

## SCOPE OF ACCREDITATION

**ACTIVATION LABORATORIES LTD.**  
**1336, 1348, & 1428 Sandhill Drive**  
**Ancaster, ON**  
**L9G 4V5**

Accredited Laboratory No. 266  
(Conforms with requirements of CAN-P-1578 , CAN-P-1579 , CAN-P-1585, CAN-P-4E (ISO/IEC 17025:2005))

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CLIENTS SERVED: All interested parties

FIELDS OF TESTING: Chemical/Physical, Mechanical/Physical

FORENSICS DISCIPLINE(S): Forensic Chemistry / Trace Evidence

PROGRAM SPECIALTY AREA: Environmental, Forensic, Mineral Analysis

ISSUED ON: 2010-03-02

VALID TO: 2014-02-27

### **ANIMAL AND PLANTS (AGRICULTURE)**

#### **Other**

**(Vegetation)**

QOP AquaGeo Multi-Element Analysis Using Aqua Regia Extraction and Inductively Coupled Plasma Atomic Emission Spectrometry (Package 2C option 1: Cu, Pb, Ag, Ni)

**ELASTOMERS AND PROTECTIVE AND OTHER COATINGS**

**(Paints and Organic Coatings)**

ASTM D1308 Standard test method for effect of household chemicals on clear and pigmented organic finishes

ASTM D1735 Standard test method for water resistance of coatings using water fog apparatus

ASTM D3359 Standard test method for measuring adhesion by tape test

ASTM D3363 Standard test method for film hardness by pencil test

ASTM D4060 Standard test method for abrasion resistance of organic coatings by the Taber abraser

ASTM E376 Practice for measuring coating by magnetic-field or eddy-current (electromagnetic) examination methods

QOP Humidity Procedure for humidity testing (Exposure of parts or base material to humidity at a specified temperature for a specified time)

QOP Salt Spray Procedure for salt spray testing (fog testing) (Salt spray exposure to various parts for a specified amount of time or during cyclical corrosion testing)

**Plastics; Resins and Rubbers:**

**Plastics**

ASTM D2240, Type A and D only Standard test method for rubber property, Durometer hardness

ASTM D395, Method B only Standard test method for rubber property compression set

ASTM D471, Except for Sections 13 and 16 Standard test method for rubber property effect of liquids

QOP Humidity Procedure for Humidity Testing (Exposure of parts or base material to humidity at a specified temperature for a specified time)

QOP SpecGrav Test Method for Specific Gravity and Density of Plastics (Determining the specific gravity of various plastics and rubbers)

**ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY**

**Environmental**

**Air Filter**

**(Major Ions Air Filter/IC aqueous extraction)**

QOP Porous Media Anions	Preparation and Determination of Inorganic Anions on Porous Media Chloride Fluoride Nitrate Sulfate
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**(Metals - Air Filter/ICP-MS)**

QOP Air Filter ICP/MS	Air Filters Spiked with Metals-Cellulose ester and Quartz Filters - Using ICPMS Cadmium Copper Lead Zinc
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**Soil/Sediment**

**(BTEX in Soil/Sediment/SPME-GC/MS)**

QOP BTEX	GC/MS analysis of benzene, toluene, ethylbenzene and xylenes Benzene Ethylbenzene m/p-xylene o-xylene Toluene
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**(Cyanide Soil/Sediment / Automated UV digestion/colourimetric)**

QOP Cyanide	Automated analyzer method for the determination of Cn in water
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**(Mercury Soil/Cold Vapour FIMS)**

QOP Hg FIMS	Mercury Analysis by Aqua Regia Leach and Flow Injection Cold Vapour Atomic Absorption Spectrophometry (Package 1G: Hg)
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**(Metals Soil/ICP - digestion)**

QOP AquaGeo	Multi-Element Analysis Using Aqua Regia Extraction and Inductively Coupled Plasma Atomic Emission Spectrometry
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Cadmium  
Chromium  
Cobalt  
Copper  
Lead  
Nickel  
Zinc

