SCOPE OF ACCREDITATION

Bureau Veritas Canada (2019) Inc., formerly known as Maxxam Analytics
Maxxam Analytics Calgary
2021 - 41st Avenue, N.E.
Calgary, AB
T2E 6P2

Accredited Laboratory No. 836
(Conforms with requirements of ISO/IEC 17025:2017)

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CLIENTS SERVED: All interested parties
Some tests are available on-site (Mobile Laboratory).

FIELDS OF TESTING: Biological, Chemical/Physical

PROGRAM SPECIALTY AREA: Agriculture Inputs, Food, Animal Health and Plant
Protection (PSA-AFAP), Environmental

INITIAL ACCREDITATION DATE: 2016-08-30

MOST RECENT ACCREDITATION: 2019-10-15

ACCREDITATION VALID TO: 2024-08-30

Testing is performed at the following locations:
Air testing: #1 2080-39th Avenue N.E. Calgary, AB. T2E 6P7
Inorganic chemistry and water microbiology: 4000-19 Street N.E Calgary, AB T2E 6P8
Organic chemistry: 2021 – 41 Avenue NE, Calgary, Alberta T2E 6P2
Food testing: #112, 3442-118 Ave S.E. Calgary, AB T2Z 3X1
Mobile Laboratory, for specific tests where identified below.
ANIMAL AND PLANTS (AGRICULTURE)

Foods and Edible Products: (Human and Animal Consumption)

Assurance GDS ® MPX Top Assay BioControl Assurance GDS ® MPX Top 6 STEC
6 STEC Assay
Assurance GDS ® MPX Top BioControl Assurance GDS ® MPX Top 7 STEC
7 STEC Assay

MFHPB-10 Isolation of *Escherichia coli* O157:H7/NM from foods and environmental surface samples
MFHPB-18 Determination of Aerobic Colony Counts in Foods
MFHPB-20 Isolation and Identification of *Salmonella* from Food and Environmental Samples
MFHPB-22 Enumeration of Yeast and Moulds in Foods
MFHPB-30 Isolation of *Listeria monocytogenes* and *Listeria spp.* from foods and environmental samples
MFHPB-33 Enumeration of Total Aerobic Bacteria in Food Products and Food Ingredients Using 3M™ Petrifilm™ Aerobic Count Plates
MFHPB-34 Enumeration of *Escherichia coli* and Coliforms in Food Products and Food Ingredients Using 3M™ Petrifilm™ *E. coli* Count Plates
MFLP-09 Enumeration of *Enterobacteriaceae* species in Food and Environmental Samples Using 3M™ Petrifilm™ *Enterobacteriaceae* Count Plates
MFLP-16 Detection of *Escherichia coli* O157:H7 in foods - Assurance GDS® for *E. coli* O157:H7 Tq Gene Detection System
MFLP-21 Enumeration of *Staphylococcus aureus* in Foods and Environmental Samples Using 3MT PetrifilmT Staph. Express Count (STX) Plates
MFLP-28 The Qualicon Bax® System Method for the Detection of *Listeria monocytogenes* in a Variety of Food.
MFLP-29 The BAX® System Method for the detection of Salmonella in foods and environmental surface samples.
MFLP-30 Detection of *Escherichia coli* O157:H7 in Select Foods using the BAX® System *E. coli* O157:H7 MP.
MFLP-36 Detection of *Salmonella* in Foods and Environmental Surface Samples-Assurance GDS® for *Salmonella* Tq Genetic Detection System
MFLP-54 Detection of *Listeria monocytogenes* from selected foods using iQ-Check™ *Listeria monocytogenes* Real-Time PCR Test Kit
MFLP-74 Enumeration of *Listeria monocytogenes* in foods
MFLP-79 Detection of *Listeria spp.* in Environmental Surface Samples using the BAX® System Real-Time PCR Assay for *Listeria* genus
MLG4 Isolation and Identification of *Salmonella* from Meat, Poultry, Pasteurized Egg and Siluriformes (fish) Products and Carcass and environmental sponges
ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY

Environmental

(Soil, Solid, Waste)

