<tr><td>EC-SCREEN-WT</td><td>Water</td><td>Conductivity Screen (Internal Use Only)</td><td>APHA 2510</td></tr>
<tr><td colspan="4">Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.</td></tr>
<tr><td>EC-SOLID-MF-WT</td><td>Soil</td><td>E. coli on sludge or solid</td><td>E3433</td></tr>
<tr><td colspan="4">A biosolid sub-sample is transferred into buffered dilution water blank. The sample is manually shaken and an aliquot of the sample is then filtered through the membrane filter. The filter is then placed on mFC-BCIG agar and incubated at 44.5 ± 0.2 ºC for 24 ± 2 hours. Method ID: WT-TM-1200. Results are reported on a dry weight basis. Moisture is required.</td></tr>
<tr><td>EC-WT</td><td>Soil</td><td>Conductivity (EC)</td><td>MOEE E3138</td></tr>
<tr><td colspan="4">A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</td></tr>
<tr><td>EC-WT</td><td>Water</td><td>Conductivity</td><td>APHA 2510 B</td></tr>
<tr><td colspan="4">Water samples can be measured directly by immersing the conductivity cell into the sample.</td></tr>
<tr><td>ETL-CHLORAMINES-WT</td><td>Water</td><td>Chloramines</td><td>APHA 4500-Cl B</td></tr>
<tr><td>ETL-N2N3-WT</td><td>Water</td><td>Calculate from NO2 + NO3</td><td>APHA 4110 B</td></tr>
<tr><td>ETL-NH3-UNION-WT</td><td>Water</td><td>Un-ionized ammonia</td><td>CALCULATION</td></tr>
<tr><td>F-DW-IC-WT</td><td>Water</td><td>Fluoride in Water by IC</td><td>EPA 300.1 (mod)</td></tr>
<tr><td colspan="4">Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</td></tr>
</table>

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Product	Matrix	Product Description	Analytical Method Reference
F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

Product	Matrix	Product Description	Analytical Method Reference
F1-F4-CALC-WT	Soil	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F1-F4-CALC-WT	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F1-HS-WT	Soil	F1 (O.Reg.153/04)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

F1-HS-WT	Water	F1 (O.Reg.153/04)	E3421/CCME (HS)

Fraction F1 is determined by analyzing by headspace-GC/FID.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-WT	Soil	F2-F4 (O.Reg.153/04)	CCME Tier 1

A sub-sample of the solid sample is extracted with a solvent mixture. Following extraction, the sample extract is treated in situ with Silica Gel analyzed by GC/FID.

The F2 fraction is determined by integrating the area in the chromatogram from the apex of nC10 to the apex nC16 and quantitating using external calibration using a standard mix containing nC10, nC16 and nC34. Similarly, the F3 fraction extends from the apex of nC16 to the apex nC34 and the F4 fraction covers the area from the apex nC34 to the apex nC50. If the chromatogram does not return to the baseline by the time nC50 elutes, a gravimetric determination of the F4 is performed.

F2-F4-WT	Water	F2-F4 (O.Reg.153/04)	MOE DECPH-E3421/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

FC-MF-WT	Water	Fecal Coliforms	SM 9222D

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mFC agar and incubated at 24±2h@44.5±0.2°C. Method ID: WT-TM-1200

FC-SOLID-MF-WT	Soil	Fecal Coliform on sludge or solid	SM 9222D

Methodology

Product	Matrix	Product Description	Analytical Method Reference
FLASH-PMCC-AUTO-CL	Waste	Pensky-Martens Closed Cup Flashpoint	ASTM D-93

A brass cup of specified dimensions, filled to the inner mark with test sample and fitted with a cover, is heated and the sample stirred at specified rates, using one of 3 defined procedures. An ignition source is directed into the cup at regular intervals until a flash is detected. The flash point is the lowest temperature corrected for barometric pressure, at which the vapour of the sample ignites.

Product	Matrix	Product Description	Analytical Method Reference
GLYCOL-CL	Soil	Glycol Screen	EPA 3550C, EPA 8015D

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015D and 3550C, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of a subsample of the sediment/soil with de-ionized water, followed by ultrasonic bath. The water extract is then analyzed by GC-FID direct aqueous injection.

Product	Matrix	Product Description	Analytical Method Reference
GLYPHOSATE-ONT-DW-WT	Water	Glyphosate in Drinking Water	MOE E3500

This analysis is carried out using procedures adapted from ON MOE E3500 "Glyphosate". Glyphosate is determined by direct injection by LC-MS/MS on a sample that bas been derivatized.

Product	Matrix	Product Description	Analytical Method Reference
GRAIN SIZE-HYD-WT	Soil	Grain Size by Hydrometer	ASTM D422-63

Particle size curve is generated from dry sieving (particles > 2 mm), wet sieving (particles 2 mm-75 um and hydrometer readings (particles < 75 um)

Product	Matrix	Product Description	Analytical Method Reference
HAA+DAL-ECD-WT	Water	Haloacetic Acids - Extended EPA List	EPA 552.3

An aliquot of sample is acidified and shaken with methyl tert-butyl ether (MTBE). After extraction, the haloacetic acids partitioned into MTBE are esterified with acidic methanol and analyzed using a gas chromatograph equipped with an electron capture detector (GC-ECD).

Product	Matrix	Product Description	Analytical Method Reference
HAA5-SUM-CALC-WT	Water		CALCULATION

Total Haloacetic Acids 5 (HAA5) represents the sum of monobromoacetic acid, monochloroacetic acid, dibromoacetic acid, dichloroacetic acid and trichloroacetic acid. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

Product	Matrix	Product Description	Analytical Method Reference
HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

Product	Matrix	Product Description	Analytical Method Reference
HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Product	Matrix	Product Description	Analytical Method Reference
HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Methodology

