2024

Northern BC's Environmental and Climate Solutions Innovation Hub

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Northern Analytical Laboratory Services

SERVICES CATALOGUE

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British Columbia, Canada. V2N 4Z9
nals@unbc.ca

nals.unbc.ca

Qualifications and Accreditations

Introduction

The Northern Analytical Laboratory Services (NALS) in Prince George, BC is a Standards Council of Canada (SCC), Provincial Health Officer (PHO), International Standards Organization (ISO), and BC Qualified Laboratory accredited for the specified Field(s) of Testing as documented by the scope of accreditation which can be viewed by visiting **nals.unbc.ca**.

We follow the following standards:

- ISO 17025:2017
- Provincial Health Officer Approved Water Microbiology Laboratory

NALS also participates in several Proficiency Analytical Testing Programs:

- AIHA Industrial Hygiene Proficiency Analytical Testing Program
- AIHA Gravimetric Pilot Study
- Environment and Climate Change Canada Proficiency Testing Program
- Abraxis PT for total Microcystins and nodularin
- Clinical Microbiology Proficiency Testing

Description of Services

Standard Turnaround Time:

5 – 10 business days unless otherwise arranged by the client. For non-routine, custom analyses or method development turnaround times can vary. Details should be discussed with the laboratory technicians at nals@unbc.ca.

RUSH analysis or Testing performed on the Holidays are subject to the applicable surcharge.

For more information about the NALS laboratory and to see what is included in the scope of accreditation please visit: nals.unbc.ca

SCC Accredited LAB LAB Accrédité CCN TM

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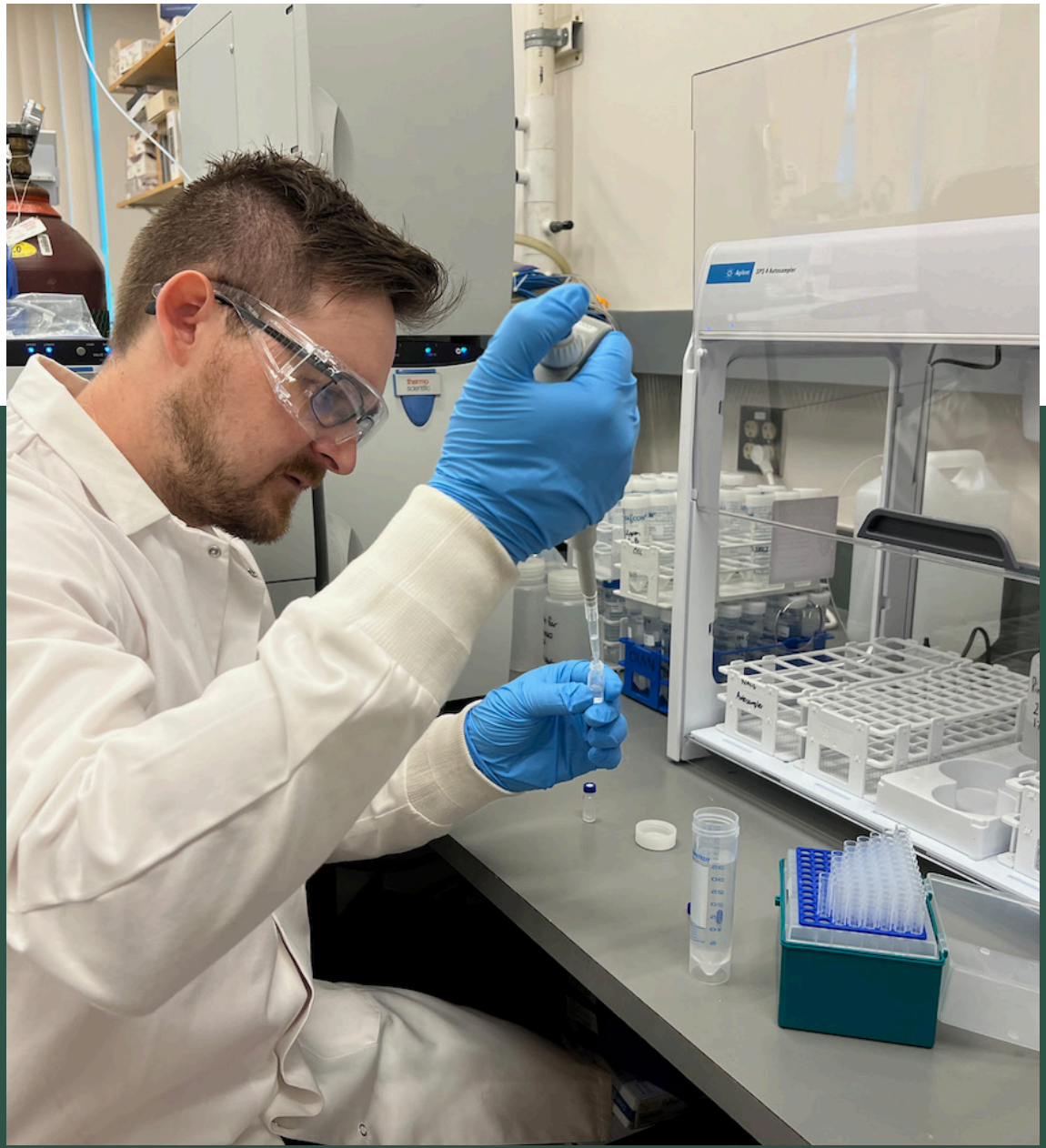
Water and Wastewater Testing



