



SRC Environmental Analytical Laboratories

ENVIRONMENTAL SERVICES GUIDE



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General Information

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E-mail: analytical@src.sk.ca
Web address: www.src.sk.ca/analytical
Hours of Operation: Monday – Friday | 7:30 a.m. - 6:00 p.m.
Ensure time critical samples arrive at the lab before 5:30 pm.

Corporate Overview

For over 50 years, the Saskatchewan Research Council's (SRC) Environmental Analytical Laboratories has provided high-quality testing services to support environmental monitoring and assessment for mining and industry throughout Saskatchewan and around the world. Our world-class facility maintains an extensive range of high-quality testing services. Most services are accredited in accordance with international standards (ISO/IEC 17025) by the Canadian Association for Laboratory Accreditation (CALA). A complete list of accredited tests offered by the laboratory is available from the laboratory or on the CALA website at www.cala.ca.

SRC Environmental Analytical Laboratories is located at Innovation Place in Saskatoon, Saskatchewan, in a modern facility with state-of-the-art instruments, equipment and data management systems. In accordance with our accreditation requirements, the laboratory follows a comprehensive quality assurance and quality control (QA/QC) program. All sample information and data are stored in a digital Laboratory Information Management System (LIMS), which is used for sample tracking, reporting and invoicing. In many cases, automated data transfer from instrumentation directly into the LIMS facilitates processing and reduces the chance of error. Data can be readily retrieved and reported in a variety of formats and can often be directly uploaded into client databases.

The skilled and knowledgeable team at SRC Environmental Analytical Laboratories provides excellent customer service and is available to assist clients with any queries. The laboratory has a long history of working with and finding solutions for clients.

We welcome your inquiries! Please contact us regarding your analysis requirements.

Billing and Reporting Information

Standard Turnaround

The rates in this price list are for reporting results within a standard turnaround time. For routine samples, the average turnaround time is 5 working days.

Rush Service

A rush service is provided for a 100% surcharge. Samples will be processed as quickly as possible during regular work hours. Turnaround time will depend on the type of analysis required and number of samples submitted, but can generally be reduced to between 1 and 3 days.

Rush Service - Overtime Authorized

Overtime is authorized to further expedite the sample turnaround time. The 100% surcharge for Rush Service will apply. In addition, any overtime required to expedite the analysis will be charged out at a rate of \$125/hour.

Contact the lab directly in **advance** to discuss turnaround time requirements and authorize overtime.

Fees

Published prices may be subject to change without prior notification. **GST/HST** will be added to the invoice, if applicable.

Late Payment

Late payment charges will be assessed after 30 days, at a rate of 1.5% compounded monthly (19.6% annually).

Minimum Billing

A minimum charge of \$50 may be applied to all analytical work orders.

Volume Discounts

Contact the laboratory to discuss the number of samples to be submitted and analysis requirements.

Results

Preliminary and final results can be accessed at any time from our secure Online Results Portal. Contact the laboratory for additional information and to obtain a secure login and password.

Final results are reported in PDF format, as well as a variety of other formats (e.g., Excel, text, etc.) suitable for your particular needs. Arrangements can also be made to have results uploaded directly into your database. Contact the laboratory regarding your specific needs.

Quality Assurance

SRC Environmental Analytical Laboratories maintains an extensive Quality Assurance Program designed to ensure the reliability of analytical data. Key components of the Quality Assurance Program are:

- Accreditation and Proficiency Testing by the Canadian Association for Laboratory Accreditation (CALA)
- Participation in interlaboratory performance assessment programs
- Comprehensive Quality Control program
- Computerized sample and data management

Accreditation and Proficiency Testing

SRC Environmental Analytical Laboratories is accredited by CALA for specific environmental tests. These tests are listed in the Scope of Accreditation found on the CALA website. Our lab has one of the largest scopes of accreditation for an environmental lab in Western Canada. The accreditation program consists of on-site assessments and proficiency testing. Accreditation ensures that the laboratory management system, facilities, procedures and methods conform to ISO/IEC 17025, the internationally recognized standard for testing and calibration laboratories.