AB SOP-00045 Specific Gravity
[Modified from SM 2710 F, MSSMA 2.25, and Petroleum and Natural Gas Industries- Field Testing of Drilling Fluids]
[Also includes Water - Inorganic, Modified from SM 2710F-Gravimetric Specific Gravity]

AB SOP-00047 Free Liquid (Paint Filter Test)
[Modified from EPA 9095 B]
Volumetric Free Liquid in Waste Samples

CAL SOP-00028 Flammability Test of Readily Combustible Solids
[Modified from Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria, Section 33]
Visual Flammability

(Water)

AB SOP-00011 Silica (Reactive) by Konelab - Molybdate/ANSA Reduction Method
[Modified from EPA 370.1]
Colorimetric Reactive Silica

AB SOP-00016 Chemical Oxygen Demand (Total and Dissolved)
[Modified from SM 5220 [D]
Colorimetric COD

AB SOP-00017 Biochemical Oxygen Demand
[Modified from SM 5210 B]
D.O. Meter BOD (5 day)
CBOD (5 day)

AB SOP-00018 Sulfate by Konelab - Automated Turbidimetry Method
[Modified from SM 4500-SO4 E]
Turbidimetric Sulfate
AB SOP-00024  Total Phosphorus by Konelab - Ascorbic Acid Reduction Method  
             [Modified from SM 4500-P, A, B, F]  
             Colorimetric  
             Inorganic phosphorus  
             Total Phosphorus

AB SOP-00032  The Determination of Residual Chlorine in Waters  
             [Modified from SM 4500 C1G]  
             Colorimetric  
             Free Chlorine  
             Total Chlorine

AB SOP-00041  Ferrous and Ferric Iron in Water - Colorimetric Determination  
             [Modified from SM 3500-Fe A, B]  
             Colorimetric  
             Ferrous Iron

AB SOP-00058  Dissolved Oxygen - Modified Winkler Method  
             [Modified from SM 4500-O C]  
             Titrimetric  
             Dissolved Oxygen

AB SOP-00060  Naphthenic Acids in water by FTIR  
             [Modified from EPA 3510C R3/FTIR] IR  
             Naphthenic Acids

AB SOP-00061  Total Suspended Solids, Total Fixed Solids, Total Volatile Solids  
             [Modified from SM 2540 D, E]  
             Gravimetric  
             Total Suspended Solids  
             Total Suspended Solids Fixed  
             Total Suspended Solids Volatile

AB SOP-00065  Total Dissolved Solids  
             [Modified from SM 2540 C]  
             Gravimetric  
             Total Dissolved Solids

AB SOP-00070  Extraction and Analysis of Naphthenic Acids in Water (DCM Extraction)  
             [Modified from Syncrude 1995 m]  
             IR DCM Extraction  
             Naphthenic Acids

AB SOP-00080  Sulphide, Low level  
             [Modified from SM 4500-S2D, A, F]  
             Colorimetric  
             Sulphide