Our comprehensive water and liquids testing suite covers a wide range of parameters. Utilizing state-of-the-art techniques, we ensure accurate and defensible results for every test.

Our team of experts is committed to delivering reliable data, ensuring the safety and quality of your water sources. Whether you're monitoring water quality, environmental compliance, or researching new formulations, trust our expertise

Metals Analysis

Total and Dissolved Metals by ICP-OES (Optical Emission)

Reportable Limits vary by element

- Aluminum
- Antimony
- Arsenic
- Barium*
- Beryllium
- Boron*
- Cadmium*
- Calcium
- Cerium
- Chromium*
- Cobalt*
- Copper
- Dysprosium
- Erbium
- Europium
- Gadolinium
- Gallium
- Hafnium
- Holmium
- Iron*
- Lanthanum
- Lead*
- Lutetium
- Magnesium
- Manganese*
- Mercury
- Molybdenum
- Neodymium
- Nickel
- Niobium
- Phosphorous*
- Potassium
- Rubidium
- Samarium
- Selenium
- Silicon
- Silver
- Sodium
- Strontium
- Sulfur
- Tantalum
- Tellurium
- Thallium
- Thorium
- Thulium
- Tin*
- Titanium
- Tungsten
- Uranium
- Vanadium
- Ytterbium
- Zinc*
- Zirconium

Total and Dissolved Metals by ICP-MS (Mass Spectrometry)

Reportable Limits vary by element

- Antimony
- Arsenic
- Barium
- Beryllium
- Boron
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Thallium
- Thorium
- Uranium
- Vanadium
- Zinc

Total and Dissolved Metals by ICP-QQQ (Triple Quadrupole MS)

Reportable Limits vary by element

- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Boron
- Cadmium
- Cesium
- Chromium
- Cobalt
- Copper
- Gallium
- Hafnium
- Iron
- Lead
- Manganese
- Mercury
- Molybdenum
- Nickel
- Phosphorous
- Rubidium
- Selenium
- Silver
- Strontium
- Tantalum
- Tellurium
- Thallium
- Tin
- Titanium
- Tungsten
- Uranium
- Vanadium
- Zinc
- Zirconium

Microbiological Examination

Analysis	Method
Total Coliforms & E-coli (MPN/100ml)*	Quanti-Tray 2000
Heterotrophic Plate Count (MPN/ml)	IDEXX Enzyme Defined Substrate

