Lupin Mines Incorporated

A wholly owned indirect subsidiary of Mandalay Resources Corporation

Lupin Mine Site

Nunavut, Canada

Liquid Waste Management Plan

(Care and Maintenance)

March 2016

Lupin Mines Incorporated
Mandalay Resources Corporation
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Document Control

Revision No.	Date	Details	Author	Approver
1.0	20/03/12	Reformatted to Lupin Mines standard Revised and updated to reflect new ownership and contact information Updated figures to reflect current site conditions Document re-write, primarily for clarity and organization Addressed comments from AANDC (2010), EC (2009) Revised to include liquid waste management	S Hamm	P Downey
2.0	30/03/13	Combined *Discharge Procedure: Tailings Containment Area and Sewage Lakes Disposal Facility* with the *Liquid Waste and Stormwater Management Plan* to create the *Liquid Waste Management Plan* Updated contact and general information Additional details on preparation for discharge from the TCA added	D Vokey	W. Osborne
3.0	18/03/16	Updated to reflect new water licence Added information about the Landfill and Landfarm facility requirements Updated effluent quality criteria Updated contact and general information Added provisions added for the annual sampling of the interior ponds of the TCA. Provided additional direction for the discharge from the sewage and TCA (These edits are highlighted in yellow to facilitate review)	SRK	K. Lewis

Executive Summary

Lupin Mines Incorporated (LMI), a wholly owned indirect subsidiary of Mandalay Resources Corporation (Mandalay), has prepared this Liquid Waste Management Plan.

A review of the Plan takes place and revisions are submitted as necessary with the annual report. The current Type A water licence 2AM-LUP1520 (Water Licence) for the Lupin Gold Mine (Lupin or the Lupin Mine or the Site) is valid until August 18, 2020.

Executive Summary Inuktitut

Awaiting translation – to be provided as soon as possible

Executive Summary Inuinnaqtun

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1 Introduction

Lupin Mines Incorporated (LMI), a wholly owned indirect subsidiary of Mandalay Resources Corporation (Mandalay), has prepared this Liquid Waste Management Plan (the Plan).

An annual review of the Plan will take place and revisions will be submitted as necessary with the Annual Report to the Nunavut Water Board (NWB). The current Type A Water Licence 2AM-LUP1520 (Water Licence) for the Lupin Gold Mine (Lupin or the Lupin Mine or the Site) is valid until August 18, 2020.

1.1 Project and Company Information

Mandalay is a Canadian based company focused on producing assets in Australia, Chile and Sweden, a development project in Chile and the exploration and development of the past-producing Lupin Gold Mine and the Ulu gold project, both located in Nunavut, Canada.

Mandalay purchased Elgin Mining Inc., which owns LMI and the Lupin Mine, in September 2014. Lupin was in operation from 1982 to 2005 with temporary suspensions of activities between January 1998 and April 2000, and again between August 2003 and March 2004. The mine resumed production in March 2004 until February 2005. Since 2005, the Site has remained in Care and Maintenance.

General site maintenance and facilities upgrades are underway at the Lupin Mine to assess operational requirements. The activities underway were screened by the Nunavut Impact Review Board under file 99WR053 and approved by the Nunavut Water Board under Water Licence 2AM-LUP1520. Surface exploration is conducted under Water Licence 2BE-LEP1217. All camp infrastructure required for the surface exploration program currently exists at the Lupin Mine

Company:	LMI
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Effective Date: March 18, 2016

Distribution List:

Karyn Lewis	General Administration
Discovery Mining Services	Site Contractor
Golder Associates	Site Consultant
SRK Consulting	Site Consultant

Additional copies of this Plan are available from General Administration. This Plan will be posted in key locations at the site, and all employees and contractors will be made aware of its contents.

1.2 Site Location

The Lupin Mine is located in the Kitikmeot Region, Nunavut, 400 km north of Yellowknife, Northwest Territories and 285 km southeast of Kugluktuk, Nunavut. The airport serving this Site is at 65° 46'00" N and 111° 14'41" W. The Site is on the western shore of Contwoyto Lake, approximately 60 km south of the Arctic Circle (Figure 1).

1.3 *Environmental and Sustainable Development Policy*

Lupin Mine Incorporated (LMI) is committed to maintaining a safe, clean, compliant and respectful work environment. LMI looks to our employees, contractors and managers to adopt and grow a culture of social responsibility and environmental excellence. Together we achieve this by:

- Promoting environmental stewardship in all tasks. Nothing is too important that it cannot be done in a clean and responsible manner. We strive towards maintaining a zero-incident work place.
- Recognizing that we have a shared responsibility as stewards of the environment in which we operate. We will not walk away from a non-compliant act.
- Identifying, managing and mitigating environmental, business and social risks in an open, honest and transparent manner.
- Planning our work so it is done in the cleanest possible manner and executing work according to plan.
- Continually improving environmental and operational performance by setting and reviewing achievable targets.
- Providing appropriate and necessary resources in the form of training, personnel and capital, including that required for closure planning and reclamation.
- Managing our materials and waste streams, maintaining a high degree of emergency response preparedness and minimizing our operational footprint to maintain environmental protection at all stages of project development.
- Procuring goods and services locally, where available, and favouring suppliers with environmentally and socially responsible business practices.
- Seeking to understand, learn from and mitigate the root causes of environmental incidents and near misses when they do occur.
- Employing systems and technology to achieve compliance, increase efficiency and promote industry best practices in development, operations and environmental stewardship.

- Working with stakeholders to identify and pursue opportunities for sustainable social and economic development and capacity building.
- Conducting early and ongoing stakeholder engagement relevant to the stage of project and mine development and operation.
- Recognizing diversity in the workplace and building meaningful relationships with all stakeholders in a timely, collaborative and transparent manner.

Through implementation of this policy, LMI seeks to earn the public's trust and be recognized as a respectful and conscientious employer, neighbor and environmental steward.

1.4 Purpose and Scope

The purpose of this Plan is to provide the necessary information pertaining to liquid waste management during routine care and maintenance at the Lupin Mine. Liquid waste management planning is necessary to ensure waste water is appropriately stored, treated and discharged to the environment in compliance with the Water Licence and the *Metal Mining and Effluent Regulation* (MMER).

The objectives of the Plan are to:

- Describe source and fate of waste water on the Lupin site, and
- Outline measures in place to mitigate impacts to the environment resulting from waste water discharge.

2 Sources of Liquid Waste

2.1 Stormwater

Water accumulates in secondary containment of fuel storage facilities and the catchment sump of the landfarm facility due to precipitation. In order to maintain secondary containment dry, accumulated water needs to removed and managed.

Precipitation and the overland flow of surface water can encounter surficial materials such as disturbed native soils, the fine-grained fraction of waste rock materials and non-hazardous landfilled waste material; and can mobilize fine particulates, chemicals and contaminants contained therein. The majority of sediment contained in runoff at the Site is waste rock fines found in stockpiles, roads, and miscellaneous "administrative" areas such as parking lots and storage yards (laydown areas).

2.2 Sewage

Sewage and grey water are conveyed to the Sewage Lakes system. Liquid waste results from camp accommodations and kitchen facilities (dishwater and sanitary waste).

2.3 Tailings

There is a substantial amount of water present within the tailings containment area (TCA) (Figure 2). The containment is divided into three main components: solids retention cells (Cells 1, 2, 3, and 5), polishing ponds (Cell 4, Pond 1 and Pond 2) and the End Lake area (not used). All of this water is periodically transferred downstream to maintain a 1 m freeboard at all times at the perimeter dams. The water in Cell 4 is transferred to Pond 1 via gated valve, from here the water is transferred from Pond 1 to Pond 2 by way of siphon. Cell 5 water is transferred directly to Pond 1 via siphon. Pond 2 is the largest pond; here, water is treated with lime and eventually discharged to the environment by way of siphon.

3 Stormwater Management

The Lupin Mine is constructed on a topographic dome (Figure 3). Drainage to the northwest is towards the main tank farm, which is isolated by a containment berm system. Drainage to southwest and south reports to the Sewage Lakes Disposal Facility, which is contained by dykes. The north and east perimeter of the site is composed of laydown areas, graded to direct over land flow to either the airstrip access road, the surface crusher access road or the burn pit access road.

Site facilities at Lupin relevant to stormwater management planning include roads, the mine site infrastructure and the airstrip.

3.1 Facilities

Mine Site Area

The mine site area referred to in this Plan includes: mine and mill buildings; shops; accommodations; laydown areas; storage facilities; landfill; weather station; landfarm facility; and bulk fuel storage facilities. Surface runoff from these areas flows either towards the main tank farm area, the sewage pond system or access roads to the airstrip, burn pit or crusher as described above.

Roads

Runoff accumulating on roads is collected in a series of ditches and culverts. Road bases were constructed with non-acid forming materials.

Airstrip

The gradient of the airstrip results in run-off flow from south to north. Spring freshet and stormwater flow parallel to the strip, controlled through a combination of natural gradient, culverts, and ditches. The water flows naturally to Boot Lake, to the northwest, and typically carries negligible sediment.

3.2 Best Management Practices

LMI utilizes a number of best management practices (BMPs) to control the discharge of stormwater runoff to points outside the mine's footprint, as discussed in the following sections.

Good Housekeeping

Lupin management promotes good housekeeping to minimize exposure of materials to the environment and potential accumulation in stormwater. Materials and equipment are stored throughout the site such that leaks and leaching are minimized and contained.

Visual Inspections

Visual inspections of cold storage buildings, laydown areas, landfill, landfarm facility, fuel containment, and tailings containment are conducted. These visual inspections are increased during spring freshet and after significant rain events.

Preventative Maintenance

Regularly scheduled maintenance for mobile equipment occurs to make sure fluids in process do not escape.

Material Handling Practices

The following material handling practices are used by Lupin personnel to minimize exposure of pollutants to stormwater:

- Containers are stored appropriately in designated storage locations at all times other than when in immediate use;
- Lids, covers, and caps are in place at all times other than when in immediate use;
- Operators use caution when refueling equipment on site or transferring materials; and
- Controls on materials placed in the landfill.

Spill Prevention and Emergency Response

Lupin has in effect a *Spill Contingency Plan*, designed to deal with proper procedures for oil and chemical spill prevention and response. Employees are trained in procedures to minimize the environmental and health risks associated with these events.

Sediment and Erosion Control

Ephemeral and intermittent drainages exist throughout the Lupin Mine site, many of which flow only because of significant rain events or during spring freshet. Ephemeral or intermittent drainages may require measures to control sedimentation and surface erosion; such as cross ditching, or silt fencing.

3.3 Bulk Fuel Storage Facility Discharge Procedures

Employees are trained in the procedures to maintain and operate the fuel and fuel handling facilities on site.

Water accumulating in secondary containment of fuel storage facilities is tested prior to discharge to the environment to ensure it is in compliance with Part E(10) of the Water Licence as listed below in Table 1. Samples for testing are collected in accordance with the *Water Quality Monitoring Plan and Quality Assurance/ Quality Control Plan* (the Monitoring Plan) found in Appendix A. Water that is not in compliance is stored until it can be treated and subsequently released to the environment at LUP-27 (Figure 4, UTM coordinates: 7293609N 489072E). Snow that is contaminated with hydrocarbons is collected and melted. The hydrocarbon portion is removed and the water is then tested and either discharged or stored for further treatment. The hydrocarbon portion and water that cannot be treated on site is shipped off site for treatment and disposal.

LMI provides notice to the Indigenous and Northern Affairs Canada (INAC) Inspector at least ten (10) days prior to initiating discharge from the Bulk Fuel Storage Facilities. The notification includes tabulated test results of the water to be discharged compared to the criteria listed in Table 1, an estimated volume proposed for discharge and the receiving location.

Table 1: Monitoring stations LUP-27 and LUP-28 effluent quality criteria.

Parameter	Maximum Concentration of any Grab sample (mg/L)
Total Ammonia	2.0
Total Lead	0.01
Benzene	0.37
Toluene	0.002
Ethylbenzene	0.090
Total Suspended Solids	15
Oil and Grease	5.0 and no visual sheen
pH	6.0 to 9.0

3.4 Landfarm Facility Discharge Procedures

Part of LMI's on-going progressive reclamation is achieved with the operation of a Landfarm Facility. Prior to the construction of the Landfarm Facility, Part G(9) of the Water Licence requires the submission of for construction design drawings and specifications for review.

Water accumulating in the sump of the facility is applied to the soil undergoing treatment during dry periods or tested and treated if necessary prior to discharge to ensure compliance with Part E(10) of the Water Licence as listed above in Table 1. Water is discharged at LUP-28 and monitored in three groundwater wells: one up gradient (LUP-29) and two down gradient wells (LUP-30a and LUP-30b). Samples collected from the monitoring wells are analyzed for the same parameters as LUP-29. Under Part E(25) of the Water Licence the locations of the monitoring wells are to be determined in

consultation with an Inspector and an Engineer. Samples for testing are collected in accordance with the Monitoring Plan found in Appendix A.

3.5 Landfill Facility Seepage Management

Seepage from the Landfill Facility is monitored at LUP-31 and groundwater is monitored in three wells: one up gradient (LUP-32) and two down gradient wells (LUP-33a and LUP34b). Samples collected from the monitoring wells are analyzed for the same parameters as LUP-31. Under Part E(25) of the Water Licence the locations of the monitoring wells are to be determined in consultation with an Inspector and an Engineer. Samples for testing are collected in accordance with the Monitoring Plan found in Appendix A.

Seepage from the Landfarm Facility is tested to ensure it is in compliance with Part E(19) of the Water Licence as listed below in Table 2. Samples for testing are collected in accordance with the Monitoring Plan found in Appendix A. Water that is not in compliance is pumped to a storage tank where it is held until it can be treated and subsequently released to the environment.

Table 2: Monitoring station LUP-31 effluent quality criteria.

Parameter	Maximum Concentration of any Grab sample (mg/L)
Total Arsenic	0.20
Total Copper	0.30
Total Lead	0.20
Total Nickel	0.50
Total Zinc	0.50
Total Suspended Solids	15
Oil and Grease	No visual sheen
pH	6.0 to 9.5

4 Sewage Waste Management

4.1 Sewage Lakes Disposal Facility

The sewage facilities consist of several lift stations within the camp and an 800 m long 6“ diameter insulated steel pipeline to the first of two sewage lakes. Alternatively, when camp capacity requirements during care and maintenance do not warrants its use; sewage and grey water are collected in a sewage tank at the accommodation buildings. The tank is then hauled to the Upper Sewage Lake wherein waste is deposited. A sewage line to convey camp sewage directly to the Upper Sewage Lake may be utilized. Grey water originating from office cabin use may be deposited in a leaching pit adjacent to the guesthouse. Under Part E(8) of the Water Licence, all sewage is to be discharged to the Sewage Lakes Disposal Facilities.

A ‘permeable’ type dam with an emergency overflow and an installed siphon exists between the Upper and Lower Sewage Lakes. Discharge from the Lower Sewage Lake is controlled by the use of a siphon. Water accumulating in the Lower Sewage Lake is tested prior to discharge to the environment to ensure

it is in compliance with Part E(9) of the Water Licence as provided in Table 3 below. If compliant, water is discharged from LUP-14 (Figure 4, UTM coordinates: 7293013N 490187E) to the environment. Samples for testing are collected in accordance with the *Water Quality Monitoring Plan and Quality Assurance/ Quality Control Plan* (Appendix A).

4.2 Sewage Lakes Disposal Facility Discharge Procedures

4.2.1 Pre-Discharge

The following procedures must be followed in preparation for discharge of sewage effluent from the Sewage Lakes Disposal Facility during open water conditions from the siphons.

3 weeks prior to Discharge

1. Collect samples from the Lower Sewage Lake near the siphon intake and test for pH, TSS, Total Metals, BOD_5, and Fecal Coliforms to confirm compliance with the effluent quality limits outlined in Table 3 following the procedures outlined in the Monitoring Plan (Appendix A).
2. The samples must be collected the morning of the plane day to account for sample holding times.
3. Inform the laboratory when the samples are shipped.

10 days prior to Discharge

1. Notify the INAC Inspector at least ten (10) days prior to initiating discharge from the sewage pond. Include in the notification the laboratory sample results, an estimated volume proposed for discharge and the receiving location.
2. Monitoring Station LUP-14 sample analysis results must not exceed the criteria outlined in Table 3 prior to commencing discharge.

5 days prior to Discharge

1. Take pH measurements daily for 5 days before anticipated discharge with the portable pH meter in the Lower Sewage Lake, near the siphon intake.
2. pH must be in the range of 6.0 to 9.5 or discharge cannot commence.

4.2.2 Discharge

The following procedures must be followed during discharge from the Sewage Lakes Disposal Facility:

1. Measure pH on the pond-side of the Lower Sewage Lake dam by the siphon intakes. If pH is between 6.0 and 9.5, and effluent quality at LUP-14 does not exceed the criteria provided in Table 3, start the siphons.
2. Record the following information for the Discharge Siphon Log:
    a. Date and time that the siphons were started
    b. Flowrate and totalized volume
    c. pH, temperature and conductivity readings from the portable meters
    d. Flow volume from each siphon
    e. General condition of the discharge point

f. Whether a visual sheen is present or not at the discharge siphon

3. Enter all information in the Discharge Siphon Log spreadsheet.
4. Collect monthly samples from LUP-14 including quality control samples (field duplicates, trip blanks) as outlined in the sampling event schedule (Table 2) of the *Water Quality Monitoring Plan and Quality Assurance/ Quality Control Plan* (Appendix A).
5. Prepare samples for shipment to the laboratory on the weekly flight following the procedures outlined in the Monitoring Plan. Each shipment must include at least one duplicate sample and one trip blank.
6. If field pH measurement is <6.0 or >9.5, IMMEDIATELY shut down the siphons, employ the Spill Contingency Plan, and notify the following:
    a. INAC inspector at (867) 975-4548
    b. 24 Hour Spill Report Line at (867) 920-8130
7. Upon receipt of analytical results for LUP-14 from the laboratory, compare analytical results to the effluent quality criteria outlined in the following Table 3. If results exceed the effluent quality limits IMMEDIATELY shut down the siphons, employ the Spill Contingency Plan, and notify the following:
    a. INAC inspector at (867) 975-4548
    b. 24 Hour Spill Report Line at (867) 920-8130

Table 3: Monitoring station LUP-14 effluent quality criteria.

Parameter	Maximum Concentration of any Grab sample (mg/L)
Total Arsenic	0.05
Total Copper	0.20
Total Lead	0.05
Total Nickel	0.30
Total Zinc	0.50
Total Suspended Solids	35
Fecal Coliforms	1000 colony forming units/ 100mL
BOD_5	30
Oil and Grease	No visual Sheen
pH	6.0 to 9.5

5 Tailings Effluent Management

5.1 Tailings Containment Area

The Tailings Containment Area (TCA) is located approximately six (6) km south of the Lupin Mine, and covers an area of about 361 ha within the 750 ha land lease. Monitoring of water quality in the interior ponds of the TCA is conducted annually to assess the progression of water quality and the performance of the system.

Water in the TCA is treated and tested prior to discharge to the environment to ensure it is in compliance with Part E(5) of the Water Licence and the Metal Mining Effluent Regulations (MMER). If compliant, water is discharged at LUP-10 (Figure 4, UTM NAD83, Zone 12N, coordinates: 485911E 7289875N). In accordance with Part E(2) and Part E(3) of the Water Licence. Discharge can commence

no sooner than July 15 of any calendar year and the volume discharged cannot exceed 70,000 m^3 per day.

The procedures for sampling discharge from the TCA in accordance with the Monitoring Program in Schedule J of the Water Licence and the MMER is described in the *Water Quality Monitoring Plan and Quality Assurance/Quality Control Plan* (the Monitoring Plan) found in Appendix A. Samples are also collected from reference areas and downstream exposure areas, LUP-20, 21, 22, 24 and 25 (Figure 4). The Environmental Effects Monitoring (EEM) program of the MMER requires biological monitoring studies be completed in addition to the water quality studies.

The TCA is also managed in compliance with Part E(6) of the Water Licence, which stipulates the following:

6. The TCA shall be constructed, operated and maintained to engineering standards such that:

a. A freeboard limit of 1.0 m shall be maintain at all times or as recommended by a Geotechnical Engineer and as approved by the Nunavut Water Board (the Board) in writing;
b. Seepage from the TCA is minimized;
c. Any seepage that occurs is collected and returned immediately to the TCA;
d. Erosion of constructed facilities is addressed immediately;
e. The solids fraction of the mill Tailings shall be permanently contained within the TCA or underground as Backfill;
f. Implement measures to ensure that the TCA is adequately covered or managed, including the use of approved binding agents, so as to prevent windblown tailings from impacting other areas of the project site;
g. During care and maintenance, inspections shall be carried out on a bi-weekly basis during freshet (approx. May and June), and monthly during the remainder of the open water period (approx. July – October) of the following:
    i. Collection and return of seepage in Dam 2,
    ii. Water levels in ponds 1 and 2, and cells 3 and 5,
    iii. General surface erosion and anomalies on dams, and,
    iv. Tension crack in dam M. If water levels in the ponds rise then inspections shall be carried out bi-weekly during the open water season (approx. May – October); and
    v. Records of these inspections shall be kept for review upon the request of an Inspector, or as otherwise approved by the Board.
h. More frequent inspections shall be performed at the request of an Inspector; and
i. An inspection of the TCA shall be carried out annually during ice free, open water conditions by a Geotechnical Engineer. The Engineer's report shall be submitted to the Board within sixty (60) days following the inspection and shall include a covering letter from the Licensee outlining an implementation plan to respond to the Engineer's recommendations.

5.2 Annual Tailings Water Quality Monitoring

Monitoring of the progression of water quality of the interior ponds of the TCA must be reported in the Annual Report to the NWB. Water from Pond 1, Pond 2, Cell 4 and Cell 5 are sampled in accordance with the Monitoring Plan found in Appendix A.

5.3 Tailings Containment Area Discharge Procedures

5.3.1 Pre Discharge

The following procedures must be followed in preparation for discharge of tailings effluent from the Tailings Containment Area (TCA). Note that calendar months and dates are provided only as a guide. Specific dates will be based on environmental conditions.

One Month prior to Discharge

1. Air Compressor Check
    - Inspect the portable air compressor to make sure it is working correctly. The compressor is needed to start the vacuum in the siphons. Get a spare jar for the compressor.
    - Transport the air compressor to Dam 1A.
2. Set-up Siphons
    - Check for holes in pipe, coupling integrity, plugged inlets and outlets.
    - Prepare a couple 8 inch siphons. As the level in Pond 2 decreases during discharge, the driving head (differential in Pond 2 water level to LUP-10 water level) decreases and additional 8 inch siphons can be added to maintain discharge flow in accordance with Part E(3) of the Licence.
    - Ensure that a vacuum can be created in the pipe to induce siphon flow.
    - Correct any problems so that the siphon process can be started when needed.
    - Test flow meters to confirm meter is working properly. Flow meters can be calibrated annually following the manufacturer's specifications for the specific size of siphon being used.
3. Organize Water Quality Monitoring Equipment
    - Rent or purchase an immersion probe to measure pH, temperature, dissolved oxygen and conductivity with a 7.5 m cable to allow for profiling.
    - Ensure the immersion probe functions correctly and that the data logger can be downloaded.
    - Ensure the handheld pH, dissolved oxygen and conductivity meters and desktop pH meter function correctly. Order replacement meters or sensors if required.
    - Check expiry date on calibration and storage solutions and order fresh solutions as required.
    - Rent or purchase a water sampler (i.e. Kemmerer, Niskin or Van Dorn bottles) to collect water at depths up to 7 m.

4. Contact Analytical Laboratory
    - Calculate the number and type of sample bottles that will be required for the sampling of monitoring program stations taking into consideration quality control samples such as field duplicates and trip blanks.
    - Order bottles from the analytical laboratory. Request an empty cooler be sent to site each week until requested by LMI to stop.
    - Ensure at least four large coolers to have on site before prior to discharge.
5. Contact Bioassay Laboratory
    - At least one month prior to discharge, contact the bioassay laboratory and order three sets of containers required for the Static pass/fail bioassay for Rainbow Trout and *Daphnia magna* (22 L), one set of containers required the MMER LC50 bioassay for Rainbow Trout and *Daphnia magna* (44L) and one set of containers for the MMER sublethal testing for Flathead Minnows, *Cladoceran Ceriodaphnia dubia*, *Lemma minor* and algae (44 L). In 2015, Nautilus Environmental (#4 6125 12th Street SE, Calgary, AB, T2H 2K1, phone: 403-253-7121, email: ABinfo@nautilusenvironmental.com) was used to test samples.
6. Collect Pre-Discharge Samples
    - Sample Pond 2 at LUP-17 and LUP-102 for pH and all parameters as listed in Table 2.2 of the Monitoring Plan (Appendix A) and submit to the laboratory for analysis.
    - If the sample from Pond 2 meets the discharge criteria listed in Table 4, except for pH, collect enough water for three static pass/fail bioassay tests for both Rainbow Trout and *Daphnia magna* following the procedures outlined in the Monitoring Plan. A sample of the lime utilized for the liming process should be sent to the laboratory along with the water samples. In order to obtain results for the range of potential discharge values the laboratory will adjust the pH of the samples between 6.0 and 9.5, i.e. 6.3, 7.5 and 8.5. For the pH adjustment ensure the laboratory uses a dilute concentration and does not batch up a molar ratio.
    - This bioassay sample point is internal LUP-102 (previously referred to as Station-102), located approximately 100 m upstream from the siphon intake. UTM NAD85, Zone 12N, coordinates: 486196E, 7289875N.
    - The bioassay samples must be collected the morning of the plane day to account for sample holding times (for the static pass/fail test there is a 5-day limit between taking the sample and start of analysis).
    - Inform the laboratory when the samples are shipped.
    - A “Pass” result must be received for the static pass/fail bioassay, Pond 2 sample analysis results must not exceed the limits listed in Table 4 and the pH of Pond 2 can be stabilized between 6.0 and 9.5 prior to commencing discharge.
7. Commence Lime Treatment
    - If the pH of Pond 2 is below 6, water treatment is to commence with the addition of a dilute lime slurry (up to 0.5% wt/wt). Typically two 25 kg bags are added per half hour to a 20 m^3 tank of water with continuous discharge (23 m^3/hr). This is adjusted based on wind speed (creates lake mixing) and the pH of Pond 2.