CAL SOP-00007  Mercury in Water Samples by Cold Vapour Atomic Fluorescence  
             [Modified from EPA 1631]  
             Cold Vapour AF  
             Mercury
| CAL SOP-00040 | Bromate, Chlorate, Chlorite by IC – Conductivity detection  
[Modified from SM 4110 D]  
Ion Chromatography  
Bromate  
Chlorate  
Chlorite |
| CAL SOP-00049 | Colour by Konelab  
[Modified from SM 2120C]  
Spectrophotometric  
Apparent colour  
True Color |
| CAL SOP-00055 | Volatile Organic Acids  
[Modified from Dionex ICE-AS6 DOC NO 34961]  
Ion Chromatography  
Glycolic Acid  
Lactic Acid |
| CAL SOP-00057 | Iodide/Thiocyanate/Thiosulfate  
[Modified from DIONEX, DOC NO 034035]  
Ion Chromatography  
Iodide  
Thiocyanate  
Thiosulfate |
| CAL SOP-00063 | Volatile Organic Acids  
[Modified from DIONEX ICE-AS1 DOC NO 031181] - Waters  
Ion Chromatography  
Acetic Acid  
Butyric Acid  
Formic Acid  
Propionic Acid |
| CAL SOP-00065 | Oxalic Acid by Ion Chromatography - Conductivity Detection  
[Modified from Standard Methods for Examination of Water and Wastewater, Method 4110B]  
Ion Chromatography  
Oxalic Acid |
| CAL SOP-00071 | Sulphite by IC  
[Modified from SM 4110 B]  
Ion Chromatography - Conductivity Detector  
Sulfite |
| CAL SOP-00074 | Total Solids  
[Modified from SM 2540 B, E]  
Gravimetric  
Total Solids  
Total Solids Fixed  
Total Solids Volatile |
| CAL SOP-00076 | Total Inorganic Carbon and Dissolved Inorganic Carbon – Auto IR analysis  
   [Modified from SM 5310 A, C]  
   Auto Infrared  
   Inorganic Carbon |
| AB SOP-00087 | Organic Carbon by Technicon - Persulfate UV Oxidation  
   Colorimetric  
   Organic Carbon |
| CAL SOP-00081 | Turbidity – Nephelometric Method  
   [Modified from SM 2130 B]  
   Nephelometric  
   Turbidity |
| CAL SOP-00099 | Extraction and analysis of Resin and Fatty Acids in water by GCMS  
   [Modified from AE 129.0 and EPA 8270E]  
   GC/MS  
   12,14-Dichlorodehydroabietic Acid  
   12-Chlorodehydroabietic Acid  
   14-Chlorodehydroabietic Acid  
   9,10-Dichlorostearic Acid (C18)  
   Abietic Acid  
   Decanoic Acid C10  
   Dehydroabietic Acid  
   Docosanoic Acid C22  
   Dodecanoic Acid C12  
   Eicosanoic Acid C20  
   Hexadecanoic Acid C16  
   Isopimaric Acid  
   Linoleic Acid C18:2  
   Linoleic Acid C18:3  
   Neoabietic Acid  
   Octadecanoic Acid C18  
   Oleic Acid C18:1  
   Palustric Acid  
   Pimaric Acid  
   Sandaracopimaric Acid  
   Tetradecanoic Acid (C14)  
   Undecanoic Acid (C11)  
   Total of Resin Acids  
   Total of Fatty Acids |

(Water and Soil (Toxicology))
AB SOP-00083
15 min. Microtox BioAssay using Vibrio fischeri [EPS 1/RM/24]
BIOLUMINESCENCE
Microtox IC50 (15 min)

Air

AIR SOP-00009
Sorbent traps for the determination of Mercury Emissions (Field)
Spectrometer - Atomic Absorption Detector
Mercury (Hg)

AIR SOP-00110
Anions-Water
[Modified from Methods Manual for Chemical Analysis of Atmospheric Pollutants, method 52121]
Ion Chromatography - Conductivity Detector
Chloride
Fluoride
Nitrate
Sulfate

AIR SOP-00111
Ammonia – Water
[Modified from Methods Manual for Chemical Analysis of Atmospheric Pollutants, method 52626]
Ion Chromatography - Conductivity Detector
Ammonia

AIR SOP-00112
Fixed Gases - Air
[Modified from Method 3, Alberta Stack Sampling Code, 1995, Publication Number: REF.89 and EPA 3C]
GC/TCD
CO
CO2
N2
O2

AIR SOP-00113
Formaldehyde – Water
[Modified from Methods Manual for Chemical Analysis of Atmospheric Pollutants, method 12525] Colorimetric
Formaldehyde

AIR SOP-00114
Hydrocarbons - Air
[Modified from AENV18]
GC/FID
Total Hydrocarbons as Methane
AIR SOP-00115  Total Particulates - Air Filter
[Modified from method 5, Determination of Particulate Emissions from Stationary Sources, Alberta Stack Sampling Code, 1995, Publication Number: REF.89]
Gravimetric Particulates

AIR SOP-00116  Total/Trace Reduced Sulfur - Air (Field)
[Modified from AENV.TRS.P&P-1 and AENV.TRS.SGP-1]
GC/PID
Carbon disulfide
Carbonyl Sulfide
Dimethyl disulfide
Dimethyl sulfide
Hydrogen Sulphide
Methyl mercaptan

