CANADA-NEWFOUNDLAND WATER QUALITY
MONITORING AGREEMENT

Sampling Manual
(Water, Sediment and Biological Sampling)

Water Resources Management Division
Surface Water Section
Department of Environment and Labour
December 1999

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TABLE OF CONTENTS

1.0 INTRODUCTION

The reliability of any data collected is contingent upon the protocols established in the field. The purpose of this manual is to provide samplers with the necessary information required to perform routine field sampling in a qualitative and consistent manner. The manual is intended for use by those required to conduct sampling as part of the Canada-Newfoundland Water Monitoring Agreement, but may be used for similar water quality monitoring projects.

The protocols presented in this manual are a synthesis of methods used by other Canadian provinces and Federal Agencies responsible for water sampling. Emphasis in this manual is placed upon collection of water samples, however, sections are devoted to collection of sediment and biota samples since they are required in special instances and during recurrent surveys.

2.0 FIELD PREPARATION

2.1 **Site Location and Access**: The selection of sampling sites is the most critical aspect of any monitoring or sampling program. Before any sampling can begin the objective must be clearly defined. The objectives of the study will determine site location. It is very important that sample location remain consistent for all samples obtained so that temporal changes in water chemistry can be interpreted with a high degree of confidence. There are three levels of criteria used in reference to sampling location:

(i) Macrolocation: This defines the river reaches which will be sampled within a particular basin. Stations may be located at the headwaters (to define background conditions), mainstem or tributaries (to define spatial changes and pollutant sources), and at the mouth of the basin (to define the how well the system is able to integrate inputs).

(ii) Microlation: This defines the sampling location relative to point source inputs, tributary inflows, or other unique features within a river reach.

(iii) Representative location: This is a point in the river's cross section from which a sample will provide a reasonable estimate of the average water quality at the cross section.

Once a sampling site is chosen a station location description is prepared. This usually includes a written station location description that identifies any key landmarks and gives the site a simple and unambiguous name. A hand drawn sketch should accompany the written location as well as a photograph if possible. It also includes information about the site

obtained from a map sheet. Information should include latitude and longitude or U.T.M. Coordinates, map sheet number, and any reference points. Today Global Positioning Systems (G.P.S) have become a common tool for plotting station locations.

Once a station is defined, a station identification form must be submitted to the National Laboratory for Environmental Testing (NLET) in Burlington, Ontario. Information provided on the station identification form is used to assign an alphanumeric identifier (ENVIRODAT number) to the new sampling station. ENVIRODAT is the acronym for the National Environmental Database which includes data on air, soil, and water. A copy of the required ENVIRODAT station identification form can be found in Appendix A.

2.2 **Field Equipment**: The equipment a sampler must take into the field is dependent upon a number of factors: the objectives of the study, the type of sample to be collected, the station locations, and the time of year. Preparation prior to any sampling trip is critical since oversights are not usually detected until the sampler has arrived at the sampling station which in many cases is too late. Poor preparation can result in lost time, added expenditures and corruption of data if improper methods have to be used as a result. As such, the sampler should prepare a comprehensive checklist which is designed to meet the requirements for each project. Any checklist should, as a minimum, identify the following:

- the type and number of bottles or containers (including extras), labelling tape and waterproof markers

- field equipment such as metres (with appropriate equipment for repairs or calibration), sampling tools (i.e. sampling iron, through ice sampler, or Van Dorn bottle)
- appropriate quantity of ice packs and coolers (many samples require refrigeration)
- log books or computerized notebooks
- personal gear for all types of weather conditions such as survival suits, raincoats, protective footwear, etc.
- safety equipment (PFD, pocket utility knife, axe, rope, first aid kit, etc.)
- camera or video equipment
- laboratory or requisition forms

A recommended method for transporting each is to place items in a clearly marked box or bag for easy handling and storage.

2.3 **Field Notes and Observations**: Good sampling practice always involves the use of detailed field notes. Specific information about seemingly unimportant facts such as the time of day or antecedent weather conditions are often important in interpreting data when no other reasonable explanation can be attributed to the results. A field log book is a required piece of equipment for any sampler. The log book should be of suitable construction and materials to withstand a variety of weather and field conditions.