Parameters identified by an asterisk (*) beside them are under our scope of accreditation. The NALS is certified for water microbiology testing with the BC Provincial Health Officer and is accredited to ISO 17025:2017 with the Standards Council of Canada. To view a complete list of testing under our Scope of Accreditation, please visit: **nals.unbc.ca/links**

Physical and Aggregate Properties

Analysis	Method
Color	Modified 2120C
Alkalinity	Titration
Total Dissolved Solids	Gravimetric or Electrode Meter
Total Suspended Solids	Gravimetric
Volatile Suspended Solids	Gravimetric
Suspended Fixed Solids	Gravimetric
Turbidity	Meter
Electrical Conductivity	Electrode Meter
Oxidation Reduction Potential	Meter
Hardness	By Calculation (as mg/L $CaCO_3$)
Temperature	Thermometer
UV Transmittance	UV Vis
Langelier Saturation Index (LSI)	Calculation

Inorganic Constituents

Analysis	Method
Orthophosphate	Ion Chromatography
Reactive Phosphate	Colorimetric
Fluoride	Ion Chromatography
Chloride	Ion Chromatography
Sulphate	Ion Chromatography
Bromide	Ion Chromatography
Nitrate	Ion Chromatography
Nitrite	Ion Chromatography
Ammonium-N (NH_4)	Segmented Flow Analysis
Total Nitrogen	Colorimetric
Total Kjeldahl Nitrogen (sTKN)	Colorimetric
Nitrite-N + Nitrate-N (Oxidized Nitrogen)	Colorimetric
Organic Nitrogen	Colorimetric
Total or Dissolved Inorganic Carbon	High Temp. Wet Oxidation
pH	Meter
Total Chlorine	Colorimetric
Free Chlorine	Colorimetric
Dissolved Carbon Dioxide	Meter

Aggregate Organic Parameters

Analysis	Method
COD	Colorimetric
BOD5	Modified EPA 5210
Total or Dissolved Organic Carbon (TOC)	High Temperature Wet Oxidation
Oil and Grease	Extraction & GC-FID