AIR SOP-00122  Chlorine and Chlorine Dioxide – Air (Field)
[Modified from Alberta Environment Stack Code, 1995, Publication Number REF 89]
Iodometric Determination
Chlorine
Chlorine Dioxide

Soil/Solid

AB SOP-00002  Moisture Content in Soil
[Modified from CCME Petroleum Hydrocarbons in Soil - Tier 1 Method Section 13]
Gravimetric
% Moisture

AB SOP-00003  Analysis of PAH in Water, Soil, Oil and Leachates by GC/MS
[Modified from EPA 8270E,, EPA 3540C, EPA 8270E ] - Soils and water
1-Methylnaphthalene
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b, j) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzo(c)phenanthrene
Benzo(e)pyrene
Chrysene
Dibenzo (a,h) anthracene
Fluoranthen
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Perylene
Phenanthrene
Pyrene
Quinoline

AB SOP-00004 Determination of Electrolytic Conductivity by Manual Meter
[Modified from SM 2510B - Soils and waters
Conductivity Meter (Manual)]
Conductivity

AB SOP-00005 Alkalinity Conductivity Fluoride and pH by PC-Titrator
[Modified from SM 2510 B, SM 4500 H+B, SM 2320 B, SM 4500-F C] - Soil & Waters
PC Titrator
Conductivity (25 °C)
Alkalinity
Fluoride
pH
Acidity

AB SOP-00006 pH by Manual Meter
[Modified from SM 4500-H+ B] Soils and waters
pH Meter
pH

AB SOP-00007 Ammonia-Nitrogen by Konelab - Phenate colorimetric method
[Modified from SM4500-NH3 A&G] - Soils and water
[Modified from SM4500-NH3 A&G] - Waters
Ammonia
Ammonia – Extraction
Colorimetric

AB SOP-00008 TKN by Konelab
[Modified from EPA 351.1, EPA 351.2 ] - Soil and Waters
Colorimetric
Total Kjeldahl Nitrogen

AB SOP-00012 Total Organic Carbon and Organic Matter in Soil
[Modified from Methods Manual for Soil and Plant Analysis, Pages 27-30]
Reflux – Titrimetric
Organic Matter – Calculation
Total Organic Carbon
AB SOP-00019 Calcium Carbonate Equivalence by pH
[Modified from SSMA 20.2]
pH Meter
Calcium Carbonate Equivalence (CCE)

AB SOP-00020 Chloride by Konelab - Automated Ferric Thiocyanate Method
[Modified from SM 4500Cl-E] - Soils and waters
Colorimetric
Chloride

AB SOP-00022 Particle Size Distribution by Sieve Analysis
[Modified from ASTM D6913]
Gravimetric/SIEVE
Grain size
Particle size by sieve (Special)

AB SOP-00023 Nitrite and Nitrate by Ion Chromatography
[Modified from SM 4110 B] – Soil and Waters
Ion Chromatography
Nitrate
Nitrite

AB SOP-00025 Ortho-phosphate by Konelab - Ascorbic Acid Reduction Method
[Modified from SM 4500-P , A and F] - Waters and soils
Colorimetric Auto Color
Ortho-phosphate

AB SOP-00026 Chloride, Sulphate and Bromide by Ion Chromatography
[Modified from SM 4110B] - Soils and waters
Ion Chromatography
Chloride
Sulfate

AB SOP-00030 PSA by Hydrometer - Texture (Sand, Silt, Clay and gravel) Analysis
[Modified from SSMA 55.3]
Hydrometer
% clay
% gravel
% sand
% silt

AB SOP-00033 Preparation of Saturation and Water-Soil Ratio Samples
[Modified from SSMA Method 15.2]
Gravimetric
% Saturation
Extraction and Analysis of BTEX/F1 and select Volatiles by HS/GC/MS/FID Water, Soil and Oil
[BTEX: Modified from EPA 8260D, GC/MS - HEADSPACE] - Soils and Waters
[F1/PHC: Modified from CCME Petroleum Hydrocarbons - Tier 1 Method and EPA5021A] - Soils and Waters
[BTEX TCLP: EPA 1311] GC/MS - HEADSPACE
1,2,4-Trimethyl Benzene
Benzene
C5-C10
Ethylbenzene
F1: C6-C10
Hexane
m/p-xylene
Methyl tert-butyl ether (MTBE)
o-xylene
Styrene
Toluene