Product	Matrix	Product Description	Analytical Method Reference
HG-DRY-MICR-CVAA-VA	Tissue	Mercury in Tissue by CVAAS (DRY)	EPA 200.3, EPA 245.7
This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic absorption spectrophotometry, adapted from US EPA Method 245.7.			
HG-DUST(DM2)-CVAA-WT	Dustfall	Total Mercury in Dustfalls by CVAA	EPA SW846 7470A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic absorption spectrophotometry.			
HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.			
HG-T-ONT-DW-WT	Water	Mercury (Hg)	EPA 1631E (mod)
HG-TCLP-WT	Waste	Mercury (CVAA) for O.Reg 347	EPA 1631E
This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using atomic absorption spectrophotometry (EPA 1631E).			
HG-WET-CVAA-WP	Tissue	Mercury in Tissue	EPA 200.3/1631E (mod)
Tissue samples undergo hotblock digestion with nitric and hydrochloric acids, in combination with repeated additons of hydrogen peroxide, followed by cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analysis by CVAAS.			
HPC-MF-WT	Water	Heterotrophic Plate Count	SM 9215D
A 1mL volume of sample is filtered through a membrane, the membrane is placed on mHPC agar and incubated for 48±2h@35±0.5° C. Method ID: WT-TM-1200			
IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
LEACH-TCLP-WT	Waste	Leachate Procedure for Reg 347	EPA 1311
Inorganic and Semi-Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP). Test results are reported in leachate concentration units (normally mg/L).			
LEACH-ZHE-WT	Waste	Zero Headspace Leaching Procedure	EPA 1311
Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP), using the Zero Headspace Extraction (ZHE) process. Test results are reported in leachate concentration units (normally mg/L).			

Methodology

Product	Matrix	Product Description	Analytical Method Reference
MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-NP-U-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	EPA SW-846 6020A

Ultra trace metals in water are analyzed by CRC ICPMS, based on US EPA Method 6020A (Jan 1998). This procedure is intended for pristine field-filtered acid-preserved water samples. The detection limits (LOR) for this test are based on lab instrumental analysis only, not including filtration. ALS-supplied field filtration equipment does not support these LOR. Therefore, because of the high probability of false positives due to filtration, it is strongly recommended that a filtration blank be analysed to aid in data interpretation. Special bottles, preservatives and sampling procedures apply.

MET-DRY-MICR-CCMS-VA	Tissue	Metals in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020B

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020B).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MET-DUST(DM2)-MS-WT	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by ICP-MS (EPA Method 6020A)

Methodology

Product	Matrix	Product Description	Analytical Method Reference
MET-ONT-DW-WT	Water	Drinking Water Metals	EPA 6020A
MET-PASTE-ICP-ED	Soil	Salinity metals by ICPOES (Sat. Paste)	CSSS CH15/EPA 6010B

A soil extract produced by the saturated paste extraction procedure is analyzed for Sodium, Calcium, and Magnesium by ICPOES as per "Soil Sampling and Methods of Analysis" by M. Carter.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-NP-U-CCMS-WT	Water	Total Metals by CRC ICPMS (Undigested)	EPA SW-846 6020A

Ultra trace metals in water are analyzed by CRC ICPMS, based on US EPA Method 6020A (Jan 1998). The detection limits provided can only be met for undigested samples. This procedure is intended for colorless, non-turbid, acid-preserved water samples (i.e. pristine water samples), having turbidity < 1 NTU and no odor. Where turbidity exceeds 1 NTU, and/or the sample is colored and has an odor, results may be biased low compared to true Total Metals concentrations. ALS recommends that turbidity analysis be requested on samples submitted for this test to aid with interpretation of results. Special bottles, preservatives and sampling procedures apply.

MET-TCLP-EXTRA-WT	Waste	O. Reg 347 Extra Metals on TCLP Leachate	EPA 200.8
MET-TCLP-WT	Waste	O.Reg 347 TCLP Leachable Metals	EPA 6020B

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter. Instrumental analysis of the digested extract is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020B).

MET-WET-CCMS-WP	Tissue	Metals in Tissue by CRC ICPMS (WET)	EPA 200.3/6020B (mod)

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MICROCYSTIN-WP	Water	Microcystin	ENVIROLOGIX QUANTIPLATE KIT CAT. EP022
Total Microcystins (intraceller and extraceller) in aqueous matrices is determined by the Enzyme-Linked ImmunoSorbent Assay (ELISA) method.			
MISC-ONT-DW-WT	Water	O.Reg 170/03 Miscellaneous Pesticides	SW846 8270
Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.			
MOISTURE-BU	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
This method is used to determine the percent moisture in a sample. Samples are homogenized, moisture is removed by heating at 105°C until constant mass is achieved. The residues are measured gravimetrically and the difference in weight between the wet sample and the dried sample is used to determine the moisture content. This percent moisture can be used, in conjunction with analytical results, to report data on a dry weight basis.			
MOISTURE-MICR-VA	Tissue	Moisture in Tissue	Puget Sound WQ Authority, Apr 1997
This analysis is carried out gravimetrically by drying the sample at <60 deg. C.			
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
N-TOTKJ-COL-SK	Soil	Total Kjeldahl Nitrogen	CSSS (2008) 22.2.3
The soil is digested with sulfuric acid in the presence of CuSO4 and K2SO4 catalysts. Ammonia in the soil extract is determined colrimetrically at 660 nm.			
NDMA-ONTDW-HRMS-BU	Water	NDMA to meet Ont Reg 170/03	MOE E3388
NDMA by modified Ont. MOE method E3388 GC/HRMS			
NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NH3-WT	Soil	Ammonia as N	EPA 350.1
Sample is distilled into a solution of boric acid and measured colorimetrically.			
NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO2-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO2-L-IC-N-WP	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO2-WT	Soil	Nitrite in Soil	EPA 300.0
5 grams of soil is mixed with 50 mL of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.			

Methodology

Product	Matrix	Product Description	Analytical Method Reference
NO3-AVAIL-SK	Soil	Available Nitrate-N	Alberta Ag / APHA 4500 NO3F
Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution. Nitrate is quantitatively reduced to nitrite by passing of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.			
NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-WT	Soil	Nitrate in Soil (NO3-N)	EPA 300.0
5 grams of soil is mixed with 50 mL of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.			
NP,NPE-LCMS-WT	Soil	Nonyl Phenols and Ethoxylates	J. of Chrom. A849 (1999) 467-482
Sample is derivatized and injected directly. Each compound is separated by reversed phase HPLC and analyzed by Electro Spray Ionization MS/MS detection using Triple Quadrupole MS/MS detector. Internal standards are used for quantitation.			
NTA-ONT-DW-WT	Water	NTA in Drinking Water	EPA 430.1
NTA refers to the tri-sodium salt of nitrilotriacetic acid, N(CH2COONa)3. Zinc forms a blue-coloured complex with 2 carboxy-2-hydroxy-5-sulfoformazylbenzene (Zincon) in a solution buffered to pH 9.2. When NTA is added to the sample, the Zinc-Zincon complex is broken which reduces the absorbance in proportion to the amount of NTA present.			
OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION
Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.			
OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B
The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.			
OGG-TOT-WT	Soil	Oil and Grease, Total	APHA 5520 B
Sample is extracted with an acetone:hexane mixture and then evaporated and the resulting residue is weighed to determine the total oil and grease.			
OGG-TOT-WT	Water	Oil and Grease, Total	APHA 5520 B
The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.			
OM-LOI-SK	Soil	Organic Matter by LOI at 375 deg C.	CSSS (1978) p. 160
The dry-ash method involves the removal of organic matter by combustion at 375 degrees C for a minimum of 16 hours. Samples are dried prior to combustion.			