- The pH, temperature and conductivity of Pond 2 is to be profiled at various intervals in depth at a minimum of five locations, including LUP-102 (Site 1), to monitor the treatment rate. The monitoring is to be conducted every two to three days during the initial stages of treatment.
- The pH, temperature and conductivity is also to be measured at a minimum of five shore locations, including LUP-17, selected based on access and changing water level conditions. The monitoring is to be conducted every two to three days during the initial stages of treatment.
- Records of any variance to the daily rate of lime usage (i.e. two 25 kg bags per half hour to a 20m^3 tank) and monitoring results shall be made.

8. Contact Environment Canada
    - Provide notice to the Environment Canada Enforcement Officer at least thirty (30) days in advance of the collecting the MMER LC50 bioassay samples.

Ten (10) days prior to discharge

If the results from the range of pH bioassay tests pass, and effluent quality at in Pond 2 does not exceed the limits listed in Table 4 other than pH, additional steps prior to commencing discharge are to be undertaken.

- Provide notice to the INAC Inspector at least ten (10) days prior to initiating discharge from the TCA including an estimated volume proposed for discharge and the receiving location, and copy the Environment Canada Enforcement Officer.
- Commence daily pH, temperature and conductivity monitoring at various consistent locations in Pond 2 to verify pH stability.
- As weather allows continue to profile Pond 2 at various locations to verify homogeneity.
- Continue water treatment to maintain a consistent pH throughout Pond 2 (ideally between pH 6.5 and 9).

5.3.2 Discharge

The following procedures must be followed during discharge from the Tailings Containment Area (TCA):

1. The discharge from the TCA at Monitoring Station LUP-10 shall commence no sooner than July 15 of any calendar year unless otherwise approved by the Board in writing.
2. Measure pH in Pond 2 near the siphon intake (LUP-17 and LUP-102). If pH is between 6.0 and 9.5, the results from the Rainbow Trout and *Daphnia* bioassay tests pass, and effluent quality at LUP-17 and LUP-102 does not exceed the criteria provided in Table 4 below, start the siphons.
3. The discharge rate from the TCA shall not exceed 70,000 cubic metres per day, unless otherwise approved by the Board in writing.
4. Record the following information for the Discharge Siphon Log:
    a. Date and time that the siphons were started,
    b. pH, temperature and conductivity readings from the portable meters,
    c. Flowrate and totalized volume from each siphon, and
    d. General condition of the discharge point.
5. Enter all information in the Discharge Siphon Log spreadsheet.

6. Collect daily, weekly, and monthly samples at LUP-10, 20, 21, 22, 24 and 25 including quality control samples (field duplicates, trip blanks) as outlined in the sampling event schedule (Table 2) of the *Water Quality Plan and Quality Assurance/ Quality Control Plan* (Appendix A). Maintain a record of all field readings.
7. Prepare samples for shipment to the laboratory on the weekly flight following the procedures outlined in the Monitoring Plan. Each shipment must include at least one duplicate sample and one trip blank.
8. Continue water treatment to maintain a consistent pH throughout Pond 2 (ideally between pH 6.5 and 9).
9. Continue daily pH, temperature and conductivity monitoring of Pond 2 to verify pH stability.
10. If field pH measurement is <6.0 or >9.5 at LUP-10, IMMEDIATELY shut down the siphons, employ the Spill Contingency Plan, and notify the following:
    a. Environment Canada MMER enforcement officer at (867) 669-4794 or (867) 446-0924,
    b. INAC inspector at (867) 975-4548, and
    c. 24 Hour Spill Report Line at (867) 920-8130.
11. Upon receipt of analytical results for LUP-10 from the lab, compare analytical results to the effluent quality criteria outlined in the Table 4 below. If results exceed the effluent quality limits IMMEDIATELY shut down the siphons, employ the Spill Contingency Plan, and notify the following:
    c. Environment Canada MMER enforcement officer at (867) 669-4794 or (867) 446-0924,
    a. INAC inspector at (867) 975-4548, and
    d. 24 Hour Spill Report Line at (867) 920-8130.

Table 4: Monitoring station LUP-10 effluent quality criteria.

Parameter	Maximum Average Concentration (mg/L)	Maximum Concentration of any Grab sample (mg/L)
Total Arsenic	0.50	1.00
Total Copper	0.15	0.30
Total Cyanide	0.80	1.60
Total Lead	0.10	0.20
Total Nickel	0.20	0.40
Total Zinc	0.40	0.80
Total Suspended Solids	15	30
Oil and Grease	No Visual Sheen	
pH	6.0 to 9.5	

Parameter	Maximum Mean Concentration	Maximum Concentration in a Composite Sample	Maximum Concentration in a Grab Sample
Radium	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L

Legend

Project Location

Coordinate System: NAD_1983_UTM_Zone_12N

Map Sources/Notes:
Various Canadian Government Websites - Feb 2012

0 60 120 240 360 480 600 Km

1:15,000,000

Approved By: SH
Prepared By: PW
Project No.: LUP
Date Revised: 21 Mar 2012
File Name: Lup-12-10-01-LocationMap-A.mxd

Project: **Lupin Project**
Location: Kitikmeot Region, Nunavut, Canada
Lupin Mine Annual Report - Water Licence 2AM-LUP0914

Location Map - Lupin Mine

Lupin Mines Incorporated

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Figure: **1**
Rev: 120321

Legend

- Building
- Lake
- Stream
- Road
- Contour (10m)
- Tailings Line Route
- Fuel Pipe
- Boundary of Surface Lease 3594
- Cell Areas
- Location of Thermistor

N
W E
S

Map Sources/Notes:
Topographic features and site layout from Satellite image dated Aug 21, 2012

Coordinate System: NAD_1983_UTM_Zone_12N

0 50 100 200 300 400 500 Meters

1:12,500

Approved By: JCB
Prepared By: PW
Project No.: LUP
Date Revised: 15 Apr 2013
File Name: Lup-13-08-02-TailingsArea-B.mxd

Project: **Lupin Gold Mine**
Location: Kitikmeot Region, Nunavut, Canada

Mine Tailings Containment Area

Lupin Mines Incorporated

ELGIN MINING INC.

Figure: 2
Rev: 130415

Boot Lake
Lupin Winter Road Access
North Burn Pit
Portal
Salt Storage
Mine Laydown
Surface Storage
Surface Storage
RTL Shop
Water Service Canada Fuel Storage
Air Traffic Control Weather Station
Ball Field
Cafeteria
Reclaimed Open Stopes
Exhaust Fan
Third Party Drum Storage
Recreation
Offices
Accommodations
Fresh Water Line
Lupin Mine Site
Office Cabin
Kitchen
Cold Storage
Incinerator and Tank IND-08
Airstrip
Main Tank Farm
Emergency Spill Shack
WZ Open Stopes
Hoist House
Shaft House
Mill
Emergency Power House
Waste Hydrocarbon Storage Area
Lube Oil Storage Area
Power House
Waste Oil Tanks
Main Shop
Carpenter Shop
Mill Laydown
To Tailings Area
Satellite Tank Farm
Lumber Ya
Burn Pit
Landfill
Sewage Line
Tailings Line
Boneyard
Upper Sewage Lake
Dump Pond #1
Lower Sewage Lake - Chaffee Lake

Legend

- Building
- Tank Farm Berm Outline
- Lake
- Edge of Disturbed Area
- Stream
- Road
- Topographic Contour (5m)
- Topographic Contour (1m)
- Sewage Pipeline (6 in Diam)
- Tailings Line Route
- Water Pipeline (8 in Diam)

Pipe - Fuel Type, Status

- Diesel, Active
- Diesel, Abandoned
- Diesel, Uncertain
- Gasoline, Active
- Jet A, Active

Location of Tank - FuelType

- Diesel P-40
- Diesel P-50
- Diesel
- Water
- Jet-A
- Gas
- Glycol
- Waste Oil
- Empty
- Unknown

N
W E
S

Map Sources/Notes:
Topographic features and site layout from Satellite image dated Aug 21, 2012
Fuel tank and Fuel Containment layouts adapted from drawings by Emerson Engineering dated Oct 17, 2011 and from data updated to March 01 2013

Coordinate System: NAD_1983_UTM_Zone_12N

0 25 50 100 150 200 Meters

1:5,000

Approved By: JCB
Prepared By: PW
Project No.: LUP
Date Revised: 01 Apr 2013
File Name: Lup-13-04-01-SiteFacilities-B.mxd

Project: **Lupin Gold Mine**
Location: Kitikmeot Region, Nunavut, Canada

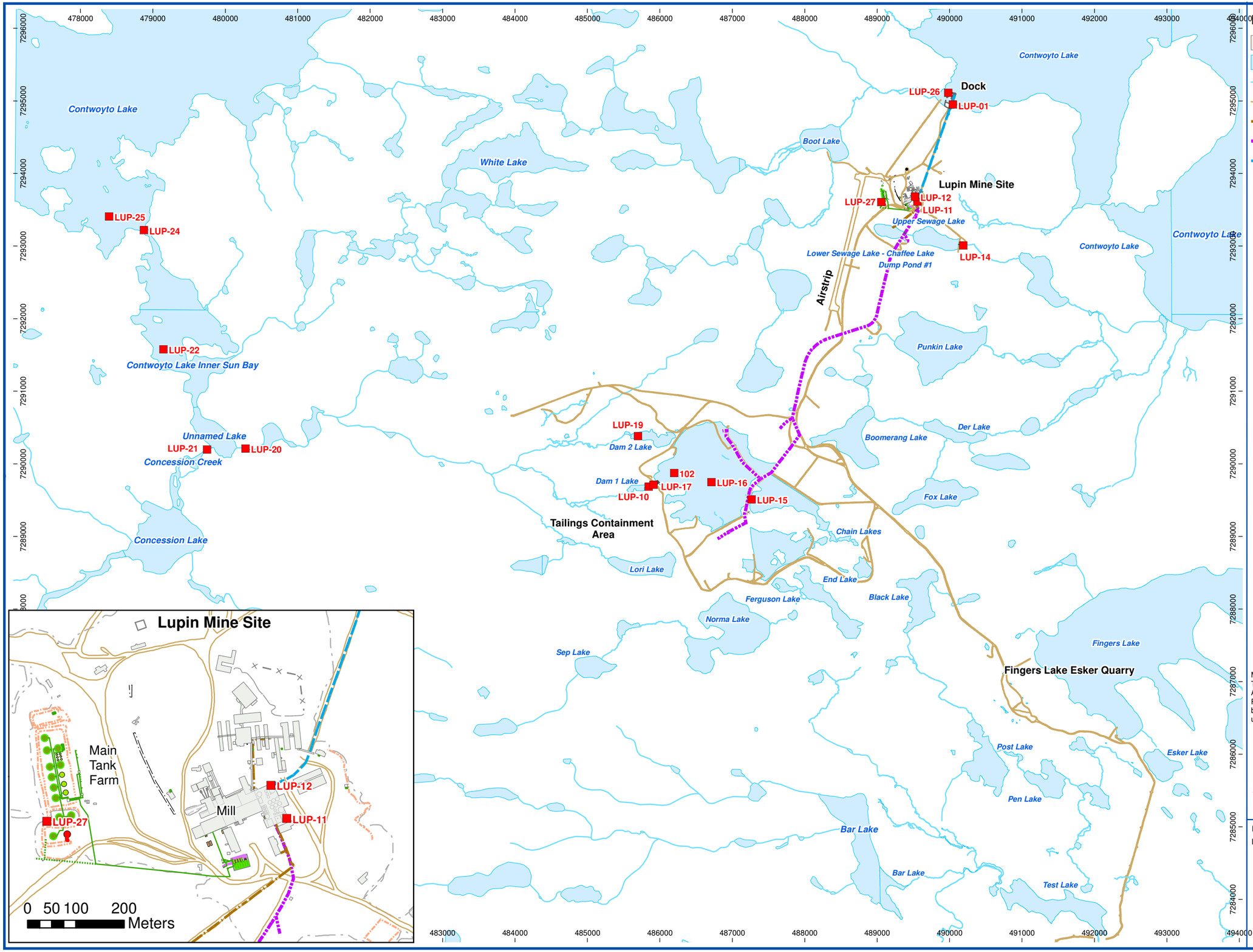
Fuel Containment Management Strategy

General Site Map - Lupin Mine

Lupin Mines Incorporated

ELGIN MINING INC.

Figure: **3**
Rev: 130401



Legend

- Building
- Lake
- Stream
- Road
- Sewage Pipeline (6 in Diam)
- Tailings Line Route
- Water Pipeline (8 in Diam)
- Water Sampling & Discharge Location

N
W E
S

Map Sources/Notes:
Topographic features and site layout from Satellite image dated Aug 21, 2012
Fuel tank and Fuel Containment layouts adapted from drawings by Emerson Engineering dated Oct 17, 2011 and from data updated to March 01 2013

Coordinate System: NAD_1983_UTM_Zone_12N

0 500 1,000 2,000 Meters

1:50,000

Approved By: AL
Prepared By: PW
Project No.: LUP
Date Revised: 15 Apr 2013
File Name: Lup-13-08-04-MonProgramStat-A.mxd

Project: **Lupin Gold Mine**
Location: Kitikmeot Region, Nunavut, Canada

Monitoring Program Stations

Lupin Mines Incorporated

ELGIN MINING INC.

Figure: 4
Rev: 130415

Appendix A: Water Quality Monitoring Plan and Quality Assurance/ Quality Control Plan

Lupin Mines Incorporated

A wholly owned indirect subsidiary of Mandalay Resources Corporation

Lupin Mine Site

Nunavut, Canada

Water Quality Monitoring Plan and Quality Assurance/ Quality Control Plan

(Care and Maintenance)

March 2016

Lupin Mines Incorporated
Mandalay Resources Corporation
76 Richmond Street East, Suite 330
Toronto, Ontario M5C 1P1

Document Control

Revision No.	Date	Details	Author	Approver
1.0	30/03/13	Replaces Care and Maintenance Plan – *Sampling Procedure: Tailings Containment Area and Sewage Lakes Disposal Facility*, March 2012 Replaces the *Environmental Laboratory Quality Assurance / Control Plan*, Prepared: March 1993, Revised: December 1995 Update contact and general information Revised to include bioassay sample requirements	D. Vokey	W. Osborne
2.0	18/03/16	Updated to reflect new water licence Added Landfill and Landfarm facility requirements Updated parameters and frequency of testing for all stations Added provisions for the annual sampling of the interior ponds of the TCA Updated contact and general information Updated UTM coordinates for sample stations to agree with those shown on the figures. Corrected reference to ammonia as NH_3 not NH_4 (NH_4 is ammonium) Updated laboratory accreditations Provided additional direction for the discharge from the sewage and TCA added (These edits are highlighted in yellow to facilitate review)	SRK	K. Lewis

Executive Summary

Lupin Mines Incorporated (LMI), a wholly owned indirect subsidiary of Mandalay Resources Corporation (Mandalay), has prepared this Monitoring Plan.

A review of the Plan takes place and revisions are submitted as necessary with the annual report. The current Type A water licence 2AM-LUP1520 (Water Licence) for the Lupin Gold Mine (Lupin or the Lupin Mine or the Site) is valid until August 18, 2020.

Executive Summary Inuktitut

Awaiting translation – to be provided as soon as possible

Executive Summary Inuinnaqtun

Awaiting translation – to be provided as soon as possible

Table of Contents

Figures

Tables

Appendices

1 Introduction

Lupin Mines Incorporated (LMI), a wholly owned indirect subsidiary of Mandalay Resources Corporation (Mandalay), has prepared this Water Quality Monitoring Plan and Quality Assurance / Quality Control Plan (the Plan).

An annual review of the Plan takes place and revisions are submitted as necessary with the Annual Report to the Nunavut Water Board (NWB). The current Type A Water Licence 2AM-LUP1520 (Water Licence) for the Lupin Gold Mine (Lupin or the Lupin Mine or the Site) is valid until August 18, 2020.

1.1 Project and Company Information

Mandalay is a Canadian based company focused on producing assets in Australia, Chile and Sweden, a development project in Chile and the exploration and development of the past-producing Lupin Gold Mine and the Ulu gold project, both located in Nunavut, Canada.

Mandalay purchased Elgin Mining Inc., which owns LMI and the Lupin Mine, in September 2014.Lupin was in operation from 1982 to 2005 with temporary suspensions of activities between January 1998 and April 2000, and again between August 2003 and March 2004. The mine resumed production in March 2004 until February 2005. Since 2005, the Site has remained in Care and Maintenance.

General site maintenance and facilities upgrades are underway at the Lupin Mine to assess operational requirements. The activities underway were screened by the Nunavut Impact Review Board under file 99WR053 and approved by the Nunavut Water Board under Water Licence 2AM-LUP1520. Surface exploration is conducted under Water Licence 2BE-LEP1217. All camp infrastructure required for the surface exploration program currently exists at the Lupin Mine

Company:	LMI
Project:	Lupin Mine, Nunavut
Company Address:	Suite 330, 76 Richmond Street East, Toronto, ON M5C 1P1
Telephone:	778-386-7340
Email:	klewis@elginmining.com
Attention:	Karyn Lewis, General Administration

Effective date: 18 March 2016

Distribution List:

Karyn Lewis	General Administration
Discovery Mining Services	Site Contractor
Golder Associates	Site Consultant
SRK Consulting	Site Consultant

Additional copies of this Plan are available from General Administration. This Plan will be posted in key locations at the Site, and all employees and contractors will be made aware of its contents.

1.2 Site Location

The Lupin Mine is located in the Kitikmeot Region, Nunavut, 400 km north of Yellowknife, Northwest Territories and 285 km southeast of Kugluktuk, Nunavut. The airport serving this Site is at 65°46'00" N and 111 14'41" W. The Site is on the western shore of Contwoyto Lake, approximately 60 km south of the Arctic Circle (Figure 1).

1.3 *Environmental and Sustainable Development Policy*

Lupin Mine Incorporated (LMI) is committed to maintaining a safe, clean, compliant and respectful work environment. LMI looks to our employees, contractors and managers to adopt and grow a culture of social responsibility and environmental excellence. Together we achieve this by:

- Promoting environmental stewardship in all tasks. Nothing is too important that it cannot be done in a clean and responsible manner. We strive towards maintaining a zero-incident work place.
- Recognizing that we have a shared responsibility as stewards of the environment in which we operate. We will not walk away from a non-compliant act.
- Identifying, managing and mitigating environmental, business and social risks in an open, honest and transparent manner.
- Planning our work so it is done in the cleanest possible manner and executing work according to plan.
- Continually improving environmental and operational performance by setting and reviewing achievable targets.
- Providing appropriate and necessary resources in the form of training, personnel and capital, including that required for closure planning and reclamation.
- Managing our materials and waste streams, maintaining a high degree of emergency response preparedness and minimizing our operational footprint to maintain environmental protection at all stages of project development.
- Procuring goods and services locally, where available, and favouring suppliers with environmentally and socially responsible business practices.
- Seeking to understand, learn from and mitigate the root causes of environmental incidents and near misses when they do occur.
- Employing systems and technology to achieve compliance, increase efficiency and promote industry best practices in development, operations and environmental stewardship.
- Working with stakeholders to identify and pursue opportunities for sustainable social and economic development and capacity building.

- Conducting early and ongoing stakeholder engagement relevant to the stage of project and mine development and operation.
- Recognizing diversity in the workplace and building meaningful relationships with all stakeholders in a timely, collaborative and transparent manner.

Through implementation of this policy, LMI seeks to earn the public's trust and be recognized as a respectful and conscientious employer, neighbor and environmental steward.

1.4 Purpose and Scope

This Plan is an appendix to the Care and Maintenance Plan. The purpose of this Plan is to identify water quality monitoring requirements for the Site and minimize the impacts of potential sampling and analytical errors by providing a set of standardized procedures for sampling, analysis and reporting. These procedures are to be implemented by any personnel involved in monitoring for the purpose of regulatory compliance or internal environmental management.

The Plan documents Quality Assurance (QA) and Quality Control (QC) procedures for the Lupin Mine Monitoring Program as required by Type A Water Licence 2AM-LUP1520 Part J, Items 5, 6 and 7. The Plan also documents QA/QC procedures for the Lupin Mine Monitoring Program as required by the *Metal Mine Effluent Regulations* (MMER) under the *Fisheries* Act Part 2 Division 1 Item 11 and Part 2 Division 2 Items 12(2), 14(1), 17(1), and 19(3) as well as Schedule 4 and 5.

QA/QC planning has been developed in accordance with the Indian and Northern Affairs Canada (INAC), *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class 'A' Licensees in meeting SNP Requirements and for Submission of a QA/QC Plan*, July 1996 which defines QA and QC as follows:

> Quality Assurance: is the system of activities designed to better ensure that quality control is one effectively.
>
> Quality Control: is the use of established procedures to achieve standards of measurement for the three principal components of quality: precision, accuracy and reliability.

Overall this Plan outlines field sample collection procedures including sampling requirements and methods; field sample identification, preservation and transport procedures; field sampling quality control measures; analytical laboratory information; and reporting requirements.

2 Field Sampling

2.1 Sample Collection

2.1.1 Sampling Station Locations, Requirements and Parameters

Sampling station locations, requirements, and parameter analyses are set out in the Type A Water Licence 2AM-LUP1520 Table 1 of Schedule J and in the MMER Part 2 Division 2 Items 12 thru 18 and Schedules 4 and 5. In addition, LMI's site monitoring program includes the collection of additional samples to assess the progression of water quality and the performance of or need for treatment measures.

Generally, samples are required from the following locations:

- Freshwater intake at Contwoyto Lake,
- Tailings Containment Area (TCA):
    - Annual characterization samples;
    - Prior to discharge;
    - During discharge;
    - Reference areas; and
    - Downstream exposure areas,
- Sewage Lakes Disposal Facility,
- Bulk Fuel Storage Facility
- Landfarm Facility, and
- Landfill Facility.

The monitoring requirements outlined in the Water Licence and MMER effluent monitoring requirements are outlined in Table 2.1. Water sampling under the Environmental Effects Monitoring Program of the MMER will accompany any planned discharges from the TCA. Monitoring guided by LMI's initiative are also outlined.

A sample event schedule is also provided in Table 2.2 which outlines the Water Licence and MMER effluent monitoring requirements as well as field monitoring and QC sample requirements (see Section 3 of this Plan for more details about QC monitoring). LMI's routine sampling initiatives are also listed. This table is intended to serve as a guide to on-site personnel with sampling responsibilities.

Regulatory authorities are to be notified of planned discharge events. Table 2.3 provides the notification schedule.

Table 2.1: Sample collection requirements

Station	Description	Samples											Frequency
		Routine[1]	Metals [2]	Nutrients [3]	Hg	CN [4]	^{226}Ra	BOD_5 [5]	Fecal Coliform	Bio-assay[6]	PHC [7]	Anions [8]	
LUP-01	Freshwater intake from Contwoyto Lake	pH, Conductivity, TSS	X		X				X				Annually
LUP-10	TCA Pond 2 discharge at Dam 1A	pH, TSS, Alkalinity, Hardness	X	NO_2, NO_3		X							Daily during periods of discharge
		Daily	Daily	Daily, NH_3		Daily	X						Weekly during periods of discharge
		Daily	Daily	Daily, Weekly	X	Daily	Weekly			MMER, DO			Monthly (no less than one month intervals) beginning at start of decant
LUP-102	Internal station in TCA Pond 2 approximately 100 m upstream from siphon intake	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_2, NO_3	X	X	X			Static pass/ fail test, DO			Twice per year, prior to initiation of decant and just prior to termination of decant
		pH, TSS, TDS, Acidity, Alkalinity, Hardness	Total and Dissolved	NH_3, NO_2, NO_3								X	Annually [9]
LUP-11	Minewater discharge at automatic sampler in the mill	INACTIVE											
LUP-12	Mill tailings taken at the mill	INACTIVE											
LUP-14	Decant structure from the Sewage Lakes Disposal Facilities	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_2, NO_3, TKN, TP, OPO_4				X	X				First day of discharge and then monthly thereafter during periods of flow
LUP-15	Discharge from TCA Pond 1 (east pond) into TCA Pond 2 (west pond)	INACTIVE											
LUP-16	TCA Pond 2 at center	INACTIVE											
LUP-17	TCA Pond 2 upstream of station LUP-10	pH, TSS, TDS, Acidity, Alkalinity, Hardness	Total and Dissolved	NH_3, NO_2, NO_3								X	Annually [9]
LUP-19	East end of Seep Creek in Dam 2 Lake	INACTIVE											

Station	Description	Samples											Frequency
		Routine[1]	Metals [2]	Nutrients [3]	Hg	CN [4]	^{226}Ra	BOD_5 [5]	Fecal Coliform	Bio-assay[6]	PHC [7]	Anions [8]	
LUP-20	West end of Seep Creek before discharge into Unnamed Lake	pH, TSS, Alkalinity, Hardness	X	NH_3		X							Weekly during discharge from the TCA
LUP-21	North end of Concession Creek before discharge into Unnamed Lake Sample at mid-depth	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_3		X							Weekly during discharge from the TCA
		Weekly	Weekly	Weekly	X	Weekly	X			DO [10]			Monthly and when bioassay sample is collected at LUP-10
LUP-22	Inner Sun Bay near centre midway between end of peninsula and west shore Sample at mid-depth	pH, TSS, Alkalinity, Hardness	X	NH_3		X							Weekly commencing one week prior to discharge from the TCA and concluding two weeks after cessation of discharge
LUP-24	Inner Sun Bay near narrows Sample at mid-depth	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_3		X							Weekly commencing one week prior to discharge from the TCA and concluding two weeks after cessation of discharge
		Weekly	Weekly	Weekly	X	Weekly	X			DO [10]			Monthly and when bioassay sample is collected at LUP-10
LUP-25	Outer Sun Bay Sample at mid-depth	pH, TSS, Alkalinity, Hardness	X	NH_3		X							Weekly commencing one week prior to discharge from the TCA and concluding two weeks after cessation of discharge
LUP-26	Contwoyto Lake in bay east of water intake	INACTIVE											
LUP-27	Bulk Fuel Storage Facility	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_2, NO_3							X		Once prior to discharge and weekly during periods of discharge
LUP-28	Discharge from the Landfarm Facility	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_2, NO_3							X		One week prior to discharge and weekly during periods of discharge
LUP-29	Landfarm Facility monitoring well – up gradient	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_2, NO_3							X		Monthly during periods of observed flow – June through September

Station	Description	Samples											Frequency
		Routine[1]	Metals [2]	Nutrients [3]	Hg	CN [4]	^{226}Ra	BOD_5 [5]	Fecal Coliform	Bio-assay[6]	PHC [7]	Anions [8]	
LUP-30a	Landfarm Facility monitoring well – down gradient	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_2, NO_3							X		Monthly during periods of observed flow – June through September
LUP-30b	Landfarm Facility monitoring well – down gradient	pH, TSS, Alkalinity, Hardness	X	NH_3, NO_2, NO_3							X		Monthly during periods of observed flow – June through September
LUP-31	Seepage from the Landfill Facility	pH, TSS, TDS [9], Acidity [9], Alkalinity, Hardness	Total and Dissolved [9]	NH_3								X [9]	Monthly during periods of observed flow – June through September
LUP-32	Landfill Facility monitoring well – up gradient	pH, Alkalinity, TSS, Hardness	X	NH_3									Monthly during periods of observed flow – June through September
LUP-33a	Landfill Facility monitoring well – down gradient	pH, Alkalinity, TSS, Hardness	X	NH_3									Monthly during periods of observed flow – June through September
LUP-34b	Landfill Facility monitoring well – down gradient	pH, Alkalinity, TSS, Hardness	X	NH_3									Monthly during periods of observed flow – June through September
LUP-POND1	Internal station in TCA Pond 1, approximately 100 m upstream of siphon intake	pH, TSS, TDS, Acidity, Alkalinity, Hardness	Total and Dissolved	NH_3, NO_2, NO_3								X	Annually [9]
LUP-CELL4	Internal station in Cell 4, upstream of gated culvert	pH, TSS, TDS, Acidity, Alkalinity, Hardness	Total and Dissolved	NH_3, NO_2, NO_3								X	Annually [9]
LUP-CELL5	Internal station in Cell 5, upstream of siphon intake	pH, TSS, TDS, Acidity, Alkalinity, Hardness	Total and Dissolved	NH_3, NO_2, NO_3								X	Annually [9]

Notes:

(1) Routine sampling may include analyses for pH, temperature, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), alkalinity, acidity, hardness;
(2) Metals refer to a whole suite of total metals unless otherwise specified;
(3) Nutrient sampling may include analyses for Ammonia (NH_3), Nitrite (NO_2), Nitrate (NO_3), Total Kjeldahl Nitrogen (TKN), Total Phosphorus (TP), and Orthophosphate (OPO_4);
(4) Total cyanide (CN) is a Water Licence requirement. Sampling of CN is only if it is used as a process reagent under MMER Subsection 13(3). CN is not used during care and maintenance;
(5) BOD_5 means five (5) day Biological Oxygen Demand;
(6) Bioassay samples mean static pass/fail bioassay for both rainbow trout and *Daphnia* species under the Water Licence and acute lethality testing, *Daphnia magna* monitoring tests and sublethal toxicity testing under the MMER;
(7) Petroleum Hydrocarbons (PHC) sampling includes Benzene, Toluene, Ethylbenzene and Xlyene (BETX) and Total Oil and Grease
(8) Anions include chloride (Cl), fluoride (F) and sulfate (SO_4);
(9) Sampling is a LMI initiative. It is not a requirement of the water licence or the MMER; and
(10) Dissolved oxygen (DO) and temperature readings are required under the MMER.