All field measurements and observances should be recorded directly into the log book before leaving the sample site. In addition to the usual entries the sampler should also make note of unusual occurrences or deviations from the normal sampling routine. These would

include the necessity of having to relocate the sampling collection site due to problems with access or in order to ensure personal safety. Rivers and streams are dynamic systems and may be altered due to natural or human intervention. Any visible changes to the water quality, such as water colour, odour of the water, excessive algal growth or any indication that foreign substances are present in the water, should be recorded in the log book and additional samples taken, if possible.

Once a field book has been completed it should be properly archived and filed for future reference.

3.0 QUALITY ASSURANCE/CONTROL

Quality Assurance (QA) is described as a management function which mainly rests on the documentation and establishment of quality control protocols, and on evaluation and summarization of their outcomes. A QA program is an integral part of all sampling programs and must be directed towards all aspects of monitoring including network design, station selection, sample collection and analysis, and data management.

Quality Control (QC) is a technical, operational function which investigates and confirms the proper conduct of all those procedural components necessary to a successful conclusion. Thus, QC is a system of routine checks and procedures, carried out by field, laboratory and data management personnel as part of normal operations to ensure that the data collected

meet prescribed performance standards.

3.1 **Field Quality Assurance**: The field Quality Assurance program involves various steps, procedures and practices such as:

- Routine maintenance and calibration of instruments
- Field measurements always made on separate sub-sample, **not lab sample**
- Use only recommended type sample container
- Inner portion of sample bottles and caps should not be touched
- Samples should never stand in sun; store in coolers with ice
- Sample from upstream side of boats and bridges

Quality Control is an essential element of a field quality assurance program. In addition to standardized field procedures, field quality control requires the submission of blank and replicate samples. The purpose of these samples is to test the purity of chemical preservatives added at the lab, to check for contamination of sample containers, filter papers, filtering equipment or any other equipment that is used in sample collection or handling, and to detect other systematic and random errors occurring from the time of sampling to the time of analysis.

3.1.1 **Bottle Blanks**: A sample blank is submitted for every shipment of samples sent to the laboratory. Blank samples are assigned the ENVIRODAT# NF00000000. Field sheets are completed as with any other sample and the bottles are labelled

accordingly, complete with sample identification number. The sample type code for blank samples is 20. Note that for blank samples only empty 500ml, 250ml, and 50ml sample bottles are required. Samples are filled with ultra-pure water at NLET. A completed copy of a field sheet for a sample blank can be found in Appendix B.

3.1.2 Replicate Samples:

3.1.2.1 Co-located samples: (field duplicate, triplicate, etc.) Co-located samples are independent samples collected as close as possible to the same point in space and time and are intended to be identical (i.e. three separate bottles or groups of bottles collected at 5 minute intervals over 15 minute period). Triplicates are required for 10% of all samples collected under the Canada-Newfoundland Water Quality Monitoring Agreement. Each triplicate sample is given a sample number and cross referenced by the final sample taken in the series. Separate field measurements are obtained for each of the three samples taken and field sheets completed accordingly. Triplicate samples are assigned a sample type code of 04. A sample of a field sheet for a triplicate sample can be found in Appendix B.

3.1.2.2 Split Samples: Split samples are obtained by dividing one sample into two or more identical sub-samples.

4.0 SURFACE WATER/ LAKE SAMPLING

4.1 Sampling Equipment:

Sampling Iron: Many times samples cannot be collected by wading. When collecting a surface water sample from bridges, boats, etc., a sampling iron is used. It is constructed of soft steel and painted with a rust inhibitor. Normally a 1 or 2 litre bottle , held in place by a neck holder, is used for collection and smaller bottles are sub-sampled from these. The device is lowered to the desired dept by means of a rope.