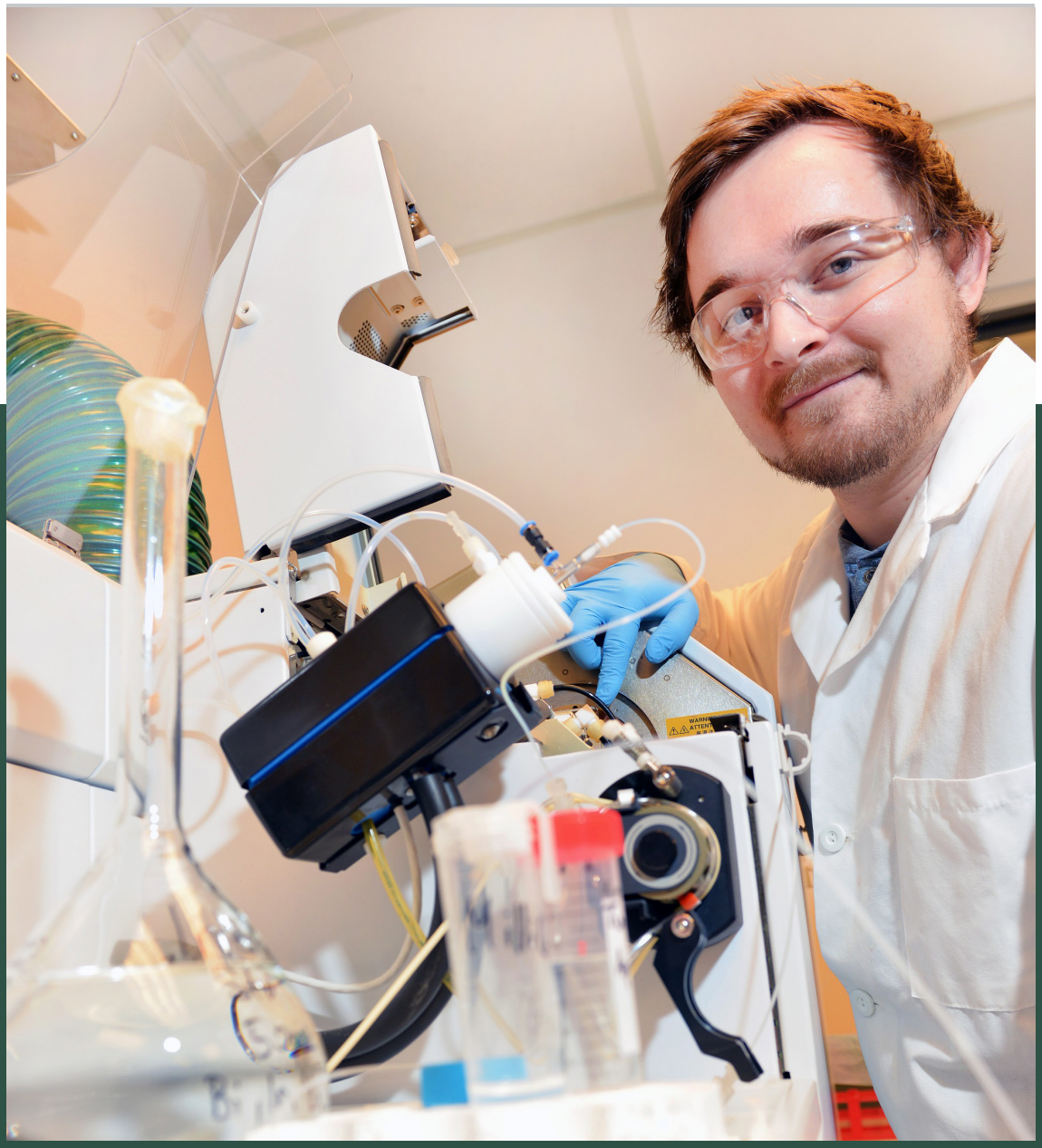
Organic Compounds

Analysis	Method
Chlorophyll (a)	Quantification by UV-Vis
28 VOC Suite (Including BTEX)	Headspace or Solid Phase Micro Extraction (SPME); GC-MS/MS
Extractable Petroleum Hydrocarbons	GC-FID
PAHs (EPA 16 PAH suite)	Extraction & GC-MS/MS (modified EPA 610 Method)
BTEX	GC-MS/MS
Unknowns Analysis	Extraction & GC-MS/MS
Total Carbon of Organic Liquids	Elemental Analyzer
Total Nitrogen of Organic Liquids	Elemental Analyzer
Volatile Acids	Colorimetric

Water Packages

Package	Tests included
NALS Drinking Water Routine	Metals (Including P); E-coli and Coliforms; Anions Scan, pH, Turbidity, EC, Hardness
NALS Drinking Water Comprehensive	Routine Package + [HPC; NH_4; Org-N; TOC; TSS; TDS; Color; Odor; Alkalinity; LSI]

Soils and Minerals Testing



Our advanced solids and soils testing services encompass diverse areas, from elemental composition to thermal analyses. With cutting-edge equipment, we provide precise data on soil health, density, and thermal properties.

Our skilled team ensures reliable insights for your soil-related concerns, be it agricultural productivity, construction suitability, or environmental assessments. For comprehensive soil insights and unmatched accuracy, rely on our expertise.

Metals Analysis

Total and Dissolved Metals by ICP-OES (Optical Emission)

Reportable Limits vary by element

- Aluminum
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- Boron
- Cadmium
- Calcium
- Cerium
- Chromium
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- Copper
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- Thorium
- Thulium
- Tin
- Titanium
- Tungsten
- Uranium
- Vanadium
- Ytterbium
- Zinc
- Zirconium

Total and Dissolved Metals by ICP-MS (Mass Spectrometry)

Reportable Limits vary by element

- Antimony
- Arsenic
- Barium
- Beryllium
- Boron
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Thallium
- Thorium
- Uranium
- Vanadium
- Zinc

Total and Dissolved Metals by ICP-QQQ (Triple Quadrupole MS)