Interlaboratory Performance Assessment

The laboratory participates in several proficiency testing programs that are used to assess the performance of participating laboratories and to identify any issues with testing procedures. The laboratory participates in proficiency testing programs offered by:

- CALA
- Environment Canada National Water Research Institute (NWRI)
- Environmental Resource Associates (ERA)
- International Atomic Energy Agency (IAEA)
- Health Canada

Quality Control

A variety of techniques, such as the analysis of reference materials, control samples, duplicates and spike recovery measurements are used to ensure the validity of the analytical results. If a problem is identified, the samples are re-analyzed, or other corrective action is undertaken, to demonstrate that the analytical results are acceptable. If this is not possible, then the client is notified. Quality control data obtained during the analysis of samples can also be reported to the client.

Quality Assurance

Quality Assurance staff at SRC Environmental Analytical Laboratories manage all aspects of the quality system. This includes reviews of quality control data, method validation and quality audits.

Water

Packages for Water Analysis

Major Ions Package

Applicable to potable water, groundwater and surface water.

Includes: Calcium, Magnesium, Sodium, Potassium, Chloride, Sulfate, Fluoride, pH, Specific conductivity, Nitrate, Alkalinity, Bicarbonate, Carbonate, Hydroxide, Total Hardness, Sum of Ions

General Chemical Package

Applicable to potable water, groundwater and surface water.

Includes: Calcium, Magnesium, Sodium, Potassium, Chloride, Sulfate, Fluoride, pH, Specific conductivity, Nitrate, Alkalinity, Bicarbonate, Carbonate, Hydroxide, Total Hardness, Sum of Ions, Total Dissolved Solids (TDS)

Trace Metals Package

Includes: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Rare Earth Elements Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Hofnium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Water Potability Package (WP)

Applicable to potable water, groundwater and surface water.

Includes: Total Coliforms, Nitrates

Sample Preparation

When necessary, sample preparation steps are performed to obtain suitable samples for analysis or when required for specific tests. For example, for dissolved parameters, filtration is required to remove suspended solids from the sample. Digestion is required for trace metals analysis to include any metals present in suspended material within the sample.

Filtration

Pressure Filtration

Digestion

Trace Metals

Trace Metals Package

Includes: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Rare Earth Elements Package

Includes: Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Hofnium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Individual Elements

Available elements: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Bismuth, Bromine, Cadmium, Calcium, Cerium, Chromium, Cobalt, Copper, Dysprosium, Europium, Erbium, Gadolinium, Hafnium, Holmium, Iron, Iodine, Lanthanum, Lead, Lithium, Lutetium, Magnesium, Manganese, Molybdenum, Nickel, Neodymium, Niobium, Phosphorous, Potassium, Praseodymium, Rubidium, Samarium, Selenium, Scandium, Silver, Sodium, Strontium, Tantalum, Tellurium, Terbium, Thallium, Thorium, Thulium, Tin, Titanium, Tungsten, Uranium, Vanadium, Ytterbium, Yttrium, Zinc, Zirconium

Mercury

Water

Radiochemistry

Radium-226

Radium-228

Thorium-230

Thorium Isotopes (Th-228, Th-230 and Th-232)

Lead-210

Polonium-210
Radon-222

Gross Alpha and Beta

Routine Chemistry

Alkalinity

Includes: Total Alkalinity, Carbonate, Bicarbonate, Hydroxide

Calcium

Chloride

Fluoride

Magnesium

pH

Potassium

Sodium

Specific Conductivity

Sulfate

Total Hardness, Calcium and Magnesium

Nutrients

Total Organic Carbon (TOC)

Dissolved Organic Carbon (DOC)
(Lab filtration, \$13)

Ammonia as Nitrogen (NH₃-N)

Nitrate (NO₃)

Nitrite (NO₂)

Nitrite + Nitrate as Nitrogen (NO₂ + NO₃-N)

Total Kjeldahl Nitrogen (TKN)

Total Phosphorous (TP)
(Digestion, \$15)

ortho-Phosphate (o-PO₄)

Inorganic Phosphorous (IP)

Total Phosphorous, Inorganic Phosphorous and Organic Phosphorous

Dissolved Phosphorous
(Lab filtration, \$13)

Miscellaneous

Solids, total dissolved (TDS)