Table 2.2: Sampling event schedule.

Sampling Events	Station	Samples and Parameters	Quality Control[(1)]
TAILINGS CONTAINMENT FACILITY			
Annually	LUP-102 (Station 102) LUP-POND1 LUP-CELL4 LUP-CELL5	Field pH, temperature, conductivity	1 field duplicate
		pH, TSS, TDS, acidity, hardness, Cl, F, SO_4, NO_2, NO_3, NH_3	
		Total Metals	
		Dissolved Metals	
One month prior to discharge	LUP-102 (Station 102)	Field pH, temperature, conductivity	1 field duplicate
		pH, TSS, acidity, alkalinity, hardness, NO_2, NO_3, NH_3	
		Total Metals	
		CN (total cyanide)	
		Total Hg	
		^{226}Ra	
Every two to three days during water treatment and then daily following 10 day notification to INAC Inspector of discharge	Pond 2 (various locations and depths)	Field pH, temperature and conductivity	
Upon receipt of results meeting discharge criteria (expect pH) and not less than two weeks prior to discharge	LUP-102 (Station 102)	Static pass/ fail Bioassay	
		Field pH, temperature, conductivity and dissolved oxygen	
One week prior to discharge	Pond 2 (various locations and depths)	Field pH, temperature, and conductivity (Daily)	1 field duplicate
		Field observation of visual sheen	
	LUP-22, 24, 25 (at mid-depth)	pH, TSS, alkalinity, hardness	
		Total Metals	
		NH_3	
		CN	
Daily during discharge	LUP-10	Field pH, temperature, and conductivity	1 field duplicate per week
		Field observation of visual sheen	
		flow rate m^3	
		pH, TSS, alkalinity, hardness, NO_2, NO_3	
		CN	
		Total Metals	
First day of discharge [(2)] (in addition to daily sampling)	LUP-10	Acidity, NH_3	1 field duplicate
		Total Hg	
		MMER Bioassays: LC50 and sublethal[3]	
		^{226}Ra	
		Field dissolved oxygen	
	LUP-20, 21 (surface), LUP-22, 24, 25 (at mid-depth)	pH, TSS, alkalinity, hardness	
		Total Metals	
		NH_4	
		CN	

Sampling Events	Station	Samples and Parameters	Quality Control[1]
	LUP-21 (surface), LUP-24 (at mid-depth)	NO_3	
		Total Hg	
		^{226}Ra	
		Field pH, temperature, conductivity, dissolved oxygen	
Weekly during discharge (in addition to daily sampling)	LUP-10	Acidity, NH_3	1 field duplicate
		^{226}Ra	
	LUP-20, 21 (surface), LUP-22, 24, 25 (at mid-depth)	pH, TSS, alkalinity, hardness	
		Total Metals	
		NH_3	
		CN	
	LUP-21 (surface), LUP-24 (at mid-depth)	NO_3	
		Total Hg	
Monthly during discharge (in addition to daily and weekly sampling)	LUP-10	MMER Bioassay LC50 and sublethal[3]	1 field duplicate
		Total Hg	
		Field dissolved oxygen	
	LUP-21 (surface), LUP-24 (at mid-depth)	Total Hg	
		^{226}Ra	
		Field pH, temperature, conductivity, dissolved oxygen	
Just before the bioassay sample at LUP-102 prior to termination of decant	LUP-21 (surface), LUP-24 (at mid-depth)	pH, TSS, alkalinity, hardness, NO_3	1 field duplicate
		Total Metals	
		NH_3	
		CN	
		Total Hg	
		^{226}Ra	
Last day of discharge	LUP-102 (Station 102)	Static Pass/ Fail Bioassay	1 field duplicate
		Field pH, temperature, conductivity and dissolved oxygen	
		pH, TSS, alkalinity, hardness, NO_2, NO_3	
		Total Metals	
		CN (total cyanide)	
		NH_3	
		Total Hg	
		^{226}Ra	
Weekly for two weeks following termination of discharge	LUP-22, 24, 25 (at mid-depth)	pH, TSS, alkalinity, hardness	1 field duplicate
		Total Metals	
		NH_3	
		CN	

Sampling Events	Station	Samples and Parameters	Quality Control[1]
SEWAGE LAKES DISPOSAL FACILITY			
Three weeks prior to discharge	LUP-14	Field pH, temperature, conductivity	1 field duplicate
		Field observation for visual sheen	
		pH, TSS, alkalinity, hardness, NO_2, NO_3	
		Total Metals	
		Nutrient for NH_3, TKN, TP, OPO_4	
		BOD_5	
		Fecal Coliforms	
Daily during discharge		Field flow rate in m^3	
		Field pH, temperature, conductivity	
		Field observation for visual sheen	
First day of discharge[2] and Monthly thereafter (in addition to daily sampling)		pH, TSS, alkalinity, hardness, NO_2, NO_3	1 field duplicate
		Total Metals	
		BOD_5	
		Fecal Coliforms	
		Nutrient for NH_3, TKN, TP, OPO_4	
FRESHWATER INTAKE FACILITY			
Daily during intake	LUP-01	Field flow rate in m^3	
Annually		Field pH, temperature, conductivity,	1 field duplicate
		pH, TSS, conductivity	
		Total Metals	
		Total Hg	
		Fecal Coliforms	
BULK FUEL STORAGE FACILITY			
One week prior to discharge (RUSH 48 hour turnaround for sample results are to be requested of the laboratory)	LUP-27	Field pH, temperature, conductivity	1 field duplicate
		Field observation for visual sheen	
		pH. TSS, hardness, alkalinity, NO_2, NO_3	
		Total Metals	
		Total Oil and Grease	
		BTEX	
		NH_3	
Daily during discharge		Field flow rate in m^3	
		Field pH, temperature, conductivity	
		Field observation for visual sheen	
Weekly during discharge (in addition to daily testing)		pH, TSS, hardness, alkalinity, NO_2, NO_3	1 field duplicate
		Total Metals	
		Total Oil and Grease	
		BTEX	
		NH_3	

Sampling Events	Station	Samples and Parameters	Quality Control[(1)]
LANDFARM FACILITY			
Monthly during discharge during periods of observed flow – June through September	LUP-28, LUP-29, LUP-30a, LUP-30b	pH, TSS, hardness, alkalinity, NO_2, NO_3	1 field duplicate
		Total Metals	
		Total Oil and Grease	
		BTEX	
		NH_4	
LANDFILL FACILITY			
Monthly during discharge during periods of observed flow – June through September	LUP-31, LUP-32, LUP-33a, LUP-33b	pH, TSS, hardness, alkalinity, NO_2, NO_3	1 field duplicate
		Total Metals	
		NH_4	

Notes:

(1) Duplicate samples must be collected for approximately every ten (10) field samples collected across the range of parameters. At least one duplicate must be submitted per sample shipment.

(2) Samples are to be collected on the morning of the next plane departure after discharge commences where hold time restraints apply.

(3) Nautilus Environmental should be advised that the dilution series for *Ceridodaphnia* and *Lemna* should be adjusted prior to sublethal testing.

Table 2.3: Discharge notification schedule.

Discharge Event	Schedule	Action Required
TAILINGS CONTAINMENT AREA	30 days prior to MMER Bioassay	Provide notice to Environment Canada of planned sample date.
	10 days prior to discharge	Provide notice to the INAC inspector, include analytical results and estimated volume of discharge.
LOWER SEWAGE LAKE	10 days prior to discharge	Provide notice to the INAC inspector, include analytical results and estimated volume of discharge.
BULK FUEL STORAGE FACILITY	10 days prior to discharge	Provide notice to the INAC inspector and estimated volume of discharge [(1)]. Analytical results will be provided upon receipt and no discharge to occur prior to INAC acknowledgment of receipt.

Note:

(1) Discharge from the bulk fuel storage facilities needs to commence as soon as possible when water starts accumulating in the spring.

Active monitoring (sampling) station locations as shown in Figure 2.1 are clearly identified in the field with permanent stakes and appropriate signage.

Samples must always be collected from the same locations, unless the sampling locations are relocated at the request of the designated INAC Inspector or sampling location modifications are approved in writing by the NWB.

The following Table 2.4 summarizes the current UTM coordinates of the active sampling locations:

Table 2.4: Lupin Mine sampling locations using the UTM NAD85, Zone 12N coordinates

Monitoring Station No.	Description	UTM Easting	UTM Northing
LUP-01	Freshwater intake from Contwoyto Lake	490030	7294933
LUP-10	TCA Pond 2 discharge at Dam 1A	485843	7289689
LUP-102 (Station 102)	Approximately 100 m upstream from the siphon intake in TCA Pond 2	486196	7289875
LUP-14	Decant structure from the Sewage Lakes Disposal Facilities	490187	7293013
LUP-20	West end of Seep Creek before discharge into Unnamed Lake	480279	7290212
LUP-21	North end of Concession Creek before discharge into Unnamed Lake	479747	7290197
LUP-22	Inner Sun Bay near centre midway between end of peninsula and west shore	479145	7291578
LUP-24	Inner Sun Bay near narrows	478876	7293222
LUP-25	Outer Sun Bay	478395	7329410
LUP-27	Bulk Fuel Storage Facility	489072	7293609
LUP-28	Discharge from the Landfarm Facility	TBD	TBD
LUP-29	Landfarm Facility monitoring well – up gradient	TBD	TBD
LUP-30a	Landfarm Facility monitoring well – down gradient	TBD	TBD
LUP-30b	Landfarm Facility monitoring well – down gradient	TBD	TBD
LUP-31	Seepage from the Landfill Facility	TBD	TBD
LUP-32	Landfill Facility monitoring well – up gradient	TBD	TBD
LUP-33a	Landfill Facility monitoring well – down gradient	TBD	TBD
LUP-33b	Landfill Facility monitoring well – down gradient	TBD	TBD

2.1.2 Field Measurements and Field Log Book

Where required by the monitoring program, pH, temperature, conductivity and dissolved oxygen of water is measured and recorded in the field directly from the water body being sampled wherever possible. Where it is not possible to take field measurements directly from the water body, the measurements can be taken from the sample bottle.

The pH and conductivity meters must be calibrated in advance of each day's sampling activities according to the manufactures instructions, using fresh standard calibration solutions. Any discrepancies must be recorded in the Field Log Book along with the sampling data; however recorded field measurements must not be altered due to calibration issues. Refer to the pH and conductivity meter manuals for instructions regarding how to calibrate and take measurements with the particular devices.

Details of all sampling activities are recorded in the Field Log Book including:

- Date and time of each sample collected,

- Sampling location visited,
- Weather conditions and air temperature,
- Flow rates where applicable,
- Integrity of sample location and water observations,
- Samples collected at each location including identification number (see Section 2.2), whether the sample will be submitted for analysis, and type of analysis as well and sample preservation measures,
- Sample depth where applicable, and
- Field measurements (i.e. pH, conductivity, temperature, dissolved oxygen) as well as any calibration discrepancies with the field meters.

Immediately following field activities, an electronic copy of the Field Log data must be made. Field log entries in the Field Log Book must not be altered; pages must not be removed; space or pages left blank must be labeled as such and crossed with a diagonal line; and errors must be crossed out, not erased.

2.1.3 Sample Containers

Sample container sizes and materials of construction depend upon the parameter(s) to be analyzed. A summary of sample container requirements for various parameters is provided in Table 2.5 (Section 2.3 of this Plan).

All water quality sample containers will be prepared and supplied by the contracted laboratory. Only clean, unused containers should be used to limit contamination and preservation errors. Samples analyzed for fecal coliform tests must be contained in bottles provided by the laboratory to ensure that the bottle is sterilized prior to use. Toxicity samples are to be collected in food grade containers, such as water jugs or buckets. The food grade containers must be thoroughly cleaned and rinsed and then triple rinsed with the sample water prior to being filled.

2.1.4 Sampling Methods

Water quality sampling methods are as follows:

- Record details of the sampling activity and field measurements in the Field Log Book (see Section 2.1.2 for details).
- In the field, disposable nitrile sampling gloves must be worn during handling of all the bottles and equipment.
- Triple rinse sample bottles with the source water prior to sample collection, except for those bottles with preservative already added by the laboratory (i.e. BTEX), as well as those bottles for Oil and Grease or Feacal Coliform analysis.
- Collect samples off-shore as much as possible without disturbing bottom sediments.
- When collecting samples from flowing bodies of waters (i.e. stream, creeks):
    - The sample must be collected as close as possible to the middle of the flowing water body. To prevent the stirring up of sediment, use a container attached to a pole extension. Otherwise, if wading into the stream is unavoidable, wait for the sediment to settle or flow away before collecting the sample.

- When rinsing, plunge the sample bottle into the flowing water toward the current allowing it to fill at a depth of approximately half the stream depth. If the stream depth is too shallow to collect a clean sample without disturbing sediment or too shallow to fill the bottle completely, use a smaller bottle and transfer the water to the larger sample bottle.
- Empty rinse water downstream of the sample locations so as not to disturb sediments.

- When collecting samples from surface water bodies (ponds, lakes) follow the same procedures as above for flowing bodies of water, ensuring that subsequent samples are collected at the same location, and by plunging the sample bottle into the water to a depth of about six (6) inches below the water surface.
- Sample bottles must be filled with room left for preservative addition and mixing. Add preservatives after filling as directed by the laboratory (unless the bottle was provided pre-loaded with preservatives by the laboratory).
- Record field measurements (pH, temperature, conductivity, dissolved oxygen) and any deviations from the sample collection method in the Field Log Book.

2.2 Sample Identification

All water samples must be provided with a unique sample identification number based on the following example:

Example: LUP-22-130801-50

LUP-22 Refers to the monitoring station.

130801 Refers to the date that the sample was collected (yy/mm/dd). In this example the date the sample was collected was August 1, 2013.

50 Refers to the depth in centimeters from surface which the same was collected. If the depth of the sample is not applicable do not include the suffix.

Sample labels including at a minimum: sample identification number, location, date, and parameters for analyses should be prepared as much as possible before entering the field for the sampling event with a waterproof, non-smear pen. Then, sample labels, bottles and preservatives should be packed, preferably in a cooler to maintain constant temperature, for transport to the field.

Sample bottle labels must be clearly and consistently labeled prior to being sent to the external laboratory with the following information:

- Company name,
- Site name,
- Sample Station Number,
- Sample Number,
- Sample Date and Time, and

- Analysis required.

Quality Control (QC) samples (i.e. field blanks, trip blanks, duplicates) are provided with unique sample identification numbers and note of the sample as a QC sample is recorded in the Field Log Book.

2.3 Sample Preservation

Water quality samples must be preserved, either by laboratory issued chemical preservative or temperature control, immediately following sample collection to ensure that the quality of the water sample remains similar to the source water. The following Table 2.5 summarizes the required containers, preservatives, holding times, and minimum sample volumes for each parameter as outlined in ALS Environmental's Western Canada Sampling/ Handling Guide, July 2015.

Table 2.5: Required sample containers, preservation, holding times, and sample volumes for analysis of specific parameters.

Parameter	Container Type	Preservative	Holding Time	Min. Sample Volume
pH [1,6]	0.5 – 1 L plastic	4° C	0.25 hours	50 mL
TSS [1]	0.5 – 1 L plastic	4° C	7 days	200 mL
Conductivity [1,6]	0.5 – 1 L plastic	4° C	28 days	50 mL
Total Metals and Hardness [2,5]	250 mL plastic	3 mL 1:3 Nitric Acid	6 months	200 mL
Mercury	250 mL plastic	3 mL 1:3 Nitric Acid	28 days	50 mL
Radium^{226}	1 L plastic	9 mL 1:3 Nitric Acid	6 months	1 L
Cyanide (Total, WAD or Free)	250 – 500 mL plastic	1 – 2 mL 6N Sodium Hydroxide	14 days	100 mL
Cyanide (Total or WAD (low level))	1 L plastic	3 mL 6N Sodium Hydroxide	14 days	750 mL
Alkalinity [1]	0.5 – 1 L plastic	4° C	14 days	150 mL
Total Ammonia Nitrogen	250 mL plastic/glass	1 mL 1:1 Sulphuric Acid	28 days	100 mL
Nitrate, Nitrite, Ammonia (unpreserved) [1]	0.5 – 1 L plastic	4° C	2 days	50 mL
Ammonia (preserved)	250 mL plastic	1 mL of 1:1 Sulphuric Acid	28 days	50 mL
Kjeldahl or Organic Nitrogen	250 mL plastic or glass	1 mL 1:1 Sulphuric Acid	28 days	200 mL
Total Nitrogen	250 mL plastic or glass	1 mL 1:1 Hydrochloric Acid	28 days	200 mL
Total Phosphorus	250 mL plastic	1 mL 1:1 Sulphuric Acid	28 days	100 mL
Ortho Phosphate[1]	0.5 – 1 L plastic	4° C	2 days	50 mL
BOD_5 [1]	0.5 – 1 L plastic	4° C	2 days	500 mL
Fecal Coliforms	250 mL sterilized plastic	Sodium Thiosulphate	30 hours	250 mL

Parameter	Container Type	Preservative	Holding Time	Min. Sample Volume
Oil and Grease	2 x 0.5-1 L amber glass	2 mL 1:1 HCL or 1:1 H_2SO_4	28 days	1 L
BTEX (3,4)	2-3 x 40 mL glass vials	Sodium Bisulphate or Thiosulphate	14 days	40 mL
Daphnia Magna (pass/fail, LC50) (7)	1-2 L glass or plastic	4° C	5 days	1, 2 L
Rainbow Trout (pass/ fail, LC50) (8)	1-2 20 L bladder	4° C	5 days	20, 40 L

Notes:

(1) Parameters may be analyzed from a single unpreserved bottle.
(2) For dissolved parameters, samples must be field filtered before preservation.
(3) 40 mL glass vials must be filled with no headspace. May contain preservative. Do not pre-rinse with sample. If sample is chlorinated use thiosulphate preservative.
(4) All volatile organics in water (chlorinated aromatics, BTEX, volatile organics, THMs and halogenated aliphatics) can be analysed from the same set of vials. Consult ALS whether 2 or 3 vials are required.
(5) If field filtering is not possible, or poses unacceptable risks for sample contamination, then send the samples unfiltered to and unpreserved to the laboratory as soon as possible.
(6) Testing in the field is recommended.
(7) For Daphnia Magna (LC50), require 2 L minimum volume. For Daphnia Magna (Pass/Fail), require 1 L minimum volume.
(8) For Rainbow Trout (LC50), 2 x 20 L bladder and 40 L minimum volume required. For Rainbow Trout (Pass/Fail), 1 x 20 L bladder and 20 L minimum volume required.

2.4 Sample Transportation

Sample integrity will be preserved from the time of sample collection to completion of delivery to the laboratory by limiting exposure of samples to heat, light, and agitation.

Sample bottles will be packed standing upright and immobile in a new or laboratory issued portable cooler. Samples suspected of elevated contaminant levels, such as a sewage sample, will be shipped separately from clean samples. All samples will be stored and transported at 10°C to 1°C in the coolers with ice packs and the cooler will be securely closed prior to shipping. Samples will be shipped as soon as possible following sample collection with appropriate transportation instructions such as “refrigerate” and “do not freeze”.

2.5 Chain of Custody Forms

A Chain of Custody Form containing the following information is completed by the sampler for every cooler shipment of samples:

- Company name and contact information,
- Analytical laboratory name, address , and contact person,
- Invoicing instructions,
- Report format requested,
- Project information,
- Sampler’s name,
- Sample identification number, time and date of sampling, sample type, and analyses requested,
- Any special instructions, and

- Name of person releasing the shipment as well as date and time of release. Each person relinquishing and receiving the samples, including the courier, must sign the Chain of Custody form.

Each cooler shipped must have a Chain of Custody form indicating those samples contained in the particular cooler. Chain of Custody forms should be enclosed in a Ziploc bag to protect them from possible water damage during shipment.

One copy of the Chain of Custody form is included with the shipment and one copy must remain at the mine site for recording keeping. An example of the Chain of Custody Form is provided in Appendix A.

3 Field Quality Control

3.1 Trip or Travel Blanks

Travel blanks are supplied and shipped by the laboratory to test for possible contamination that might arise during the handling, transport, or storage of the samples. The identity of these samples must be recorded in the Field Log Book.

One travel blank must be submitted per sample shipment.

3.2 Duplicates or Replicates

Duplicate or replicate sampling is the collection of more than one sample for a given analysis at a given location to test the validity of sampling procedures and laboratory methodology. Duplicates are collected, handled, and analysed using the same procedures applied to routine samples. Duplicates are submitted to the laboratory with a unique (ficticious) identifier to prevent association of the paired samples. The identity of these samples must be recorded in the Field Log Book.

Duplicate samples must be collected for approximately every ten (10) field samples collected across the range of parameters. At least one duplicate must be submitted per sample shipment.

4 Laboratory Analyses

ALS Environmental laboratories (ALS) located in Yellowknife, NWT performs the required environmental analyses for the Lupin Mine, with the exception of MMER toxicity testing which is completed by Nautilus Environmental in Calgary, AB.

ALS is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) and conforms to the requirements of ISO/IEC Standard 17025. Attached in Appendix B is a copy of the ALS Yellowknife laboratory scope of accreditation. The scope of accreditation of all ALS laboratories is available from their website at:

http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads.

Nautilus Environmental is accredited by the CALA to conduct acute lethality and Daphnia magna monitoring tests and conforms to the requirements of ISO/IEC Standard 17025. Nautilus Environmental should be advised that the dilution series for *Ceridodaphnia* and *Lemna* should be adjusted prior to

sublethal testing. Attached in Appendix B is a copy of the Nautilus Environmental Burnaby laboratory scope of accreditation.

All analyses are conducted in accordance with methods prescribed in the current edition of Standard Methods for the Examination of Water and Wastewater including regular QA/QC during the analysis of field samples including a program of method blanks, laboratory control samples, instrument calibration samples, matrix spikes, and duplicates.

5 Reporting

All analytical results will be forwarded in electronic format from ALS to LMI for data collection and management. Upon receipt, LMI will review the results to identify any anomalies. Anomalous results will be either re-analyzed by the laboratory or new samples will be collected to confirm the analytical results.

Any analytical results that indicate exceedance of regulatory criteria will be reported to the appropriate agencies including the NWB and the INAC inspector.

Part J Item 10 of the Lupin Mine Water Licence requires LMI to include in its Annual Report (due March 31st), all data, monitoring results and information required by Part J of the Water Licence. Under the MMER effluent monitoring reporting of all tests and monitoring conducted during each quarter is to be reported not later than 45 days after the end of a quarter. A report summarizing the previous calendar year is also required under the MMER to Environment Canada (due March 31st).

To facilitate the required annual reporting, LMI prepares written monthly reports supported by laboratory analyses results table summaries and quality assurance review. Each monthly report includes the following:

- A description of the sample activities undertaken,
- Description of the existing conditions at each sampling station,
- Tabular summary of analytical lab result including the results of the quality control samples (travel blank, field blank, duplicate samples), and
- Interpretation of the analytical lab results including comparison of the results with water licence criteria and assessment of the reliability of the results.