Methodology

Product	Matrix	Product Description	Analytical Method Reference
P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PAH-C429-LRMS-BU	Tissue	PAH by GC/LRMS	CARB 429

Samples are Soxhlet extracted with dichloromethane. Extracts are prepared by column chromatography, reduced in volume and analyzed by isotope-dilution SIM-GC/LRMS

PAHERB-LCMS-PPM-WT	Water	Phenoxyacid Herbicides by LC-MS/MS	MOE E3552

Water samples are subjected to 0.2 µM RC filtration and analyzed by direct injection without sample preparation using liquid chromatography tandem mass spectrometry (LC-MS/MS).

PAHERB-ONT-DW-WT	Water	O.Reg 170/03 PA Herbicides	MOE E3552

Water samples are analyzed by direct injection without sample preparation using liquid chromatography tandem mass spectrometry (LC-MS/MS).

PARAQUAT-ONT-DW-WT	Water	Paraquat in Water by LC/MS-MS	E3503

An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.

PARTICULATE-0.10-SLT	Filter	Respirable Dust N0600	NIOSH 0600 Mod., MW MCE Filter
PCB-TCLP-WT	Waste	PCBs for O. Reg 347	SW846 8270
PCB-WT	Soil	Polychlorinated Biphenyls	EPA 8082

A representative sub-sample of a soil sample is mixed with methanol and extracted with toluene using a shaker technique. An aliquot of the separated toluene is analyzed by GC/MSD.

PCP-WT	Soil	Pentachlorophenol	SW846 8270

Soil samples are extracted and the extracts are analyzed by GC/MSD

PH-1:2 CACL2-ED	Soil	pH (1:2 CaCl2)	CSSS 16.3 - 1:2 Extraction w/0.01M CaCl2

Soil and 0.01M CaCl2 solution (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter.

PH-1:2-ED	Soil	pH 1:2 H2O Extract	CSSS 16.2 - PH OF 1:2 WATER EXTRACT

Soil and de-ionized water (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
PH-BF	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			
PH-WT	Soil	pH	MOEE E3137A
A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
PH-WT	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days			
PHENOLS-4AAP-WT	Soil	Phenol (4AAP)	EPA 9066
A manual method is used to distill the sample. The distillate is then buffered to pH 9.4 and reacts with 4AAP and alkaline ferricyanide to form a red complex which is measured colorimetrically.			
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.			
PHEOA-ACET-FLUORO-WP	Water	Pheophytin a by fluorometry	EPA 445.0 ACET
This analysis is done using procedures modified from EPA method 445.0. Pheopigments present in the sample are determined collectively as Pheophytin a by a 90% (v/v) acetone extraction followed with analysis by fluorometry using the acidification procedure.			
PO4-DO-COL-WT	Soil	Orthophosphate in Soil (PO4-P)	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a soil sample that has been extracted and filtered through a 0.45 micron membrane filter.			
PO4-DO-COL-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.			
PO4/K-AVAIL-SK	Soil	Plant Available Phosphorus and Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)
Plant available phosphorus and potassium are extracted from the soil usng Modified Kelowna solution. Phosphorous in the soil extract is determined colorimetrically at 880 nm, while potassiumis determined by flame emission at 770 nm.			
PREP-DRY/GRIND-ED	Soil	Dry and Grind	
PREP-DRY/GRIND-SK	Soil	Dry and Grind	
PREP-MET-DIGEST-WT	Water	Sample Prep (Digestion for Metals)	
PREP-MET-FILT-WT	Water	Sample Prep (Filtration for Metals)	

Methodology

<table>
<tr><th>Product</th><th>Matrix</th><th>Product Description</th><th>Analytical Method Reference</th></tr>
<tr><td>PREP-MICR-DIGEST-VA</td><td>Tissue</td><td>Tissue/Vegetation MIcro Preparation</td><td></td></tr>
<tr><td>PSA-1-ED</td><td>Soil</td><td>Particle Size</td><td>CSSS 55.3-Hydrometer</td></tr>
<tr><td colspan="4">Soil samples are oven dried, ground to pass a 2 mm sieve , and soaked in Calgon solution for a minimum of 16 hours. Soil suspensions are measured for particle size by distribution using a hydrometer after specified settling times.</td></tr>
<tr><td>PSA-1-SK</td><td>Soil</td><td>Particle Size Analysis:Mini-Pipet Method</td><td>SSIR-51 Method 3.2.1</td></tr>
<tr><td colspan="4">Dry, < 2 mm soil is treated with sodium hexametaphosphate to ensure complete dispersion of primary soil particles. After treatment, sub-samples of the homogenized soil suspension are taken at specific times and sampling depths as determined by Stoke's Law. The dry weight of soil found in each sub-sample is used determine the silt and clay content. The sand fraction is determined by difference.