Solids, total suspended (TSS)

Low-Level TSS

Turbidity

Acidity

Amines

Chlorophyll (A, B, C)
(Lab filtration, \$13)

Total Cyanide

Weak Acid Dissociable Cyanide

Eh (Oxidation-reduction potential)

Water

Microbiology

Total Coliforms and E. coli

Fecal Coliforms

Heterotrophic plate count

Fecal Streptococcus

Routine Wastewater

Biochemical Oxygen Demand (5-day BOD)

Carbaceous Biochemical Oxygen Demand

(c-BOD)

Chemical Oxygen Demand (COD)

Hexavalent Chromium (Cr VI)

Oil and Grease

(n-Hexane Extractable material; HEM)

Mineral Oil and Grease

(Silica-Gel Treatment n-Hexane Extractable Material; SGT-HEM)

Phenolics

Sulfide

Organics

Haloacetic Acids (HAA)

Includes: Monochloroacetic acid, Monobromoacetic acid, Dichloroacetic acid, Trichloroacetic acid, Dibromoacetic acid, HAA-5 total, Bromochloroacetic acid

Trihalomethanes (THM)

Includes: Chloroform, Bromodichloromethane, Dibromochloromethane, Bromoform, THM, total

Polychlorinated Biphenyls (PCBs)

Phenoxy Herbicides

Includes: 2,4-D, Bromoxynil (Buctril), Dicamba (Banvel), Diclofop methyl (Hoe grass), Picloram (Tordon), 2,4,5-T, 2,4,5-TP (Silvex), MCPA, 2,4-DP

Chlorinated Pesticides

Includes: Aldrin, a-Chlordane, g-chlordane, Dieldrin, Endrin, Endosulfan I, Endosulfan II, Heptachlor Epoxide, Heptachlor, Methoxychlor, Mirex, O,P'-DDD, O,P'-DDT, P,P'-DDD, P,P'-DDE, P,P'-DDT, PCBs, Toxaphene, alpha-BHC, beta-BHC, gamma-BHC (Lindane)

Pesticides I

Includes: Mataven (Flamprop-methyl), Propanil (Stampede), Triallate (Avadex BW), Trifluralin (Treflan), Diazinon, Dimethoate (Cygon), Fenitrothion, Lorsban (Chlorpyrifos), Malathion, Methyl Parathion, Parathion, Atrazine, Carbaryl (Sevin), Carbofuran (Furadan), Ethylfluralin

Pesticides II

Includes: Bromacil, Diuron, Linuron, Simazine, Tebuthiuron

Purgeable or Extractable Hydrocarbons

• Purgeable hydrocarbons includes:
BTEX (Benzene, Toluene, Ethylbenzene, Xylenes), F1 (C6-C10)

• Extractable hydrocarbons includes:
F2-F4 (C11-C50)

Total Petroleum Hydrocarbons

Includes: BTEX (Benzene, Toluene, Ethylbenzene, Xylenes), F1-F4

Polycyclic Aromatic Hydrocarbons (PAHs)

Includes: Acenaphthylene, Acenaphthene, Acridine, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(b+j)fluoranthene, Benzo(e)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3,c,d)pyrene, Naphthalene, Perylene, Phenanthrene, Pyrene, 1-Methylnaphthalene, 2-Methylnaphthylene, Quinoline

Organic Volatiles (VOCs)

Includes: Vinyl Chloride, 1,1-Dichloroethylene, Dichloromethane, MTBE, 1,1-Dichloroethane, Chloroform, 1,1,1-Trichloroethane, Carbon Tetrachloride, 1,2-Dichloroethane, Benzene, Trichloroethylene, Bromodichloromethane, Toluene, 1,1,2-Trichloro-ethane, Tetrachloroethylene, Dibromochloromethane, Chlorobenzene, 1,1,1,2-Tetrachloroethane, Ethylbenzene, m+p-Xylene, o-Xylene, Styrene, Bromoform, 1,1,2,2-Tetrachloroethane, 1,2,4-Trimethylbenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene

Glycols

Includes: 1,2-Propanediol, Diethylene glycol, Ethylene glycol, Triethylene glycol

Chlorophenols (Phenols)