Within the annual report, the acceptability of samples will be evaluated qualitatively by examination of the trip blanks and field duplicate sample data. Reproducibility of samples will be expressed as relative percent difference (RPD):

$$RPD = 100 * ((X_1 – X_2) / (X_1 + X_2) / 2)$$

Where X_1 is the original sample concentration, X_2 is the duplicate sample concentration, and X_1-X_2 denotes the absolute value of the difference between these two concentrations.

Legend

Project Location

Coordinate System: NAD_1983_UTM_Zone_12N

Map Sources/Notes:
Various Canadian Government Websites - Feb 2012

0 60 120 240 360 480 600 Km

1:15,000,000

Approved By: SH
Prepared By: PW
Project No.: LUP
Date Revised: 21 Mar 2012
File Name: Lup-12-10-01-LocationMap-A.mxd

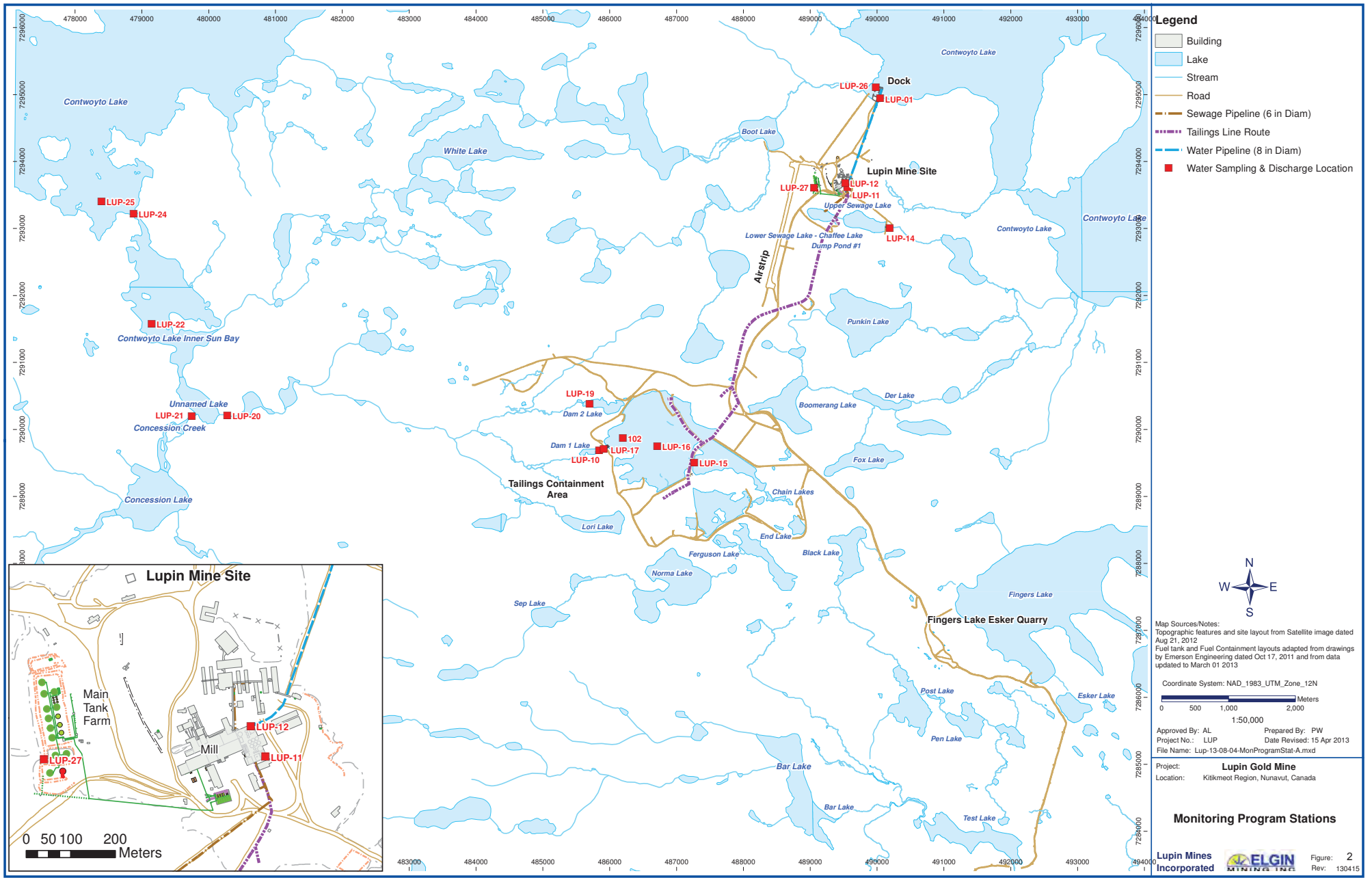
Project: **Lupin Project**
Location: Kitikmeot Region, Nunavut, Canada
Lupin Mine Annual Report - Water Licence 2AM-LUP0914

Location Map - Lupin Mine

Lupin Mines Incorporated

ELGIN MINING INC.

Figure: **1**
Rev: 120321


Legend
Building
Lake
Stream
Road
Sewage Pipeline (6 in Diam)
Tailings Line Route
Water Pipeline (8 in Diam)
Water Sampling & Discharge Location
Contwoyto Lake
Dock
LUP-26
LUP-01
Bool Lake
White Lake
Lupin Mine Site
LUP-27
LUP-12
LUP-11
Upper Sewage Lake
LUP-14
Lower Sewage Lake - Chaffee Lake
Dump Pond #1
Airstrip
Punkin Lake
LUP-25
LUP-24
LUP-22
Contwoyto Lake Inner Sun Bay
Unnamed Lake
LUP-21
LUP-20
Concession Creek
Concession Lake
LUP-19
Dam 2 Lake
Boomerang Lake
Der Lake
Dam 1 Lake
102
LUP-17
LUP-16
LUP-10
LUP-15
Fox Lake
Tailings Containment Area
Chain Lakes
Lori Lake
End Lake
Ferguson Lake
Black Lake
Norma Lake
Sep Lake
Fingers Lake
Fingers Lake Esker Quarry
Post Lake
Esker Lake
Pen Lake
Bar Lake
Bar Lake
Test Lake
Lupin Mine Site
Main Tank Farm
Mill
LUP-12
LUP-11
LUP-27
0 50 100 200
Meters
N
W
E
S
Map Sources/Notes:
Topographic features and site layout from Satellite image dated Aug 21, 2012
Fuel tank and Fuel Containment layouts adapted from drawings by Emerson Engineering dated Oct 17, 2011 and from data updated to March 01 2013
Coordinate System: NAD_1983_UTM_Zone_12N
0 500 1,000 2,000
Meters
1:50,000
Approved By: AL
Prepared By: PW
Project No.: LUP
Date Revised: 15 Apr 2013
File Name: Lup-13-08-04-MonProgramStat-A.mxd
Project: Lupin Gold Mine
Location: Kitikmeot Region, Nunavut, Canada
Monitoring Program Stations
Lupin Mines Incorporated
ELGIN MINING INC
Figure: 2
Rev: 130415

Appendices

Appendix A: Chain of Custody

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 14 -

Page 1 of 1

Report To		**Report Format / Distribution**	**Select Service Level Below** (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Lupin Mines Incorporated c/o Mandalay Resources Corporation	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	K. Lewis	Quality Control (QC) Report with Report ☑ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	76 Richmond Street East, Suite 330 Toronto, ON M5C 1P1	☐ Criteria on Report - provide details below if box checked	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
		Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	778-386-7340	Email 1 or Fax klewis@elginmining.com	Specify Date Required for E2,E or P:
		Email 2	**Analysis Request**

Invoice To	Same as Report To ☑ Yes ☐ No	**Invoice Distribution**
	Copy of Invoice with Report ☐ Yes ☐ No	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Company:		Email 1 or Fax klewis@elginmining.com
Contact:		Email 2

Project Information		**Oil and Gas Required Fields (client use)**	
ALS Quote #:	XXXXXX	Approver ID:	Cost Center:
Job #:		GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:	Lupin Mine	Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Rick Zoliewski **Sampler:** C.deR./A.Bowie

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Hardness, Alkalinity, TSS, TDS	Total Metals	Low level Metals	Sulphate & Chloride	Total Oil and Grease	BTEX	Ammonia	F2-F4	F1					Number of Containers
						P	F/P		P	P	P	P						
	LUP-XX-YYMMDD	dd-mmm-yy	hh:mm	Water	R	R	R	R	R	R	R	R	R					11
	LUP-XX-YYMMDD	dd-mmm-yy	hh:mm	Water	R	R	R	R	R	R	R	R	R					11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ Yes ☑ No

Are samples for human drinking water use?
☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐		SIF Observations	Yes ☐	No ☐
Ice packs	Yes ☐	No ☐	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES ºC			FINAL COOLER TEMPERATURES ºC		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0326e v09 Front/04 January 2014

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

HydroQual Laboratories Ltd.

#4, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

General Test Chain of Custody

Reporting and Billing Information Client: Sample:

Client / Operation: Lupin Mine Inc. c/o Mandalay Resources Corporation	
Contact: K. Lewis	
Report Address: 76 Richmond Street East, Suite 330, Toronto, ON M5C 1P1	
Billing Address: (If different from above)	
Tel: 778-386-7340	Fax: n/a
Quote/PO/Job: XXXXXXX	E-mail: klewis@elginmining.com

Tests Requested (Codes on Back)
(Example: Trout with 5 Treatments, TR-D)

Static Pass/fail - Trout	Static pass/fail - D. Mag					
✓	✓					

Notes: S = Single Treatment, D = Multiple Treatments

Sample ID	Sampled By / Date / Time	Location	Method	Type
LUP-10-yymmdd	XXX/yy-mmm-dd/hh:mm	LUP-10	call lab	call lab

Check Appropriate Box Below

✓	✓					

Rush (Turnaround Time) Requirements:*

***Rush Charges may apply. Rates will be discussed in advance. If a specific deadline for testing or reporting is needed, please specify the requirement here and contact the lab.**

Sample Receipt Information:

Date _____ Seals Y N
Time _____ Initials Y N
Condition _____
Temperature _____
Container _____ x _____
Courier _____

Relinquished By	Date / Time	Received By (HQ)

HydroQual Laboratories Ltd.

#5, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Test Codes, Volumes, and Sampling Guide

Test		Test Code	Sample Volume (L)		Hold Time (Days)
			Screen (S)	Definitive (D)	
Screen (S): Single Concentration Test (100%; Pass/Fail); Definitive (D): Multiple-Concentration Test.					
Water	*Daphnia magna* (48 hours, Static, Acute)	DA	1	1	5
	Rainbow Trout (96 hours, Static, Acute)	TR	20	40	5
	Algal Growth Inhibition (72 hours, Static)	AG	1	1	3
	Ceriodaphnia Survival and Reproduction (5-8 day)	CD	3	6	3
	Fathead Minnow Survival and Growth (7 day)	FM	10	20	3
	Lemna minor Growth (7 day)	LM	1	1	3
	Salmonid Early Life Stage (7-10 day)	ELS	80	160	3
Sediments	*Hyalella azteca* (14 day, Static)	HA	2	-	42
	Chironomids (10 day, Static)	CT	2	-	42
Microbial	Total Heterotrophic/Hydrocarbon Degrading Bacteria	THB/HDB	0.1	-	1
	Total Coliforms and *E. coli*	TC/EC	0.1	-	1
	Enterococcus Detection	ENT	0.1		1
	Pseudomonas Detection	PSE	0.1		1
	Heterotrophic Plate Count	HPC	0.1		1
	Detection of Bacteria (DNA-Based Techniques)	DNA	contact us	-	1
	BART	BART	0.1	-	1
	Legionella Detection (Plate Method)	LEG	0.5	-	1
	Cryptosporidium and *Giardia* (Raw/Treated)	CGE	100/1000	-	4
	Microcystin -LR	MCLR	0.1	-	28
	Algal Identification	AGID	1	-	7
	D50 Microtox	D50	0.5	0.5	-
	Bacterial Luminescence	BL	0.5	0.5	3
	Microtox Threshold (Product)	MTX-TH	0.5	0.5	-
Terrestrial	Total Organic Carbon	TOC	0.1	-	1
	Earthworm Chronic (56 or 63 days)	EW-C	15	30	42
	Plant Growth Studies	PG	10	20	42
	Earthworm survival (14 days)	EW-A	5	10	42

For additional testing, research, or consulting information or pricing, contact 403-253-7121 or info@hydroqual.ca

Sampling and Shipping Instructions

Containers	(provided by HydroQual, shipping billed back at cost)
Liquids	Glass, polyethylene, or polypropylene containers
	collapsible 10 and 20 L carboys, plastic pails and gasket lined lids, glass jars with lids
Solids	Glass, polyethylene, or polypropylene container (wide mouth) polyethylene bags (6 mL)
Microbial	Sterile containers (contact lab for appropriate containers)
Sampling	
Liquids	Rinse three times with sample before filling (>5% of container volume for each rinse)
	Fill container to exclude air (minimal headspace) and seal with cap; cover cap with tape and initial
	Keep composited sample cool during collection (4 ± 2˚C)
Solids	Fill container to the top and seal (no headspace)
Microbial	Sterile sample containers must be used
Labelling	Label sample container with type of sample (effluent, groundater, surface water, etc.), source, date, time of collection, name of sampler (s), and sample volume and turbidity (where appropriate)
	For traceability, tape lids or seals of containers, add sampler's initials, fill out chain of custody completely and ship with sample
Transport	Samples should be transported in the dark, at 1-8°C. During the winter season, ship samples in a heated truck, or include heating packs with the shipment to prevent freezing.

Notes: BART, Biological Activity Reaction Test

Appendix B: Scope of Accreditations

Canadian Association for Laboratory Accreditation Inc.

CALA

Certificate of Accreditation

HydroQual Laboratories Ltd.
#4, 6125 12th St. S.E.
Calgary, Alberta

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 8 January 2009).

CALA

Accreditation No.: A2800
Issued On: June 2, 2015
Accreditation Date: January 3, 2005
Expiry Date: November 30, 2017

President & CEO

ilac-MRA CALA

CALA
Canadian Association for
Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 2800
Laboratory Name: HydroQual Laboratories Ltd.
Parent Institution:
Address: #4, 6125 12th St. S.E. Calgary AB T2H 2K1
Contact: Ms. Tamara McClure
Phone: (403) 253-7121
Fax: (403) 252-9363
Email: tamaramc@nautilusenvironmental.com; tanya@nautilusenvironmental.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: June 2, 2015
Valid To: November 30, 2017

Scope of Accreditation

Solids (Toxicology)
Chironomids - Sediment (013)
WTR-ME-026; EPS 1/RM/32
SURVIVAL AND GROWTH
Freshwater Midge Chironomus Dilutus

Solids (Toxicology)
Hyalella azteca - Sediment (014)
WTR-ME-021; EPS 1/RM/33
SURVIVAL AND GROWTH
Freshwater Amphipod Hyalella Azteca (14d)

Water (Microbiology)
Cryptosporidium and Giardia - Water (025)
WTQR-ME-014; EPA 815-R-05-002.METHOD 1623
FILTRATION/IMS/FA
Cryptosporidium
Giardia lambia

Water (Microbiology)
Escherichia coli (E. coli) - Water (027)
WTRQ-ME-009; modified from SM 9223 B
MOST PROBABLE NUMBER
Escherichia coli (E. coli)

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Water (Microbiology)
Microcystins - Water (058)
WTRQ-ME-016; ENZYME-LINKED IMMUNOSORBENT ASSAY FOR THE CONGENER-INDEPENDENT DETERMINATION OF MICROCYSTINS and NODULARINS IN WATER SAMPLES
MICROCYSTINS/NODULARINS (ADDA), ELISA
Microcystins

Water (Microbiology)
Total Coliforms - Water (052)
WTRQ-ME-009; modified from SM 9223 B
MOST PROBABLE NUMBER
Total Coliforms

Water (Toxicology)
Ceriodaphnia dubia - Water (006)
WTR-ME-018; EPS 1/RM/21
SURVIVAL AND REPRODUCTION
Ceriodaphnia dubia

Water (Toxicology)
Daphnia magna - Water (002)
WTR-ME-015; EPS 1/RM/11 and EPS 1/RM/14
ACUTE LETHALITY (SURVIVAL)
Daphnia LC50 (48 h)
Single Concentration (48hrs)

Water (Toxicology)
Fathead Minnow - Water (007)
WTR-ME-046; EPS 1/RM/22
GROWTH AND SURVIVAL
Fathead minnow (Pimephales promelas)

Water (Toxicology)
Lemna minor - Water (017)
WTR-ME-030; EPS 1/RM/37
GROWTH INHIBITION
Freshwater macrophyte (Lemna minor)

Water (Toxicology)
Microtox - Liquid Phase - Water (003)
SOIL-ME-001; EPS 1/RM/24
BIOLUMINESCENCE
Microtox IC50 (15 min)

Water (Toxicology)
Pseudokirchneriella subcapitata - Water (008)
WTR-ME-034; EPS 1/RM/25
GROWTH INHIBITION
Freshwater alga (Pseudokirchneriella subcapitata)

Water (Toxicology)
Rainbow Trout - pH Stabilization - Water (057)
WTR-ME-062; EPS 1/RM/13 and EPS 1/RM/50
ACUTE LETHALITY (pH STABILIZATION)
Single Concentration (96h)
Trout LC 50 (96h)

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Water (Toxicology)
Rainbow Trout - Water (001)
WTR-ME-041; EPS 1/RM/9 and EPS 1/RM/13
ACUTE LETHALITY (SURVIVAL)
Single Concentration (96hrs)
Trout LC50 (96 h)

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Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

ALS Environmental (Yellowknife)
ALS Canada Ltd.
116 314 Old Airport Road
Yellowknife, Northwest Territories

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
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 8 January 2009).

Accreditation No.: A3590
Issued On: June 27, 2014
Accreditation Date: February 4, 2008
Expiry Date: December 25, 2016

President & CEO

CALA
Canadian Association for
Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 3590
Laboratory Name: ALS Environmental (Yellowknife)
Parent Institution: ALS Canada Ltd.
Address: 116 314 Old Airport Road Yellowknife NT X1A 3T3
Contact: Mr. Rick Zolkiewski
Phone: (867) 873-5593
Fax: (867) 920-4238
Email: alsed.quality@alsglobal.com; rick.zolkiewski@alsglobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served:
Revised On: June 27, 2014
Valid To: December 25, 2016

Scope of Accreditation

Air
Arsenic - Air (016)
YL-TP-2201/YL-TM-1011; modified from APHA 3114
HYDRIDE AA
Arsenic

Water (Inorganic)
Conductivity - Water (009)
YL-TM-1005; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic)
Cyanide - Wastewater (003)
NA-TP-2009/YL-TM-1002; modified from SM 4500-CN C,E
COLOR - DISTILLATION
CN (WAD)
Cyanide (SAD)

Water (Inorganic)
Dissolved Metals - Water (015)
NA-TP-2002/YL-TM-1011; modified from APHA 3114
HYDRIDE AA
Arsenic

Water (Inorganic)
pH - Water (005)
YL-TM-1004; modified from SM 4500-H B
pH METER
pH

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Water (Inorganic)
Solids - Wastewater (004)
YL-TM-1003; modified from SM 2540 D
GRAVIMETRIC
Total Suspended Solids

Water (Inorganic)
Total Metals - Water (017)
NA-TP-2001/YL-TM-1011; modified from APHA 3114
HYDRIDE AA
Arsenic

Water (Inorganic)
Turbidity - Water (012)
YL-TM-1009; modified from APHA 2130 B
TURBIDIMETRIC
Turbidity

Water (Microbiology)
Coliforms and Escherichia coli (E. coli) - Water (006)
YL-TM-1200; modified from SM 9223 B
MOST PROBABLE NUMBER (COLILERT)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology)
Fecal (Thermotolerant) Coliforms - Water (007)
YL-TM-1201; modified from SM 9222 D
MEMBRANE FILTRATION (mFC)
Fecal (Thermotolerant) Coliforms

Water (Organic)
Chlorophyll-a - Water (014)
YL-TM-1010; modified from EPA 445.0
FLUORIMETRY
Chlorophyll a

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Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

ALS Environmental (Edmonton)
ALS Canada Ltd.
9936 - 67th Ave. NW
Edmonton, Alberta

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
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 8 January 2009).

Accreditation No.: A1352
Issued On: October 10, 2014
Accreditation Date: January 3, 2005
Expiry Date: April 9, 2017

President & CEO

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 1352
Laboratory Name: ALS Environmental (Edmonton)
Parent Institution: ALS Canada Ltd.
Address: 9936 - 67th Ave. NW Edmonton AB T6E 0P5
Contact: Ms. Sarah Stilson
Phone: (780) 413-5226
Fax: (780) 437-2311
Email: alsed.quality@alsglobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: February 29, 2016
Valid To: April 9, 2017

Scope of Accreditation

Air (Inorganic)
Dustfall - Air (120)
ED-TM-1030; modified from AB ENVIRONMENT 32020
GRAVIMETRIC
Dustfall, Fixed
Dustfall, Total

Air (Inorganic)
Fluoride - Air (188)
ED-TP-2011, ED-TM-1026; modified from SM 4500-F C
SELECTIVE ION ELECTRODE
Fluoride

Air (Inorganic)
Mercury - Air Filter (190)
ED-TP-2001, ED-TM-1033; modified from NIOSH 6009 and EPA 245.1
COLD VAPOUR AA - DIGESTION
Mercury

Air (Inorganic)
Metals - Air Filter (016)
ED-TP-2001, NA-TM-1002; modified from EPA 6020A and NIOSH 7303
ICP/MS - DIGESTION
Aluminum
Barium
Beryllium
Cadmium
Calcium
Chromium

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Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Silver
Sodium
Strontium
Thallium
Tin
Vanadium
Zinc

Biological Tissue (Inorganic)

Metals - Tissue (186)

NA-TP-2003, ED-TM-1021, ED-TP-2018; modified from EPA 200.3 and EPA 200.7

ICP - DIGESTION

Aluminum
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Magnesium
Manganese
Phosphorus
Potassium
Sodium
Strontium
Titanium
Zinc

Oil (Organic)

Polychlorinated Biphenyls (PCB) - Oil (002)

ED-TM-1104; modified from EPA 8082 and ASTM D4059

GC/ECD - EXTRACTION

Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Aroclor 1262
Aroclor 1268
Total PCB

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Paint
Lead - Paint (153)
ED-TM-1021, NA-TP-2004, ED-TP-2018; modified from EPA 200.2 and EPA 200.7
ICP - DIGESTION
Lead

Solids (Inorganic)
Ammonia - Soil (177)
ED-TM-1016, ED-TP-2019; modified from CSSS 15.2.1/SM 4500-NH3
COLORIMETRIC (SATURATED PASTE)
Ammonia

Solids (Inorganic)
Anions - Soil (176)
ED-TP-2019, NA-TM-1001; modified from CSSS 15.2.1, EPA 300.1
ION CHROMATOGRAPHY (SATURATED PASTE)
Nitrate
Nitrite
Sulfate

Solids (Inorganic)
Barium - Soil (172)
ISOP 158, ED-TM-1021, ED-TP-2018; modified from SSSA PART 3, 1996, PG 202, EPA 200.7
ICP - FUSION
Barium

Solids (Inorganic)
Barium (Extractable) - Soil (182)
ED-TM-1051, ED-TM-1021, ED-TP-2018; modified from BARITE WASTE GUIDELINES
ICP - EXTRACTION
Barium

Solids (Inorganic)
Chloride - Saturated Paste, Soil (168)
ED-TM-1032, ED-TP-2019; modified from CSSS 15.2.1/SM 4500 - CL E
COLORIMETRIC
Chloride

Solids (Inorganic)
Conductivity - Soil (156)
ED-TP-2019, ISOP19; modified from CARTER CSSS 15.2.1, 15.3
SATURATED PASTE, METER
Conductivity

Solids (Inorganic)
Conductivity - Soil (157)
ISOP 19; modified from CARTER CSSS 15.3
1:2 EXTRACTION, METER
Conductivity

Solids (Inorganic)
Density - Soil (170)
ED-TM-1025; modified from ASTM D5057
GRAVIMETRIC
Density

Solids (Inorganic)
Grain Size - Soil (028)
ISOP 68; modified from ASTM D422-63
SIEVING
Grain Size

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Solids (Inorganic)
Hexavalent Chromium - Soil (148)
ED-TM-1023; modified from EPA 3060A
IC-ALKALINE DIGESTION
Chromium

Solids (Inorganic)
Hot Water Soluble Boron - Soil (145)
ED-TM-1040, ED-TM-1021, ED-TP-2018; modified from KEREN 1996 METHODS OF SOIL ANALYSIS
ICP - EXTRACTION
Boron

Solids (Inorganic)
Mercury - Soil (164)
NA-TP-2004, ED-TM-1033; modified from EPA 200.2 and EPA 245.1
COLD VAPOUR AA - DIGESTION
Mercury

Solids (Inorganic)
Metals - Soil (023)
NA-TM-1002, NA-TP-2004; modified from EPA 200.2 and EPA6020
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Solids (Inorganic)
Oil and Grease - Soil (029)
ED-TM-1131; modified from SM 5520
GRAVIMETRIC - EXTRACTION
Oil and Grease

Solids (Inorganic)
Particle Size - Soil (110)
ED-TM-1010; modified from CARTER CSSS 47.3
PARTICLE SIZE
% Clay
% Sand
% Silt

Solids (Inorganic)
Percent Moisture - Soil (179)
ED-TM-1200; modified from ASTM D2216-80
GRAVIMETRIC
% Moisture

Solids (Inorganic)
Percent Saturation - Soil (169)
ED-TP-2019; modified from CSSS 15.2.1
GRAVIMETRIC
% Saturation

Solids (Inorganic)
pH - Soil (099)
ED-TP-2019, ISOP 18; modified from CARTER CSSS 15.2.1,16.2
SATURATED PASTE, METER
pH

Solids (Inorganic)
pH - Soil (100)
ISOP 18; modified from CARTER CSSS 16.2
1:2 EXTRACTION, METER
pH

Solids (Inorganic)
pH (1:2 CaCl2) - Soil (163)
ED-TM-1015; modified from CSSS 16.3
1:2 CaCl2 EXTRACTION - METER
pH (1:2 CaCl2)

Solids (Inorganic)
Salinity - Soil (160)
ED-TM-1021, ED-TP-2019; modified from CARTER CSSS 15.2.1 and EPA 200.7
ICP (SATURATED PASTE)
Calcium
Magnesium
Potassium
Sodium
Sulfur SO4