Reportable Limits vary by element

- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Boron
- Cadmium
- Cesium
- Chromium
- Cobalt
- Copper
- Gallium
- Hafnium
- Iron
- Lead
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- Strontium
- Tantalum
- Tellurium
- Thallium
- Tin
- Titanium
- Tungsten
- Uranium
- Vanadium
- Zinc
- Zirconium

Inorganics and General Chemistry

Analysis	Method
Anions Scan	Ion Chromatography (Br, Cl, F, NO_3, NO_2, PO_4, SO_4)
Available Ammonium-N	KCl Extraction & Segmented Flow Analysis
pH	Meter
Electrical Conductivity	Electrode Meter
Total Carbon	Combustion Elemental Analyzer
Total Nitrogen	Combustion Elemental Analyzer
Total Hydrogen	Combustion Elemental Analyzer
Inorganic Carbon	Acid Fumigation & Elemental Analyzer
Carbon-13	IRMS and EA Delta-V
Nitrogen-15	IRMS and EA Delta-V
Ash Content	Muffle Furnace
Sulphated Ash	Sulphoric Acid & Muffle Furnace
Mehlich-3 Extractable Metals (P, Ca, Mg, K, Na)	Extraction & ICP-OES
Effective Cation Exchange Capacity	$C_2H_7NO_2$ or $BaCl_2$ Extraction & ICP-OES
Sodium Adsorption Ratio	ICP/OES; Calculation
Saturation (%)	Gravimetric Determination of Water Content on Saturated Paste
Moisture Content	Air Oven
Mechanical Fractionation (0.053-12.5 mm)	Stainless-steel Sieves
Mechanical Milling	Ball Mill
Mechanical Grinding	Blade Grinder
Freeze Drying	Freeze Dryer
Solid/Liquid Physical Separation	High-speed Centrifugation

Organics

Analysis	Method
Non-volatile Organic Carbon	Acid Fumigation & Elemental Analyzer
Organic Matter Content	Muffle Furnace
28 VOC Suite (Including BTEX)	Headspace; GC-MS/MS Solid Phase Micro Extraction (SPME); GC-MS/MS Thermal Desorption; GC-MS/MS
Unknown Volatiles Analysis	Headspace or Thermal Desorption (Qualitative)
BTEX	Headspace; GC-MS/MS Solid Phase Micro Extraction (SPME); GC-MS/MS Thermal Desorption; GC-MS/MS
PAHs (EPA 16 PAH suite)	DCM Extraction & GC-MS/MS (modified EPA 610 Method)
Pyrolysis and Bio-char synthesis	Muffle Furnace (Inert Atmosphere)
Loss on Ignition	Muffle Furnace

Materials Characterization

Analysis	Method
Particle Size Distribution	Mastersizer (Wet or Dry)
Mineralogical Analysis	X-Ray Diffractometion (XRD)
Chemical Composition	X-ray Fluorescence (XRF)
Morphological Analysis	Scanning Electron Microscope (SEM)
Molecular Characterization	Fourier Transform Infrared Spectroscopy (FTIR)
Thermal Gravimetric Analysis	Thermal Gravimetric Analyzer (TGA)
Differential Scanning Calorimetry	Differential Scanning Calorimeter (DSC)
Dynamic Mechanical Analysis	Dynamic Mechanical Analyzers (DMA)
Surface Area, Pore Distribution, Adsorption/Desoption Isotherm	Brunauer-Emmett-Teller (BET) Analyzer
Physisorption and Chemisorption	Brunauer-Emmett-Teller (BET) Analyzer
Bulk Density	Needs the soil volume
Specific Gravity	Hydrometer
Water Holding Capacity	Water gravity drained
Calorimetry (Higher Heating Value)	Manual Parr Bomb
Proximate (CNHS + Ash + Oxygen By Calculation)	Thermal Gravimetric Analyzer (TGA)
Ultimate (Fixed Carbon + Volatile Matter + Ash)	Elemental Analyzer; ICP-OES; Muffe Furnace

Soil Packages

Package	Tests included
NALS Soils Routine	Total Metals; Anions; pH; EC; Moisture; Organic Matter; Effective CEC and Percent Base Saturation; Total Carbon and Nitrogen; Particle Size Distribution
NALS Salinity Package	Soluble EC, pH, Na, Ca, Mg, K, S, Chloride, $SO_{4,}$ Sodium Adsorption Ratio (SAR), Saturation %

Industrial Hygiene & Gas Testing

Our chemistry expertise enhances our industrial hygiene services, offering precise air quality and chemical hazard assessments. Utilizing advanced chemical analysis, we accurately identify workplace chemical risks.