Includes: 2,4-Dichlorophenol, 2,4,6-Trichlorophenol, 2,3,4,6-Tetrachlorophenol, Pentachlorophenol

Glyphosate

Soil

Sample Preparation

To obtain representative results, samples are normally dried and ground before analysis. Percent moisture can be determined and results are typically reported on a dry weight basis. If unstable or volatile parameters, such as mercury, are required, a representative portion of the wet sample is taken and analyzed. The moisture results are used to calculate these results back to a dry basis. Initial preparation charges for soil are as follows:

Drying

Grinding

Grinding (Radioactive)

Drying, Grinding and % Moisture

Drying, Grinding and % Moisture (Radioactive)

Microwave Digestion

Water Leach and Filtration

Compositing, per portion (\$18 minimum)

Packages for Soil

Trace Metals Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Calcium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Phosphorous, Potassium, Selenium, Sodium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Note that boron determined with the trace metals package is not suitable for evaluating compliance with environmental quality guidelines. For evaluation of compliance with environmental quality guidelines, boron must be determined from a suitable leach.

Rare Earth Elements Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Holmium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Individual Elements

Pricing does not include any sample preparation.

Available elements: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Copper, Dysprosium, Europium, Erbium, Gadolinium, Hafnium, Holmium, Iron, Lanthanum, Lead, Lithium, Lutetium, Magnesium, Manganese, Molybdenum, Nickel, Neodymium, Niobium, Phosphorous, Potassium, Praseodymium, Rubidium, Samarium, Selenium, Scandium, Silver, Sodium, Strontium, Tantalum, Tellurium, Terbium, Thallium, Thorium, Thulium, Tin, Titanium, Uranium, Vanadium, Ytterbium, Yttrium, Zinc, Zirconium

Mercury (includes sample digestion)

Boron (includes leach)

Soil

Soil Characteristics

Salinity Package

The salinity package is used to assess suitability of a soil for various agricultural purposes. It is often used for remediation purposes. A minimum of 500 g of soil is required.

Pricing includes the paste leach preparation and the following determinations: pH, Conductivity (EC, Electrical Conductivity or Specific Conductivity), Sodium Absorption Ratio (SAR), % Saturation, Calcium, Magnesium, Sodium, Potassium, Sulfate, Chloride and Theoretical Gypsum Rate (TGR)

Package price does not include initial preparation, such as drying and grinding.

For more complete information about the condition of the soil, additional parameters can be added to the package.

Ammonia as Nitrogen

Nitrite + Nitrate as Nitrogen

Phosphorus (available)

Alkalinity (carbonate and bicarbonate)

Boron

Cation Exchange Capacity (CEC)

CEC is a measure of a soil's fertility and nutrient retention capacity. Clay mineral and organic matter components of soil have negatively charged sites on their surfaces, which adsorb and hold positively charged ions (cations). In general, soils that retain more cations are more fertile than those with lower CEC.

CEC with Sodium Acetate

CEC with Ammonium Acetate

Miscellaneous

Ash

Total Carbon*

Organic Carbon*

Inorganic Carbon*

Carbonates by back titration

Chloride, water soluble (includes water leach \$25)

Hexavalent Chromium (Cr VI)

Cyanide

Bulk Density

Fluoride

Gamma Spectroscopy

Scan for naturally occurring isotopes or specific gamma emitting radionuclides of interest.

Loss on Ignition (550°C)

Ammonia as Nitrogen (includes water leach \$25)

Nitrite + Nitrate as Nitrogen

(includes water leach \$25)

Total Kjeldahl Nitrogen

pH (paste pH or rinse pH)

Total Phosphorus (TP)

(includes digestion)

Inorganic Phosphorus (IP)

Organic Phosphorus

(OP) (calculated, requires TP and IP)

Silica

Specific Conductivity

Sulfate, acid soluble (includes digestion)

Sulfide (calculated, with sulfate and total sulfur)

Sulfur, total*

*Subcontracted to SRC Geoanalytical Laboratories.

