



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ELEMENT MATERIALS TECHNOLOGY CANADA INC.

7217 Roper Road

Edmonton, Alberta, CANADA T6B 3J4

Jennie Wong, Kali Bassett Phone: 780 438 5522

[Jennie.Wong@element.com](mailto:Jennie.Wong@element.com), [Kali.Bassett@element.com](mailto:Kali.Bassett@element.com)

CHEMICAL

Valid To: January 31, 2028

Certificate Number: 6206.01

In recognition of the successful completion of the A2LA evaluation process accreditation is granted to this laboratory to perform the following chemical tests identified on the analytes noted below:

Soil:

| Analyte(s)                                                                                                                             | Test Method(s) | Reference Method(s)                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------|
| Acid Neutralizing Value for Liming Materials<br><br>Calcium Carbonate Equivalent                                                       | TM SOIL 024-01 | AOAC 955.01 Modified                                                  |
| Alcohols in Soil and Leachates by Capillary Gas Chromatograph<br><br>Cyclohexanone<br>Iso-Butanol<br>Methanol<br>n-Butanol<br>Pyridine | TM GC 075-10   | EPA 1311, SW-846 Extraction, EPA 8015D Modified                       |
| Analysis of BTEX/in Soil Samples Using SHS-GC/MSD + FID<br><br>Benzene<br>Ethylbenzene<br>m/p-Xylene<br>o-Xylene<br>Toluene            | TM ORG 001-10  | SW 846, EPA 5021A/8260B Method A108.0-1/CCME-CWS-PHCS-TIER 1 Modified |

| <b>Analyte(s)</b>                                                                                                                           | <b>Test Method(s)</b> | <b>Reference Method(s)</b>                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------|
| Atterberg Limits of Soils<br><br>Atterberg Limits                                                                                           | TM SOIL 050-10        | ASTM D4318-Modified                                                                                 |
| Barium in Soil by ICP<br><br>Barium Extractable<br>Barium Fusion<br>Barium Soluble                                                          | TM METAL 060-10       | Alberta Environment/British Columbia Environmental Laboratory Manual/ASTM D4503/APHA 3120B Modified |
| Bulk Density and Specific Gravity of "As-Received" Samples<br><br>Bulk Density                                                              | TM PREP 016-10        | American Society of Agronomy No. 9, Part 1, Method 13-2 Modified                                    |
| CaCO <sub>3</sub> (Lime) Requirement in Soil by Sikora Buffer<br><br>Lime Requirement - Soil                                                | TM SOIL 060-10        | Soil Sci. Soc. Am. J. 70: 474-486. Modified                                                         |
| Calcium Carbonate in Soil by Dual pH<br><br>Calcium Carbonate                                                                               | TM SOIL 133-10        | J. Ashworth, COM. SOIL SCI PLANT SCI 28, 841-848, 1997 Modified                                     |
| Cyanide in Aqueous Solutions by Continuous Flow Colorimetry<br><br>Cyanide, SAD<br>Cyanide, Total<br>Cyanide, WAD<br>Cyanide, Water Soluble | TM WET 053-10         | NAQUADAT NO. 06608L/Method 335.3/APHA 4500-CN- I/ APHA 4500-CN-C Modified                           |
| Dean Stark Analysis in Soil and Sludge<br><br>Oil Fraction<br>Solids Fraction<br>Water Fraction                                             | TM OIL 027-10         | ACOSA REF. METHOD Modified                                                                          |
| EOX in Soil/Waste<br><br>Extractable Organic Halogens                                                                                       | TM OIL 500-90         | EPA 9023 Modified                                                                                   |