The soil texture is determined according to the CSSC soil texture triangle.</td></tr>
<tr><td>PYR-TCLP-WT</td><td>Waste</td><td>Pyridine for O. Reg 347</td><td>SW846 8260D</td></tr>
<tr><td colspan="4">Samples are leached according to TCLP protocol and then analyzed on GC/MSD</td></tr>
<tr><td>RA226-MMER-FC</td><td>Water</td><td>Ra226 by Alpha Scint, MDC=0.01 Bq/L</td><td>EPA 903.1</td></tr>
<tr><td>S2-T>H2S-CALC-WT</td><td>Water</td><td>Total Sulphide Calculated as H2S</td><td>Calculation</td></tr>
<tr><td colspan="4">This calculation converts Total Sulphide as (S2-) and reports it as Total Sulphide as (H2S). Total Sulphide as (S2-) is determined using procedures adapted from APHA 4500-S2 "Sulphide".</td></tr>
<tr><td>SAL-MG/KG-CALC-ED</td><td>Soil</td><td>Detail Salinity in mg/kg</td><td>Calculation</td></tr>
<tr><td colspan="4">Conversion of Saturation Extract soluble ions from units of mg/L to mg/kg:
mg/kg = mg/L * (% Saturation / 100%)</td></tr>
<tr><td>SALINITY-INTCHECK-ED</td><td>Soil</td><td></td><td>CSSS 18.4-Calculation</td></tr>
<tr><td colspan="4">An internal calculation is reviewed to examine the balance of cations to anions, to ensure data correctness.</td></tr>
<tr><td>SAMPLE-DISPOSAL-WT</td><td>Misc.</td><td>Sample Handling and Disposal Fee</td><td></td></tr>
<tr><td>SAR-PASTE-CALC-ED</td><td>Soil</td><td>Sodium Adsorption Ratio (Sat. Paste)</td><td>CSSS 15.4.4-Calculation</td></tr>
<tr><td colspan="4">A soil extract produced by the saturated paste extraction procedure is analyzed for Sodium, Calcium, and Magnesium by ICPOES. Sodium Adsorption Ratio (SAR) is calculated as per "Soil Sampling and Methods of Analysis" by M. Carter.</td></tr>
<tr><td>SAR-R511-WT</td><td>Soil</td><td>SAR-O.Reg 153/04 (July 2011)</td><td>SW846 6010C</td></tr>
<tr><td colspan="4">A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).</td></tr>
<tr><td>SAT-PCNT-ED</td><td>Soil</td><td>% Saturation</td><td>CSSS 15.2-CALCULATION</td></tr>
<tr><td colspan="4">As received samples are pasted to saturation. A sub-sample is weighed, oven dried and re-weighed to determine % saturation.</td></tr>
</table>

Methodology

Product	Matrix	Product Description	Analytical Method Reference
SHIPPING-WT	Misc.	Shipping Charge	
SIO2-T-CALC-WT	Water	Total Silicon (reported as Silica)	Calculation
SO4-AVAIL-SK	Soil	Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)
Plant available sulfate in the soil is extracted using a weak calcium chloride solution. Sulfate in the extract is determined by ICP-OES. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.			
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SO4-PASTE-ICP-ED	Soil	Sulfur (as SO4) by ICPOES (Sat. Paste)	CSSS CH15/EPA 6010B
A soil extract produced by the saturated paste extraction procedure is analyzed for Sulfur by ICPOES, then converted mathematically to report as SO4.			
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C
A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.			
SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.			
SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104±1°C for a minimum of four hours or until a constant weight is achieved.			
SPECIAL REQ-61-WP	Misc.	Special Request Inorganics Winnipeg	SPECIAL REQUEST
SPECIAL REQUEST-AV	Misc.	Special Request Activation Laboratories	SEE SUBLET LAB RESULTS
SPECIAL REQUEST-SLT	Misc.	Special Request Datachem Salt Lake	SEE SUBLET LAB RESULTS
SULFOLANE-LCMS-WT	Soil	Sulfolane in soil by LC/MS-MS	ASTM D7599
A soil sample is spiked with internal standard, extracted with HPLC Water. and analyzed by direct injection using HPLC Triple Quadrupole MS/MS.			
SULPHIDE-WT	Water	Sulphide (as S)	APHA 4500S2D
This analysis is carried out using procedures adapted from APHA Method 4500-S2-D "Methylene Blue Method". Sulphide is determined colourmetrically.			

Methodology

Product	Matrix	Product Description	Analytical Method Reference
TC,EC-QT51-WT	Water	Total Coliform and E. Coli	APHA 9223B

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

TC-MF-WT	Water	Total Coliforms	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35±0.5° C for 24±2h. Method ID: WT-TM-1200

THM-SUM-CALC-WT	Water	Total Trihalomethanes (THMs)	CALCULATION

Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

THM-SUM-PPB-CALC-WT	Water	Total Trihalomethanes (THMs)	CALCULATION

Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

THM-TCLP-WT	Waste	Trihalomethanes for O. Reg 347	SW846 8260

A sample of waste is leached in a zero headspace extractor at 30±2 rpm for 18±2.0 hours with the appropriate leaching solution. After tumbling the leachate is analyzed directly by purge and trap technology, followed by GC/MS using internal standard quantitation.

TI-DRY-MICR-CCMS-VA	Tissue	Titanium in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020B

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020B).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Soil	TOC & FOC in Solids	CARTER 21.3.2

Soil is treated with excess acidic dichromate, which reacts with the organic carbon, oxidizing it to CO2. The residual dichromate is titrated with ferrous ammonium sulphate and TOC calculated by difference.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

Methodology

<table>
<tr><th>Product</th><th>Matrix</th><th>Product Description</th><th>Analytical Method Reference</th></tr>
<tr><td>TURBIDITY-BF</td><td>Water</td><td>Turbidity</td><td>APHA 2130 B</td></tr>
<tr><td colspan="4">Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.</td></tr>
<tr><td>TURBIDITY-WT</td><td>Water</td><td>Turbidity</td><td>APHA 2130 B</td></tr>
<tr><td colspan="4">Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.</td></tr>
<tr><td>VOC-511-HS-WT</td><td>Soil</td><td>VOC-O.Reg 153/04 (July 2011)</td><td>SW846 8260 (511)</td></tr>
<tr><td colspan="4">Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).</td></tr>
<tr><td>VOC-ONT-DW-WT</td><td>Water</td><td>Volatile Organics (O.Reg 170/03)</td><td>SW846 8260</td></tr>
<tr><td colspan="4">Liquid samples are analyzed by headspace GC/MSD.</td></tr>
<tr><td>VOC-ROU-HS-WT</td><td>Water</td><td>Volatile Organic Compounds</td><td>SW846 8260</td></tr>
<tr><td colspan="4">Aqueous samples are analyzed by headspace-GC/MS.</td></tr>
<tr><td>VOC-TCLP-WT</td><td>Waste</td><td>VOC for O. Reg 347</td><td>SW846 8260</td></tr>
<tr><td colspan="4">A sample of waste is leached in a zero headspace extractor at 30±2 rpm for 18±2.0 hours with the appropriate leaching solution. After tumbling the leachate is analyzed directly by headspace technology, followed by GC/MS using internal standard quantitation.</td></tr>
<tr><td>XYLENES-SUM-CALC-WT</td><td>Soil</td><td>Sum of Xylene Isomer Concentrations</td><td>CALCULATION</td></tr>
<tr><td colspan="4">Total xylenes represents the sum of o-xylene and m&p-xylene.</td></tr>
<tr><td>XYLENES-SUM-CALC-WT</td><td>Water</td><td>Sum of Xylene Isomer Concentrations</td><td>CALCULATION</td></tr>
<tr><td colspan="4">Total xylenes represents the sum of o-xylene and m&p-xylene.</td></tr>
</table>