**(Metals Soil/ICP-MS)**

QOP Ultra Trace 1 Trace elements by aqua regia digestion and ICP/MS  
Antimony  
Arsenic  
Beryllium  
Cadmium  
Chromium  
Cobalt  
Copper  
Lead  
Nickel  
Zinc

**(PAH Soil/GC-MS extraction)**

QOP PAH GC/MS analysis of polyaromatic hydrocarbons  
Benzo (a) anthracene  
Benzo (a) pyrene  
Benzo (b) fluoranthene  
Benzo (g,h,i,) perylene  
Benzo (k) fluoranthene  
Fluoranthene  
Indeno (1,2,3 - cd) Pyrene  
Phenanthrene  
Pyrene

**(Perchlorate - Soil/Sediment / LC/ESI/MS)**

QOP Perchlorate - EPA 331.0 Determination of Perchlorate in Water and Other Matrixes using LC/ESI/MS as described by EPA method 331.0

**(Ra-226 Soil/High Resolution Alpha Spectrometry)**

QOP Ra-226 RA-226 for water and soil using High Resolution Alpha Spectrometry

**(VOC in Soil/Sediment/SPME-GC/MS)**

QOP VOC GC/MS analysis of volatile organic compounds  
1,1-dichloroethylene  
1,2-dichlorobenzene  
1,2-dichloroethane  
1,4-dichlorobenzene  
Bromodichloromethane  
Bromoform  
Carbon Tetrachloride  
Chlorobenzene  
Chlorodibromomethane  
Chloroform  
Dichloromethane  
Tetrachloroethylene  
Trichloroethylene

**Water (Inorganic)**

**(Alkalinity Water/Titrimetric)**

QOP Alkalinity Titration method for the determination of alkalinity of water

**(Ammonium Water/pH/mV meter with ion selective electrode)**

QOP Ammonia Electrode method for the determination of ammonia in water

**(BOD Water/Incubation/dissolved O<sub>2</sub> meter)**

QOP BOD Biochemical oxygen demand of water a method for measuring organic pollutants in water

**(COD Water/Digestion/Colourimetric)**

QOP COD Spectrophotometer method for the Detection of Chemical Oxygen Demand

**(Conductivity Water/Conductivity meter)**

QOP Conductivity Electrode method for measuring the conductivity of water

**(Cyanide Water/Automated UV digestion/colourimetric)**

QOP Cyanide Automated analyzer method for the determination of Cn in water

**(DOC Water/TOC instrument)**

QOP TOC,  
Verbatim United States  
Pharmacopeia <643>

Determination of Total Organic Carbon and Dissolved Organic  
Acid using Shimadzu TOC 5000A

**(Hydride Metals Water/ICP-MS)**

QOP HydroGeo

Hydrogeochemistry by ICP/MS  
Total Antimony  
Total Arsenic  
Total Selenium

**(Ions Water/Ion Chromatography)**

QOP Anions, EPA 300.1

Determination of Inorganic anions in water by IC as described by  
EPA Method 300.1  
Bromide  
Chloride  
Fluoride  
Nitrate  
Nitrite  
Orthophosphate  
Sulfate

**(Mercury Water/Cold Vapour AA)**

QOP Hg FIMS

Mercury Analysis by Aqua Regia Leach and Flow Injection Cold  
Vapour Atomic Absorption Spectrophometry (Package 1G: Hg)

**(Metals Water/ICP-MS)**

QOP HydroGeo

Hydrogeochemistry by ICP/MS  
Dissolved Aluminum  
Dissolved Barium  
Dissolved Beryllium  
Dissolved Boron  
Dissolved Cadmium  
Dissolved Calcium  
Dissolved Chromium  
Dissolved Cobalt  
Dissolved Copper  
Dissolved Iron  
Dissolved Lead  
Dissolved Magnesium  
Dissolved Manganese