| Analyte(s)                                                                                                                                                              | Test Method(s)  | Reference Method(s)                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------|
| Exchangeable Cations and Cation Exchange Capacity (CEC) In Soil by Ammonium Acetate Extraction<br><br>Ammonium<br>C.E.C.<br>Calcium<br>Magnesium<br>Potassium<br>Sodium | TM METAL 053-10 | MSS Method 3.32/APHA 3120 B/<br>APHA 4500-NH3 G Modified    |
| Extractable Ammonium and Nitrate in Soil by Continuous Flow Colorimetry<br><br>Ammonium<br>Nitrate                                                                      | TM WET 016-10   | MSS Method 4.35/APHA 4500-NH3 G/MSS Method 6.3 Modified     |
| Extractable Macro Nutrients in Soil by ICP<br><br>Calcium<br>Magnesium<br>Sodium                                                                                        | TM METAL 054-10 | MSS Method 4.51/APHA 3120 B Modified                        |
| Extractable Micro Nutrients in Soil by ICP<br><br>Copper<br>Iron<br>Manganese<br>Zinc                                                                                   | TM METAL 073-10 | MSS Method 4.65/APHA 3120B Modified                         |
| Extractable Nitrate, Phosphate and Potassium in Soils by Continuous Flow Colorimetry<br><br>Nitrate<br>Phosphorus<br>Potassium                                          | TM WET 018-10   | SSMA Method 6.3/APHA 4500-P D/<br>Method 19103 565 Modified |
| Elemental Sulfur in Soil by ICP                                                                                                                                         | TM METAL 084-10 | In house method                                             |
| Extractable Sulfur as Sulfate in Soils by ICP<br><br>Sulfate                                                                                                            | TM METAL 083-10 | MSS Method 4.47/ APHA 3120B Modified                        |
| Flash Point in Liquid and Soil Samples by Penske-Martens Closed Cup Tester<br><br>Flash Point                                                                           | TM OIL 025-10   | ASTM D93 Modified                                           |
| Hot Water Soluble Boron in Soil by ICP<br>Boron                                                                                                                         | TM METAL 059-10 | MSS Method 4.61/APHA 3120B Modified                         |

| Analyte(s)                                                                                                                                                                                                                                                                                                                                                | Test Method(s)                     | Reference Method(s)                                                                         |
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| Leachable BTEX in Solids and Waste<br>by GC/PID + FID with headspace<br>analyzer<br><br>Benzene<br>Ethylbenzene<br>m/p-xylene<br>o-xylene<br>Toluene                                                                                                                                                                                                      | TM WET 033-10                      | SW-846, EPA1311, 5021A/8260B<br>Modified                                                    |
| Metals in Soil, Sludge, Sediment and<br>Oily Waste by ICP MS<br><br>Antimony<br>Arsenic<br>Barium<br>Beryllium<br>Bismuth<br>Boron<br>Cadmium<br>Chromium<br>Cobalt<br>Copper<br>Iron<br>Lead<br>Lithium<br>Mercury<br>Molybdenum<br>Nickel<br>Selenium<br>Silver<br>Strontium<br>Thallium<br>Tin<br>Titanium<br>Uranium<br>Vanadium<br>Zinc<br>Zirconium | TM METAL 077-10<br>TM METAL 081-10 | BCMOE SALM/EPA Method<br>200.8/EPA 1311 TCLP/Special Waste<br>Extraction Procedure Modified |
| Metals in Soil, Sludge, Sediment and<br>Oily Waste by ICP OES<br><br>Aluminum<br>Calcium<br>Iron<br>Magnesium<br>Manganese                                                                                                                                                                                                                                | TM METAL 077-10                    | BCMOE SALM Modified                                                                         |