Solids (Inorganic)
Sulfate - Solids (173)
ISOP 155; modified from CSA A23.2
IC - DIGESTION
Sulfate

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Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (154)
NA-TM-1102, NA-TP-2102; CCME, EPA 8260
GC/MS - HEADSPACE
Benzene
Ethylbenzene
m/p-xylene
o-xylene
Toluene

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (155)
NA-TM-1102, NA-TP-2102; CCME, EPA 8260, EPA 5021
GC/FID - HEADSPACE
F1: C6-C10
VH: C6-C10

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (158)
NA-TM-1100, NA-TP-2100; CCME
GC/FID - EXTRACTION TUMBLER
F2: C10-C16
F3: C16-C34
F4: C34-C50

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (171)
NA-TM-1100, NA-TP-2100; CCME
GRAVIMETRIC - TUMBLER
F4: Gravimetric

Solids (Organic)
Phenols - Soil (077)
ED-TM-1113; modified from EPA 8270 and EPA 3540
GC/MS - EXTRACTION
2-Chlorophenol
2-Methylphenol (o-Cresol)
2-Nitrophenol
2,3-Dichlorophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6 Tetrachlorophenol
2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,3,6-Trichlorophenol
2,4 & 2,5-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dichlorophenol
3-Chlorophenol
3-Methylphenol (m-Cresol)
3,4-Dichlorophenol
3,4,5-Trichlorophenol
3,5-Dichlorophenol
4-Chloro-3-methylphenol

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

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4-Chlorophenol
4-Methylphenol (p-Cresol)
4-Nitrophenol
4,6-Dinitro-2-methylphenol
Pentachlorophenol
Phenol

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Soil (097)
ED-TM-1103; modified from EPA 3550 and EPA 8082
GC/ECD - EXTRACTION
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Aroclor 1262
Aroclor 1268
Total PCB

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (167)
NA-TM-1102; modified from EPA 5021 and EPA 8260
GC/MS - HEADSPACE/EXTRACTION
1,1-Dichloroethane
1,1-dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane
1,2-dichlorobenzene
1,2-dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-dichlorobenzene
2-Chlorotoluene
2-Hexanone
2,2-Dichloropropane
4-Chlorotoluene
Acetone (2-Propanone)
Acrylonitrile
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

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Bromoform
Bromomethane
Carbon Disulphide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
cis-1,4-Dichloro-2-Butene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethyl Alcohol
Ethyl Methacrylate
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Isopropylbenzene
m/p-xylene
Methyl Ethyl Ketone
Methyl Iodide
Methyl isobutyl Ketone
n-butylbenzene
n-propylbenzene
Naphthalene
o-xylene
p-Isopropyltoluene
sec-butylbenzene
Styrene
tert-butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trans-1,4-Dichloro-2-Butene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

Tissue (Inorganic)
Mercury - Tissue (054)
ED-TP-2012, ED-TM-1033; modified from EPA 200.3 and EPA 245.1AND EPA 245.7
COLD VAPOR AA - DIGESTION
Mercury

Tissue (Inorganic)
Metals - Tissue (060)
NA-TP-2003, NA-TM-1002; modified from EPA 200.3 and EPA 6020
ICP/MS - DIGEST
Aluminum
Antimony
Arsenic

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Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Selenium
Silver
Strontium
Thallium
Uranium
Vanadium
Zinc

Waste (Inorganic)
Flashpoint - Waste (055)
ED-TM-1012; modified from ASTM 93-D
PENSKE-MARTEN CLOSED CUP
Flashpoint

Waste (Inorganic)
Mercury - TCLP - Waste (162)
NA-TM-1700, ED-TP-2012, ED-TM-1033; EPA 1311 (LEACH) and modified from EPA 245.1 and EPA 245.7 (ANALYSIS)
COLD VAPOUR AA - DIGESTION - TCLP
Mercury

Waste (Inorganic)
Metals - TCLP Leachate - Waste (141)
NA-TM-1700, NA-TM-1002; EPA 1311 (LEACH) and modified from EPA 6020 (ANALYSIS)
ICP/MS - TCLP
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Chromium
Cobalt
Copper
Iron
Lead
Nickel
Selenium
Silver
Thallium
Uranium
Vanadium
Zinc

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Zirconium

Waste (Inorganic)
Specific Gravity - Waste (174)
ED-TM-1025; modified from ASTM D5057
GRAVIMETRIC
Specific Gravity

Waste (Organic)
BTEX - TCLP Leachate - Waste (135)
ED-TP-2005, NA-TM-1102; EPA 1311 (LEACH) and modified from EPA 8260B (ANALYSIS)
GC/MS - TCLP
Benzene
Ethylbenzene
m/p - xylene
o-xylene
Toluene

Water (Inorganic)
Alkalinity - Water (004)
ED-TM-1026; modified from SM 2320 B
TITRIMETRIC
Alkalinity (pH 4.5)
Alkalinity (pH 8.3)

Water (Inorganic)
Ammonia - Water (178)
ED-TM-1016; modified from SM 4500 NH3
COLORIMETRIC
Ammonia

Water (Inorganic)
Anions - Water (005)
NA-TM-1001; modified from EPA 300.1
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Water (Inorganic)
Biochemical Oxygen Demand (BOD) - Water (013)
ED-TM-1007, ED-TM-1037; modified from SM 5210B
D.O. METER
BOD (5 day)
BODu (ultimate)
CBOD (5 day)

Water (Inorganic)
Carbon - Water (118)
ED-TM-1002; modified from SM 5310 B
IR - COMBUSTION
Inorganic Carbon
Organic Carbon
Total Carbon (TC)

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Water (Inorganic)
Chemical Oxygen Demand (COD) - Water (051)
ED-TM-1009; modified from SM 5220 D
COLORIMETRIC - DIGESTION
COD

Water (Inorganic)
Chlorine - Water (123)
ISOP134; modified from SM 4500 CL-A,F,G
COLORIMETRIC
Free Chlorine
Total Chlorine

Water (Inorganic)
Colour - Water (152)
ED-TM-1038; modified from SM 2120 A, C
SPECTROPHOTOMETRIC
True Colour

Water (Inorganic)
Colour (Automated) - Water (199)
ED-TM-1052; modified from SM 2120 A, C
COLORIMETRIC
True Colour

Water (Inorganic)
Conductivity - Water (006)
ED-TM-1026; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic)
Dissolved Metals - Water (007)
NA-TM-1002/NA-TP-2002; modified from EPA 6020
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium

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Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic)
Dissolved Metals - Water (083)
ED-TM-1021, NA-TP-2002, ED-TP-2018; modified from SM 3030 E and EPA 200.2
ICP
Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Sulfur
Thallium
Tin
Titanium
Vanadium
Zinc

Water (Inorganic)
Hexavalent Chromium - Water (035)
ED-TM-1023; modified from SM 3500-CR,C
ION CHROMATOGRAPHY
Hexavalent Chromium

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Water (Inorganic)
Mercury - Water (149)
ED-TP-2012, ED-TM-1033; modified from EPA 245.7 and EPA 245.1
COLD VAPOUR AA, COLD OXIDATION
Mercury

Water (Inorganic)
Microtox - Water (161)
NA-TM-1400; modified from AER ERCB Directive 050
BIOLUMINESCENCE
Microtox IC50 (15 min)

Water (Inorganic)
Nitrate/Nitrite - Water (057)
ED-TM-1018; modified from SM 4500-NO2,B and SM 4500-NO3,H
COLORIMETRIC
Nitrate plus Nitrite
Nitrite

Water (Inorganic)
Oil and Grease - Water (038)
ED-TM-1132; modified from SM 5520 A,B,F
GRAVIMETRIC
Total Oil and Grease

Water (Inorganic)
Oil and Grease - Water (159)
ED-TM-1133; modified from SM 5520 C, F
INFRA-RED
Hydrocarbon Oil and Grease
Total Oil and Grease

Water (Inorganic)
pH - Water (015)
ED-TM-1026; modified from SM 4500-A,B
pH METER
pH

Water (Inorganic)
Phenols - Water (146)
ED-TM-1044; modified from ALBERTA ENVIRONMENT 154
COLORIMETRIC
Total Phenolics

Water (Inorganic)
Phosphate - Water (084)
ED-TM-1031; modified from SM 4500-P
COLORIMETRIC
Phosphate

Water (Inorganic)
Phosphates (Low) - Water (183)
ED-TM-1018; modified from SM 4500-P
COLORIMETRIC - TECHNICON
Phosphate

Water (Inorganic)
Phosphorus - Water (011)
ED-TM-1031; modified from SM 4500-P,B,E
COLORIMETRIC - DIGESTION
Total Dissolved Phosphorus

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Total Phosphorus

Water (Inorganic)
Phosphorus - Water (119)
ED-TM-1031; modified from SM 4500-A B, E
COLORIMETRIC
Inorganic Phosphorus

Water (Inorganic)
Phosphorus - Water (184)
ED-TM-1019; modified from SM 4500, P, B, E
COLORIMETRIC - TECHNICON
Total Dissolved Phosphorus
Total Phosphorus

Water (Inorganic)
Reactive Silica - Water (200)
ED-TM-1053; modified from SM 4500-SIO2 A, E
COLORIMETRIC
Reactive Silica

Water (Inorganic)
Solids - Water (012)
ED-TM-1005; modified from SM 2540 A, B, C, D, E
GRAVIMETRIC
Fixed Suspended Solids
Total Dissolved Solids
Total Suspended Solids
Volatile Suspended Solids

Water (Inorganic)
Sulfide - Water (033)
ED-TM-1001; modified from SM 4500-S2 A, D,E
COLORIMETRIC
Sulfide

Water (Inorganic)
Total Kjeldahl Nitrogen (TKN) - Water (010)
ED-TM-1017; modified from EPA 351.2
COLORIMETRIC - DIGESTION
Dissolved Kjeldahl Nitrogen
Total Kjeldahl Nitrogen

Water (Inorganic)
Total Metals - Water (081)
NA-TP-2001, ED-TM-1021, ED-TP-2018; modified from SM 3030 E and EPA 200.2
ICP - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron

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Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Sulfur
Thallium
Tin
Titanium
Vanadium
Zinc

Water (Inorganic)
Total Metals - Water (082)
NA-TP-2001, NA-TM-1002; modified from EPA 6020 and SM 3030 E
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Cesium
Chromium
Cobalt
Copper
Lead
Lithium
Molybdenum
Nickel
Rubidium
Selenium
Silver
Sodium
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc
Zirconium

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Water (Inorganic)
Turbidity - Water (078)
ED-TM-1011; modified from SM 2130 A, B
TURBIDIMETRIC
Turbidity

Water (Microbiology)
Coliforms - Water (196)
NA-TM-1300; modified from SM 9223 B
MOST PROBABLE NUMBER (QUANTI-TRAY)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology)
Fecal (Thermotelrant) Coliforms - Water (197)
NA-TM-1300; modified from SM 9223 B
MOST PROBABLE NUMBER (QUANTI-TRAY)
Fecal (Thermotolerant) Coliforms

Water (Microbiology)
Heterotrophic Plate Count (HPC) - Water (198)
NA-TM-1300; modified from SM 9215 E
MOST PROBABLE NUMBER (QUANTI-TRAY)
Heterotrophic Plate Count (HPC)

Water (Organic)
Base Neutral Extractables - Water (117)
ED-TM-1124; modified from EPA 3510 and EPA 8270
GC/MS - EXTRACTION
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
2-Chloronaphthalene
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Pentachlorobenzene

Water (Organic)
Chlorophenols - Water (019)
ED-TM-1108; modified from EPA 1653 and ALBERTA ENVIRONMENT 130.0
GC/MS - EXTRACTION
2-Chlorophenol
2-Chlorosyringaldehyde
2,4,5-Trichlorophenol
2,6-Dichlorophenol
2,6-Dichlorosyringaldehyde
3,4-Dichlorocatechol
3,4-Dichloroguaiacol
3,4,5-Trichlorocatechol
3,4,5-Trichloroguaiacol
3,4,5-Trichloroveratrole
3,4,6-Trichlorocatechol
3,4,6-Trichloroguaiacol
3,5-Dichlorocatechol
3,6-Dichlorocatechol

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4-Chlorocatechol
4-Chloroguaiacol
4-Chlorophenol
4,5-Dichlorocatechol
4,5-Dichloroguaiacol
4,5-Dichloroveratrole
4,5,6-Trichloroguaiacol
4,5,6-Trichlorosyringol
4,6-Dichloroguaiacol
5-Chlorovanillin
5,6-Dichlorovanillin
6-Chlorovanillin
Tetrachlorocatechol
Tetrachloroguaiacol
Tetrachloroveratrole
Trichlorotrimethoxybenzene

Water (Organic)
Petroleum Hydrocarbons (PHC) - Water (075)
NA-TM-1110; modified from EPA 3511
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Water (Organic)
Petroleum Hydrocarbons (PHC) - Water (165)
NA-TM-1102; modified from EPA 5021 and EPA 8260
GC/FID - HEADSPACE
F1: C6-C10
VH: C6-C10

Water (Organic)
Phenols - Water (076)
ED-TM-1114; modified from EPA 8270 and EPA 3510
GC/MS - EXTRACTION
2-Chlorophenol
2-Methylphenol (o-Cresol)
2-Nitrophenol
2,3-Dichlorophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-tetrachlorophenol
2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,3,6-Trichlorophenol
2,4 & 2,5-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4,5-Trichlorophenol
2,4,6-trichlorophenol
2,6-Dichlorophenol
3-Chlorophenol
3-Methylphenol (m-Cresol)
3,4-Dichlorophenol
3,4,5-Trichlorophenol

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3,5-Dichlorophenol
4-Chloro-3-methylphenol
4-Chlorophenol
4-Methylphenol (p-Cresol)
4-Nitrophenol
4,6-Dinitro-2-methylphenol
Pentachlorophenol
Phenol

Water (Organic)
Polychlorinated Biphenyls (PCB) - Water (096)
MSOP4; modified from EPA 3510 and EPA 8082
GC/ECD - EXTRACTION
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Aroclor 1262
Aroclor 1268
Total PCB

Water (Organic)
Resin and Fatty Acids - Water (020)
ED-TM-1106; modified from ALBERTA ENVIRONMENT 129.0
GC/MS - EXTRACTION
12-Chlorodehydroabietic Acid
12,14-Dichlorodehydroabietic Acid
14-Chlorodehydroabietic Acid
9,10-Dichlorostearic Acid
Abietic Acid
Arachidic Acid
Dehydroabietic Acid
Isopimaric Acid
Levopimaric Acid
Linoleic Acid
Linolenic Acid
Myristic Acid
Neoabietic Acid
Oleic Acid
Palmitic Acid
Palustric Acid
Pimaric Acid
Sandaracopimaric Acid
Stearic Acid

Water (Organic)
Resin and Fatty Acids - Water (132)
ED-TM-1106; modified from ALBERTA ENVIRONMENT 129.0
GC/MS - EXTRACTION (RFA-Low ED)
12-Chlorodehydroabietic acid
12,14-Dichlorodehydroabietic acid
14-Chlorodehydroabietic acid
9,10-Dichlorostearic acid

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Abietic acid
Arachidic acid
Dehydroabietic Acid
Isopimaric acid
Levopimaric acid
Linoleic Acid
Linolenic Acid
Myristic acid
Neoabietic acid
Oleic Acid
Palmitic Acid
Palustric acid
Pimaric acid
Sandaracopimaric acid
Stearic Acid

Water (Organic)

Volatile Organic Compounds (VOC) - Water (166)
NA-TM-1102; modified from EPA 5021 and EPA 8260
GC/MS - HEADSPACE

1,1-Dichloroethane
1,1-dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-dichlorobenzene
1,2-dichloroethane
1,2-Dichloropropane
1,2,3-Trichloropropane
1,3-Dichlorobenzene
1,4-dichlorobenzene
2-Hexanone
Acetone (2-Propanone)
Acrylonitrile
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Disulphide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
cis-1,4-Dichloro-2-Butene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethyl Alcohol
Ethyl Methacrylate
Ethylbenzene

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Ethylene Dibromide
m/p-xylene
Methyl Ethyl Ketone
Methyl Iodide
Methyl isobutyl Ketone
o-xylene
Styrene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trans-1,4-Dichloro-2-Butene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

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Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

ALS Environmental (Vancouver)
ALS Canada Ltd.
8081 Lougheed Highway
Suite 100
Burnaby, British Columbia

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
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 8 January 2009).

Accreditation No.:	A1719
Issued On:	November 12, 2014
Accreditation Date:	January 3, 2005
Expiry Date:	May 12, 2017

President & CEO

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 1719
Laboratory Name: ALS Environmental (Vancouver)
Parent Institution: ALS Canada Ltd.
Address: 8081 Lougheed Highway Suite 100 Burnaby BC V5A 1W9
Contact: Ms. Helenita Franco
Phone: (604) 253-4188
Fax: (604) 253-6700
Email: quality.vancouver@ALSGlobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: January 7, 2016
Valid To: May 12, 2017

Scope of Accreditation

Air (Inorganic)
Dustfall - Air (227)
VA-TM-1039; BCLM PARTICULATE and ASTM D1739-98
GRAVIMETRIC
Total Dustfall
Total Insoluble Dustfall
Total Soluble Dustfall

Air (Inorganic)
Mercury - Dustfall (223)
VA-TP-2063/VA-TM-1061/VA-TP-2067/VA-TP-2076; modified from BCLM PARTICULATE and EPA 245.7
CVAFS - DIGESTION
Mercury

Air (Inorganic)
Metals - Air Filter (050)
VA-TM-1075/VA-TM-1066/VA-TP-2072; modified from NIOSH 7303 and EPA 6010C
ICP/OES - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Cadmium
Calcium
Chromium
Cobalt
Copper

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Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Thallium
Tin
Titanium
Vanadium
Zinc

Air (Inorganic)

Metals - Dustfall (224)
VA-TP-2063/NA-TM-1002/NA-TP-2007; modified from BCLM PARTICULATE and EPA 200.8
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Selenium
Silver
Sodium
Strontium
Thallium
Tin
Uranium
Vanadium
Zinc

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Air (Inorganic)
Metals - Dustfall (226)
VA-TP-2063/VA-TM-1066/VA-TP-2072; modified from BCLM PARTICULATE and EPA 6010C
ICP/OES - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Thallium
Tin
Titanium
Vanadium
Zinc

Air (Inorganic)
Total Particulates - Air Filter (035)
VA-TM-1041; modified from BCWCB 1150 and ASTM D2009-65
GRAVIMETRIC
Respirable Dust
Total Particulate

Air (Organic)
Volatile Organic Compounds (VOC) - Air (206)
VA-TM-1109/NA-WI-3006; modified from EPA TO-17
GC/MS
1,1-biphenyl
1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropylene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2-trichlorotrifluoroethane (Freon 113)

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1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Butadiene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
2-butanone (MEK)
2-Chlorophenol
2-Chlorotoluene
2-Hexanone
2-propanol
2,2-Dichloropropane
4-Chlorotoluene
4-Isopropyltoluene
4-methyl-2-pentanone (MIBK)
Acetone
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropylene
cyclohexane
Decane
Dibromochloromethane
Dibromomethane
Dichlorodifluoromethane
Dichloromethane (Methylene Chloride)
ethylacetate
Ethylbenzene
Hexachlorobutadiene
Isopropylbenzene
meta- & para-Xylene
Methyl t-butyl ether (MTBE)
Methylcyclohexane
n-Butylbenzene

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n-Heptane (nC7)
n-Hexane (nC6)
n-Octane (nC8)
n-Propylbenzene
Naphthalene
ortho-Xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropylene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chlorine

Air (Organic)
Volatile Organic Compounds (VOC) - Air (207)
VA-TM-1109/NA-WI-3003; modified from EPA TO-17
GC/FID
F1 (C6-C10)
F2 (C10-C16)
TVOC (>C10-C12)
TVOC (>C12-C16)
TVOC (>C6-C8)
TVOC (>C8-C10)
VHv (C6-C13)

Food
Arsenic Species - Eggs, Meat, Fresh Fruits and Vegetables, Processed Food (236)
VA-TM-1082; modified from CFIA SOM-DAR-CHE-053-04
HPLC - ICP/MS
Arsenate (As v)
Arsenite (As III)
Arsenobetaine (AsB)
Arsenocholine (AsC)
Dimethyl Arsinic Acid (DMA)
Monomethyl Arsenate (MMA)

Oil (Organic)
Total PCBs - Oil (080)
VA-TM-1118/VA-TP-2116; modified from ASTM D4059-86 and EPA 3500 and EPA 3620 and EPA 8082
GC/ECD
Total PCB

Seawater (Inorganic)
Dissolved Metals - Seawater (118)
VA-TM-1076/NA-TP-2002/NA-TP-2007/NA-TM-1002; modified from PUGET SOUND PROTOCOLS and EPA 200.8
ICP/MS - EXTRACTION/FILTRATION
Cadmium
Cobalt
Copper
Iron
Lead
Manganese

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Nickel
Uranium
Zinc

Seawater (Inorganic)
Dissolved Metals - Seawater (204)
VA-TM-1068/NA-TP-2002/VA-TP-2074; modified from SM 3030 B and EPA 200.8
HI RESOLUTION ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Gallium
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rhenium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Yttrium
Zinc
Zirconium

Seawater (Inorganic)
Total Metals - Seawater (205)
VA-TM-1068/NA-TP-2001/VA-TP-2074; modified from SM 3030 E and EPA 200.8
HI RESOLUTION ICP/MS
Aluminum

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Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Gallium
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rhenium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Yttrium
Zinc
Zirconium

Seawater (Inorganic)

Total Metals - Seawater (222)

VA-TM-1076/NA-TP-2001/NA-TP-2007/NA-TM-1002; modified from PUGET SOUND PROTOCOLS and EPA 200.8

ICP/MS - EXTRACTION/DIGESTION

Cadmium
Cobalt
Copper
Iron
Lead
Manganese
Nickel
Uranium

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Zinc

Solids (Inorganic)
Acid Volatile Sulfide (AVS) - Soil (230)
VA-TM-1021; modified from EPA-821-R-91-100
COLORIMETRIC - EXTRACTION
Acid Volatile Sulfides

Solids (Inorganic)
Anions - Soil (148)
VA-TP-2066/NA-TM-1001; SSMA CHAPTER 15 and modified from SM 4110 B and EPA 300.1
IC-SATURATED EXTRACTION
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Solids (Inorganic)
Chloride - Soil (243)
VA-TM-1014, VA-TP-2009, VA-TP-2066; modified from SSMA CHAPTER 15 AND SM 4500-CL E
COLORIMETRIC-SATURATION EXTRACTION
Chloride

Solids (Inorganic)
Conductivity - Soil (147)
VA-TP-2066/VA-TM-1005; modified from SSMA CHAPTER 15 and SM 2510 B
METER - SATURATION EXTRACTION
Conductivity

Solids (Inorganic)
Cyanide - Soil (213)
NA-TM-1003/VA-WI-3019; modified from ONT MOE E3015 and ISO 14403 and SM-CN I
AUTO COLOR - DISTILLATION-EXTRACTION
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Cyanide - Soil (214)
NA-TM-1003/VA-WI-3019; modified from ONT MOE E3015 and ASTM 7237
AUTO COLOR/GAS DIFFUSION-EXTRACTION
Cyanide (Free)

Solids (Inorganic)
Leachable Mercury - Solids (165)
VA-TM-1071/VA-TM-1061/VA-TP-2067/VA-TP-2076; BC EMA/HWR - MLEP and modified from EPA 245.7
CVAFS - MLEP EXTRACTION
Mercury

Solids (Inorganic)
Leachable Mercury - Solids (166)
NA-TM-1700/VA-TM-1061/VA-TP-2076/VA-TP-2067; EPA 1311 (LEACH) and modified from EPA 245.7 (ANALYSIS)
CVAFS - EXTRACTION - TCLP
Mercury

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Solids (Inorganic)
Leachable Metals - Soil (235)
NA-TM-1700/NA-TM-1002/NA-TP-2007; EPA 1311 (LEACH) and modified from EPA 200.8 (ANALYSIS)
ICP/MS - Extraction - TCLP
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Nickel
Selenium
Silver
Thallium
Uranium
Vanadium
Zinc
Zirconium

Solids (Inorganic)
Leachable Metals - Solids (121)
VA-TM-1071/VA-TM-1066/VA-TP-2072; BC EMA/HWR - MLEP and modified from EPA 6010C
ICP/OES- MLEP EXTRACTION
Arsenic
Barium
Boron
Cadmium
Chromium
Copper
Lead
Selenium
Silver
Uranium
Zinc

Solids (Inorganic)
Leachable Metals - Solids (122)
NA-TM-1700/VA-TM-1066/VA-TP-2072; EPA 1311 (LEACH) and modified from EPA 6010C (ANALYSIS)
ICP/OES - EXTRACTION - TCLP
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt

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Copper
Iron
Lead
Magnesium
Nickel
Selenium
Silver
Thallium
Vanadium
Zinc
Zirconium

Solids (Inorganic)
Mercury - Soil (138)
VA-TM-1061/NA-TP-2004/VA-TP-2067/VA-TP-2076; modified from EPA 200.2 and EPA 245.7 and BCLM SALM IN SOIL
CVFAS - DIGESTION
Mercury

Solids (Inorganic)
Metals - Soil (152)
NA-TM-1002/NA-TP-2004/NA-TP-2007; modified from EPA 200.2 and EPA 200.8 and BCLM SALM IN SOIL
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

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Solids (Inorganic)
Metals - Soil (153)
VA-TP-2066/VA-TM-1066/VA-TP-2072; modified from SSMA CHAPTER 15 and EPA 6010C
ICP/OES - SATURATION EXTRACTION
Calcium
Magnesium
Potassium
Sodium

Solids (Inorganic)
Methyl Mercury - Soil (173)
VA-TM-1062/VA-TP-2075; modified from EPA 1630
P&T - GC - CVAFS - EXTRACTION
Methyl Mercury

Solids (Inorganic)
Moisture % - Soil (089)
VA-TM-1069; modified from ASTM D2974-00
GRAVIMETRIC
Moisture %

Solids (Inorganic)
Oil and Grease - Soil (239)
VA-TM-1125; modified from BCLM OIL AND GREASE AND OIL AND GREASE-MINERAL IN SOLIDS BY HEXANE EXTRACTION
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Oil and Grease