APPENDIX E

Analytical Laboratory QA/QC Procedures

ALS Quality Management System Summary

ALS is a global diversified testing services organization with a presence on every continent, offering a broad range of services to leading global companies.

The following report summarizes standard practices routinely employed by the ALS Environmental Division in Canada. Our practices exceed accreditation requirements and have been built to meet the needs of our customers and to give them confidence in the reliability of our test data.

Additional information is available on request from the Quality Department. Customers are invited to audit or tour ALS facilities at their convenience.

Services to Customers

ALS cooperates closely with its customers to ensure their testing needs are understood, and allows them reasonable access to relevant work areas of the laboratories to audit the management system or to witness test work undertaken on their behalf.

All client issues are logged into our tracking system to ensure each issue is addressed completely and appropriately. Local and national oversight and initiatives ensure that identified improvements are incorporated in the Canadian laboratories so that customers receive the same level of service regardless of which location performs the testing.

Documentation and Document Control

Test methods and support procedures are documented in detail to ensure consistency of application, repeatability of test results and traceability of analyses.

Test method requirements include but are not limited to sample handling, sample storage, minimizing interference, sample preparation, reagent and standard specifications, equipment, supplies, calibration requirements, instrumental measurement procedures, quality control requirements, data quality objectives and corrective actions, calculations, reporting requirements, reference information, hazards and their preventive measures.

Administrative support procedures are also documented where needed to ensure quality system procedures and customer services are provided in a controlled, approved manner consistent with ALS policies and client needs.

All procedures are authorized prior to use by the signing authority, ensuring adequate technical and quality oversight.

Distribution of documents is controlled to ensure only the most recent version is available for use. Authorized documents are reviewed periodically by the signing authority to ensure they continue to meet ALS requirements and customer needs.

Test methods and support procedures are available for client viewing on-site.

Internal Audits

Internal audits are scheduled and performed by qualified Quality and Technical staff for all routine analytical procedures and Quality System elements. Such audits ensure that procedures are implemented as intended, that test methods are scientifically defensible and technically sound, and that policies, procedures and records continue to meet the Quality System objectives.

Quality staff may periodically initiate unscheduled audits in response to proficiency testing program results, client feedback, requests from managers or any other circumstance that warrants investigation.

Quality Control (QC)

ALS has established QC procedures for monitoring the validity of tests performed by its laboratories. Individual test methods specify quality control requirements, frequency of use, and Data Quality Objectives (DQOs).

The type of quality control elements used for process monitoring is dependent on the test performed, but typically includes (as appropriate): Calibration Verification Standards, Continuing Calibration Verifications, Instrument Blanks, Method Blanks, Laboratory Control Samples, Reference Materials, Matrix Spikes, Surrogate Spikes, and Internal Standards.

DQOs are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal DQOs.

Test results for selected QC samples are available on test reports. Please contact your Account Manager for more information.

Control Charts

Control charts are used to provide a graphical representation of QC results and test method performance over time. Control charts graphically display DQOs as well as the statistically derived mean and ± 2 and 3 standard deviations ("sigma") around the mean, calculated from recent historical QC results. ALS applies advanced trend monitoring algorithms to identify outliers and non-random data distributions (trends) that may indicate undesirable changes in test method performance. The trend monitoring process has been automated within our LIMS. Upon data entry, each QC result is checked against programmed limits and trends. If a trend is identified, a notification is e-mailed to the analyst and their supervisor, so that it can be investigated and corrected.

Continuous Improvement

ALS is committed to continuously improving its processes and services. The Quality System feeds into a continuous cycle of review, implementation, and monitoring so that improvements are actively sought and adopted where needed.

Data Validation

ALS analytical data proceeds through several reviews prior to the release of final reports. The ALS data validation process includes test result validation, inter-parameter validation and report validation. Test result validation involves an independent peer review of raw and calculated test results. Inter-parameter validation occurs when all department specific parameters for a sample are completed, and involves an overall review of test results within each sample for consistency among any related test parameters. Report validation occurs when all the requested test results for a work order are completed, and involves a review of the final report before it is sent to the customer.

ALS maintains laboratory records in a traceable manner for five years.

Method Validation

Customers rely on ALS to select test methods that are appropriate to meet their needs. Wherever possible, ALS references the latest versions of published standard methods developed by organizations such as American Public Health Association, United States Environmental Protection Agency, NIOSH, Environment Canada, and other international, regional or regulatory organizations, or equipment manufacturers.

Method validations are conducted to confirm that our test methods are fit for their intended use. The validations are as extensive as necessary to meet the needs of the given application. The extent depends on the source of the method. Test methods are revalidated periodically to ensure continued suitability and fitness for purpose.

Method Detection Limits and Limits of Reporting

ALS Limits of Reporting (LORs) are established using rigorous experimental and statistical procedures that begin with the determination of the Method Detection Limit (MDL) at 99% confidence. The MDL takes into account several factors, like long term Method Blanks, low level Sample Duplicates, and low level Spiked Samples. When detected at or above the MDL, ALS test results are considered to be qualitatively accurate, and a parameter can be reported with 99% confidence as being present in the sample.

$$\mathbf{MDL = (s_0 \times t_{n\text{-}1}) + |MBlk|}$$

Where:
- s_0 = the standard deviation derived from the analysis of blank or low level samples, whichever gives a higher standard deviation,
- t_{n-1} = the Student's t-distribution with n-1 degrees of freedom for the one-sided 99% confidence interval.
- |MBlk|= the absolute value of the mean method blank.