| <b>Analyte(s)</b>                                                                                                                        | <b>Test Method(s)</b>            | <b>Reference Method(s)</b>           |
|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------|
| Metals in Soil, Sludge, Sediment and Oily Waste by ICP OES (cont.)<br><br>Phosphorous<br>Potassium<br>Silicon<br>Sodium<br>Sulfur        | TM METAL 077-10                  | BCMOE SALM Modified                  |
| Organic Matter in Soil by Loss on Ignition                                                                                               | TM SOIL 019-10                   | MSS Method 3.8 Modified              |
| Paint Filter Test<br><br>Free Liquids - Waste                                                                                            | TM SOIL 130-10                   | SW846 EPA 9095B Modified             |
| Particle Size Analysis by Wet Sieve                                                                                                      | TM SOIL 121-10                   | ASTM C117 Modified                   |
| Particle Size Analysis of Soil by Dry Sieve                                                                                              | TM SOIL 032-10                   | MSS Method 55.4 Modified             |
| Particle Size Analysis of Soil by Hydrometer                                                                                             | TM SOIL 120-10                   | MSS Method 55.3 Modified             |
| pH and Electrical Conductivity in Soil/pH in Soil by 0.01M Calcium Chloride<br><br>pH (0.01 M CaCl <sub>2</sub> )<br>pH (1:2 Water/Soil) | TM SOIL 001-10<br>TM SOIL 021-10 | MSS Method 4.11 & 4.12/3.11 Modified |
| pH and Electrical Conductivity in Soil: Water<br><br>E.C. (1:2 water)                                                                    | TM SOIL 001-10                   | MSS Method 4.11/4.12 Modified        |
| Phenol in Aqueous Solutions by Continuous Flow Colorimetry<br><br>Phenols, Total                                                         | TM WET 058-10                    | APHA 5530D Modified                  |
| Salinity, pH and EC of Field-Moist Soils<br><br>Ammonium<br>Calcium<br>Chloride<br>EC<br>Extract<br>Magnesium                            | TM SOIL 129-10                   | SSMA. 2008. pp. 161-168 Modified     |

| <b>Analyte(s)</b>                                                                                                                                                                                                                                                                                                                                                                | <b>Test Method(s)</b> | <b>Reference Method(s)</b>                                                                                                   |
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| Salinity, pH and EC of Field-Moist Soils (cont.)<br><br>Nitrate + Nitrite<br>pH<br>Potassium<br>Sodium<br>Sulfur                                                                                                                                                                                                                                                                 | TM SOIL 129-10        | SSMA. 2008. pp. 161-168 Modified                                                                                             |
| Sodium Adsorption Ratio (SAR), pH and EC in Soil by Saturated Paste<br><br>Ammonium<br>Calcium<br>Chloride<br>EC<br>Magnesium<br>Nitrate + Nitrite<br>pH<br>Potassium<br>Saturated Paste Extract<br>Saturation Percentage<br>Sodium<br>Sulfur                                                                                                                                    | TM SOIL 022-10        | SSMA CH.15 Modified                                                                                                          |
| Soil Moisture Content<br><br>% Moisture                                                                                                                                                                                                                                                                                                                                          | TM PREP 003-10        | Martin R. Carter & E.G. Gregorich. Soil Sampling and Methods of Analysis, 2008. Method 4.4, Sample Moisture Content Modified |
| Volatile Organic Compounds in Solids and Leachate by Gas Chromatography / Mass Spectrometry (GC/MS): Capillary Column Technique<br><br>2-Butanone (MEK)<br>2-Nitropropane<br>Acetone<br>Benzene<br>Carbon disulfide<br>Ethyl Acetate<br>Ethyl Benzene<br>Ethyl Ether<br>m&p-Cresol<br>m&p-Xylene<br>Methyl-2-Pentanone (MIBK)<br>Nitrobenzene<br>o-Cresol<br>o-Xylene<br>Toluene | TM GC 070-10          | EPA 1311, SW-846 Extraction, EPA 8260B Modified, EPA 5021A Modified                                                          |

**Water (Inorganic):**

| <b><u>Analyte(s)</u></b>                                                                                                                                                            | <b><u>Test Method(s)</u></b> | <b><u>Reference Method(s)</u></b>                                                                            |
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| Ammonia-N in Aqueous Solutions by Continuous Flow Colorimetry<br><br>Ammonium                                                                                                       | TM WET 008-10                | APHA 4500 NH <sub>3</sub> -G/EPA 1311 Modified                                                               |
| Anions in Aqueous Solutions by Ion Chromatography<br><br>Bromate<br>Bromide<br>Chlorate<br>Chloride<br>Chlorite<br>Fluoride<br>Iodide<br>Nitrate<br>Nitrite<br>Phosphate<br>Sulfate | TM WET 012-10                | APHA 4110 B/EPA 1311/Special Waste Extraction Procedure Modified                                             |
| Biological Oxygen Demand in Waters and Wastewaters by Incubation<br><br>BOD<br>CBOD                                                                                                 | TM WET 044-10                | APHA 5210B Modified                                                                                          |
| Chemical Oxygen Demand in Water and Wastewater by Block Digestion<br><br>COD                                                                                                        | TM WET 050-10                | APHA 5220 D Modified                                                                                         |
| Chloride in Aqueous Solutions by Colorimetric Analysis<br><br>Chloride                                                                                                              | TM WET 100-10                | APHA 4500Cl E Modified                                                                                       |
| Cyanide in Aqueous Solutions by Continuous Flow Colorimetry<br><br>Cyanide - Dissolved<br>Cyanide - SAD<br>Cyanide - Total<br>Cyanide - WAD                                         | TM WET 053-10                | NAQUADAT 06608L/EPA 335.3/APHA 4500-CN C/APHA 4500-CN-I/EPA 1311/Special Waste Extraction Procedure Modified |
| Dissolved Oxygen in Water and Wastewater by Titration<br><br>COD                                                                                                                    | TM WET 022-10                | APHA 4500-O C, Modified                                                                                      |