Solids (Inorganic)
pH - Soil (120)
VA-TP-2066/VA-TM-1007; modified from SSMA CHAPTER 15 and modified from SM 4500-H B
METER - SATURATION EXTRACTION
pH

Solids (Inorganic)
pH - Soil (169)
VA-TM-1078; modified from "SSMA" CHAPTER 15, BCLM, and SM 4500-H B
METER - FIXED RATIO EXTRACTION
pH

Solids (Inorganic)
Saturated Paste - Soil (149)
VA-TP-2066; modified from SSMA CHAPTER 15
SATURATION EXTRACTION
Saturation Percentage (%)

Solids (Inorganic)
Simultaneously Extracted Metals (SEM) - Soil (228)
VA-TM-1021/VA-TM-1061/VA-TP-2067/VA-TP-2076; modified from EPA 821-R-91-100/245.7
CVAFS - SEM EXTRACTION
Mercury

Solids (Inorganic)
Simultaneously Extracted Metals (SEM) - Soil (229)
VA-TM-1021/VA-TM-1066/VA-TP-2072; modified from EPA 821-R-91-100/6010C
ICP/OES - SEM EXTRACTION
Arsenic
Cadmium
Copper

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Lead
Nickel
Zinc

Solids (Inorganic)
Waste Oil - Solids (123)
VA-TM-1111; BCLM OIL and GREASE (MINERAL) BY PETROLEUM ETHER GRAVIMETRIC - EXTRACTION
Waste Oil Content

Solids (Organic)
Extractable Hydrocarbons - Soil (184)
NA-TM-1106/NA-TP-2106; BCLM EPH IN SOLIDS and SILICA GEL CLEANUP OF SOLIDS. modified from EPA 3570.
GC/FID - EXTRACTION (COLD SHAKE)
EPH 10-19
EPH 19-32
EPH 19-32 (sg)
EPH10-19 (sg)

Solids (Organic)
Glycols - Soil (156)
VA-TM-1113; modified from EPA 8015B
GC/FID - EXTRACTION
1,2-Propylene Glycol
Diethylene Glycol
Ethylene Glycol
Triethylene Glycol

Solids (Organic)
Organochlorine Pesticides (OCP) - Soil (079)
VA-TM-1121/VA-TP-2117; modified from EPA 3540 and EPA 3610 and EPA 3630 and EPA 3660 and EPA 8081
GC/ECD - EXTRACTION
2,4'-DDD
2,4'-DDE
2,4'-DDT (o,p'-DDT)
4,4'-DDD
4,4'-DDE
4,4-DDT (p,p'-DDT)
Aldrin
alpha-BHC
beta-BHC
cis-Chlordane (alpha)
cis-Nonachlor
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
gamma-BHC (Lindane)
Heptachlor
Heptachlor Epoxide
Methoxychlor
Mirex
Oxychlordane
trans-Chlordane (gamma)

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trans-Nonachlor

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (189)
NA-TM-1100/NA-TP-2100; modified from CCME DEC 2000 NO. 1310; ALBERTA ENVIRONMENT INTERPRETATION, SEPT 2003
GC/FID - TUMBLER EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (190)
NA-TM-1100/NA-TP-2100; modified from CCME DEC 2000 NO. 1310; ALBERTA ENVIRONMENT INTERPRETATION, SEPT 2003
GRAVIMETRIC - TUMBLER EXTRACTION
F4: Gravimetric
F4G-Sg

Solids (Organic)
Phenols - Soil (071)
VA-TM-1122/VA-TP-2113; modified from EPA 3570 and EPA 8270 and KNAPP 1979
GC/MS - EXTRACTION
2-Chlorophenol
2,3-Dichlorophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-Tetrachlorophenol
2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,3,6-Trichlorophenol
2,4-Dichlorophenol / 2,5-Dichlorophenol
2,4-Dimethylphenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dichlorophenol
3-Chlorophenol
3,4-Dichlorophenol
3,4,5-Trichlorophenol
3,5-Dichlorophenol
4-Chloro-3-Methylphenol
4-Chlorophenol
m-cresol
o-cresol
p-cresol
Pentachlorophenol
Phenol

Solids (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Soil (185)
NA-TM-1106/NA-TP-2103; modified from EPA 3570 and EPA 8270
GC/MS - EXTRACTION (COLD SHAKE)
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Anthracene
Benzo (a) anthracene

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Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo(b&j)fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Chrysene
Dibenzo (a,h) anthracene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Phenanthrene
Pyrene
Quinoline

Solids (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Soil (203)
NA-TM-1105/NA-TP-2103; modified from EPA 3570 and EPA 8270
GC/MS - EXTRACTION (SHORT COLD SHAKE)
2-Methylnapthalene
Acenaphthene
Acenaphthylene
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo(b+j)fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Chrysene
Dibenzo (a,h) anthracene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Phenanthrene
Pyrene

Solids (Organic)
Total PCBs - Soil (112)
VA-TM-1119/VA-TP-2116; modified from EPA 3500 and EPA 3620 and EPA 3630 and EPA 3660 and EPA 3665 and EPA 8082
GC/ECD - EXTRACTION
Total PCB

Solids (Organic)
Volatile Hydrocarbons (VH) - Soil (202)
NA-TM-1103/NA-TP-2102; modified from EPA 5021A and 8260C
GC/FID - HEADSPACE
F1: C6-C10
VH: C6-C10

Solids (Organic)
Volatile Organic Compounds (VOC) - Soil (201)
NA-TM-1102/NA-TM-1103/NA-TP-2102; modified from EPA 5021A and 8260C
GC/MS - HEADSPACE
1,1-Dichloroethane

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1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
4-Isopropylbenzene
Benzene
Bromodichloromethane
Bromoform
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Cumene (Isopropylbenzene)
Dichloromethane
Ethylbenzene
Ethylene Dibromide
m/p-xylene
Methyl t-butyl ether
n-Propylbenzene
Naphthalene
o-xylene
Styrene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

Tissue (Inorganic)
Lipid Content - Tissue (241)
VA-TM-1112; modified from EPA 8290 AND 3570
GRAVIMETRIC
Lipid Content

Tissue (Inorganic)
Methyl Mercury - Tissue (172)
VA-TM-1062/VA-TP-2075; modified from EPA 1630
P&T - GC - CVAFS - DIGESTION
Methyl Mercury

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Tissue (Inorganic)
Moisture Percent - Tissue (090)
VA-TM-1069; modified from PUGET SOUND PROTOCOLS
GRAVIMETRIC
Moisture %

Tissue (Inorganic)
Total Mercury - Tissue (140)
VA-TM-1061/NA-TP-2003/VA-TP-2067/VA-TP-2076; modified from EPA 200.3 and EPA245.7 and EPA 1631
CVAFS - DIGESTION
Mercury

Tissue (Inorganic)
Total Metals - Tissue (051)
VA-TM-1066/NA-TP-2003/VA-TP-2072; modified from EPA 200.3 and EPA 6010C
ICP/OES - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Sodium
Strontium
Sulfur
Thallium
Tin
Titanium
Vanadium
Zinc

Tissue (Inorganic)
Total Metals - Tissue (100)
NA-TM-1002/NA-TP-2003/NA-TP-2007; modified from EPA 200.3 and EPA 200.8
ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth

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Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium
Silver
Sodium
Strontium
Tellurium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc
Zirconium

Tissue (Inorganic)

Total Metals - Tissue (200)
VA-TM-1068/NA-TP-2003/VA-TP-2074; modified from EPA 200.8
HI RESOLUTION ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Gallium
Iron
Lanthanum
Lead
Lithium
Magnesium
Manganese

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Molybdenum
Nickel
Phosphorus
Potassium
Rhenium
Rubidium
Selenium
Silver
Sodium
Strontium
Tellurium
Thallium
Thorium
Tin
Titanium
Uranium
Vanadium
Yttrium
Zinc
Zirconium

Urine (Inorganic)
Creatinine - Urine (234)
VA-TM-1052; THERMO DRI CREATININE-DETECT SPECIMEN VALIDITY TEST
COLORIMETRIC
Creatinine

Urine (Organic)
Arsenic Speciation - Urine (233)
VA-TM-1081; modified from CDC METHOD ID ITU003B, 2004
HPLC-ICPMS
Arsenate (As(V))
Arsenite (As(III))
Arsenobetaine (AsB)
Dimethylarsinic acid (DMA)
Monomethyl arsenate (MMA)
Total Arsenic Species
Total Inorganic Arsenic
Total Inorganic Arsenic and Methylated Metabolites

Water (Inorganic)
Acidity - Water (219)
VA-TM-1001/VA-TP-2005; modified from SM 2310
TITRIMETRIC
Acidity (pH 8.3)

Water (Inorganic)
Alkalinity - Water (001)
VA-TM-1002/VA-TP-2005; modified from SM 2320-B
TITRIMETRIC
Alkalinity (pH 4.5)
Alkalinity-Bicarbonate
Alkalinity-Carbonate
Alkalinity-Hydroxide

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Water (Inorganic)
Alkalinity - Water (002)
VA-TM-1003; modified from EPA 310.2
COLORIMETRIC
Alkalinity (pH 4.5)
Alkalinity-Bicarbonate
Alkalinity-Carbonate
Alkalinity-Hydroxide

Water (Inorganic)
Ammonia - Water (208)
VA-TM-1024; IN-HOUSE
AUTO-FLUORESCENCE
Ammonia

Water (Inorganic)
Anions - Water (026)
NA-TM-1001; modified from EPA 300.1
IC
Bromide
Chloride
Fluoride
Nitrate
Nitrate plus Nitrite
Nitrite
Sulfate

Water (Inorganic)
Arsenic- Water (232)
VA-TM-1081; modified from CDC IT0003B, 2004 and FDA METHOD 4.11 ELEMENTAL ANALYSIS METHOD, 2012
HPLC - ICPMS
Arsenate (AsV)
Arsenite (ASIII)
Arsenobetaine (AsB)
Dimethylarinic acid (DMA)
Monomethyl arsenate (MMA)
Total Arsenic Species
Total Inorganic Arsenic
Total Inorganic Arsenic and Methylated Metabolites

Water (Inorganic)
Biochemical Oxygen Demand (BOD) - Water (027)
VA-TM-1032; modified from SM 5210-B
D.O. METER
BOD (5 day)
CBOD (5 day)
Soluble BOD

Water (Inorganic)
Carbon - Water (091)
VA-TM-1037; modified from SM 5310 B
IR - COMBUSTION
Inorganic Carbon
Organic Carbon
Total Carbon

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Water (Inorganic)
Chemical Oxygen Demand (COD) - Water (028)
VA-TM-1033; modified from SM 5220-D
COLOR - DIGESTION
COD

Water (Inorganic)
Chloride - Water (003)
VA-TM-1014/VA-TP-2009; modified from SM 4500-CL -E
COLORIMETRIC
Chloride

Water (Inorganic)
Chlorophyll-a - Water (220)
VA-TM-1038/VA-TP-2011; modified from EPA 445.0
FLUORIMETRY
Chlorophyll a

Water (Inorganic)
Colour - Water (015)
VA-TM-1004/VA-TP-2011; modified from BCLM and SM 2120-C
COLORIMETRIC
Apparent Colour
True Colour

Water (Inorganic)
Conductivity - Water (004)
VA-TM-1005; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic)
Cyanide - Water (209)
NA-TM-1003 ; modified from ISO 14403 and SM 4500-CN- I
AUTO COLOR - DISTILLATION
Cyanide (SAD)
Cyanide (WAD)

Water (Inorganic)
Cyanide - Water (210)
NA-TM-1003; modified from ASTM 7237
AUTO COLOR (GAS DIFFUSION)
Cyanide (Free)

Water (Inorganic)
Dissolved Ferrous Iron - Water (242)
VA-TM-1046, VA-TP-2009; modified from APHA 3500-Fe
COLORIMETRIC - FILTRATION
Ferrous Iron

Water (Inorganic)
Dissolved Metals - Water (032)
NA-TM-1002/NA-TP-2002/NA-TP-2007; modified from SM 3030 B and EPA 200.8
ICP/MS - FILTRATION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth

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Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Gallium
Gold
Indium
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Sulfur
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic)

Dissolved Metals - Water (036)

VA-TM-1066/NA-TP-2002/VA-TP-2072; modified from SM 3030 B and EPA 6010C

ICP/OES

Aluminum (High)
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron

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Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Thallium (High)
Tin
Titanium
Vanadium
Zinc

Water (Inorganic)

Dissolved Metals - Water (198)

VA-TM-1068/NA-TP-2002/VA-TP-2074; modified from SM 3030B and EPA 200.8

HI RESOLUTION ICP/MS - FILTRATION

Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Gallium
Iron
Lanthanum
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Niobium
Phosphorus
Potassium
Rhenium
Rubidium
Selenium
Silicon
Silver
Sodium

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Strontium
Tantalum
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Yttrium
Zinc
Zirconium

Water (Inorganic)
Fluoride - Water (005)
VA-TM-1016; modified from SM 4500-F -C
SIE
Fluoride

Water (Inorganic)
Mercury (Total and Dissolved)- Water (136)
VA-TM-1061/NA-TP-2002/VA-TP-2068/VA-TP-2067/VA-TP-2076; modified from EPA 1631E
CVAFS - BrCl DIGESTION
Mercury

Water (Inorganic)
Methyl Mercury - Water (192)
VA-TM-1062/VA-TP-2075; modified from EPA 1630
P&T GC-CVAFS-DISTILLATION
Methyl Mercury

Water (Inorganic)
Nitrogen - Water (217)
VA-TM-1047/VA-TP-2201; modified from SM 4500-P J
AUTO COLOR - DIGESTION
Total Dissolved Nitrogen
Total Nitrogen

Water (Inorganic)
Oil and Grease - Water (061)
VA-TM-1110; modified from EPA 1664
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Total Oil and Grease

Water (Inorganic)
Oxidation Reduction Potential (ORP) - Water (221)
VA-TM-1006; modified from SM 2580
MV METER
ORP

Water (Inorganic)
pH - Water (018)
VA-TM-1007; modified from SM 4500-H -B
pH METER
pH

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Water (Inorganic)
Phosphorus - Water (179)
VA-TM-1025/VA-TP-2009/VA-TP-2201; modified from SM 4500-P BANDE
COLOR - DIGESTION (AUTOCLAVE)
Phosphate
Total Dissolved Phosphorus
Total Phosphorus

Water (Inorganic)
Reactive Silica - Water (008)
VA-TM-1018; modified from SM 4500-SIO2 -D
COLORIMETRIC
Reactive Silica

Water (Inorganic)
Solids - Water (016)
NA-TM-1004/VA-TM-1009; modified from SM 2540- B, C and D
GRAVIMETRIC
Fixed Suspended Solids
Total Dissolved Solids
Total Solids
Total Suspended Solids
Volatile Suspended Solids

Water (Inorganic)
Sulfide - Water (010)
VA-TM-1020; modified from SM 4500-S2 -D
COLOR
Sulfide

Water (Inorganic)
Sulphate - Water (009)
VA-TM-1019; modified from SM 4500-SO4 -E
TURBIDIMETRIC
Sulfate

Water (Inorganic)
Tannin and Lignin - Water (231)
VA-TM-1035/VA-TP-2009; modified from SM 5550 B
COLORIMETRIC
Tannin and Lignin

Water (Inorganic)
Thiocyanate - Water (014)
VA-TM-1029; modified from SM 4500-CN -M
COLOR
Thiocyanate

Water (Inorganic)
Total Kjeldahl Nitrogen (TKN) - Water (211)
VA-TM-1044; modified from SM 4500 NORG- D
AUTO FLUORESCENCE - DIGESTION
Dissolved Kjeldahl Nitrogen
Total Kjeldahl Nitrogen

Water (Inorganic)
Total Metals - Water (031)
NA-TM-1002/NA-TP-2001/NA-TP-2007; modified from SM 200.2 and EPA 6020 A
ICP/MS - DIGESTION
Aluminum

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Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Gallium
Gold
Indium
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Sulfur
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic)

Total Metals - Water (041)

VA-TM-1066/NA-TP-2001/VA-TP-2072; modified from SM 3030 E and EPA 6010C

ICP/OES - DIGESTION

Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium

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Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosporus
Potassium
Selenium
Silicon
Silver
Sodium
Strontium
Thallium
Tin
Titanium
Vanadium
Zinc

Water (Inorganic)
Total Metals - Water (199)
VA-TM-1068/NA-TP-2001/VA-TP-2074; modified from SM 3030E and EPA 200.8
HI RESOLUTION ICP/MS - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Gallium
Iron
Lanthanum
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Niobium
Phosphorus
Potassium
Rhenium

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Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Tantalum
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Yttrium
Zinc
Zirconium

Water (Inorganic)
Turbidity - Water (020)
VA-TM-1011; modified from SM 2130-B
TURBIDIMETRIC
Turbidity

Water (Microbiology)
Coliforms - Water (145)
NA-TM-1300; modified from SM 9223 B
MOST PROBABLE NUMBER (ENZYME SUBSTRATE)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology)
Enterococci - Water (186)
VA-TM-1203; modified from SM 9230 C
MEMBRANE FILTRATION (mENTEROCOCCUS)
Enterococci

Water (Microbiology)
Escherichia coli - Water (240)
VA-TM-1201; modified from SM 9222 G
MEMBRANE FILTRATION (mENDO/NA-MUG)
Escherichia coli (E. coli)

Water (Microbiology)
Fecal (Thermotolerant) Coliforms - Water (029)
VA-TM-1200; modified from SM 9221 E
MOST PROBABLE NUMBER
Fecal Coliforms

Water (Microbiology)
Fecal (Thermotolerant) Coliforms - Water (030)
VA-TM-1201; modified from SM 9222 D
MEMBRANE FILTRATION (mFC)
Fecal (Thermotolerant) Coliforms

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Water (Microbiology)
Heterotrophic Plate Count (HPC) - Water (126)
VA-TM-1205; modified from SM 9215B
POUR PLATE (PLATE COUNT AGAR)
Heterotrophic Plate Count (HPC)

Water (Microbiology)
Pseudomonas aeruginosa - Water (187)
VA-TM-1204; modified from SM 9213 E
MEMBRANE FILTRATION (mPAC)
Pseudomonas aeruginosa

Water (Microbiology)
Total Coliforms - Water (142)
VA-TM-1200; modified from SM 9221 B
MOST PROBABLE NUMBER
Total Coliforms

Water (Microbiology)
Total Coliforms - Water (143)
VA-TM-1201; modified from SM 9222 B
MEMBRANE FILTRATION (mENDO)
Total Coliforms

Water (Organic)
Extractable Petroleum Hydrocarbons (EPH) - Water (063)
VA-TM-1115/NA-TP-2106; BCLM EPH IN WATER and SILICA GEL CLEANUP OF EPH
GC/FID - EXTRACTION
EPH 10-19
EPH 10-19 (sg)
EPH 19-32
EPH 19-32 (sg)
Total Extractable Hydrocarbons (C10-30)

Water (Organic)
Glycols - Water (155)
VA-TM-1113; modified from EPA 8015B
GC/FID - EXTRACTION
1,2-Propylene Glycol
Diethylene Glycol
Ethylene Glycol
Triethylene Glycol

Water (Organic)
Organochlorine Pesticides (OC) - Water (065)
VA-TM-1121/VA-TP-2117; modified from EPA SW-846 3510 and EPA SW-846 3610 and EPA SW-846 3630 and EPA SW-846 3660 and EPA SW-846 8081
GC/ECD - EXTRACTION
2,4'-DDD
2,4'-DDE
2,4'-DDT
4,4'-DDD
4,4'-DDE
4,4'-DDT
A -BHC
a - Chlordane
Aldrin
Beta-BHC

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cis-Nonachlor
Delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
g - Chlordane
Heptachlor
Heptachlor Epoxide
Lindane (gamma-BHC)
Mirex
o,p' - DDT
Oxychlordane
p,p' - DDT
p,p' Methoxychlor
trans-Nonachlor

Water (Organic)
Petroluem Hydrocarbons (PHC) - Water (238)
NA-TP-2100, VA-TM-1124; modified from EPA 3511, and CCME CWS PHC
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Water (Organic)
Phenols - Water (059)
VA-TM-1101/VA-TP-2113; modified from EPA 3510 and EPA 8270
GC/MS - EXTRACTION
2-Chlorophenol
2,3-Dichlorophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-tetrachlorophenol
2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,3,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4,5-Trichlorophenol
2,4,6-trichlorophenol
2,6-Dichlorophenol
3-Chlorophenol
3,4-Dichlorophenol
3,4,5-Trichlorophenol
3,5-Dichlorophenol
4-Chloro-3-Methylphenol
4-Chlorophenol
m-cresol
o-Cresol
p-Cresol
Pentachlorophenol
Phenol

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Water (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Water (068)
VA-TM-1115/NA-TP-2103; modified from EPA SW-846 3510 and EPA SW-846 3630 and EPA SW-846 8270
GC/MS - EXTRACTION

- 2-Methylnaphthalene
- Acenaphthene
- Acenaphthylene
- Acridine
- Anthracene
- Benzo (a) anthracene
- Benzo (a) pyrene
- Benzo (b) fluoranthene
- Benzo(b&j)fluoranthene
- Benzo(b&j&k)Fluoranthene
- Benzo (g,h,i) perylene
- Benzo (k) fluoranthene
- Chrysene
- Dibenzo (a,h) anthracene
- Fluoranthene
- Fluorene
- Indeno (1,2,3 - cd) pyrene
- Naphthalene
- Phenanthrene
- Pyrene
- Quinoline

Water (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Water (237)
VA-TM-1124, VA-TP-2128; modified from SM 3511 AND EPA 8270 D
GC/MS - EXTRACTION

- 1-Methylnaphthalene
- 2-Methylnaphthalene
- Acenaphthene
- Acenaphthylene
- Acridine
- Anthracene
- Benzo (a) anthracene
- Benzo (a) pyrene
- Benzo (b) fluoranthene
- Benzo (b&j) Fluoranthene
- Benzo (g,h,i) perylene
- Benzo (k) fluoranthene
- Chrysene
- Dibenzo (a,h) anthracene
- Fluoranthene
- Fluorene
- Indeno (1,2,3 - cd) pyrene
- Naphthalene
- Phenanthrene
- Pyrene
- Quinoline

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Water (Organic)
Resin and Fatty Acids - Water (212)
VA-TM-1105/VA-TP-2114; EPA 3510 and EPA 8270
GC/MS/LIQUID-LIQUID EXTRACTION
12-Chlorodehydro-abietic Acid
14-Chlorodehydro-abietic Acid
Abietic Acid
Arachidic Acid
Behenic Acid
Dehydroabietic Acid
Dichlorodehydro-abietic Acid
Isopimaric and Palustric Acid
Lauric Acid
Levopimaric Acid
Lignoceric Acid
Linoleic Acid
Linolenic Acid
Myristic Acid
Neoabietic Acid
Oleic Acid
Palmitic Acid
Pimaric Acid
Sandaracopimaric Acid
Stearic Acid

Water (Organic)
Total PCBs - Water (115)
VA-TM-1115/VA-TP-2116; EPA 3510 and EPA 3620 and EPA 3660 and EPA 3665 and 8082
GC/ECD - EXTRACTION
Total PCB

Water (Organic)
Volatile Hydrocarbons (VH) - Water (197)
NA-TM-1103; modified from EPA 5021A and 8260C and BCMOE FOR VH IN WATER
GC/FID - HEADSPACE
CWS-F1
VH 6-10

Water (Organic)
Volatile Organic Compounds (VOC) - Water (196)
NA-TM-1102/NA-TM-1103; modified from EPA 5021A and 8260C
GC/MS - HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
4-Isopropyltoluene

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Benzene
Bromodichloromethane
Bromoform
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Cumene (Isopropylbenzene)
Dichloromethane
Ethylbenzene
Ethylene Dibromide
m/p-xylene
Methyl t-butyl ether
n-propylbenzene
Napthalene
o-xylene
Styrene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

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CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 2635
Laboratory Name: Taiga Environmental Laboratory
Parent Institution: Government of Northwest Territories (GNWT)
Address: P.O. Box 1320 4601 - 52nd Avenue Yellowknife NT X1A 2L9
Contact: Mr. Bruce Stuart
Phone: (867) 765-6645
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Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: September 16, 2015
Valid To: March 16, 2018

Scope of Accreditation

Solids (Inorganic)
Moisture - Soil (030)
TEL007; CWS-PHC CCME TIER 1
GRAVIMETRIC
Moisture

Solids (Organic)
BTEX - Soil (072)
TEL038; modified from EPA 5030B and EPA 602 and EPA 502.2
GC/MS - PURGE AND TRAP
Benzene
Ethylbenzene
m/p-xylene
o-xylene
Toluene

Solids (Organic)
Purgeable Hydrocarbons- Soil (074)
TEL056; CWS-PHC CCME TIER 1
GC/FID - PURGE AND TRAP
F1: C6-C10

Water (Inorganic)
Alkalinity - Water (066)
TEL060:PC TITRATE; modified from SM 2320 A, B
AUTO TITRIMETRIC
Alkalinity (pH 4.5)

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Water (Inorganic)
Ammonia as Nitrogen - Water (089)
TEL068; modified from SM 4500-NH3 G
COLORIMETRIC - DISCRETE
Ammonia

Water (Inorganic)
Anions - Water (059)
TEL055; modified from SM 4110 B
ION CHROMATOGRAPHY
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Water (Inorganic)
Biochemical Oxygen Demand (BOD) - Water (004)
TEL019; modified from SM 5210 A, B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic)
Carbon - Water (029)
TEL033; modified from SM 5310 B
INFRARED
Organic Carbon

Water (Inorganic)
Cations - Water (042)
TEL055; modified from SM 4110 B
ION CHROMATOGRAPHY
Calcium
Magnesium
Potassium
Sodium

Water (Inorganic)
Chemical Oxygen Demand (COD) - Water (061)
TEL016; modified from SM 5220 D
REFLUX - COLORIMETRIC
COD

Water (Inorganic)
Colour - Water (063)
TEL051; modified from SM 2120 C
HACH - SPECTROPHOTOMETRIC
Apparent Colour
True Colour

Water (Inorganic)
Conductivity - Water (068)
TEL059:PC TITRATE; modified from SM 2510 B
AUTO CONDUCTIVITY METER
Conductivity (25°C)

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Water (Inorganic)
Dissolved Metals - Water (013)
TEL035; modified from EPA 200.8
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Manganese
Molybdenum
Nickel
Rubidium
Selenium
Silver
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