Van Dorn Bottle: This device is used to collect sub-surface water samples. It is available in both polyvinyl chloride and acrylic plastic so that it may be used for general or trace metal sampling. It is designed for sampling at a dept of 2 metres or greater. The device has two end seals and a drain valve for sample removal. The basic procedure is to open the sampler by raising the end seals, set the trip mechanism, lower sampler to the desired depth, activate the trip messenger, and then transfer the water sample from the Van Doren bottle to individual sample containers via the drain valve

4.2 Chemical/physical Parameters: Chemical/Physical attributes of water quality are determined through the measurement of inorganic and organic parameters. Information on parameters, preservation methods, holding times and recommended container types can be found in the National Laboratory for Environmental Testing document "Sample Collection

Summary" in Appendix E (Table I and III).

4.3 **Inorganic Parameters:** The analytical parameters measured can be classified into four groups: Physical parameters, Major Ions, Nutrients, and Metals.

Physical parameters include temperature, specific conductivity, colour, turbidity, dissolved oxygen, pH, and alkalinity. The major ions measured are calcium, sodium, magnesium, potassium, sulfate and chloride. Dissolved organic carbon, phosphorus, nitrate-nitrite, nitrogen and silica are the measured nutrients. Metals include aluminum, arsenic, barium, beryllium, cadmium, cobalt, chromium, copper, iron, mercury, lithium, manganese, molybdenum, nickel, lead, selenium, strontium, vanadium and zinc.

4.3.1 **Sampling Methods:** Most water samples collected under the Canada-Newfoundland Water Quality Monitoring Agreement are obtained by **grab** method. **Composite** samples are generally only required under special circumstances, such as special projects or recurrent surveys. The following procedures are generally followed when collecting **grab** water quality samples while wading:

- Place labelled sampling containers into carrying bag. Generally parameters collected for Can-Nfld Agreement are: Major Ions (1000 ml plastic), Metals (500 ml plastic), Mercury (100 ml glass), and Total Phosphorus(50 ml glass).
- Facing upstream, remove bottle cap, ensuring not to touch inside of cap or

neck of bottle, insert sample container into stream with mouth of container entering water first to a depth of approximately 0.30 cm. While submerged turn container upright expressing the air in the bottle.

- Rinse container and inside of cap twice before collecting sample
- Place cap tightly on container, again carefully ensuring not to touch inside of cap or neck of container.
- Repeat procedure for all samples.

When collecting samples from bridges or boats a sampling iron is used to collect the samples. The procedure is the same as for wading, except the 1000 ml container is used for decanting the required amount of sample into the other containers. All samples are collected on the upstream side of the bridge to avoid possible contamination from road salt and other contaminants associated with road traffic.

When sampling on ice in winter, overlying snow should be removed to provide a suitable working area. Hand augers are usually used to drill holes in the ice, as gas powered augers may contaminate sampling equipment. The hole should be cleaned of debris and ice chips. Samples should not be collected from the hole. A sampling iron or sampler nabber (pole to which bottles can be attached) should be lowered below the ice surface to collect the sample.

Composite samples require the mixing of about three or four equal grab samples

(either at the same location but at equal time intervals or at multiple points but at different depths). The composite sample provides an estimate of average water quality conditions.

4.3.2 **Sample Labelling:** The chemical/physical water bottles should be labelled clearly with a waterproof felt tip marker on vinyl tape that can be easily removed without degrading the bottle. The label should include the sample number (year, followed by preset sequential numbers supplied by Environment Canada, i.e. 2000007600), the ENVIRODAT station number (alphanumeric code supplied by Environment Canada), the project number (consists of year and code supplied by Environment Canada, i.e. 00-801), the date the sample was collected (yymmdd), the time (in 24 hour format), the time zone (either NST or NDT), the parameters to be analysed (i.e. metals major ions , etc.), and the location of the sample site (optional). The bottle should be labelled before sampling because the tape does not stick well to wet surfaces. An example of a label is shown below:

SAMPLE #	PROJECT #	ANALYSIS REQUIRED
ENVIRODAT #		
YYMMDD		TIME

4.3.3 **Preservation:** Preservation methods can be found in the National Laboratory for Environmental Testing document "Sample Collection Summary" in Appendix E

(Table I).