ALS takes a conservative approach to detection limits. Our goal is to minimize false positives, because we recognize that any false positive results can be damaging for our clients. Where possible, we establish LORs at levels well-above the statistical MDL, and ideally at the LOQ_5. This improves the accuracy and precision of results near the detection limit, and reduces the chance of false positives due to sample-specific issues. At or above the LOQ_5, test results are considered to be quantitatively accurate. A reported parameter at the LOQ_5 is considered to be within 40% of the true value 95% of the time.

$$\mathbf{LOQ_5 = 5s_0 + |MBlk|}$$

Where:
- s_0 = the standard deviation used in the MDL calculation,
- |MBlk| = the absolute value of the mean method blank.

The D. L. column on ALS analytical reports contains the LOR. The LOR may be the MDL as calculated above, or a higher value. ALS does not report LORs that are less than the calculated MDL.

Measurement Uncertainty (MU)

ALS procedures for calculating measurement uncertainty are based on accepted practices of identifying components contributing to uncertainty, compiling data that represents or includes these components, evaluating the data using appropriate statistical calculations, and reporting in a manner that prevents misunderstanding of the result. The Type A method of calculating measurement uncertainty is followed, however additional factors are considered to ensure the best and most complete information is derived from our evaluation of test method performance.

The ALS model describes the dependency of uncertainty on three factors. The first is a constant contribution to uncertainty attributable to s_0, the standard deviation of the method for concentrations that approach zero. The second is a constant relative uncertainty associated with higher parameter concentrations. The third is a constant contribution to uncertainty attributable to the mean long-term method blank value where it is significant. The following is the ALS equation for measurement uncertainty, using an expansion factor of k=2:

Expanded 95% Uncertainty as a Function of Concentration

$$U(c) = 2 * [\sqrt{ \{ s_0^2 + (\Theta c)^2 \} }] + |MBlk_{LT}|$$

Where:
- **U(c)** = The expanded uncertainty at concentration c. The range c ± U(c) represents approximately the 95% confidence interval (two standard deviations).
- **c** = Measured concentration of parameter in the sample.
- **s_0** = A constant contribution to standard uncertainty represented by the standard deviation at zero concentration, which is related to the method detection limit.
- **Θ** = Combined relative standard uncertainty, excluding MDL and Method Blank contributions. Theta has no units.
- **$|MBlk_{LT}|$** = Absolute value of the mean long-term Method Blank value, where significant (i.e. if > 1/5 s_0). [Note that the Method Blank term is not expanded because it represents a constant bias, not a variance.]

Uncertainty values obtained from this procedure must be regarded as estimates. Primarily, this is because all environmental samples are different, especially with regard to matrix effects and heterogeneity. It is our intent with this procedure to arrive at an estimate of a 95% confidence level uncertainty value that can be assumed to apply to 95% (or more) of the samples that a laboratory receives for a given test. It follows that for samples where undetected matrix effects or interferences occur, or for samples that are atypically heterogeneous, uncertainty estimates may be low.

Another aspect of reporting MU is the reporting of test method bias. Bias occurs in a small number of test methods that cannot recover 100% of a parameter from a sample. In these cases ALS reports bias along with the MU to aid with the interpretation of the test result.

Participation in Interlaboratory Proficiency Testing (PT) Programs

ALS locations participate in an extensive variety of proficiency testing programs. Where available, formal programs operated by outside agencies are used. When not available, ALS utilizes less formal proficiency testing studies. Root cause analysis is initiated and corrective action plans are developed when PT program results indicate a decline in test method performance.

Staff Training

Formal training procedures are in place to ensure all staff are trained in ALS polices and analytical procedures prior to performing analyses. A staff orientation program communicates ALS polices to newly hired staff. Task specific training is performed, and analyst proficiency is demonstrated and documented before staff are authorized to work independently. On-going analyst proficiency is monitored using proficiency testing programs. Records are maintained in training logs issued to staff upon hiring.

As well, ALS Canada promotes continuing education and learning by offering advanced courses covering technical and quality functions.

Employee Agreements

ALS protects its customers' confidential information and proprietary rights. We require all employees to review and sign a Code of Conduct policy that communicates the ALS confidentiality policy. It is ALS practice to never disclose information about a client's analysis to a third party without prior consent of the client, or unless compelled to by law. If we are obligated by law to disclose such information, we will inform the client prior to doing so.

Our employees avoid involvement in activities that would diminish confidence in their competence, impartiality, judgment, or integrity by complying with the ALS Code of Conduct and Data Integrity Policy.

Sample Tracking

Procedures are in place to track samples from receipt at the lab through to final reporting. A data management system (LIMS – Laboratory Information Management System) is used to generate a work order number for each sample submission, and a unique identification number is generated for each sample within the work order. The system is then used to assign specific analyses for the samples, to identify methods to be used, and to assign due dates for the results. The system is used to manage analytical workloads and track the status of all samples in-house. LIMS is a secure system that can only be accessed using login passwords. Controlling the level of access according to staff needs provides additional security.

When requested by the client, legal sample protocols are implemented to ensure chain of custody defensibility in a court of law. Contact the lab for legal sampling and transportation instructions if this service is needed.

Equipment Calibration

Measuring and testing equipment used by ALS laboratories that can have a significant effect on the accuracy or validity of test results is calibrated using established procedures. The procedures ensure traceability through an unbroken chain of calibrations or comparisons to national measurement standards. Where traceability of measurements to SI units is not possible and/or not relevant, traceability is provided by the use of certified reference materials and/or consensus standards.

Management Reviews (MR)

Management conducts a review at least annually to ensure the management system is effective, and continues to be suitable for its operations, and to identify necessary changes or improvements. Senior management is included in the review process for all locations.

ALS Quality Control Protocols

08 May, 2012

Quality control samples are introduced into batches of samples at critical points of sample handling, preparation and analysis to demonstrate the processes are performing as expected. In general, quality control samples are considered either Instrument QC or Method QC.

Instrument QC:

Instrument QC samples demonstrate control for the instrumental portion of a method. Instrument QC requirements must be successfully met before the analysis of Method QC or samples may proceed.