Dissolved Molybdenum  
Dissolved Nickel  
Dissolved Silver  
Dissolved Strontium  
Dissolved Thallium  
Dissolved Tin  
Dissolved Titanium  
Dissolved Uranium  
Dissolved Vanadium  
Dissolved Zinc  
Potassium  
Sodium

**(Metals Water/ICP-OES)**

QOP Water (EPA 200.5)      Determination of Multi-Elements in waters using inductively coupled plasma atomic emission spectrometry  
Dissolved Aluminum  
Dissolved Barium  
Dissolved Beryllium  
Dissolved Boron  
Dissolved Cadmium  
Dissolved Calcium  
Dissolved Chromium  
Dissolved Cobalt  
Dissolved Copper  
Dissolved Iron  
Dissolved Lead  
Dissolved Magnesium  
Dissolved Manganese  
Dissolved Molybdenum  
Dissolved Nickel  
Dissolved Silica  
Dissolved Silver  
Dissolved Strontium  
Dissolved Thallium  
Dissolved Tin  
Dissolved Titanium  
Dissolved Uranium  
Dissolved Vanadium  
Dissolved Zinc

**(Perchlorate - Water / LC/ESI/MS)**

QOP Perchlorate - EPA 331.0      Determination of Perchlorate in Water and Other Matrices using



Total Copper  
Total Iron  
Total Lead  
Total Magnesium  
Total Manganese  
Total Nickel  
Total Selenium  
Total Silica  
Total Vanadium  
Total Zinc

**(TSS Water/Gravimetric)**

QOP TSS Filter method for the measurement of total suspended solids in water by gravimetry

**(Turbidity Water/Nephelometric)**

QOP Turbidity Turbidimeter method for the measurement of turbidity of water

**Water (Microbiology)**

**(E.coli Water)**

QOP Microbiology Coliforms Microbiology Testing of Water  
Escherichia Coli  
Total coliforms

**(Fecal coliforms Water)**

QOP Microbiology Coliforms Microbiology Testing of Water  
Fecal Coliforms

**(Heterotrophic Plate Count Water)**

QOP Microbiology Coliforms Microbiology Testing of Water  
Heterotrophic Plate Count

**Water (Organic)**

**(BTEX in water/SPME-GC/MS)**

QOP BTEX GC/MS analysis of benzene, toluene, ethylbenzene and xylenes  
Benzene  
Ethylbenzene

m/p-xylene  
o-xylene  
Toluene

**(PAH Water/GC-MS extraction)**

QOP PAH GC/MS analysis of polyaromatic hydrocarbons  
Benzo (a) anthracene  
Benzo (a) pyrene  
Benzo (b) fluoranthene  
Benzo (g,h,i,) perylene  
Benzo (k) fluoranthene  
Fluoranthene  
Indeno (1,2,3 - cd) Pyrene  
Phenanthrene  
Pyrene

**(Phenol Water/Wastewater/UV digestion/colourimetric)**

QOP Phenol Automated Analyzer Method for the Determination of Total Phenol in Water

**(VOC in water/SPME-GC/MS)**

QOP VOC GC/MS analysis of volatile organic compounds  
1,1-dichloroethylene  
1,2-dichlorobenzene  
1,2-dichloroethane  
1,4-dichlorobenzene  
Bromodichloromethane  
Bromoform  
Carbon Tetrachloride  
Chlorobenzene  
Chlorodibromomethane  
Chloroform  
Dichloromethane  
Tetrachloroethylene  
Trichloroethylene

**Occupational Health and Safety:**

QOP U Isotope Hair Uranium isotopic ratio in hair samples by ELAN 6000-6100 ICP/MS  
QOP U Isotope Urine Uranium isotopic ratio in urine samples by ELAN 6000-6100 ICP/MS

QOP Uranium Hair	Total uranium concentration in hair samples by ELAN 6000-6100 ICP/MS
QOP Uranium Urine	Total uranium concentration in urine by ELAN 6000-6100 ICP/MS