Purgeable or Extractable Hydrocarbons

• Purgeable hydrocarbons includes:
BTEX (Benzene, Toluene, Ethylbenzene, Xylenes),
F1 (C6-C10)

• Extractable hydrocarbons includes:
F2-F4 (C11-C50)

Petroleum Hydrocarbons

Includes: BTEX (Benzene, Toluene, Ethylbenzene, Xylenes), F1-F4

Polycyclic Aromatic Hydrocarbons (PAHs)

Includes: Acenaphthylene, Acenaphthene, Acridine, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(b+j)fluoranthene, Benzo(e)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3,c,d)pyrene, Naphthalene, Perylene, Phenanthrene, Pyrene, 1-Methylnaphthalene, 2-Methylnaphthylene, Quinoline

Soil

Radionuclides

Radionuclide Package

Includes: Sample digestion, Lead-210, Polonium-210, Radium-226 and Thorium-230

Lead-210

(includes digestion)

Polonium-210

(includes digestion)

Lead-210 and Polonium-210 together

(includes shared digestion)

Radium-226

(includes digestion)

Thorium-230

(includes digestion)

Thorium isotopes

(includes sample digestion, Th-228, Th-230 and Th-232)

Fish Tissue

Sample Preparation

Fish tissue should be submitted frozen to preserve the integrity of the sample.

When separate analysis of flesh and bone is required, fish should be submitted skinned, gutted and frozen. Additional charges will apply if preparation is required prior to separation of flesh and bone. Flesh and bone are considered two separate samples.

If smaller fish are submitted and compositing is required to obtain sufficient sample size, a compositing charge will apply for each additional fish in the composite.

To attain the lowest detection limits for radionuclides, fish of at least 800 g wet weight should be submitted. Smaller sizes can be submitted if higher detection limits are acceptable.

Large Fish

Separation of Flesh and Bone (per fish)

Fish Compositing (per additional fish)

Filleting (per fish)

Skinning (per fish)

Gutting (per fish)

Thermal Ash

Small Fish

Homogenization (blending)

Homogenization (chop and mince)

Trace Metals

Trace Metals Package

Includes: Sample digestion, Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Rare Earth Elements Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Holmium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Individual Elements

Pricing does not include any sample preparation.

Available elements: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Copper, Dysprosium, Europium, Erbium, Gadolinium, Hafnium, Holmium, Iron, Lanthanum, Lead, Lithium, Lutetium, Manganese, Molybdenum, Nickel, Neodymium, Niobium, Phosphorous, Potassium, Rubidium, Samarium, Selenium, Scandium, Silver, Sodium, Strontium, Tantalum, Tellurium, Terbium, Thallium, Thorium, Thulium, Tin, Titanium, Uranium, Vanadium, Ytterbium, Yttrium, Zinc, Zirconium

Mercury (includes sample digestion)

Radionuclides

Radionuclide Package

Includes: thermal ash, large sample digestion, acid digestion of ash, Lead-210, Polonium-210, Radium-226 and Thorium-230

Lead-210

(includes acid digestion of ash; thermal ash is extra)

Polonium-210

(includes large sample digestion)

Lead-210 and Polonium-210 together

(includes shared digestion)

Radium-226

(includes acid digestion of ash; thermal ash is extra)

Thorium-230

(includes acid digestion of ash; thermal ash is extra)

Thorium isotopes

Includes: Acid digestion of ash, Th-228, Th-230 and Th-232; thermal ash is extra

Miscellaneous

Moisture (with oven-drying)

Moisture (with freeze-drying)

Total Cyanide

Animal Tissue

Sample Preparation

Animal tissue should be submitted frozen to preserve the integrity of the sample.

Many types of tissue can be analyzed, including muscle, bone and individual organs. Identification and separation of organs should be done prior to sample submission. Any unusual preparation requirements (e.g., deboning) should be discussed with the laboratory prior to sample submission.

Sample preparation required will depend on the specific type of animal submitted, any preparation that has taken place prior to submission to the laboratory and the analysis requirements. Most tissue will require a digestion to destroy organic material and obtain an aqueous solution for analysis. Radionuclides will typically require either a thermal ash to concentrate the radionuclides or a large-sample digestion.

To attain the lowest detection limits for radionuclides, tissue of at least 800 g wet weight should be submitted. Smaller sizes can be submitted if higher detection limits are acceptable.

Please contact the lab to ensure that enough sample will be provided for all your analytical requirements.