Our team provides dependable insights for safety, compliance, and health risk evaluations. Trust our combined chemical knowledge and industrial hygiene skills for thorough, accurate assessments.

Metals Analysis

Elemental Analysis by ICP-OES (Optical Emission); NIOSH 7303 or NIOSH 7304			
Reportable limits vary by element and media type (e.g., MCE, Quartz fiber, PTFE)			
• Aluminum* • Antimony* • Arsenic* • Barium* • Beryllium* • Cadmium* • Calcium* • Chromium*	• Cobalt* • Copper* • Hafnium* • Iron* • Lead* • Magnesium* • Manganese* • Molybdenum*	• Nickel* • Potassium* • Selenium* • Sodium* • Tantalum* • Tellurium* • Thallium* • Tin*	• Titanium* • Tungsten* • Uranium* • Vanadium* • Zinc* • Zirconium*

Elemental Analysis by ICP-QQQ (Triple Quadrupole MS); NIOSH 7303 or NIOSH 7304			
Reportable limits vary by element and media type (e.g., MCE, Quartz fiber, PTFE)			
• Aluminum • Arsenic • Boron • Barium • Beryllium • Cadmium • Cesium • Cobalt	• Chromium • Copper • Iron • Gallium • Hafnium • Mercury • Manganese • Molybdenum • Nickel	• Phosphorous • Lead • Rubidium • Antimony • Selenium • Tin • Strontium • Tantalum • Sodium	• Tellurium • Titanium • Thallium • Vanadium • Tungsten • Zinc • Zirconium • Potassium • Calcium

Other Analyses

Analysis	Media	Method
Gravimetric Analysis*	DIS, IOM, DRS, MCE, PVC	NIOSH 0500
Soluble Chromium Speciation	DIS	Modified EPA 6800;. IC/ICP-MS
Welding Fume Profile	DIS	High Temperature Microwave Digesiton; ICP-MS

Ambient Air and Gas Testing

Analysis	Media	Method
28 VOC Suite (Including BTEX)	Filter (Glass, Quartz fiber, PTFE), Canister, Tedlar Bag, Liquids	Headspace; GC-MS/MS Liquid Extraction; GC-MS/MS Thermal Desorption; GC-MS/MS Direct injection; GC-MS/MS
Unknowns Analysis (Qualitative)	Filter (Glass, Quartz fiber, PTFE), Canister, Tedlar Bag, Sorbent Tubes	Headspace; GC-MS/MS Thermal Desorption; GC-MS/MS Liquid Extraction; GC-MS/MS
Syngas suite (H_2, CO_2, CO, CH_4, Ethane, Propane, NO_2, SO_2, H_2S, N_2, and O_2/Ar)	Canister or Tedlar bag	GC-FID/TCD/SCD
BTEX	Sorbent Tubes	DCM Extraction
PAHs (EPA 16 PAH Suite)	Filter (Glass, Quartz fiber, PTFE)	DCM Extraction; GC MS/MS (Modified EPA 610 Method)

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Address

#4-234, 3333 University Way,
Prince Gerorge,
British Columbia, Canada.
V2N 4Z9

Contact

Phone : 250-960-5713
Email : nals@unbc.ca

Hours of Operation

Monday to Friday, 9:00 am to 4:00 pm PST.
Closed on Weekends and Statutory Holidays.

*Bacteriological samples are only accepted from Monday to Thursday, 9:00 am to 4:00 pm PST.