Analysis of Extractable Hydrocarbons in Water and Soils by GCFID
C6-C50 Hydrocarbons
F2(C10-C16 Hydrocarbons)
F3(C16-C34 Hydrocarbons)
F3A(C16-C22 Hydrocarbons)
F3B(C22-C50 Hydrocarbons)
F4(C34-C50 Hydrocarbons)
Reached Baseline at C50
F4G-SG (Heavy Hydrocarbons-Grav.)
Total Extractables C10 to C30
Total Extractables C10 to C22
Total Extractables C23 to C60
F4 HTG(>C34 – High Temp GC)
Total Petroleum Hydrocarbon
Visible Sheen

Metals on Liquids and Solids by ICPOES
[Modified EPA 6010 D-Soils and Waters]
ICP/OES
Aluminum
Barium
Boron
Calcium
Chromium
Iron
Lithium
<table>
<thead>
<tr>
<th>Elements</th>
</tr>
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<tbody>
<tr>
<td>Magnesium</td>
</tr>
<tr>
<td>Manganese</td>
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<tr>
<td>Phosphorus</td>
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<tr>
<td>Potassium</td>
</tr>
<tr>
<td>Silicon</td>
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<tr>
<td>Sodium</td>
</tr>
<tr>
<td>Strontium</td>
</tr>
<tr>
<td>Sulfur</td>
</tr>
<tr>
<td>Thorium</td>
</tr>
</tbody>
</table>

**AB SOP-00043**

Metals Analysis on Soils and Waters Using ICPMS
[Modified from EPA 6020 B] - Soils and Waters
[TCLP: EPA 1311]
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Mercury
Molybdenum
Nickel
Palladium
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Tellurium
Thallium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

AB SOP-00049  Particle Size Distribution by Hydrometer
   [Modified from ASTM D422-63] Hydrometer
   Particle Size Distribution

AB SOP-00050  Dry Bulk Density and Wet Bulk Density
   [Modified from McKeague and MSSMA Section 2.21]
   Gravimetric
   Bulk Density

AB SOP-00052  Bromide by Ion Chromatography - UV Detection
   [Modified from SM 4110 B] – Soils and waters
   Ion Chromatography/UV Detector
   Bromide

AB SOP-00056  Preparation and Analysis VOC - Water and Soil by
   HS/GC/MS/FID
   [Modified from EPA8260D and EPA5021A ]– Soils and Waters
   GC/MS/FID [Headspace]
   1,1,1,2-Tetrachloroethane
   1,1,1-Trichloroethane
   1,1,2,2-Tetrachloroethane
   1,1,2-Trichloroethane
   1,1-Dichloroethane
   1,1-dichloroethylene
   1,2 dibromoethane
   1,2,3-Trichlorobenzene
   1,2,4-Trichlorobenzene
   1,2,4-Trimethylbenzene
   1,2-dichlorobenzene
   1,2-dichloroethane
   1,2-Dichloropropane
   1,3,5 Trichlorobenzene
   1,3,5-Trimethylbenzene
   1,3-Dichlorobenzene
   1,4-dichlorobenzene
   Benzene
   Bromodichloromethane
   Bromoform
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dichloromethane
Ethylbenzene
m/p-xylene
Methyl methacrylate
Methyl t-butyl ether
o-xylene
Styrene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

AB SOP-00062 Flashpoint by Small Scale Closed Cup Tester (SetaFlash)
[Modified from ASTM D3828]
Seta Flash Closed Cup Flashpoint

AB SOP-00063 Hexavalent Chromium by Konelab
[Modified from SM 3500-Cr B] - Soil and water
Colorimetric
Hexavalent Chromium

AB SOP-00071 Electrolytic Conductivity in Water and Soil by Manual Meter - Mobile Lab
[Modified from SM 2510 B] – Waters and soil
Conductivity Meter
Conductivity (25 °C)