Thermal Ash

Homogenization (blending)

Homogenization (chop and mince)

Trace Metals

Trace Metals Package

Includes: Sample digestion, Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Rare Earth Elements Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Holmium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Individual Elements

Pricing does not include any sample preparation.

Available elements: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Copper, Dysprosium, Europium, Erbium, Gadolinium, Hafnium, Holmium, Iron, Lanthanum, Lead, Lithium, Lutetium, Manganese, Molybdenum, Nickel, Neodymium, Niobium, Phosphorous, Potassium, Rubidium, Samarium, Selenium, Scandium, Silver, Sodium, Strontium, Tantalum, Tellurium, Terbium, Thallium, Thorium, Thulium, Tin, Titanium, Uranium, Vanadium, Ytterbium, Yttrium, Zinc, Zirconium

Mercury (includes sample digestion)

Radionuclides

Radionuclide Package

Includes: Thermal ash, large sample digestion, acid digestion of ash, Lead-210, Polonium-210, Radium-226 and Thorium-230

Lead-210

(includes acid digestion of ash; thermal ash is extra)

Polonium-210

(includes large sample digestion)

Lead-210 and Polonium-210 together

(includes shared digestion)

Radium-226

(includes acid digestion of ash; thermal ash is extra)

Thorium-230

(includes acid digestion of ash; thermal ash is extra)

Thorium isotopes

Includes: Acid digestion of ash, Th-228, Th-230 and Th-232; thermal ash is extra

Individual Parameters

Moisture (with oven-drying)

Moisture (with freeze-drying)

Total Cyanide

Vegetation

Sample Preparation

Vegetation samples should be submitted free of foreign matter, such as dirt or stones. Samples should be kept cool to prevent the formation of mold.

Vegetation will normally require a digestion to destroy organic material and obtain an aqueous solution for analysis. Radionuclides will typically require either a thermal ash to concentrate the radionuclides or a large-sample digestion. Depending on the type of vegetation submitted, suitable homogenization techniques may be required to obtain representative subsamples for laboratory analysis.

To attain the lowest detection limits for radionuclides, a sample size of at least 400 g dry weight should be submitted. Smaller sizes can be submitted if higher detection limits are acceptable.

Please contact the lab to ensure that enough sample will be provided for all your analytical requirements.

Thermal Ash

Homogenization (blending)

Homogenization (chop and mince)

Trace Metals

Trace Metals Package

Includes: Sample digestion, Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Rare Earth Elements Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Holmium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Individual Elements

Pricing does not include any sample preparation.

Available elements: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Copper, Dysprosium, Europium, Erbium, Gadolinium, Hafnium, Holmium, Iron, Lanthanum, Lead, Lithium, Lutetium, Manganese, Molybdenum, Nickel, Neodymium, Niobium, Phosphorous, Potassium, Rubidium, Samarium, Selenium, Scandium, Silver, Sodium, Strontium, Tantalum, Tellurium, Terbium, Thallium, Thorium, Thulium, Tin, Titanium, Uranium, Vanadium, Ytterbium, Yttrium, Zinc, Zirconium

Mercury (includes sample digestion)

Radionuclides

Radionuclide Package

Includes: Thermal ash, large sample digestion, microwave digestion of ash, Lead-210, Polonium-210, Radium-226 and Thorium-230

Lead-210

(includes microwave digestion of ash; thermal ash is extra)

Polonium-210

(includes large sample digestion)

Lead-210 and Polonium-210 together

(includes shared digestion)

Radium-226

(includes microwave digestion of ash; thermal ash is extra)

Thorium-230

(includes microwave digestion of ash; thermal ash is extra)

Thorium isotopes

Includes: Acid digestion of ash, Th-228, Th-230 and Th-232; thermal ash is extra

Individual Parameters

Moisture (with oven-drying)

Moisture (with freeze-drying)

Total Cyanide

Benthic Invertebrates

Sample Preparation

Invertebrate samples are typically freeze-dried and subsequently homogenized. A portion of the sample is taken for metals analysis and the remaining sample can be used for other tests, such as radiochemical analysis.

To attain the lowest detection limits for radionuclides, a sample size of at least 50 g of wet sample should be submitted. Smaller sizes can be submitted if higher detection limits are acceptable.