4.3.4 **Sample Documentation:** The completion of field sheets as well as a diary of the sampling program are both important requirements for any field program. The field sheets include information such as ENVIRODAT #, narrative description, date and time of sampling, field values at site (i.e. temperature, pH, etc.), parameter codes, weather conditions, snow cover, ice, and physical characteristics such as algal growth, logging activity, dead fish, etc. A diary containing information for each site should duplicate the field sheet information. An example of a completed field sheet can be found in Appendix B.

4.3.5 **Storage and Shipping:** Sample Submission Forms must accompany all samples sent to NLET for analysis. If there is more than one shipping container with samples to be submitted , enclose copies of the submission form in all containers. The Sample Submission Forms require various information. See Appendix C for an example of a Sample Submission and instructions on how to provide the required information.

Samples should be shipped within two weeks of the sample date and until such time the bottles must be kept in a refrigerator at 4°C. Samples should be shipped in a sturdy container or cooler. Ice packs should be used instead of loose or bagged ice in order to prevent contamination of samples or breakage of glass containers. Pack

samples upright ensuring that containers are separated by ice packs or other packing material to prevent shifting or breakage. Complete the laboratory requisition forms, enclose them in a sealed plastic bag, and place them in or on top of the cooler. A sample condition report, requesting information on date and condition of samples upon arrival at the laboratory, should also be included with the shipment. Seal the cooler with heavy packing tape to reduce accidental opening. Each shipping container should be labelled with the destination, the return address, and any required safety markings and labels as well as any special instructions to ensure the safety of the container's arrival.

4.3.6 **Field Measurement and Instrument Calibration:** Field measurements involve the use of specialized equipment. The measurements that this manual will address are temperature, dissolved oxygen, conductivity and pH. All field data must be recorded in the field log book and then entered into the database as soon as possible. Samples measured in situ are designated with a lab code of 80. Those measured in the field or at the Department of Environment & Labour Laboratory are designated with a code 81.

Temperature: Temperature can be measured manually with a thermometer, or electronically with a metre. It is recommended that the temperature be measured with an electronic hand held digital metre with an accuracy of $\pm$ 0.1 °C. Dissolved oxygen and specific conductivity metres usually have a temperature measurement

function. Temperature must be measured at the sample site and preferably directly in the river. If *in situ* measurements are not possible, eg. when sampling from a bridge, then a water sample can be taken in a 1 or 2L wide mouth bottle and the temperature measured directly from the bottle. Temperature should be taken immediately. The measurement is recorded to one decimal point in °C. The method of measurement, metre or thermometer, should be recorded in the field log book.

Conductivity: Conductivity is a numerical expression of a fluids ability to carry an electric current. Conductivity is measured using a conductivity bridge or metre. They are available in many forms - analog or digital, automatic or manual temperature compensation, and usually with a number of ranges. One important factor is to have a range or scale that is not too broad for the conductivity being measured, otherwise the measurement will be inaccurate. For example, if the metre scale is 0-500 uS, and you are measuring in the 20-30 uS range, the accuracy of the measurement will be very poor. It is best to use metres with a low range of 0-200 uS and three additional ranges. The metre is used in conjuction with the temperature. Manually compensated metres require the temperature to be measure and dialled in on the conductivity metre. This type metre may have a probe specifically to measure the temperature. The measurement must then be corrected to a standard temperature of 25 °C. Automatic temperature compensated metres correct the measurement to a standard temperature of 25 °C. The probe is agitated to remove any air bubbles, placed in the centre of the bottle, and the conductivity is read to the nearest uS on the 0 - 200 uS

range or to the nearest 10 uS on the 0 - 2000 uS range. *In situ* measurements are preferred, but measurements can be done in the field immediately after sample collection or at the Water Resources laboratory within 24 hrs.

pH: At a given temperature the intensity of the acidic or basic nature of a solution is indicated by the pH or hydrogen ion activity. There are a number of portable pH metres on the market, but based on experience the Corning Metre and electrode give the best results. Because the pH of a sample can change from the time of collection to the time of analysis, it is recommended that the pH be measured on site. However, in recent years it has been proven that more stable pH readings are obtained at a temperature of 10 - 25°C. The recommended proceedure is to measure sample pH at the Water Resources laboratory at room temperature at the end of the day (or within 24 hours), thus providing a more stable environment for the buffers and the metre.