| Analyte(s)                                                                                                                                                                                                                                                       | Test Method(s)  | Reference Method(s)                                                                                                                 |
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| Dissolved Solids<br><br>Fixed Dissolved Solids<br>Total Dissolved Solids<br>Volatile Dissolved Solids                                                                                                                                                            | TM WET 055-10   | APHA 2540C/APHA 2540 E Modified                                                                                                     |
| Filterable Residue in Oilfield Water, Gravimetric<br><br>Dissolved Solids - Ignited at 550 °C<br>Dissolved Solids - Dried at 110 °C                                                                                                                              | TM WQ 035b-90   | APHA 2540 C/APHA 2540 E Modified                                                                                                    |
| Hexavalent Chromium in Aqueous Solutions by Colorimetric Discrete Analyzer<br><br>Chromium (Hexavalent)                                                                                                                                                          | TM WET 075-10   | APHA 3500CR B/EPA 1311 Modified                                                                                                     |
| Measurement of pH in Water and Wastewater at 15°C<br><br>pH                                                                                                                                                                                                      | TM WET 104-10   | APHA, 4500H+ B, Modified                                                                                                            |
| Mercury in Aqueous Solutions by Cold Vapour Atomic Fluorescence<br><br>Mercury - Dissolved<br>Mercury - Extractable<br>Mercury - Total                                                                                                                           | TM METAL 063-10 | EPA Method 245.5 /APHA 3112B Modified                                                                                               |
| Metals in Aqueous Solutions by ICP-OES<br><br>Total Calcium<br>Total Iron<br>Total Magnesium<br>Total Manganese<br>Total Phosphorus<br>Total Potassium<br>Total Silicon<br>Total Sodium<br>Total Sulfur                                                          | TM METAL 080-10 | British Columbia Environmental Lab Manual (2009) - Digestion for Total Metals in Water - Prescriptive/EPA 200.8/APHA 3125B Modified |
| Metals in Aqueous Solutions by ICP-OES<br><br>Dissolved Barium (High)<br>Dissolved Calcium<br>Dissolved Iron (High)<br>Dissolved Magnesium<br>Dissolved Manganese (High)<br>Dissolved Phosphorus<br>Dissolved Potassium<br>Dissolved Silicon<br>Dissolved Sodium | TM METAL 080-10 | APHA 3120B/APHA 3030 F Modified                                                                                                     |