- Verification of initial calibration - criteria varies with each test.
- 2nd source Calibration Verification Standard (CVS) – at minimum, with each initial calibration.
- Continuing Calibration Verification (CCV) – frequency varies by test.
- Instrument Blanks – usage and frequency varies by test.

Method QC:

Method QC samples encompass the entire method and are initiated at the earliest point of the method where appropriate. Refer to the QC Definitions below. One set of Method QC is included for each batch of up to 20 client samples. Each set includes:

- 1 Method Blank.
- 1 Sample Duplicate. *
- 1 Lab Control Sample.
- 1 Reference Material or Matrix Spike. **
- Surrogate Compounds.

* Duplicate analyses are not performed where sub-sampling is not possible – e.g. most tests for organics in water.
** Spikes and Reference Materials are unavailable for Microbiology tests.

Method QC must be successfully analyzed before sample results are approved. Method QC results are normally reported to ALS clients with data reports.

Data Quality Objectives (DQOs):

DQOs are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal DQOs. Current DQOs are available upon request.

Detailed descriptions of how DQOs are evaluated for different types of Quality Control samples are described on the following pages.

Types of Quality Control – Definitions and Evaluation Protocols

Method Blank (MB) - A blank sample prepared to represent the sample matrix as closely as possible and analyzed exactly like the calibration standards, samples, and quality control (QC) samples. Results of Method Blanks provide an estimate of the within batch variability of the blank response and an indication of bias introduced by the analytical procedure.

Except in special cases (as outlined in ALS DQO summary documents) the ALS DQO for Method Blanks is for all results to lie below the Limit of Reporting (LOR).

Laboratory Sample Duplicate (DUP) - A second portion of sample taken from the same container as the sub-sample used for the primary analysis, that is analyzed independently through all steps of the laboratory's sampling and analytical procedures. Duplicate samples are used to assess variance of the total method including sampling and analysis.

Duplicate precision is normally measured as Relative Percent Difference (RPD), where RPD = |(Result2 - Result1) / Mean| * 100. Duplicate samples should normally agree to within the ALS Precision DQO for the test and parameter (expressed as RPD), or within ± 2 x the LOR (for low level results). Refer to the ALS DQOs for Precision for specific limits for any given test.

ALS does not establish DQOs for Field Sample Duplicates. However, it is generally understood and accepted that the variability of Field Sample Duplicates is significantly more than what is observed with Laboratory Sample Duplicates.[1]

Laboratory Control Sample (LCS) - A known matrix spiked with compound(s) representative of the target analytes. An LCS is used to verify the accuracy of the laboratory's performance of the test.

LCS accuracy is calculated as the measured amount divided by the target concentration, and is normally expressed as percent recovery. LCS recoveries should normally lie within the ALS Accuracy DQOs for the test and parameter. For a low level LCS, the result should lie within ± 1 x the LOR of the target concentration. Refer to the ALS Accuracy DQOs for specific limits for any given test.

Reference Material (RM) – A material or substance, one or more of whose property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. An RM is similar to an LCS, but encompasses a representative sample matrix. Similar to an LCS, an RM is used to verify the accuracy of the laboratory's performance of the test, but including the challenges of a complex sample matrix.

RM accuracy is calculated, expressed, and evaluated similarly to LCS accuracy. Refer to ALS Accuracy DQOs for specific limits for any given test.

Matrix Spike (MS) - A sample prepared by adding a known amount of a target analyte to a specified amount of a sample for which an independent estimate of the target analyte concentration is available. Spiked samples are used, for example, to determine the effect of the sample matrix on a method's recovery efficiency.

Matrix Spike results are calculated and expressed as percent recovery, by dividing the measured result (minus any analyte contribution from the unspiked sample) by the target analyte concentration. Matrix Spike results should normally lie within the ALS Accuracy DQOs for Matrix

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[1] Depending on the type of Field Sample Duplicates being evaluated (e.g. Co-located versus Split Sample Duplicates), ALS recommends DQOs for Field Sample Duplicates that are between 1.5 – 2.0 times higher than our Laboratory Sample Duplicate DQOs. Co-located Sample Duplicates generally require higher DQOs than Split Sample Duplicates.

Spikes. Matrix Spike results cannot be calculated or reported in cases where the background concentration of the test parameter in the sample is too high relative to the spike level.

Surrogate Compounds (SURR) – Surrogate Compounds are added to every sample where applicable (organics tests only). They are substances with properties that mimic the analyte of interest, and which are unlikely to be found in environmental samples. They are added at known concentration to samples to establish that the analytical method has been properly performed.

Surrogate results are calculated and expressed as percent recovery, by dividing the measured result against the expected target concentration. Refer to ALS Accuracy DQOs for specific limits for any given test.

Automated Relational Checks

In addition to all our standard Quality Control checks, ALS also employs dozens of "Relational Checks", which are programmed into our Laboratory Information Systems (LIMS) to automatically highlight any situations where the expected relationships between different test parameters are violated, which can often point to errors. Such errors may originate with field sampling, or from laboratory processes, but should always be identified and pro-actively investigated.

Total versus Dissolved Metals ("D > T" Check) – One of the most important and common relational checks we do is a check for situations where Dissolved Metal concentrations significantly exceed Total Metal concentrations. By definition, this situation should not occur. However, there are a few reasons why this can occur:

i) Circumstances where Dissolved Metals slightly exceed Total Metals are expected in a small percentage of samples, simply due to normal random variability. In fact, when all metals in a test sample exist in the dissolved form, we expect that Dissolved Metals measurements will numerically exceed Total Metals measurements exactly half the time (by a small margin), simply due to random chance.

ii) Samples to be analyzed for Dissolved Metals must be filtered, which is normally done in the field. Filtration processes are a common source of low level metals contaminants. Contamination of a sample during filtration is the most common source of significant D > T issues.

iii) Field samples for Dissolved and Total Metals are normally collected independently, so variability of the sampling process is another common cause of D > T issues.

If none of the above causes can explain a situation where Dissolved Metals exceed Total Metals, then another type of error may be indicated, either with the collection of the sample in the field, or with sample containers or preservatives, or with the laboratory testing process.

ALS automatically highlights and investigates all circumstances where a Dissolved Metal result exceeds the Total Metal result by 20% RPD or more, but only if the absolute difference between the two results is greater than the sum of the Limits of Reporting (Detection Limits) of the two results.

The mechanism of this relational check is derived from the ALS Duplicate DQOs for Metals in Water.