Water (Inorganic)
Hexane Extractable Material (Oil and Grease) - Water (060)
TEL024: HEM ; modified from EPA 1664A, REVISION A
GRAVIMETRIC - EXTRACTION
Total Oil and Grease

Water (Inorganic)
Mercury - Water (080)
TEL062; modified from EPA 245.7
ATOMIC FLUORESCENCE MERCURY ANALYSIS SYSTEM
Mercury

Water (Inorganic)
pH - Water (067)
TEL058:PC TITRATE; modified from SM 4500-H+ A, B
AUTO - pH METER
pH

Water (Inorganic)
Phosphate - Water (087)
TEL069; modified from SM 4500-P F
COLORIMETRIC - DISCRETE
Phosphate

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Water (Inorganic)
Reactive Silica - Water (090)
TEL070; modified from SM 4500-SI F
COLORIMETRIC - DISCRETE ANALYZER
Reactive Silica

Water (Inorganic)
Solids - Water (011)
TEL008/TEL009; modified from SM 2540 C, D
GRAVIMETRIC
Total Dissolved Solids
Total Suspended Solids

Water (Inorganic)
Total and Dissolved Nitrogen - Water (086)
TEL066; modified from ISO/TR 11905:1997(E) and ASTM D 5176-91
PYROLYSIS AND CHEMILUMINESCENCE DETECTION
Dissolved Nitrogen
Total Nitrogen

Water (Inorganic)
Total and Dissolved Phosphorus - Water (088)
TEL069; modified from SM 4500-P F
COLORIMETRIC - DISCRETE
Dissolved Phosphorus
Total Phosphorus

Water (Inorganic)
Total Metals - Water (054)
TEL035; modified from EPA 200.8
ICP/MS
Aluminum
Arsenic
Barium
Beryllium
Boron
Cadmium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Manganese
Mercury
Molybdenum
Nickel
Rubidium
Selenium
Silver
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium

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Zinc

Water (Inorganic)
Turbidity - Water (028)
TEL006; modified from SM 2130 B
NEPHELOMETRY
Turbidity

Water (Microbiology)
Coliforms - Water (045)
TEL053; modified from IDEXX QUANTI-TRAY
MOST PROBABLE NUMBER (QUANTI-TRAY)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology)
Fecal (Thermotolerant) Coliforms - Water (041)
TEL017; modified from SM 9222 D
MEMBRANE FILTRATION (mFC)
Fecal (Thermotolerant) Coliforms

Water (Microbiology)
Fecal Streptococci - Water (055)
TEL053; modified from IDEXX QUANTI-TRAY
MOST PROBABLE NUMBER (QUANTI-TRAY)
Fecal Streptococcus

Water (Organic)
BTEX - Water (070)
TEL037:BTEX; modified from EPA 5030B and EPA 602 and EPA 502.2
GC/MS - PURGE AND TRAP
Benzene
Ethylbenzene
m/p-xylene
o-xylene
Toluene

Water (Organic)
Extractable Hydrocarbons - Water (085)
TEL067; modified from SM 6010 and EPA 3510C and EPA 3630C
GC/FID - SOLID PHASE EXTRACTION
C10-C50

Water (Organic)
Purgeable Hydrocarbons - Water (084)
TEL044; modified from EPA SW-846 5030 and EPA SW-846 8000 and EPA SW-846 8015 and EPA SW-846 8260B
GC/FID - PURGE AND TRAP
C6-C10

Water (Organic)
Trihalomethanes (THM) - Water (077)
TEL039:THM; modified from EPA 5030B and EPA 602 and EPA 502.2
GC/MS - PURGE AND TRAP
Bromodichloromethane (Parameter suspended on 8/8/2015)
Bromoform
Chlorodibromomethane
Chloroform

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Scope of Accreditation
For
ALS Environmental

225 Commerce Drive
Fort Collins, CO 80524
Robert P. DiRienzo
970-490-1511

In recognition of a successful assessment to ISO/IEC 17025:2005 and the requirements of the DoD Environmental Laboratory Accreditation Program (LABPR 403 DoD ELAP) as detailed in the DoD Quality Systems Manual for Environmental Laboratories (DoD QSM V5) based on the TNI Standard - Environmental Laboratory Sector, Volume 1 – Management and Technical Requirements for Laboratories Performing Environmental Analysis, Sept 2009 (EL-V1-2009); accreditation is granted to **ALS Environmental** to perform the following tests:

Accreditation granted through: **June 1, 2016**

Testing – Environmental

Non-Potable Water		
Technology	**Method**	**Analyte**
Ion Chromatography	EPA 300.0 / EPA 9056A	Bromide
Ion Chromatography	EPA 300.0 / EPA 9056A	Chloride
Ion Chromatography	EPA 300.0 / EPA 9056A	Fluoride
Ion Chromatography	EPA 300.0 / EPA 9056A	Nitrate as N
Ion Chromatography	EPA 300.0 / EPA 9056A	Nitrite as N
Ion Chromatography	EPA 300.0 / EPA 9056A	Orthophosphate as P
Ion Chromatography	EPA 300.0 / EPA 9056A	Sulfate
Analyzer	EPA 415.1 / EPA 9060	TOC
ICP	EPA 6010B	Aluminum
ICP	EPA 6010B	Antimony
ICP	EPA 6010B	Arsenic
ICP	EPA 6010B	Barium
ICP	EPA 6010B	Beryllium
ICP	EPA 6010B	Bismuth
ICP	EPA 6010B	Boron
ICP	EPA 6010B	Cadmium
ICP	EPA 6010B	Calcium

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP	EPA 6010B	Chromium
ICP	EPA 6010B	Cobalt
ICP	EPA 6010B	Copper
ICP	EPA 6010B	Iron
ICP	EPA 6010B	Lead
ICP	EPA 6010B	Lithium
ICP	EPA 6010B	Magnesium
ICP	EPA 6010B	Manganese
ICP	EPA 6010B	Molybdenum
ICP	EPA 6010B	Nickel
ICP	EPA 6010B	Phosphorus
ICP	EPA 6010B	Potassium
ICP	EPA 6010B	Selenium
ICP	EPA 6010B	Silicon
ICP	EPA 6010B	Silicon as SiO_2
ICP	EPA 6010B	Silver
ICP	EPA 6010B	Sodium
ICP	EPA 6010B	Strontium
ICP	EPA 6010B	Sulfur
ICP	EPA 6010B	Thallium
ICP	EPA 6010B	Tin
ICP	EPA 6010B	Titanium
ICP	EPA 6010B	Uranium
ICP	EPA 6010B	Vanadium
ICP	EPA 6010B	Zinc
ICP	EPA 6010B	Zirconium
ICP / MS	EPA 6020A	Aluminum
ICP / MS	EPA 6020A	Antimony
ICP / MS	EPA 6020A	Arsenic
ICP / MS	EPA 6020A	Barium
ICP / MS	EPA 6020A	Beryllium
ICP / MS	EPA 6020A	Cadmium
ICP / MS	EPA 6020A	Calcium

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP / MS	EPA 6020A	Cerium
ICP / MS	EPA 6020A	Chromium
ICP / MS	EPA 6020A	Cobalt
ICP / MS	EPA 6020A	Copper
ICP / MS	EPA 6020A	Iron
ICP / MS	EPA 6020A	Lanthanum
ICP / MS	EPA 6020A	Lead
ICP / MS	EPA 6020A	Lithium
ICP / MS	EPA 6020A	Magnesium
ICP / MS	EPA 6020A	Manganese
ICP / MS	EPA 6020A	Molybdenum
ICP / MS	EPA 6020A	Neodymium
ICP / MS	EPA 6020A	Nickel
ICP / MS	EPA 6020A	Potassium
ICP / MS	EPA 6020A	Praseodymium
ICP / MS	EPA 6020A	Selenium
ICP / MS	EPA 6020A	Silver
ICP / MS	EPA 6020A	Sodium
ICP / MS	EPA 6020A	Strontium
ICP / MS	EPA 6020A	Thallium
ICP / MS	EPA 6020A	Thorium
ICP / MS	EPA 6020A	Tin
ICP / MS	EPA 6020A	Titanium
ICP / MS	EPA 6020A	U-235
ICP / MS	EPA 6020A	U-238
ICP / MS	EPA 6020A	Uranium
ICP / MS	EPA 6020A	Vanadium
ICP / MS	EPA 6020A	Yttrium
ICP / MS	EPA 6020A	Zinc
Colorimetric	EPA 335.1 SM 4500-CN C,E	Cyanide (Total and Amenable)
UV-Vis	EPA 9010C	Cyanide (Total and Amenable)
UV-Vis	EPA 7196A	Hexavalent Chromium (Cr^{VI})
Titrimetric	EPA 9013 / EPA 9014 EPA 335.2	Cyanide

Non-Potable Water		
Technology	**Method**	**Analyte**
Gravimetric	EPA 160.1 / SM 2540 C	Total Dissolved Solids
Gravimetric	EPA 160.2 / SM 2540 D	Total Suspended Solids
Gravimetric	EPA 1664A / EPA 9071B	HEM/Oil And Grease
ISE	SM 2510B EPA 120.1 / EPA 9050A	Conductivity
Titration	SM 2320B EPA 310.1	Alkalinity
UV/VIS	EPA 353.2	Nitrogen, Nitrate-Nitrite
Colorimetric	EPA 354.1 SM 4500-NO2 B	Nitrogen, Nitrite
Colorimetric	EPA 365.2 SM 4500-P E	Phosphorous, Total And Ortho
Titrimetric	EPA 376.1 SM 4500-S2 F	Sulfide
Gravimetric	EPA 9095A	Paint Filter Liquids Test
CVAA	EPA 245.1 / EPA 7470	Mercury
ISE	EPA 150.1 / EPA 9040C SM 4500-H+ B	pH
Flash Point	EPA 1010A	Ignitability
GC / ECD	EPA 8081A	4,4'-DDD
GC / ECD	EPA 8081A	4,4'-DDE
GC / ECD	EPA 8081A	4,4'-DDT
GC / ECD	EPA 8081A	Aldrin
GC / ECD	EPA 8081A	Alpha-BHC
GC / ECD	EPA 8081A	Alpha-Chlordane
GC / ECD	EPA 8081A	Beta-BHC
GC / ECD	EPA 8081A	Chlordane
GC / ECD	EPA 8081A	Delta-BHC
GC / ECD	EPA 8081A	Dieldrin
GC / ECD	EPA 8081A	Endosulfan I
GC / ECD	EPA 8081A	Endosulfan II
GC / ECD	EPA 8081A	Endosulfan Sulfate
GC / ECD	EPA 8081A	Endrin
GC / ECD	EPA 8081A	Endrin Aldehyde
GC / ECD	EPA 8081A	Endrin Ketone
GC / ECD	EPA 8081A	Gamma-BHC (Lindane)

Non-Potable Water		
Technology	**Method**	**Analyte**
GC / ECD	EPA 8081A	Gamma-Chlordane
GC / ECD	EPA 8081A	Heptachlor
GC / ECD	EPA 8081A	Heptachlor Epoxide
GC / ECD	EPA 8081A	Methoxychlor
GC / ECD	EPA 8081A	Toxaphene
GC / ECD	EPA 8082	Aroclor-1016
GC / ECD	EPA 8082	Aroclor-1221
GC / ECD	EPA 8082	Aroclor-1232
GC / ECD	EPA 8082	Aroclor-1242
GC / ECD	EPA 8082	Aroclor-1248
GC / ECD	EPA 8082	Aroclor-1254
GC / ECD	EPA 8082	Aroclor-1260
GC / ECD	EPA 8082	Aroclor-1262
GC / ECD	EPA 8082	Aroclor-1268
GC / ECD	EPA 8151A	2,4,5-T
GC / ECD	EPA 8151A	2,4-D
GC / ECD	EPA 8151A	2,4-DB
GC / ECD	EPA 8151A	Dalapon
GC / ECD	EPA 8151A	Dicamba
GC / ECD	EPA 8151A	Dichloroprop
GC / ECD	EPA 8151A	Dinoseb
GC / ECD	EPA 8151A	MCPA
GC / ECD	EPA 8151A	MCPP
GC / ECD	EPA 8151A	Silvex
GC / FPD	EPA 8141A	Chlorpyrifos
GC / FPD	EPA 8141A	Coumaphos
GC / FPD	EPA 8141A	Demeton O + S
GC / FPD	EPA 8141A	Diazinon
GC / FPD	EPA 8141A	Dichlorvos
GC / FPD	EPA 8141A	Disulfoton
GC / FPD	EPA 8141A	Ethoprop
GC / FPD	EPA 8141A	Fensulfothion
GC / FPD	EPA 8141A	Fenthion

Non-Potable Water		
Technology	**Method**	**Analyte**
GC / FPD	EPA 8141A	Malathion
GC / FPD	EPA 8141A	Merphos A + B
GC / FPD	EPA 8141A	Methyl Azinphos
GC / FPD	EPA 8141A	Methyl Parathion
GC / FPD	EPA 8141A	Mevinphos
GC / FPD	EPA 8141A	Naled
GC / FPD	EPA 8141A	Phorate
GC / FPD	EPA 8141A	Ronnel
GC / FPD	EPA 8141A	Sulprofos
GC / FPD	EPA 8141A	Tetrachlorvinphos
GC / FPD	EPA 8141A	Tokuthion
GC / FPD	EPA 8141A	Trichloronate
GC / FPD	EPA 8141A	Triphenylphosphate
GC / FID	EPA 8015B	GRO
GC / FID	EPA 8015B	DRO
GC / FID	EPA 8015B	Ethylene Glycol
GC / FID	EPA 8015B	Propylene Glycol
GC / FID	EPA 8015B	Diethylene Glycol
GC / FID	EPA 8015B	Triethylene Glycol
GC / FID	EPA 8015B	Tetraethylene Glycol
GC / MS	EPA 8260C	Chloroacetonitrile
GC / MS	EPA 8260C	1-chlorobutane
GC / MS	EPA 8260C	Methyl acrylate
GC / MS	EPA 8260C	Pentafluorobenzene
GC / MS	EPA 8260C	1,1,1,2-Tetrachloroethane
GC / MS	EPA 8260C	1,1,1-Trichloroethane
GC / MS	EPA 8260C	1,1,2,2-Tetrachloroethane
GC / MS	EPA 8260C	1,1,2-Trichloro-1,2,2-Trifluoroethane
GC / MS	EPA 8260C	1,1,2-Trichloroethane
GC / MS	EPA 8260C	1,1-Dichloroethane
GC / MS	EPA 8260C	1,1-Dichloroethene
GC / MS	EPA 8260C	1,1-Dichloropropene
GC / MS	EPA 8260C	1,2,3-Trichlorobenzene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC / MS	EPA 8260C	1,2,3-Trichloropropane
GC / MS	EPA 8260C	1,2,4-Trichlorobenzene
GC / MS	EPA 8260C	1,2,4-Trimethylbenzene
GC / MS	EPA 8260C	1,2-Dibromo-3-Chloropropane
GC / MS	EPA 8260C	1,2-Dibromoethane
GC / MS	EPA 8260C	1,2-Dichlorobenzene
GC / MS	EPA 8260C	1,2-Dichloroethane
GC / MS	EPA 8260C	1,2-Dichloroethene (Total)
GC / MS	EPA 8260C	1,2-Dichloropropane
GC / MS	EPA 8260C	1,3,5-Trimethylbenzene
GC / MS	EPA 8260C	1,3-Dichlorobenzene
GC / MS	EPA 8260C	1,3-Dichloropropane
GC / MS	EPA 8260C	1,4-Dichlorobenzene
GC / MS	EPA 8260C	1-Chlorohexane
GC / MS	EPA 8260C	2,2-Dichloropropane
GC / MS	EPA 8260C	2-Butanone
GC / MS	EPA 8260C	2-Chlorotoluene
GC / MS	EPA 8260C	2-Hexanone
GC / MS	EPA 8260C	4-Chlorotoluene
GC / MS	EPA 8260C	4-Methyl-2-Pentanone
GC / MS	EPA 8260C	Acetone
GC / MS	EPA 8260C	Benzene
GC / MS	EPA 8260C	Bromobenzene
GC / MS	EPA 8260C	Bromochloromethane
GC / MS	EPA 8260C	Bromodichloromethane
GC / MS	EPA 8260C	Bromoform
GC / MS	EPA 8260C	Bromomethane
GC / MS	EPA 8260C	Carbon Disulfide
GC / MS	EPA 8260C	Carbon Tetrachloride
GC / MS	EPA 8260C	Chlorobenzene
GC / MS	EPA 8260C	Chloroethane
GC / MS	EPA 8260C	Chloroform
GC / MS	EPA 8260C	Chloromethane

Non-Potable Water		
Technology	**Method**	**Analyte**
GC / MS	EPA 8260C	Cis-1,2-Dichloroethene
GC / MS	EPA 8260C	Cis-1,3-Dichloropropene
GC / MS	EPA 8260C	Dibromochloromethane
GC / MS	EPA 8260C	Dibromomethane
GC / MS	EPA 8260C	Dichlorodifluoromethane
GC / MS	EPA 8260C	Ethylbenzene
GC / MS	EPA 8260C	Hexachlorobutadiene
GC / MS	EPA 8260C	Iodomethane
GC / MS	EPA 8260C	Isopropylbenzene
GC / MS	EPA 8260C	M+P-Xylene
GC / MS	EPA 8260C	Methyl Tertiary Butyl Ether
GC / MS	EPA 8260C	Methylene Chloride
GC / MS	EPA 8260C	Naphthalene
GC / MS	EPA 8260C	N-Butylbenzene
GC / MS	EPA 8260C	N-Propylbenzene
GC / MS	EPA 8260C	O-Xylene
GC / MS	EPA 8260C	P-Isopropyltoluene
GC / MS	EPA 8260C	Sec-Butylbenzene
GC / MS	EPA 8260C	Styrene
GC / MS	EPA 8260C	Tert-Butylbenzene
GC / MS	EPA 8260C	Tetrachloroethene
GC / MS	EPA 8260C	Toluene
GC / MS	EPA 8260C	Total Xylenes
GC / MS	EPA 8260C	Trans-1,2-Dichloroethene
GC / MS	EPA 8260C	Trans-1,3-Dichloropropene
GC / MS	EPA 8260C	Trichloroethene
GC / MS	EPA 8260C	Trichlorofluoromethane
GC / MS	EPA 8260C	Vinyl Acetate
GC / MS	EPA 8260C	Vinyl Chloride
GC / MS	EPA 8270D	1,2,4-Trichlorobenzene
GC / MS	EPA 8270D	1,2-Dichlorobenzene
GC / MS	EPA 8270D	1,3-Dichlorobenzene
GC / MS	EPA 8270D	1,4-Dichlorobenzene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC / MS	EPA 8270D	1,4-Dioxane
GC / MS	EPA 8270D	2,3,4,6-Tetrachlorophenol
GC / MS	EPA 8270D	2,4,5-Trichlorophenol
GC / MS	EPA 8270D	2,4,6-Trichlorophenol
GC / MS	EPA 8270D	2,4-Dichlorophenol
GC / MS	EPA 8270D	2,4-Dimethylphenol
GC / MS	EPA 8270D	2,4-Dinitrophenol
GC / MS	EPA 8270D	2,4-Dinitrotoluene
GC / MS	EPA 8270D	2,6-Dinitrotoluene
GC / MS	EPA 8270D	2-Chloronaphthalene
GC / MS	EPA 8270D	2-Chlorophenol
GC / MS	EPA 8270D	2-Methylnaphthalene
GC / MS	EPA 8270D	2-Methylphenol
GC / MS	EPA 8270D	2-Nitroaniline
GC / MS	EPA 8270D	2-Nitrophenol
GC / MS	EPA 8270D	3,3’-Dichlorobenzidine
GC / MS	EPA 8270D	3+4-Methylphenol
GC / MS	EPA 8270D	4,6-Dinitro-2-Methylphenol
GC / MS	EPA 8270D	4-Aminobiphenyl
GC / MS	EPA 8270D	4-Bromophenyl Phenyl Ether
GC / MS	EPA 8270D	4-Chloro-3-Methylphenol
GC / MS	EPA 8270D	4-Chloroaniline
GC / MS	EPA 8270D	4-Chlorophenyl Phenyl Ether
GC / MS	EPA 8270D	4-Nitroaniline
GC / MS	EPA 8270D	4-Nitrophenol
GC / MS	EPA 8270D	Acenaphthene
GC / MS	EPA 8270D	Acenaphthylene
GC / MS	EPA 8270D	Aniline
GC / MS	EPA 8270D	Anthracene
GC / MS	EPA 8270D	Azobenzene
GC / MS	EPA 8270D	Benzo(A)Anthracene
GC / MS	EPA 8270D	Benzo(A)Pyrene
GC / MS	EPA 8270D	Benzo(B)Fluoranthene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC / MS	EPA 8270D	Benzo(G,H,I)Perylene
GC / MS	EPA 8270D	Benzo(K)Fluoranthene
GC / MS	EPA 8270D	Benzoic Acid
GC / MS	EPA 8270D	Benzyl Alcohol
GC / MS	EPA 8270D	Bis(2-Chloroethoxy)Methane
GC / MS	EPA 8270D	Bis(2-Chloroisopropyl)Ether
GC / MS	EPA 8270D	Bis(2-Ethylhexyl)Phthalate
GC / MS	EPA 8270D	Butyl Benzyl Phthalate
GC / MS	EPA 8270D	Carbazole
GC / MS	EPA 8270D	Chrysene
GC / MS	EPA 8270D	Dibenzo(A,H)Anthracene
GC / MS	EPA 8270D	Dibenzofuran
GC / MS	EPA 8270D	Dimethyl Phthalate
GC / MS	EPA 8270D	Di-N-Octyl Phthalate
GC / MS	EPA 8270D	Fluoranthene
GC / MS	EPA 8270D	Fluorene
GC / MS	EPA 8270D	Hexachlorobenzene
GC / MS	EPA 8270D	Hexachlorobutadiene
GC / MS	EPA 8270D	Hexachlorocyclopentadiene
GC / MS	EPA 8270D	Hexachloroethane
GC / MS	EPA 8270D	Indeno(1,2,3-Cd)Pyrene
GC / MS	EPA 8270D	Isophorone
GC / MS	EPA 8270D	Naphthalene
GC / MS	EPA 8270D	Nitrobenzene
GC / MS	EPA 8270D	N-Nitrosodimethylamine
GC / MS	EPA 8270D	N-Nitroso-Di-N-Propylamine
GC / MS	EPA 8270D	N-Nitrosodiphenylamine
GC / MS	EPA 8270D	Pentachlorophenol
GC / MS	EPA 8270D	Phenanthrene
GC / MS	EPA 8270D	Phenol
GC / MS	EPA 8270D	Pyrene
GC / MS	EPA 8270D	Pyridine
Gas Proportional Counting	EPA 900 / EPA 9310	Gross Alpha

Non-Potable Water		
Technology	**Method**	**Analyte**
Gas Proportional Counting	EPA 900 / EPA 9310	Gross Beta
Gas Proportional Counting	EPA 904 / EPA 9320	Ra228
Gas Proportional Counting	HASL 300 Sr01 HASL 300 Sr02	Strontium 90
Gas Proportional Counting	ASTM D5811	Strontium 90
Gas Proportional Counting	EPA 902.0 ALS SOP 753	Iodine-129
Liquid Scintillation Counting	EPA 906.0 SM 7500 3H	Tritium
Liquid Scintillation Counting	EPA C-01	Carbon-14
Liquid Scintillation Counting	DOE RP550 DOE RS551	Technicium-99
Liquid Scintillation Counting	Horwitz, Chiariza, Dietz 1992	Lead-210
Liquid Scintillation Counting	ALS SOP 704	Pu241, Pm147
Liquid Scintillation Counting	ALS SOP 774	Nickle-63
Emanation	EPA 903.1 SM 7500-Ra C	Radium 226
Gas Proportional Counting	EPA 903.0 / EPA 9315	Total Radium
Liquid Scintillation Counting	SM 7500-Rn B ASTM D 5072	Rn-222
Gas Proportional Counting	EPA 903.0 / EPA 9315	Radium-226
Alpha-Spec	HASL 300 U02 ASTM D 3972	Ac-227
Alpha-Spec	HASL 300 U02 ASTM D 3972	Am-241
Alpha-Spec	HASL 300 U02 ASTM D 3972	Am-242/243
Alpha-Spec	HASL 300 U02 ASTM D 3972	Am-243
Alpha-Spec	HASL 300 U02 ASTM D 3972	Cm-242
Alpha-Spec	HASL 300 U02 ASTM D 3972	Cm-243/244
Alpha-Spec	HASL 300 U02 ASTM D 3972	Cm-244
Alpha-Spec	HASL 300 U02 ASTM D 3972	Cm-245/246
Alpha-Spec	HASL 300 U02 ASTM D 3972	Np-237

Non-Potable Water		
Technology	**Method**	**Analyte**
Alpha-Spec	HASL 300 U02 ASTM D 3972	Po-210
Alpha-Spec	HASL 300 U02 ASTM D 3972	Pu-238
Alpha-Spec	HASL 300 U02 ASTM D 3972	Pu-239
Alpha-Spec	HASL 300 U02 ASTM D 3972	Pu-239/240
Alpha-Spec	HASL 300 U02 ASTM D 3972	Pu-242
Alpha-Spec	ALS-SOP 701	Ra-226
Alpha-Spec	HASL 300 U02 ASTM D 3972	Th-227
Alpha-Spec	HASL 300 U02 ASTM D 3972	Th-228
Alpha-Spec	HASL 300 U02 ASTM D 3972	Th-230
Alpha-Spec	HASL 300 U02 ASTM D 3972	Th-232
Alpha-Spec	HASL 300 U02 ASTM D 3972	U-232
Alpha-Spec	HASL 300 U02 ASTM D 3972	U-233/234
Alpha-Spec	HASL 300 U02 ASTM D 3972	U-234
Alpha-Spec	HASL 300 U02 ASTM D 3972	U-235
Alpha-Spec	HASL 300 U02 ASTM D 3972	U-235/236
Alpha-Spec	HASL 300 U02 ASTM D 3972	U-238
Alpha-Spec	HASL 300 U02 ASTM D 3972	Uranium, Total
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ac-227
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ac-228
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ag-108m