| <b>Analyte(s)</b>                                                                                                                                                                                                                                                                                                                                            | <b>Test Method(s)</b>          | <b>Reference Method(s)</b>                           |
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| Metals in Aqueous Solutions by ICP-OES (cont.)<br><br>Dissolved Sulfur<br>Hardness - Calculation<br>Sodium Absorption Ratio – Calculation<br>Extractable Calcium<br>Extractable Iron<br>Extractable Magnesium<br>Extractable Manganese<br>Extractable Phosphorus<br>Extractable Potassium<br>Extractable Silicon<br>Extractable Sodium<br>Extractable Sulfur | TM METAL 080-10                | APHA 3120B/APHA 3030 F Modified                      |
| Molybdate Reactive Silica in Water by Spectrophotometer<br><br>Reactive Silica                                                                                                                                                                                                                                                                               | TM WET 091-10                  | APHA 4500 SIO2 F Modified                            |
| Nitrate and Nitrite in Aqueous Solutions by Flow Injection Colorimetry<br><br>Nitrate + Nitrite<br>Nitrite                                                                                                                                                                                                                                                   | TM WET 109-10                  | APHA 4500 NO <sub>3</sub> -I Modified                |
| Orthophosphate in Water by Colorimetric Discrete Analyzer /Total and Dissolved Phosphorus in Water by Smartchem Colorimetric Discrete Analyzer<br><br>Orthophosphate (SRP)<br>Total Dissolved Phosphorus<br>Total Phosphorus                                                                                                                                 | TM WET 073-10<br>TM WET 099-10 | APHA 4500 P-F/APHA, 4500-P B/APHA, 4500-P F Modified |
| pH, Electrical Conductivity and Total and Phenolphthalein Alkalinity in Water by PCTitrate Auto Titrator<br><br>Alkalinity (pH 4.5)<br>Electrical Conductivity<br>pH                                                                                                                                                                                         | TM WET 001-10                  | APHA 2320 B/APHA, 2510 B/APHA 4500H+ B Modified      |
| Phenol in Aqueous Solutions by Continuous Flow Colorimetry<br><br>Phenols                                                                                                                                                                                                                                                                                    | TM WET 058-10                  | APHA 5530 D/EPA 1311 Modified                        |

| <b>Analyte(s)</b>                                                                                                                                                                                                                           | <b>Test Method(s)</b> | <b>Reference Method(s)</b>                                                                                                          |
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| TOC, DOC, TIC, DIC, and TC in Water and Wastewater by High-Temperature Combustion<br><br>Carbon-Dissolved Inorganic<br>Carbon-Dissolved Nonpurgeable Organic<br>Carbon-Total<br>Carbon-Total Inorganic<br>Carbon-Total Nonpurgeable Organic | TM WET 020-10         | APHA 5310B                                                                                                                          |
| Total and Free Chlorine in Water by Spectrophotometer<br><br>Free Chlorine<br>Total Chlorine                                                                                                                                                | TM WET 068-10         | APHA 4500CL G Modified                                                                                                              |
| Total Nitrogen in Water and Wastewater by High-Temperature Combustion<br><br>Dissolved Kjeldahl Nitrogen<br>Dissolved Nitrogen<br>Total Kjeldahl Nitrogen<br>Total Nitrogen                                                                 | TM WET 040-10         | ISO/TR 11905:1997(E) Modified                                                                                                       |
| Total Oil & Grease in Water by Gravimetric Analysis<br><br>Total Oil and Grease                                                                                                                                                             | TM OIL 065-10         | EPA 1664 Modified                                                                                                                   |
| Total Sulfide in Aqueous Solutions by Automated Gas Dialysis<br><br>Sulfide                                                                                                                                                                 | TM WET 057-10         | APHA 4500 S2-E Modified                                                                                                             |
| Total Suspended Solids in Water and Wastewater Dried at 104° C<br><br>Fixed Suspended Solids<br>Total Suspended Solids<br>Volatile Suspended Solids                                                                                         | TM WET 056-10         | APHA 2540 D/APHA 2540 E Modified                                                                                                    |
| Trace Metals in Aqueous Solutions by ICP-MS<br>Total Aluminum<br>Total Antimony<br>Total Arsenic<br>Total Barium<br>Total Beryllium<br>Total Bismuth<br>Total Boron<br>Total Cadmium<br>Total Chromium                                      | TM METAL 081-10       | British Columbia Environmental Lab Manual (2009) - Digestion for Total Metals in Water - Prescriptive/EPA 200.8/APHA 3125B Modified |