Please contact the lab to ensure that enough sample will be provided for all your analytical requirements.

Moisture (with freeze-drying)

Trace Metals

Trace Metals Package

Includes: Sample digestion, Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Rare Earth Elements Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Holmium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Individual Elements

Pricing does not include any sample preparation.

Available elements: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Copper, Dysprosium, Europium, Erbium, Gadolinium, Hafnium, Holmium, Iron, Lanthanum, Lead, Lithium, Lutetium, Manganese, Molybdenum, Nickel, Neodymium, Niobium, Phosphorous, Potassium, Rubidium, Samarium, Selenium, Scandium, Silver, Sodium, Strontium, Tantalum, Tellurium, Terbium, Thallium, Thorium, Thulium, Tin, Titanium, Uranium, Vanadium, Ytterbium, Yttrium, Zinc, Zirconium

Mercury (includes sample digestion)

Radionuclides

Radionuclide Package

Includes: Sample digestion, Lead-210, Polonium-210, Radium-226 and Thorium-230

Lead-210

(includes digestion)

Polonium-210

(includes digestion)

Lead-210 and Polonium-210 together

(includes shared digestion)

Radium-226

(includes digestion)

Thorium-230

(includes digestion)

Thorium isotopes

Includes: Acid digestion of ash, Th-228, Th-230 and Th-232; thermal ash is extra

Sediment Quality

Sample Preparation

Samples should be submitted in zip-lock bags (double-bagged), jars or other suitable containment and kept cool or frozen to preserve integrity until analysis.

Samples typically require drying, grinding and % moisture before analysis. If particle size analysis is required, the sample must be split before drying and grinding. Alternatively, a separate sample portion can be submitted for the particle size analysis.

Particle size is normally done by laser diffraction on the unmodified sample. If comparison with previous particle size analysis done by sieve analysis is desired, sieve analysis can be done as well.

Drying

Grinding

Drying, Grinding and % Moisture

Moisture with freeze-drying

Trace Metals

Trace Metals Package

Includes: Sample digestion, Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Calcium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Phosphorous, Potassium, Selenium, Sodium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc

Rare Earth Elements Package

Pricing does not include initial preparation, such as drying and grinding.

Includes: Sample digestion, Cerium, Dysprosium, Erbium, Europium, Gadolinium, Hafnium, Holmium, Lanthanum, Lutetium, Neodymium, Niobium, Praseodymium, Samarium, Scandium, Tantalum, Terbium, Thulium, Ytterbium, Yttrium

Individual Elements

Pricing does not include any sample preparation.

Available elements: Aluminum, Antimony, Arsenic, Boron, Barium, Beryllium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Copper, Dysprosium, Europium, Erbium, Gadolinium, Hafnium, Holmium, Iron, Lanthanum, Lead, Lithium, Lutetium, Manganese, Molybdenum, Nickel, Neodymium, Niobium, Phosphorous, Potassium, Rubidium, Samarium, Selenium, Scandium, Silver, Sodium, Strontium, Tantalum, Tellurium, Terbium, Thallium, Thorium, Thulium, Tin, Titanium, Tungsten, Uranium, Vanadium, Ytterbium, Yttrium, Zinc, Zirconium

Mercury (includes sample digestion)

Radionuclides

Radionuclide Package

Includes: Lead-210, Polonium-210, Radium-226, Thorium-230 and sample digestions

Lead-210

(includes digestion)

Polonium-210

(includes digestion)

Lead-210 and Polonium-210 together

(includes shared digestion)

Radium-226

(includes digestion)

Thorium-230

(includes digestion)

Thorium isotopes

(includes sample digestion, Th-228, Th-230 and Th-232)

Individual Parameters

Ash

Total Carbon*

Organic Carbon*

Inorganic Carbon*

Loss on Ignition (550°C)

Particle Size

Laser diffraction analysis, including particle size distribution and 5 fraction EEMS classification (gravel, coarse sand, fine sand, silt and clay)

Particle Size*

Pipette and sieve analysis to 5 fraction EEMS classification (gravel, coarse sand, fine sand, silt and clay)

* Subcontracted tests



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