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ag-110m
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Al-26
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Am-241
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Am-243
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	As-72
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	As-73
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	As-74
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ba-133
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ba-140
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Be-7
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Bi-211
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Bi-212
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Bi-214
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Br-76

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Br-77
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Br-82
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cd-109
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ce-139
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ce-141
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ce-144
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cf-249
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cf-251
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cl-39
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	CM-243
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-56
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-57
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-58
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-60

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cr-51
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-134
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-135
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-136
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-137
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Eu-152
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Eu-154
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Eu-155
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Fe-59
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Gd-153
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ge-68
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Hf-181
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Hg-197m
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Hg-203

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	I-131
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ir-192
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	K-40
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Kr-85
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	La-140
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Mn-54
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Na-22
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Na-24
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Nb-94
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Nb-95
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Nd-147
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Np-236
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Np-237
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Np-239

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Os-191
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pa-231
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pa-234m
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-210
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-211
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-212
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-214
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pm-144
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pm-146
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Po-209
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-223
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-224
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-226
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-228

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rb-83
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rb-86
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rh-101
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rh-106
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ru-103
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ru-106
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sb-124
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sb-125
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sc-46
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Se-75
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sn-113
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sn-126
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sr-85
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ta-182

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Tb-160
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-227
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-228
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-230
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-231
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-232
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-234
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Tl-208
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	U-235
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Uranium, Total
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	V-48
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Y-88
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Zn-65
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Zr-95

Non-Potable Water		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Au-198
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cr-51
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Kr-85
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Te-132
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rb-86
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Se-75
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cd-109
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	In-111
GC/FID	RSK-175	Methane
GC/FID	RSK-175	Ethane
GC/FID	RSK-175	Ethene
GC/FID	RSK-175	Propane
Preparation	**Method**	**Type**
Preparation	EPA 3005A	Acid Digestion Total Recoverable or Dissolved Metals
Preparation	EPA 3010A	Acid Digestion for Total Metals
Leaching Procedure	EPA 1311	Toxicity Characteristic Leaching Procedure Metals

Non-Potable Water		
Technology	**Method**	**Analyte**
Leaching Procedure	EPA 1311	Toxicity Characteristic Leaching Procedure Semi-Volatiles
Leaching Procedure	EPA 1311	Toxicity Characteristic Leaching Procedure Volatiles
Preparation	EPA 3520C	Continuous Liquid-Liquid Extraction
Cleanup Procedure	EPA 3620B	Florisil Cleanup
Cleanup Procedure	EPA 3630C	Silica Gel Cleanup
Cleanup Procedure	EPA 3640A	Gel Permeation Cleanup
Cleanup Procedure	EPA 3660A	Sulfur Cleanup
Purge and Trap	EPA 5030C	Purge-and-Trap for Aqueous Samples

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Ion Chromatography	EPA 300.0 / EPA 9056A	Bromide
Ion Chromatography	EPA 300.0 / EPA 9056A	Chloride
Ion Chromatography	EPA 300.0 / EPA 9056A	Fluoride
Ion Chromatography	EPA 300.0 / EPA 9056A	Nitrate as N
Ion Chromatography	EPA 300.0 / EPA 9056A	Nitrite as N
Ion Chromatography	EPA 300.0 / EPA 9056A	Orthophosphate as P
Ion Chromatography	EPA 300.0 / EPA 9056A	Sulfate
ICP - AES	EPA 6010B	Aluminum
ICP - AES	EPA 6010B	Antimony
ICP - AES	EPA 6010B	Arsenic
ICP - AES	EPA 6010B	Barium
ICP - AES	EPA 6010B	Beryllium
ICP - AES	EPA 6010B	Bismuth
ICP - AES	EPA 6010B	Boron
ICP - AES	EPA 6010B	Cadmium
ICP - AES	EPA 6010B	Calcium
ICP - AES	EPA 6010B	Chromium
ICP - AES	EPA 6010B	Cobalt
ICP - AES	EPA 6010B	Copper
ICP - AES	EPA 6010B	Iron
ICP - AES	EPA 6010B	Lead

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP - AES	EPA 6010B	Lithium
ICP - AES	EPA 6010B	Magnesium
ICP - AES	EPA 6010B	Manganese
ICP - AES	EPA 6010B	Molybdenum
ICP - AES	EPA 6010B	Nickel
ICP - AES	EPA 6010B	Phosphorus
ICP - AES	EPA 6010B	Potassium
ICP - AES	EPA 6010B	Selenium
ICP - AES	EPA 6010B	Silicon
ICP - AES	EPA 6010B	Silicon as SiO_2
ICP - AES	EPA 6010B	Silver
ICP - AES	EPA 6010B	Sodium
ICP - AES	EPA 6010B	Strontium
ICP - AES	EPA 6010B	Sulfur
ICP - AES	EPA 6010B	Thallium
ICP - AES	EPA 6010B	Tin
ICP - AES	EPA 6010B	Titanium
ICP - AES	EPA 6010B	Uranium
ICP - AES	EPA 6010B	Vanadium
ICP - AES	EPA 6010B	Zinc
ICP - AES	EPA 6010B	Zirconium
ICP / MS	EPA 6020A	Aluminum
ICP / MS	EPA 6020A	Antimony
ICP / MS	EPA 6020A	Arsenic
ICP / MS	EPA 6020A	Barium
ICP / MS	EPA 6020A	Beryllium
ICP / MS	EPA 6020A	Cadmium
ICP / MS	EPA 6020A	Calcium
ICP / MS	EPA 6020A	Cerium
ICP / MS	EPA 6020A	Chromium
ICP / MS	EPA 6020A	Cobalt
ICP / MS	EPA 6020A	Copper
ICP / MS	EPA 6020A	Iron

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP / MS	EPA 6020A	Lanthanum
ICP / MS	EPA 6020A	Lead
ICP / MS	EPA 6020A	Lithium
ICP / MS	EPA 6020A	Magnesium
ICP / MS	EPA 6020A	Manganese
ICP / MS	EPA 6020A	Molybdenum
ICP / MS	EPA 6020A	Neodymium
ICP / MS	EPA 6020A	Nickel
ICP / MS	EPA 6020A	Potassium
ICP / MS	EPA 6020A	Praseodymium
ICP / MS	EPA 6020A	Selenium
ICP / MS	EPA 6020A	Silver
ICP / MS	EPA 6020A	Sodium
ICP / MS	EPA 6020A	Strontium
ICP / MS	EPA 6020A	Thallium
ICP / MS	EPA 6020A	Thorium
ICP / MS	EPA 6020A	Tin
ICP / MS	EPA 6020A	Titanium
ICP / MS	EPA 6020A	U-235
ICP / MS	EPA 6020A	U-238
ICP / MS	EPA 6020A	Uranium
ICP / MS	EPA 6020A	Vanadium
ICP / MS	EPA 6020A	Yttrium
ICP / MS	EPA 6020A	Zinc
CVAA	EPA 7471	Mercury
ISE	EPA 9045D	pH
Titrimetric	EPA 9013 / EPA 9014	Cyanide
UV-Vis	EPA 9010C	Cyanide (Total and Amenable)
UV-Vis	EPA 7196A	Hexavalent Chromium (Cr^{VI})
Gravimetric	EPA 9071B	HEM/Oil And Grease
Wet Chemistry	SW846 7.3.3.2 SW846 7.3.4.1	Reactivity
Flash Point Tester	EPA 1010A	Ignitability
GC / ECD	EPA 8081A	4,4'-DDD

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC / ECD	EPA 8081A	4,4'-DDE
GC / ECD	EPA 8081A	4,4'-DDT
GC / ECD	EPA 8081A	Aldrin
GC / ECD	EPA 8081A	Alpha-BHC
GC / ECD	EPA 8081A	Alpha-Chlordane
GC / ECD	EPA 8081A	Beta-BHC
GC / ECD	EPA 8081A	Chlordane
GC / ECD	EPA 8081A	Delta-BHC
GC / ECD	EPA 8081A	Dieldrin
GC / ECD	EPA 8081A	Endosulfan I
GC / ECD	EPA 8081A	Endosulfan II
GC / ECD	EPA 8081A	Endosulfan Sulfate
GC / ECD	EPA 8081A	Endrin
GC / ECD	EPA 8081A	Endrin Aldehyde
GC / ECD	EPA 8081A	Endrin Ketone
GC / ECD	EPA 8081A	Gamma-BHC (Lindane)
GC / ECD	EPA 8081A	Gamma-Chlordane
GC / ECD	EPA 8081A	Heptachlor
GC / ECD	EPA 8081A	Heptachlor Epoxide
GC / ECD	EPA 8081A	Methoxychlor
GC / ECD	EPA 8081A	Toxaphene
GC / ECD	EPA 8082	Aroclor-1016
GC / ECD	EPA 8082	Aroclor-1221
GC / ECD	EPA 8082	Aroclor-1232
GC / ECD	EPA 8082	Aroclor-1242
GC / ECD	EPA 8082	Aroclor-1248
GC / ECD	EPA 8082	Aroclor-1254
GC / ECD	EPA 8082	Aroclor-1260
GC / ECD	EPA 8082	Aroclor-1262
GC / ECD	EPA 8082	Aroclor-1268
GC / ECD	EPA 8151A	2,4,5-T
GC / ECD	EPA 8151A	2,4-D
GC / ECD	EPA 8151A	2,4-DB

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC / ECD	EPA 8151A	Dalapon
GC / ECD	EPA 8151A	Dicamba
GC / ECD	EPA 8151A	Dichloroprop
GC / ECD	EPA 8151A	Dinoseb
GC / ECD	EPA 8151A	MCPA
GC / ECD	EPA 8151A	MCPP
GC / ECD	EPA 8151A	Silvex
GC / FPD	EPA 8141A	Chlorpyrifos
GC / FPD	EPA 8141A	Coumaphos
GC / FPD	EPA 8141A	Demeton O + S
GC / FPD	EPA 8141A	Diazinon
GC / FPD	EPA 8141A	Dichlorvos
GC / FPD	EPA 8141A	Disulfoton
GC / FPD	EPA 8141A	Ethoprop
GC / FPD	EPA 8141A	Fensulfothion
GC / FPD	EPA 8141A	Fenthion
GC / FPD	EPA 8141A	Malathion
GC / FPD	EPA 8141A	Merphos A + B
GC / FPD	EPA 8141A	Methyl Azinphos
GC / FPD	EPA 8141A	Methyl Parathion
GC / FPD	EPA 8141A	Mevinphos
GC / FPD	EPA 8141A	Naled
GC / FPD	EPA 8141A	Phorate
GC / FPD	EPA 8141A	Ronnel
GC / FPD	EPA 8141A	Sulprofos
GC / FPD	EPA 8141A	Tetrachlorvinphos
GC / FPD	EPA 8141A	Tokuthion
GC / FPD	EPA 8141A	Trichloronate
GC / FID	EPA 8015B	GRO
GC / FID	EPA 8015B	DRO
GC / FID	EPA 8015B	Ethylene Glycol
GC / FID	EPA 8015B	Propylene Glycol
GC / FID	EPA 8015B	Diethylene Glycol

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC / FID	EPA 8015B	Triethylene Glycol
GC / FID	EPA 8015B	Tetraethylene Glycol
GC / MS	EPA 8260C	Chloroacetonitrile
GC / MS	EPA 8260C	1-chlorobutane
GC / MS	EPA 8260C	Methyl acrylate
GC / MS	EPA 8260C	Pentafluorobenzene
GC / MS	EPA 8260C	1,1,1,2-Tetrachloroethane
GC / MS	EPA 8260C	1,1,1-Trichloroethane
GC / MS	EPA 8260C	1,1,2,2-Tetrachloroethane
GC / MS	EPA 8260C	1,1,2-Trichloro-1,2,2-Trifluoroethane
GC / MS	EPA 8260C	1,1,2-Trichloroethane
GC / MS	EPA 8260C	1,1-Dichloroethane
GC / MS	EPA 8260C	1,1-Dichloroethene
GC / MS	EPA 8260C	1,1-Dichloropropene
GC / MS	EPA 8260C	1,2,3-Trichlorobenzene
GC / MS	EPA 8260C	1,2,3-Trichloropropane
GC / MS	EPA 8260C	1,2,4-Trichlorobenzene
GC / MS	EPA 8260C	1,2,4-Trimethylbenzene
GC / MS	EPA 8260C	1,2-Dibromo-3-Chloropropane
GC / MS	EPA 8260C	1,2-Dibromoethane
GC / MS	EPA 8260C	1,2-Dichlorobenzene
GC / MS	EPA 8260C	1,2-Dichloroethane
GC / MS	EPA 8260C	1,2-Dichloroethene (Total)
GC / MS	EPA 8260C	1,2-Dichloropropane
GC / MS	EPA 8260C	1,3,5-Trimethylbenzene
GC / MS	EPA 8260C	1,3-Dichlorobenzene
GC / MS	EPA 8260C	1,3-Dichloropropane
GC / MS	EPA 8260C	1,4-Dichlorobenzene
GC / MS	EPA 8260C	1-Chlorohexane
GC / MS	EPA 8260C	2,2-Dichloropropane
GC / MS	EPA 8260C	2-Butanone
GC / MS	EPA 8260C	2-Chlorotoluene
GC / MS	EPA 8260C	2-Hexanone

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC / MS	EPA 8260C	4-Chlorotoluene
GC / MS	EPA 8260C	4-Methyl-2-Pentanone
GC / MS	EPA 8260C	Acetone
GC / MS	EPA 8260C	Benzene
GC / MS	EPA 8260C	Bromobenzene
GC / MS	EPA 8260C	Bromochloromethane
GC / MS	EPA 8260C	Bromodichloromethane
GC / MS	EPA 8260C	Bromoform
GC / MS	EPA 8260C	Bromomethane
GC / MS	EPA 8260C	Carbon Disulfide
GC / MS	EPA 8260C	Carbon Tetrachloride
GC / MS	EPA 8260C	Chlorobenzene
GC / MS	EPA 8260C	Chloroethane
GC / MS	EPA 8260C	Chloroform
GC / MS	EPA 8260C	Chloromethane
GC / MS	EPA 8260C	Cis-1,2-Dichloroethene
GC / MS	EPA 8260C	Cis-1,3-Dichloropropene
GC / MS	EPA 8260C	Dibromochloromethane
GC / MS	EPA 8260C	Dibromomethane
GC / MS	EPA 8260C	Dichlorodifluoromethane
GC / MS	EPA 8260C	Ethylbenzene
GC / MS	EPA 8260C	Hexachlorobutadiene
GC / MS	EPA 8260C	Iodomethane
GC / MS	EPA 8260C	Isopropylbenzene
GC / MS	EPA 8260C	M+P-Xylene
GC / MS	EPA 8260C	Methyl Tertiary Butyl Ether
GC / MS	EPA 8260C	Methylene Chloride
GC / MS	EPA 8260C	Naphthalene
GC / MS	EPA 8260C	N-Butanol
GC / MS	EPA 8260C	N-Butylbenzene
GC / MS	EPA 8260C	N-Propylbenzene
GC / MS	EPA 8260C	O-Xylene
GC / MS	EPA 8260C	P-Isopropyltoluene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC / MS	EPA 8260C	Sec-Butylbenzene
GC / MS	EPA 8260C	Styrene
GC / MS	EPA 8260C	Tert-Butylbenzene
GC / MS	EPA 8260C	Tetrachloroethene
GC / MS	EPA 8260C	Toluene
GC / MS	EPA 8260C	Total Xylenes
GC / MS	EPA 8260C	Trans-1,2-Dichloroethene
GC / MS	EPA 8260C	Trans-1,3-Dichloropropene
GC / MS	EPA 8260C	Trichloroethene
GC / MS	EPA 8260C	Trichlorofluoromethane
GC / MS	EPA 8260C	Vinyl Acetate
GC / MS	EPA 8260C	Vinyl Chloride
GC / MS	EPA 8270D	1,2,4-Trichlorobenzene
GC / MS	EPA 8270D	1,2-Dichlorobenzene
GC / MS	EPA 8270D	1,3-Dichlorobenzene
GC / MS	EPA 8270D	1,4-Dichlorobenzene
GC / MS	EPA 8270D	1,4-Dioxane
GC / MS	EPA 8270D	2,3,4,6-Tetrachlorophenol
GC / MS	EPA 8270D	2,4,5-Trichlorophenol
GC / MS	EPA 8270D	2,4,6-Trichlorophenol
GC / MS	EPA 8270D	2,4-Dichlorophenol
GC / MS	EPA 8270D	2,4-Dimethylphenol
GC / MS	EPA 8270D	2,4-Dinitrophenol
GC / MS	EPA 8270D	2,4-Dinitrotoluene
GC / MS	EPA 8270D	2-Chloronaphthalene
GC / MS	EPA 8270D	2-Chlorophenol
GC / MS	EPA 8270D	2-Methylnaphthalene
GC / MS	EPA 8270D	2-Methylphenol
GC / MS	EPA 8270D	2-Nitroaniline
GC / MS	EPA 8270D	2-Nitrophenol
GC / MS	EPA 8270D	3,3'-Dichlorobenzidine
GC / MS	EPA 8270D	3+4-Methylphenol
GC / MS	EPA 8270D	4,6-Dinitro-2-Methylphenol

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC / MS	EPA 8270D	4-Aminobiphenyl
GC / MS	EPA 8270D	4-Bromophenyl Phenyl Ether
GC / MS	EPA 8270D	4-Chloro-3-Methylphenol
GC / MS	EPA 8270D	4-Chloroaniline
GC / MS	EPA 8270D	4-Chlorophenyl Phenyl Ether
GC / MS	EPA 8270D	4-Nitroaniline
GC / MS	EPA 8270D	4-Nitrophenol
GC / MS	EPA 8270D	Acenaphthene
GC / MS	EPA 8270D	Acenaphthylene
GC / MS	EPA 8270D	Aniline
GC / MS	EPA 8270D	Anthracene
GC / MS	EPA 8270D	Azobenzene
GC / MS	EPA 8270D	Benzo(A)Anthracene
GC / MS	EPA 8270D	Benzo(A)Pyrene
GC / MS	EPA 8270D	Benzo(B)Fluoranthene
GC / MS	EPA 8270D	Benzo(G,H,I)Perylene
GC / MS	EPA 8270D	Benzo(K)Fluoranthene
GC / MS	EPA 8270D	Benzoic Acid
GC / MS	EPA 8270D	Benzyl Alcohol
GC / MS	EPA 8270D	Bis(2-Chloroethoxy)Methane
GC / MS	EPA 8270D	Bis(2-Chloroethyl)Ether
GC / MS	EPA 8270D	Bis(2-Ethylhexyl) Adipate
GC / MS	EPA 8270D	Butyl Benzyl Phthalate
GC / MS	EPA 8270D	Carbazole
GC / MS	EPA 8270D	Chrysene
GC / MS	EPA 8270D	Dibenzo(A,H)Anthracene
GC / MS	EPA 8270D	Dibenzofuran
GC / MS	EPA 8270D	Diethyl Phthalate
GC / MS	EPA 8270D	Dimethyl Phthalate
GC / MS	EPA 8270D	Di-N-Butyl Phthalate
GC / MS	EPA 8270D	Di-N-Octyl Phthalate
GC / MS	EPA 8270D	Fluoranthene
GC / MS	EPA 8270D	Fluorene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC / MS	EPA 8270D	Hexachlorobenzene
GC / MS	EPA 8270D	Hexachlorobutadiene
GC / MS	EPA 8270D	Hexachlorocyclopentadiene
GC / MS	EPA 8270D	Hexachloroethane
GC / MS	EPA 8270D	Indeno(1,2,3-Cd)Pyrene
GC / MS	EPA 8270D	Isophorone
GC / MS	EPA 8270D	Naphthalene
GC / MS	EPA 8270D	Nitrobenzene
GC / MS	EPA 8270D	N-Nitrosodimethylamine
GC / MS	EPA 8270D	N-Nitroso-Di-N-Propylamine
GC / MS	EPA 8270D	N-Nitrosodiphenylamine
GC / MS	EPA 8270D	Pentachlorophenol
GC / MS	EPA 8270D	Phenanthrene
GC / MS	EPA 8270D	Phenol
GC / MS	EPA 8270D	Pyrene
GC / MS	EPA 8270D	Pyridine
Gas Proportional Counting	EPA 900 / EPA 9310	Gross Alpha
Gas Proportional Counting	EPA 900 / EPA 9310	Gross Beta
Gas Proportional Counting	EPA 904 / EPA 9320	Ra228
Gas Proportional Counting	HASL 300 Sr01 HASL 300 Sr02 ASTM D5811	Strontium 90
Gas Proportional Counting	HASL 300 Sr01 HASL 300 Sr02 ASTM D5811	Strontium 90
Liquid Scintillation Counting	EPA 906.0 SM 7500 3H	Tritium
Liquid Scintillation Counting	EPA C-01	Carbon-14
Liquid Scintillation Counting	DOE RP550 DOE RS551	Technicium-99
Liquid Scintillation Counting	Horwitz, Chiariza, Dietz 1992	Lead-210
Liquid Scintillation Counting	ALS SOP 704	Pu241, Pm147
Liquid Scintillation Counting	ALS SOP 774	Nickle-63
Emanation	EPA 903.1 SM 7500-Ra C	Radium-226
Gas Proportional Counting	EPA 903.0 / EPA 9315	Total Radium
Gas Proportional Counting	EPA 903.0 / EPA 9315	Radium-226

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gas Proportional Counting	EPA 902.0 ALS SOP 753	Iodine-129
Alpha-Spec	HASL 300 U02 ASTM D3972	Ac-227
Alpha-Spec	HASL 300 U02 ASTM D3972	Am-241
Alpha-Spec	HASL 300 U02 ASTM D3972	Am-242/243
Alpha-Spec	HASL 300 U02 ASTM D3972	Am-243
Alpha-Spec	HASL 300 U02 ASTM D3972	Cm-242
Alpha-Spec	HASL 300 U02 ASTM D3972	Cm-243/244
Alpha-Spec	HASL 300 U02 ASTM D3972	Cm-244
Alpha-Spec	HASL 300 U02 ASTM D3972	Cm-245/246
Alpha-Spec	HASL 300 U02 ASTM D3972	Np-237
Alpha-Spec	HASL 300 U02 ASTM D3972	Po-210
Alpha-Spec	HASL 300 U02 ASTM D3972	Pu-238
Alpha-Spec	HASL 300 U02 ASTM D3972	Pu-239
Alpha-Spec	HASL 300 U02 ASTM D3972	Pu-239/240
Alpha-Spec	HASL 300 U02 ASTM D3972	Pu-242
Alpha-Spec	ALS SOP 701	Ra-226
Alpha-Spec	HASL 300 U02 ASTM D3972	Th-227
Alpha-Spec	HASL 300 U02 ASTM D3972	Th-228
Alpha-Spec	HASL 300 U02 ASTM D3972	Th-230
Alpha-Spec	HASL 300 U02 ASTM D3972	Th-232
Alpha-Spec	HASL 300 U02 ASTM D3972	U-232

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Alpha-Spec	HASL 300 U02 ASTM D3972	U-233/234
Alpha-Spec	HASL 300 U02 ASTM D3972	U-234
Alpha-Spec	HASL 300 U02 ASTM D3972	U-235
Alpha-Spec	HASL 300 U02 ASTM D3972	U-235/236
Alpha-Spec	HASL 300 U02 ASTM D3972	U-238
Alpha-Spec	HASL 300 U02 ASTM D3972	Uranium, Total
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ac-227
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ac-228
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ag-108m
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ag-110m
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Al-26
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Am-241
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Am-243
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	As-72
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	As-73
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	As-74

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ba-133
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ba-140
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Be-7
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Bi-211
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Bi-212
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Bi-214
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Br-76
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Br-77
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Br-82
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cd-109
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ce-139
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ce-141
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ce-144
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cf-249

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cf-251
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cl-39
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cm-243
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-56
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-57
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-58
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Co-60
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cr-51
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-134
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-135
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-136
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cs-137
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Eu-152
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Eu-154

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Eu-155
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Fe-59
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Gd-153
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ge-68
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Hf-181
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Hg-197m
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Hg-203
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	I-131
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ir-192
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	K-40
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Kr-85
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	La-140
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Mn-54
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Na-22

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Na-24
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Nb-94
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Nb-95
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Nd-147
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Np-236
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Np-237
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Np-239
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Os-191
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pa-231
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pa-234m
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-210
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-211
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-212
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pb-214

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pm-144
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Pm-146
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Po-209
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-223
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-224
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-226
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ra-228
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rb-83
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rb-86
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rh-101
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rh-106
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rn-222
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ru-103
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ru-106

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sb-124
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sb-125
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sc-46
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Se-75
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sn-113
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sn-126
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Sr-85
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Ta-182
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Tb-160
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-227
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-228
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-230
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-231
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-232

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Th-234
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Tl-208
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	U-235
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Uranium, Total
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	V-48
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Y-88
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Zn-65
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Zr-95
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Au-198
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cr-51
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Kr-85
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Te-132
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Rb-86
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Se-75

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	Cd-109
Gamma Spec	EPA 901.1 HASL 300 Ga-01-R EML 4.5.2.3	In-111
Preparation	**Method**	**Type**
Preparation	EPA 3060 A	Alkaline Digestion For Hexavalent Chromium
Preparation	EPA 3050 B	Acid Digestion Of Sediments, Sludges And Soils
Leaching Procedure	EPA 1311	Toxicity Characteristic Leaching Procedure Metals
Leaching Procedure	EPA 1311	Toxicity Characteristic Leaching Procedure Semi-Volatiles
Leaching Procedure	EPA 1311	Toxicity Characteristic Leaching Procedure Volatiles
Preparation	EPA 3540C	Soxhlet Extraction
Preparation	EPA 3580A	Waste Dilution
Cleanup Procedure	EPA 3620B	Florisil Cleanup
Cleanup Procedure	EPA 3630C	Silica Gel Cleanup
Cleanup Procedure	EPA 3640A	Gel Permeation Cleanup
Cleanup Procedure	EPA 3660A	Sulfur Cleanup
Purge and Trap	EPA 5035A	Purge-And-Trap And Extraction For Volatile Organics
Preparation	EPA-3546 for EPA 8081 A	Microwave Extraction
Preparation	EPA-3546 for EPA 8082	Microwave Extraction
Preparation	EPA-3546 for EPA 8270 D	Microwave Extraction

Notes:

1) This laboratory offers commercial testing service.

Approved by: _____ Date: August 20, 2015

R. Douglas Leonard
Chief Technical Officer

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