| Analyte(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Test Method(s)  | Reference Method(s)                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Trace Metals in Aqueous Solutions by ICP-MS (cont.)<br><br>Dissolved Aluminum<br>Dissolved Antimony<br>Dissolved Arsenic<br>Dissolved Barium<br>Dissolved Beryllium<br>Dissolved Bismuth<br>Dissolved Boron<br>Dissolved Cadmium<br>Dissolved Chromium<br>Dissolved Cobalt<br>Dissolved Copper<br>Dissolved Iron<br>Dissolved Lead<br>Dissolved Lithium<br>Dissolved Molybdenum<br>Dissolved Nickel<br>Dissolved Selenium<br>Dissolved Silver<br>Dissolved Strontium<br>Dissolved Thallium<br>Dissolved Tin<br>Dissolved Titanium<br>Dissolved Uranium<br>Dissolved Vanadium<br>Dissolved Zinc<br>Dissolved Zirconium<br>Extractable Aluminum<br>Extractable Antimony<br>Extractable Arsenic<br>Extractable Barium<br>Extractable Beryllium<br>Extractable Boron<br>Extractable Cadmium<br>Extractable Chromium<br>Extractable Cobalt<br>Extractable Copper<br>Extractable Iron<br>Extractable Lead<br>Extractable Lithium<br>Extractable Molybdenum<br>Extractable Nickel<br>Extractable Selenium<br>Extractable Silver<br>Extractable Strontium<br>Extractable Thallium<br>Extractable Tin | TM METAL 081-10 | British Columbia Environmental Lab Manual (2009) - Digestion for Total Metals in Water - Prescriptive/EPA 200.8/APHA 3125B Modified |

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| Trace Metals in Aqueous Solutions by ICP-MS (cont.)<br><br>Extractable Titanium<br>Extractable Uranium<br>Extractable Vanadium<br>Extractable Zinc<br>Extractable Zirconium<br>Total Cobalt<br>Total Copper<br>Total Iron<br>Total Lead<br>Total Lithium<br>Total Manganese<br>Total Molybdenum<br>Total Nickle<br>Total Selenium<br>Total Silver<br>Total Strontium<br>Total Thallium<br>Total Thorium<br>Total Tin<br>Total Titanium<br>Total Uranium<br>Total Vanadium<br>Total Zinc<br>Total Zirconium | TM METAL 081-10 | British Columbia Environmental Lab Manual (2009) - Digestion for Total Metals in Water - Prescriptive/EPA 200.8/APHA 3125B Modified |
| Trace Metals in Aqueous Solutions by ICP-OES                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TM METAL 081-10 | EPA 200.8/APHA 3125B Modified                                                                                                       |
| True and Apparent Color in Water by Visual Comparison<br><br>Color                                                                                                                                                                                                                                                                                                                                                                                                                                         | TM WET 025-10   | APHA 2120B Modified                                                                                                                 |
| Turbidity in Water and Wastewater by Nephelometric Method<br><br>Turbidity                                                                                                                                                                                                                                                                                                                                                                                                                                 | TM WET 064-10   | APHA 2130B Modified                                                                                                                 |
| UV Absorbance and Transmittance in Water and Waste Water by Spectrophotometer<br><br>UV Absorbance and Transmittance                                                                                                                                                                                                                                                                                                                                                                                       | TM WET 035-10   | APHA 5910B Modified                                                                                                                 |

**Water (Organic):**

| <b><u>Analyte(s)</u></b>                                                | <b><u>Test Method(s)</u></b> | <b><u>Reference Method(s)</u></b>            |
|-------------------------------------------------------------------------|------------------------------|----------------------------------------------|
| Microtox 15 Minute, Multiple Concentration, Acute, Static EC50 Bioassay | TM Bio 037-10                | EPS 1/RM/24 Modified Microtox EC 50 (15 min) |