## **METALLIC ORES AND PRODUCTS**

### **Articles of Metal:**

#### **(Chemical Tests)**

QOP Carbon & Sulphur	Total Carbon Content in Metals by the Combustion Instrumental Method (Carbon Content by Combustion/IR)
QOP Carbon& Sulphur	Total Sulphur Content in Metals by the Combustion Instrumental Method (Sulphur Content by Combustion/IR)
QOP ICP MET	Multi-Element Chemical Analysis of Metallic Material using (ICP-AES) for alloys of Steel, Stainless Steel, Copper, Aluminum, Nickel (Chemical analysis of metals for the following elements: Mn, P, Si, Cr, Ni, Mo, Cu, V, Al, , Co, Zr, Cb, Nb, Ta, W, Mg, Fe, Sn, Sb, Ag, Bi, Sr, Cd)

#### **(Laboratory Corrosion Tests)**

ASTM G34	Standard test method for exfoliation corrosion susceptibility in 2xxx and 7xxx series aluminium alloys (EXCO Test)
ASTM A763	Standard practice for detecting susceptibility to intergranular attack in ferritic stainless steel
ASTM B154	Standard test method for mercurous nitrate test for copper and copper alloys
ASTM D1735	Standard practice for water resistance of coating using water fog apparatus
ASTM G110	Standard practice for intergranular corrosion resistance of heat treatable aluminum alloys by immersion in sodium chloride + hydrogen peroxide solution
ASTM G28	Standard test method for detecting susceptibility to intergranular corrosion in wrought, nickel-rich, chromium-bearing alloys
ASTM G46	Standard guide for examination and evaluation of pitting corrosion
ASTM G48, method A and B only	Standard test method for pitting and crevice corrosion resistance of stainless steels and related alloys by use of ferric chloride solution
ASTM G66	Standard test method for visual assessment of exfoliation corrosion susceptibility of 5xxx series aluminium alloys (ASSET Test)
ASTM G67	Standard test method for determining the susceptibility to intergranular corrosion of 5xxx series aluminium alloys by mass loss after exposure to nitric acid (NAMLT test)

QOP Humidity	Procedure for Humidity Testing (Exposure of parts or base material to humidity at a specified temperature for a specified time)
QOP Corrosion Resistance	Procedure for Detecting Susceptibility to Intergranular attack in Austenitic Stainless Steels (Testing various materials for their susceptibility to Intergranular Attack based on ASTM A262)
QOP Salt Spray	Procedure for Salt Spray Testing (Fog Testing) (Salt Spray exposure to various parts for a specified amount of time or during cyclical corrosion testing)

**(Mechanical Tests)**

ASTM A370	Standard test methods and definitions for mechanical testing of steel products
QOP Brinell	Test method for determining of the Brinell hardness of metallic materials (Brinell hardness tests on different metals)
QOP Guided Bend	Guided bend tests for ductility of welds (Bend testing of welds)
QOP Rockwell	Rockwell hardness testing of metallic materials
QOP Semi Guided Bend	Bend test for ductility of metallic materials
ASTM F606, Except for section 7 (Embrittlement test)	Standard test method for mechanical properties of externally and internally threaded fasteners, washers, and rivets
QOP Impact	Test method for Charpy V-notch impact testing (Charpy impacts testing at various temperatures)
QOP Tension	Test method for tension testing of metallic materials (Tensile testing of metals; may or may not include yield, load, elongation)

**(Metallic Coatings)**

ASTM A239	Standard practice for the thinnest spot in a zinc coating
ASTM A90	Standard test method for weight of coating on zinc coated iron or steel articles
ASTM B137	Standard test method for measurement of coating mass per unit area on anodically coated aluminum
ASTM B428	Standard test method for weight of coating on aluminium coated iron or steel articles
ASTM B489	Standard practice for bend test for ductility of electrodeposited and autocatalytically deposited metal coatings on metals
ASTM B490	Standard practice for micrometer bend test for ductility of electrodeposits
ASTM B578	Standard test method for microhardness of electroplated coating
ASTM B680	Standard test method for seal quality of anodic coating on aluminum by acid dissolution
QOP Humidity	Procedure for Humidity Testing (Exposure of parts or base material to humidity at a specified temperature for a specified time)
QOP Plating - Coating	Test Method for Plating Thickness Measurement (Using microscopic examination or instrumentation to determine the coating thickness on various materials)