AB SOP-00073 Moisture in Solid Samples-Mobile Lab
[Modified from CCME PHC-CWS]
Gravimetric
% Moisture

AB SOP-00074 Determination of pH in Water and Soil by Manual Meter - Mobile Laboratory
[Modified from SM 4500H+ B] – Soils and waters
pH Meter
pH

AB SOP-00075  
Preparation of Saturation Samples - Mobile Lab  
[Modified from SSMA Method 15.2]  
Gravimetric  
% Saturation

AB SOP-00076  
BTEX/F1 – Soil and Water (Mobile lab)  
[BTEX: Modified from EPA 8021B] – GC/PID - Headspace  
[F1: CCME Hydrocarbons Tier 1, BCMOE Section D, BCMELP] -  
GC/FID - Headspace  
Benzene  
C6-O-Xylene  
Ethylbenzene  
F1:C6-C10  
m/p-xylene  
o-xylene  
O-Xylene-C10  
Styrene  
Toluene  
Total C6-C10

AB SOP-00077  
Extractable Hydrocarbon – Soil and Water (Mobile lab)  
[Modified from CCME hydrocarbons Analysis tier 1, BCMOE  
Section D, BCMELP]-Soils and waters  
GC/FID - Direct Injection  
EPH (C10-C19)  
EPH (C19-C32)  
F2: C10-C16  
F3: C16-C34  
F4: C34-C50  
TEH (C10-C30)

AB SOP-00078  
Chloride Analysis by Hach DR2800- Mobile Laboratory  
[Modified from SM 4500-Cl E] - Soils and waters  
Colorimetric  
Chloride

AB SOP-00082  
Nitrate and Nitrite by Technicon  
[Modified from SM 4500 NO3-] Soil and water  
Colorimetric  
Nitrate  
Nitrite

AB SOP-00067  
Elemental Sulfur  
Colour-Extraction  
Elemental Sulphur
CAL SOP-00032  Spontaneous combustion (Self Heating)  
Combustion  
Spontaneous Combustion

CAL SOP-00052  Diisopropanolamine  
[Modified from DIONEX PAX500 DOC #034217] - Water and soil IC - Extraction  
Diisopropanolamine (DIPA)

CAL SOP-00054  Amines  
[Modified from DIONEX PAX500 DOC #034217] - Water and soil IC – Extraction  
Diethanolamine (DEA)  
Methyldiethanolamine (MDEA)  
Monoethanolamine (MEA)

AB SOP-00088  Phenolics Phenolics Automated 4-AAP Colorimetry  
[Modified from SSMA Chapter 40]-Soil [Modified from EPA 9066]-Water  
Colorimetric – Distillation Extraction  
Phenol

CAL SOP-00093  Preparation and Analysis of Glycols and Sulfolane in Water, Soil and oil by GC-FID  
[Modified from EPA 8015D] – Soils, waters and oil  
GC/FID – Extraction  
Diethylene Glycol  
Ethylene Glycol  
Propylene Glycol  
Sulfolane  
Tetraethylene Glycol  
Triethylene Glycol

CAL SOP-00094  Herbicides  
[Modified from EPA 8151A and EPA 8270E] – Soils and Waters  
GC/MS – Extraction  
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)  
2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP)  
2,4-Dichlorophenoxyacetic acid (2,4-D)  
2,4-Dichlorophenoxybutyric acid (2,4-DB)  
3,5-Dichlorobenzoic Acid  
Bentazon  
Bromoxynil  
Chloramben  
Dicamba  
Dichlorprop
Diclofop-methyl
Dinoseb (DNBP)
MCPA
MCPP
Pentachlorophenol
Picloram

CAL SOP-00096 Extraction and Analysis of OG and TPH in Water and Soil by FTIR
[Modified from SM 23 5520 C m] - Soils and waters
IR – Extraction
Oil and Grease
Total Petroleum Hydrocarbons