Dissolved Oxygen: Dissolved Oxygen (DO) is one of the most fundamental parameters measured in water. It is essential to the metabolism of all aerobic organisms. Solubility of oxygen in water is governed by atmospheric and hydrostatic pressure, turbulence, temperature, salinity, currents, upwellings, ice cover, and biological processes.

Dissolved oxygen can be measured by either wet chemistry or by using an electronic metre. In Newfoundland all regional offices have electronic metres for talking measurements. The two most common types of metres being used are the Orion and Y.S.I. metres. Dissolved oxygen measurements are done *in situ* in order to obtain accurate measurements.

Calibration, measurement procedure, and maintenance for temperature, specific conductance, Ph, and dissolved oxygen are outlined in the respective operating manuals included with the instruments.

4.4 **Organic Parameters:** Organics are analyzed in order to detect and measure substances which could adversely the health of water users. Organic parameters are generally classified as volatile or non-volatile. Both can be highly toxic to humans, animals, and fish and therefore require special care in sampling. Common parameters analysed are Polynuclear Aromatic Hydrocarbons (PACs), Organochlorinated Pesticides (OCs), Polychlorinated Biphenyls (PCBs), Chlorinated Phenols (CPs), and Chlorinated Benzenes (CBs).

Information on parameter preservation methods, holding times, and recommended container types can be found in the National Laboratory for Environmental Testing document "Sample Collection Summary" in Appendix E (Table III).

4.4.1 **Sampling Method:** Samples of volatile organics are usually taken in 40 ml amber vials with Teflon-lined septum caps (the septum caps allow the laboratory to insert a syringe into the vial and obtain the volatiles without removing the cap). Sodium thiosulphate, used to destroy any free chlorine that may be in the water, is normally added to the empty container before filling. The vial should be filled to the point of overflow. This provides excess sample that is squeezed out as the sample is capped and ensures that there is no headspace.

When sampling non-volatile organic substances the proceedure followed is the same as that outlined for collecting inorganic parameters.

Whenever sampling for organic parameters, the collector must always wear protective gear (goggles, gloves, waders, etc.)

4.4.2 **Sample Labelling:** See Section 4.3.2

4.4.3 **Sample Preservation:** Parameter and preservation method is described in the National Laboratory for Environmental Testing document "Sample Collection Summary" in Appendix E (Table III).

4.4.4 **Sample Documentation**: See Section 4.3.4

4.4.5 Storage and Shipping: See Section 4.3.5

5.0 SEDIMENT SAMPLING

5.1 Sampling Equipment: There are two types of samplers commonly used for collecting bottom sediments: grab samplers, used for collecting surface sediments and core samplers used for collecting a depth profile of sediments. The type of sampler used depends on the scope of the study and desired objectives outlined in the project design.

5.1.1 Grab Samplers: Generally there are three types of grab samplers commonly used for obtaining sediment: Ekman grab, Petersen Grab and Ponar Grab. Each device consists of a set of mechanical jaws which shut when lowered to the sediment. The type of sampler used depends on the characterization of the bottom sediment. The Petersen Grab is used for collecting hard bottom material such as sand, marl, gravel and firm clay. The Ponar Grab is generally used for collecting fine-grained to more coarse bottom sediments. The Ekman Grab is most suitable for collecting soft, fine-grained sediments and is the most commonly used device for collecting samples under the Canada-Newfoundland Agreement. Operation of these grab devices is described in Appendix.