**Petroleum Crudes and Natural Gas:**

| <b><u>Analyte(s)</u></b>                                                                                                                                                                                                                                                                                                              | <b><u>Test Method(s)</u></b> | <b><u>Reference Method(s)</u></b>                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------|
| Absolute and Relative Density and API Gravity: Digital Density Meter                                                                                                                                                                                                                                                                  | TM OIL 050-90                | ASTM D4052 Density, Relative Density, Modified/ASTM D5002 Modified |
| Acid Number by Catalytic Thermometric Titration                                                                                                                                                                                                                                                                                       | TM OIL 245-90                | ASTM D8045                                                         |
| Acid Number by Potentiometric Titration                                                                                                                                                                                                                                                                                               | TM OIL 241-90                | ASTM D664 Modified                                                 |
| Asphaltenes Content of Crude Oil, Condensate and Bitumen<br><br>Asphaltene                                                                                                                                                                                                                                                            | TM OIL 200-90                | Syncrude Method 5.1 Modified                                       |
| Carbon Residue: Microcarbon Method<br><br>Micro Carbon Residue                                                                                                                                                                                                                                                                        | TM OIL 135-90                | ASTM D4530                                                         |
| Compositional Gas Analysis<br><br>Natural gas:<br>N <sub>2</sub> , CO <sub>2</sub> , C <sub>1</sub> -C <sub>10</sub> +, He, H <sub>2</sub> , H <sub>2</sub> S<br>Density, Gross Heating Value, Pseudocritical Pressure and Temperature, Relative Molecular Mass (Total and C <sub>7</sub> +) and Vapour Pressure (C <sub>5</sub> +) ) | TM GAS 023-90                | GPA 2286 Modified<br>GPA 2261 Modified                             |
| D86 Atmospheric Distillation                                                                                                                                                                                                                                                                                                          | TM OIL 150-90                | ASTM D86 Modified                                                  |
| Dynamic Viscosity and Density of Liquids by Stabinger Viscometer<br><br>Absolute Viscosity<br>Density<br>Kinematic Viscosity                                                                                                                                                                                                          | TM OIL 145-90                | ASTM D7042 Modified                                                |
| Extended Gas Analysis<br><br>GPA 2286:<br>N <sub>2</sub> , CO <sub>2</sub> , C <sub>1</sub> -C <sub>15</sub> +, He, H <sub>2</sub>                                                                                                                                                                                                    | TM GAS 028-90                | GPA 2286 Modified                                                  |
| Flash and Fire Points by Cleveland Open Cup Tester<br><br>Flash Point                                                                                                                                                                                                                                                                 | TM OIL 170-90                | ASTM D92 Modified                                                  |

| Analyte(s)                                                                                                                                                                                                                                                                            | Test Method(s) | Reference Method(s)                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flash Point of Petroleum Oils and Lubricants<br><br>Flash Point - Closed Cup                                                                                                                                                                                                          | TM OIL 171-90  | ASTM D93 Modified                                                                                                                                                                                 |
| High Pressure Liquid Compositional Analysis<br><br>N2, CO2, H2S, C1-C30+, Benzene, Toluene, Ethylbenzene & p+m Xylene, o-Xylene, 1,2,4 Trimethylbenzene, Cyclopentane, Methylcyclopentane, Cyclohexane, Methylcyclohexane, Density, Relative Molecular Mass and Gas Equivalent Factor | TM GAS 015-90  | In-House Method                                                                                                                                                                                   |
| Hydrogen Sulfide and Mercaptan Sulfur in Liquid Hydrocarbon: by Potentiometric Titration<br><br>Hydrogen Sulfide<br>Mercaptan as Sulfur                                                                                                                                               | TM GAS 025-90  | UOP 163 Modified                                                                                                                                                                                  |
| Light Ends Characterization by Direct Injection<br><br>N2, CO2, C1 – C4, iC4, nC4                                                                                                                                                                                                     | TM GAS 273-90  | GPA 2177 Modified                                                                                                                                                                                 |
| Low Pressure Liquid Composition Analysis<br><br>H2S, C1-C30+, Benzene, Toluene, Ethylbenzene & p+m Xylene, o-Xylene, 1,2,4 Trimethylbenzene, Cyclopentane, Methylcyclopentane, Cyclohexane, Methylcyclohexane, Density, Relative Molecular Mass and Gas Equivalent Factor             | TM GAS 016-90  | ASTM D2887 Modified                                                                                                                                                                               |
| Metals and Organic Phosphorus in Light Crude Oil by ICP<br><br>Aluminum<br>Antimony<br>Arsenic<br>Barium<br>Beryllium<br>Cadmium<br>Calcium<br>Chromium<br>Cobalt<br>Copper<br>Iron                                                                                                   | TM OC 100-90   | ASTM D5708A Modified<br><br>Canadian Association of Petroleum Producers: Test Method for Determination of Organo-Phosphorus in Volatile Distillates of Crude Oil by ICP-OES, Oct 6, 2006 Modified |