QOP Salt Spray Procedure for Salt Spray Testing (Fog Testing) (Salt Spray exposure to various parts for a specified amount of time or during cyclical corrosion testing)

### **(Metallography)**

ASTM A247	Standard test method for the microstructure of graphite in iron castings
ASTM A262, Method A only	Standard tests method for oxalic acid etch test for austenitic stainless steel
ASTM A923	Standard test method for detecting detrimental intermetallic phase in duplex stainless steel
ASTM B390	Standard practice for evaluating apparent grain size and distribution of cemented tungsten carbides
ASTM E1077	Standard test method for estimating the depth of decarburization of steel
ASTM E340	Standard test method for macroetch metals and alloy
ASTM F788	Standard specification for surface discontinuities of bolts, screws, and studs
QOP Grain Size	Test method for Determining Average Grain Size (Examination of metals for the their non-metallic inclusions, grain size, case depth, etc.)
QOP Macro Etch	Test Method for the Macroetch Testing, Inspection and Rating of Steel Products (General and weld macrostructure examination)
QOP Micro	Microstructural Evaluations of Metals and Alloys, Determination of Inclusion Content and Volume Fraction by Systematic Point Count, evaluation of microstructure
QOP Microhardness	Vickers Microhardness Testing of Metallic Materials
QOP Microhardness Traverse	Method for Performing Microhardness Traverse (Vickers hardness of surfaces of different metals and coatings)
QOP Plating - Coating	Test Method for Plating Thickness Measurement (Using microscopic examination or instrumentation to determine the coating thickness on various materials)
QOP Section	Test Method for Sectioning Grinding, Polishing and Etching Samples for Micro/Macro Structural Examination

### **Metallic Ores:**

#### **Rocks and Ores**

Refer to minor sub-heading: *Sediments*

#### **Sediments**

QOP H2O:	Gravimetric Determination of H2O+/H2O-Water of Soils and Rocks (Gravimetric Package 4F: H2O+/H2O-)
QOP Hg FIMS, Based on EPA 245	Mercury Analysis by Aqua Regia Leach and Flow Injection Cold Vapour Atomic Absorption Spectrophotometry (Package 1G: Hg)

## **Mineral Analysis Testing**

(CAN-P-1579)