CAL SOP-00104 Preparation and Analysis of Extended VOC in Water and Soils by HS/GC/MS
[Modified from EPA 8260D and EPA 5021A]
[VOC TCLP: EPA 1311]- Soils and waters
GC/MS – HS/Extraction
  1,2,3-trichloropropane
  1,1-dichloropropene
  1,2-dibromo-3-chloropropane
  1,3-dichloropropane
  2,2-dichloropropane
  2-butanol (MEK)
  2-chlorotoluene
  2-hexanone
  2-nitropropane
  4-chlorotoluene
  4-methyl-2-pentanone (MIBK)
Acetone
Acetonitrile
Acrolein
Acrylonitrile
Bromobenzene
Bromochloromethane
Carbon disulphide
Cyclohexane
Cyclohexanone
Dibromomethane
Dichlorodifluoromethane
Dicyclopentadiene
Ethyl acetate
Ethyl ether
Ethyl methacrylate
Hexachlorobutadiene
Hexane
Iodomethane
Isopropylbenzene
Naphthalene
n-Butylbenzene
Nitrobenzene
n-Propylbenzene
p-Isopropyltoluene
sec-Butylbenzene
tert-Butylbenzene

Polychlorinated Biphenyls (PCB)
[Modified from EPA 8082A] - Soils, waters and oil
GC/ECD - Extraction
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Aroclor 1262
Aroclor 1268
Total PCB

Semi Volatile Phenols
[Modified from 8270E] - Soils and waters
GC/MS - Extraction
2,3,4,5-tetrachlorophenol
2,3,4,6-tetrachlorophenol
2,3,4-trichlorophenol
2,3,5,6-tetrachlorophenol
2,3,5-trichlorophenol
2,3,6-trichlorophenol
2,3-dichlorophenol
2,4,5-trichlorophenol
2,4,6-trichlorophenol
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2,5-dichlorophenol
2,6- dimethylphenol
2,6-dichlorophenol
2-chlorophenol
2-methylphenol
2-nitrophenol
3&4-chlorophenol
3&4-methylphenol
3,4,5-trichlorophenol
3,4-dichlorophenol
3,4-dimethylphenol
3,5-dichlorophenol
4,6-dinitro-2-methylphenol
4-chloro-3-methylphenol
4-nitrophenol
Pentachlorophenol
Phenol

CAL SOP-00184  Aliphatic and Aromatic fractionation and analysis for >C10-C50 PHC
[Modified from Atl RBCA m] – Soils and Waters
GC/FID
>C10-C12 Aliphatic
>C10-C12 Aromatic
>C12-C16 Aliphatic
>C12-C16 Aromatic
>C16-C21 Aliphatic
>C16-C21 Aromatic
>C21-C34 Aliphatic
>C21-C34 Aromatic
>C34 Aliphatic (Up to C50)
>C34 Aromatic (Up to C50)

CAL SOP-00239  BC Extractable Petroleum Hydrocarbons in Water and Soil by GC/FID
[Modified from BCMOE EPH S 12/16]- soils and water
GC/FID
EPH: C10-C19
EPH: C19-C32

CAL SOP-00240  Fractionation for C6-C10 and BC method VPH by Headspace GC/FID/MS
[Modified from volatile HC in soils by GC/FID and EPA method 5021A, BC MELP VH; Atl. RBCA] - Soils and waters
GC/FID
Benzene
C6-C8
C6-o-Xylene
C8-C10 Aromatic
Ethylbenzene
m&p-xylene
Methyl-tert-butylether
o-xylene
o-Xylene-C10
Styrene
Toluene

CAL SOP-00243/CAL SOP-00263
Carbon, Nitrogen and Sulfur
[Modified from LECO Corporation Form No. 203-821-170,203-821-165 and Vario El Cube No AN-A-030609, Total Organic Carbon (TOC/FOC) in soil/sediment by combustion (PBM)] - Soils IR Combustion
Carbon
Nitrogen
Organic Carbon
Sulphur