| Analyte(s)                                                                                                                                                                                                                                                                                     | Test Method(s) | Reference Method(s)                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------|
| Lead<br>Magnesium<br>Manganese<br>Molybdenum<br>Nickel<br>Phosphorus<br>Organo - Phosphorus<br>Potassium<br>Selenium<br>Silver<br>Sodium<br>Strontium<br>Tin<br>Titanium<br>Vanadium<br>Zinc<br>Zirconium                                                                                      |                |                                                                                                      |
| NGL Analysis by Gas Chromatography<br><br>N <sub>2</sub> , CO <sub>2</sub> , H <sub>2</sub> S, C <sub>1</sub> -C <sub>12</sub> +, Density, Relative Molecular Mass and Gas Equivalent Factor                                                                                                   | TM GAS 009-90  | ASTM D2163 Modified                                                                                  |
| Organic Chloride Content of Crude and Waste Oil<br><br>Organic Chloride                                                                                                                                                                                                                        | TM OIL 076-90  | ASTM D4929 B Modified                                                                                |
| Salt Content in Oil                                                                                                                                                                                                                                                                            | TM OIL 070-90  | In-House Method                                                                                      |
| Sediment and Water (BS&W) in Crude and Heavy Oil: Centrifuge Method                                                                                                                                                                                                                            | TM OIL 040-90  | ASTM D4007 Modified                                                                                  |
| Sediment in Crude Oil by Membrane Filtration                                                                                                                                                                                                                                                   | TM OIL 242-90  | ASTM D4807 Modified<br>CCQTA Test Method for Filterable Solids Measurement in Condensate Procedure C |
| Total Reduced Sulfur Analysis of Natural Gas: Gas Chromatography/Sulfur Chemiluminescence Detector.<br><br>Hydrogen sulfide, Carbonyl Sulfide, MethylMercaptan, EthylMercaptan, DimethylSulfide, Carbon Disulfide, i-PropylMercaptan, t-ButylMercaptan, n-PropylMercaptan, MethylEthylSulfide, | TM GAS 014a-90 | ASTM D5504                                                                                           |

| Analyte(s)                                                                               | Test Method(s) | Reference Method(s)                        |
|------------------------------------------------------------------------------------------|----------------|--------------------------------------------|
| s-ButylMercaptan, i-ButylMercaptan, Diethylsulfide, n-ButylMercaptan, Dimethyl disulfide |                |                                            |
| Total Sulfur: X-Ray Fluorescence Method                                                  | TM OIL 060-90  | ASTM D4294 Modified                        |
| Vapour Pressure - Automated<br><br>VPCR - ASTM D 6377<br>TVP – ASTM D5191                | TM OIL 125-90  | ASTM D6377 Modified<br>ASTM D5191 Modified |
| Water Content by Karl Fischer Coulometric Titration                                      | TM OIL 160-90  | ASTM D4928<br>ASTM D6304                   |

**Notes:**

**AOAC:** Association of Official Analytical Collaboration

**ASTM:** American Society for Testing and Materials

**APHA:** American Public Health Association (Standard Methods for the Examination of Water & Wastewater)

**BCMOE:** British Columbia Ministry of Environment

**CCME-CWS-PHCS Tier 1:** Canadian Council of Ministers of the Environment, Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1

**EPA:** Environmental Protection Agency

**GPA:** Gas Processors Association

**MSS:** Manual on Soil Sampling and Methods of Analysis - J.A. McKeague, 1978

**SSMA:** Soil Sampling and Methods of Analysis, Martin R. Carter, 2008



## Accredited Laboratory

A2LA has accredited

**ELEMENT MATERIALS TECHNOLOGY CANADA INC.**

*Edmonton, Alberta, CANADA*

for technical competence in the field of

**Chemical Testing**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. 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).



Presented this 3<sup>rd</sup> day of November 2025.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 6206.01  
Valid to January 31, 2028

*For the tests to which this accreditation applies, please refer to the laboratory's Chemical Scope of Accreditation.*