### **Contract Settlement Assaying**

Refer to minor sub-heading: *Geotechnical Testing*

### **Geotechnical Testing**

Refer to minor sub-heading: *Mineral Assaying*

### **Mineral Assaying**

QOP 1B2 ICP-MS	Platinum Group Elements using NiS Fire Assay and ICP-MS (Ir, Ru, Rh, Pt, Pd, Au and Re by Fire Assay with ICP-MS finish)
QOP AA - Au	Procedure for the analysis of Gold and/or Silver by Fire Assay with AA or Gravimetric finish
QOP AquaGeo	Multi-Element Analysis Using Aqua Regia Extraction and Inductively Coupled Plasma Atomic Emission Spectrometry for Mineral Analysis of Cd (<0.5 ppm), Cu (<1%), Mo (<1%), Ni (<1%), Pb (<0.5%), Zn (<1%)
QOP ASSAY	Assay Analysis Using Aqua Regia Extraction and Inductively Coupled Plasma Spectrometry for Mineral Analysis of Co (<1%), Cu (>1%), Ni (>1%), Pb (>0.5%), Zn (>1%)
QOP FUSION XRF	Fusion XRF using PHILIPS PW 2400 XRF Spectrometer (Quantify 15 analytes by X-ray Fluorescence which are fused with Lithium and reported in the oxide form SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , MnO, MgO, CaO, Na <sub>2</sub> O, K <sub>2</sub> O, TiO <sub>2</sub> , P <sub>2</sub> O <sub>5</sub> , Cr <sub>2</sub> O <sub>3</sub> , Co <sub>3</sub> O <sub>4</sub> , NiO, Zn and Cu)
QOP INAAGEO	Procedures for Instrumental Neutron Activation Analysis (INAA) for Mineral Samples As, Au, Cr, Co, Sb, Sc, Ta, U (238), U (235 by DNC, Delayed Neutron Counting), W
QOP PGE ICP-MS	PGE Analysis using ICP-MS (Au, Pt, Pd by Fire Assay with ICP/MS finish)
QOP Sodium Peroxide	Multi-Element Analysis using Sodium Peroxide Extraction and Inductively Couple Plasma Atomic Emission Spectrometry (for Aluminum, Arsenic, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Silicon, Sulphur, Titanium and Zinc)
QOP TOTAL	Multi-Element Analysis Using Hydrofluoric/Nitric/Perchloric/Hydrochloric Acid Digestion and Inductively Coupled Plasma Atomic Emission Spectrometry (for Cu, Mo, Ni, Pb, Zn)
QOP Total Assay	Total Assay Digestion using Hydrofluoric/HNO <sub>3</sub> /Perchloric/HCl Acid with Inductively Coupled Plasma Atomic Emission Spectrometry (for Cu, Co, Fe, Mo, Ni, Pb and Zn)
QOP TRACE XRF	Trace Element analysis using the PHILIPS PW 2400 XRF Spectrometer (Quantify 14 analytes by pressing into a disk and using X-ray Fluorescence spectrophotometry Rb, Sr, Y, Zr, Nb, Mo, Th, U, Sn, Pb, Ga, Ba, Cr, Co)

QOP Ultra Trace 1	Trace elements by aqua regia digestion and ICP/MS Li, Be, B, Na, Mg, Al, K, Ca V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Rb, Sr, Y, Zr, Nb, Mo, Ag, Cd, In, Sn, Sb, Te, Cs, Ba, La, Ce, Nd, Sm, Eu, Tb, Yb, Lu, Hf, Ta, W, Re, Au, Tl, Pb, Bi, Th, U
QOP WRA	Multi-Element Whole Rock Analysis - Using Multi-Element Fusion Inductively Coupled Plasma - Atomic Emission Spectrometer (Al <sub>2</sub> O <sub>3</sub> , CaO, Fe <sub>2</sub> O <sub>3</sub> , K <sub>2</sub> O, LOI, MgO, MnO, Na <sub>2</sub> O, P <sub>2</sub> O <sub>5</sub> , SiO <sub>2</sub> , TiO <sub>2</sub> , Ba, Be, Sc, Sr, V, Y, Zr)
QOP WRA4B2	Trace Element Suite by Fusion Method 4B and Inductively Coupled Plasma-Mass Spectrometer (ICP/MS) Ba, Hf, Nb, Rb, Sn, Ta, Th, U, V, Y, Zr, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu

## **FORENSICS**

### **Forensic Chemistry / Trace Evidence**

#### **Techniques for which laboratory is accredited:**

- a. QOP : OpenIdent : Method for the characterization of the organics present in unknown samples.
- b. QOP Flammable : The analysis for the presence/absence of ignitable liquids in fire debris samples.
- c. QOP Smoke : Method for the presence or absence of smoke contaminants and/or the tracing of the presence of smoke residues.

#### **Notes:**

***CAN-P-4E (ISO/IEC 17025):*** General Requirements for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025-2005)

***CAN-P-1578:*** Guidelines for the Accreditation of Forensic Testing Laboratories

***CAN-P-1579:*** Guidelines for the Accreditation of Mineral Analysis Testing Laboratories

***CAN-P-1585:*** Guidelines for Accreditation of Environmental Testing Laboratories

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S. Cross, Director, Conformity Assessment

Date: 2010-03-02

Number of Scope Listings: 125

Number of Forensic Techniques: 3

SCC 1003-15/308

Partner File #0

Partner: SCC