CAL SOP-00250
Preparation and analysis of Alkylated PAH in soils and water
[Modified from SM 8270 E and ESTD-OR-20]- Soils and waters GC/MS – Extraction
1-Methylnaphthalene
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzo(b&j)fluoranthene
Benzo(c)phenanthrene
Benzo(e)pyrene
Biphenyl
C1-Acenaphthene
C1-Benzo(b&j)fluoranthene / Benzo[a]pyrene
C1-Biphenyl
C1-Benzo(a) anthracene/ Chrysene
C1-Dibenzothiopene
C1-Fluorene
C1-Naphthalene
C1-Phenanthrene / anthracene
C1- Fluoranthene / pyrene
C2-Benzo(b&j)fluoranthene / Benzo[a]pyrene
C2-Biphenyl
C2-Benz[a]anthracene / chrysene
C2-Dibenzothiophene
C2-Fluorene
C2-Naphthalene
C2-Phenanthrene/anthracene
C2-Fluoranthene / Pyrene
C3-Benzo[a]anthracene / chrysene
C3-Dibenzothiophene
C3-Fluorene
C3-Naphthalene
C3-Phenanthrene / anthracene
C3-Fluoranthene / Pyrene
C4-Benzo[a]anthracene / Chrysene
C4-Dibenzothiophene
C4-Naphthalene
C4-Phenanthrene / anthracene
C4-Fluoranthene / Pyrene
Chrysene
Dibeno (a,h) anthracene
Dibenzothiophene
Fluoranthene
Fluorene
Indeno (1,2,3-cd) pyrene
Indeno (1,2,3-cd) fluoranthene
Naphthalene
Perylene
Phenanthrene
Pyrene
Quinoline
Retene

CAL SOP-00251
Extraction and analysis of low level Sulfolane in water and soil by GCMS
[Modified from EPA 8270E]
GC/MSD - Extraction
Sulfolane

CAL SOP-00258
Liquid limit, plastic limit and plasticity index of soil
[Modified from ASTM D4318]
ATTERBERG LIMITS TEST
Liquid limit
Plastic limit
Plasticity index
Preparation and Analysis of Alcohol/Solvents (Water, soil, oil) by GC/FID
[Modified from EPA 8015D] – Soils and waters
GC/FID – Extraction
2-Methylphenol
3-Methylphenol
4-Methylphenol
Acetone (2-Propanone)
Ethanol
Isobutanol
Isopropanol
Methanol
n-butanol
Nitrobenzene
n-propanol
Pyridine

ICPMS Analysis for Low Level Metals
[Modified from EPA SW846 Method 6020B]-Soils and waters
ICPMS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lanthanum
Lead
Lithium
Magnesium
Manganese
Mercury
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

CAL SOP-00266  Free Cyanide
[Modified from EPA Method 9016]-Water
Colorimetric- Distillation
Free cyanide

CAL SOP-00270  Determination of cyanide by automated colourimetry
[Modified from SM 23 4500-CN-, O]-Soil and Water
Colorimetric- Distillation
Cyanide SAD
Cyanide WAD

Water (Microbiology)

CAL SOP-00012  Heterotrophic Plate Count (HPC)
[Modified from SM 9215 A, B]
Pour Plate
Heterotrophic Plate Count (HPC)

AB SOP-00089  Total and Fecal Coliforms by defined substrate technique.
[Modified from SM 9223 A, B]
Most Probable Number (Colilert)
*Escherichia coli* (*E. coli*)
Total Coliforms
Fecal (Thermotolerant) Coliforms
Determination of Iron-Related and Sulfate Reducing Bacteria using the BART Method
[Modified from Dbi Env Tech Verification of the Irb Bart Tester for the Detection and Evaluation of Iron Bacteria in Water and Dbi Enviro Tech Verification of the Srb Bart Tester for the Detection and Verification of Sulphate Reducing Bacteria in Water
BART™
Iron Related Bacteria (IRB)
Sulfate Reducing Bacteria (SRB)

Notes:

ISO/IEC 17025: General Requirements for the Competence of Testing and Calibration Laboratories
MFHPB: Microbiological Foods Health Protection Branch, Health Canada
MFLP: Microbiological Food Laboratory Procedure, Health Canada
MLG: Food Safety and Inspection Services Microbiology Laboratory Guidebook, U.S. Department of Agriculture
AB SOP: Internal test method (Alberta)
CAL SOP: Internal test method (Calgary)
CCME: Canadian Council of Ministers of the Environment

Elias Rafoul, Vice-President
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