All D > T relational checks that violate the rule above are flagged internally, and are investigated by ALS before sample results will be released to our clients. In most cases, results will be re-analyzed to confirm or correct the anomalous relationship. If results are confirmed by re-analysis, the following data qualifier is applied:

DTC: Dissolved concentration exceeds total. Results were confirmed by re-analysis.

Other Important Relational Checks Conducted by ALS

ALS employs dozens of other relational checks to highlight anomalous relationships between test parameters. Some of more common checks include the following:

- *Total Ammonia should not exceed Total Kjeldahl Nitrogen*
- *Weak Acid Dissociable Cyanide should not exceed Total Cyanide*
- *E. coli should not exceed Fecal Coliforms*
- *Nitrate + Nitrite should not exceed Total Nitrogen*
- *Hexavalent Chromium should not exceed Total Chromium*
- *True Colour should not exceed Apparent Colour*
- *Mineral Oil and Grease should not exceed Total Oil and Grease*
- *Reactive Phosphorus should not exceed Total Phosphorus*

ALS Environmental

Quality Control Report Guide

Matrix is the substance type of the QC sample.

Common matrices are water, soil, and tissue.

The **Reference** column contains:

a) Lab sample number (L#) or work group number (WG#) of samples that were used for duplicates or matrix spikes - this information is for internal tracking purposes.

b) Test results for actual samples that were duplicated for QC purposes.

Result from analyzing the QC sample.

% Recovery is calculated for QC samples with known target values (e.g. Spikes or CRMs).

Actual (absolute) test results are reported for the second aliquot of a duplicate pair and method blanks.

A **Qualifier** is used to communicate important information about the QC sample test results.

Sample parameter qualifiers used in the report are defined near the end of the Quality Control Report.

Also refer to the *Sample Parameter Qualifier Definitions* on the next page.

Units of the QC sample test results.

Test results are reported in % recovery for samples with known target values.

Actual (absolute) concentration units are used for reporting duplicate sample and Method Blank test results.

The calculated **Relative % Difference** between duplicate pairs.

RPD is calculated as follows:
|{(Sample Result - Duplicate Result) / [Mean]}| x 100

Duplicate pairs with test results that are < 5 x LOR are reported in sample concentration units (absolute units) and are accompanied by a J qualifier.

The Control **Limit** for the QC sample (ALS Data Quality Objective (DQO)).

QC samples must fall within Control Limits or appropriate action is taken, such as reanalysis where possible, or the data is qualified.

QC samples with known target values have a range for % recovery (eg) 85-115%.

Duplicates have a ± RPD range (e.g. ± 20 RPD). The RPD is reported as an absolute value (e.g. 20 RPD).

Method Blank control limit is the parameter Detection Limit (DL), also known as the Limit of Reporting (LOR).

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-WP	Water							
Batch R2179887								
WG1269694-3 DUP		L997018-4						
Sulfate		60.1	62.0		mg/L	3.1	20	21-APR-11
WG1269674-2 LCS								
Sulfate			100		%		85-115	21-APR-11
WG1269674-1 MB								
ulfate			<0.50		mg/L		0.5	21-APR-11
WG1269674-4 MS		L997018-4						
ulfate			N/A	MS-B	%		-	21-APR-11
G1269674-5 CVS								
ulfate			103		%		85-115	21-APR-11
G1269674-6 CRM								
lfate			95		%		80-120	21-APR-11

Test Code:
Sulfate (SO4), analyzed by Ion Chromatography (IC), in ALS Winnipeg (WP).

DUP: Laboratory Sample Duplicate - a second portion of sample taken from the same container as the sub-sample used for the primary analysis. Assesses variance of the total method including lab sub-sampling and analysis.

The results for this duplicate pair are 60.1 and 62.0 mg/L. The RPD is 3.1 and the control limits are ± 20 RPD.

LCS: Laboratory Control Sample – a known matrix spiked with target analytes. Verifies the accuracy of the performance of the test.

The recovery for this LCS is 100%, with control limits of 85 to 115% recovery.

MB: Method Blank – a blank matrix taken through the entire test method. Monitors variability of the blank response and bias of the test method.

The result for this MB is less than 0.50 mg/L. The control limit for the MB is equal to the LOR.

MS: Matrix Spike – a known amount of target analytes are added to a client sample. Measures the effect of the sample matrix on a method's recovery efficiency.

In this example, the recovery of the MS could not be calculated. The qualifier explains why – refer to the *Sample Parameter Qualifier Definitions*.

CVS: Calibration Verification Standard - a second source reference standard containing known concentrations of target analytes. Confirms the accuracy and stability of the calibration standards.

This CVS has a recovery of 103% and control limits of 85 to 115% recovery.

CRM/IRM: Certified or Internal Reference Material – a homogeneous sample whose analyte values have been well characterized.

This CRM has a 95% recovery and control limits of 80 to 120% recovery.

Quality Control Report Guide

Legend:

Limit ALS Control Limit (Data Quality Objectives)
DUP Duplicate RPD Relative Percent Difference
N/A Not Available
LCS Laboratory Control Sample
SRM Standard Reference Material
MS Matrix Spike
MSD Matrix Spike Duplicate
ADE Average Desorption Efficiency
MB Method Blank
IRM Internal Reference Material
CRM Certified Reference Material
CCV Continuing Calibration Verification
CVS Calibration Verification Standard
LCSD Laboratory Control Sample Duplicate

Legend: explains acronyms that may be used in the QC Report.

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Qualifiers: QC sample qualifiers are listed and explained here.

The three examples are common qualifiers. They explain unusual or special circumstances that pertain to the QC sample results.

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Parameters and sample numbers that had Hold Time exceedances are listed in this table.

Hold Times are tracked from sampling date and time to the date and time when the sample was processed in the lab.

The recommended Hold Times.

See the Notes* section for sources of recommendations.

Hold time exceedance Qualifiers are explained in the *Legend and Qualifiers Definitions* section below.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Transmittance, UV (254 nm)	1	19-APR-11 14:00	25-APR-11 08:16	48	38	hours	EHTL
pH	1	19-APR-11 14:00	10-MAY-11 09:32	0.25	499	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Explanations for the Qualifiers listed above.

See also the additional Notes below.

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L997206 were received on 21-APR-11 07:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.