5.1.2 Core Samplers: Core samplers are designed to penetrate the sediment more deeply than grab samplers. They provide a cross-sectional sample of sediment which gives

information about the sediment deposition. Core samplers generally consist of a tube that enters the sediment layer by free falling from a sufficient height. Core samplers are most commonly used for lake sampling but can be used in rivers where the depositional layer is soft and thick enough for penetration. Core samplers are generally used for very specific surveys under the Canada-Newfoundland Agreement.

5.2 **Analytical Parameters:** Both organic and inorganic parameters are usually measured in sediment. Under the Canada-Newfoundland Water Quality Monitoring Agreement sediment sampling is usually performed during Recurrent Surveys or special projects. Parameters measured include: extractable non-residual metals, totoal mercury, Organochlorinated Pesticides, Polychlorinated Biphenyls, Polynuclear Aromatic Hydrocarbons, Chlorinated Phenols, Chlorinated Benzenes, particulate organic carbon, nitrogen, and sediment particle size. A more comprehensive listing of parameters, recommended containers, preservation and holding times can be found in Appendix E in the NLET Sample Collection Summary submission (Table II and IV).

5.3 **Lake Sediment Sampling:** Safety is the primary concern for any lake sampling endeavour. Prior to beginning any lake sampling project the sampler must first ensure that all of the necessary safety equipment (i.e. PFD's, flares etc.) have been acquired and are in proper working condition. If sampling during winter in ice conditions the sampler must first measure ice thickness prior to sampling ensuring that the thickness exceeds at least 15 cm. Also sediment samples may contain hazardous substances, so it is important for the sampler

to avoid any skin contact with the sample by wearing protective clothing during sampling and sample handling.

Regardless of the equipment used for lake sampling a measurement of water depth must be taken at each sampling station prior to sampling. Measurement methods can range from a graduated weighted rope to an electronic depth sounder. The purpose is to ensure that the appropriate amount of cable or rope length is used in order to control the speed of entry of the sampler into the bottom sediment. The speed of deployment of the device is critical to obtaining a representative sample. If the descent of the sampling device is too fast a shock wave is generated in front of the device which will displace any loose material at the surface of the sediment. On triggered devices rapid deployment may also cause the device to prematurely engage. In the case of core samplers if the speed of descent is too slow an insufficient quantity of sediment sample will be obtained.

Bottom sediments collected with the Eckman grab are transferred to a pyrex tray. At the centre of the grab sample , the upper two centimeters of sediment are taken with an aluminum or plastic scoop, depending on the type of analysis to be performed, and placed in a large plastic or stainless steel bowl. The sample is then placed into the appropriate sample container.

Note: For samples that are to be analyzed for organics, scoops and containers should not be plastic. For samples that are to be analyzed for metals, the scoops and containers

should not be metal.

Duplicate or triplicate splits are prepared by repeating this proceedure at least three times, homogenizing the three samples together to form a larger sample, dividing it into two or three different portions, and placing each portion into a different container. Samples should be labelled immediately and put in a cooler containing ice until they can be frozen.

5.4 **River/Stream Sediment Sampling:** As with lake sampling, safety is the primary concern when sampling in rivers or streams. The sampler must ensure that all the necessary safety equipment has been obtained and conditions at the sampling location are safe.

Most often when sampling river/streams, the Eckman grab sampling device is most commonly used. Ideally samples are obtained from a bridge location, although sampling can be done from a boat provided stability can be achieved.

Prior to sampling a site the sampler must have a general idea of the strength of the currents of the river/stream prior to deployment of the sampling device. Strong near bottom currents can deflect the sampling device or require a longer cable than provided. Care should be taken to ensure that the weight of the sampler is adequate for working in particular current conditions and that the sampler collects samples at or very near the desired sampling point Samples are collected as decribed in Section 5.2.

the cooler with heavy packing tape to reduce accidental opening. Each shipping container should be labelled with the destination, the return address, and any required safety markings and labels as well as any special instructions to ensure the safety of the container's arrival.

6.0 BIOLOGICAL SAMPLING

Biological sampling is generally conducted for special research projects or for Recurrent Surveys. Biological sampling under the Canada-Newfoundland Monitoring Agreement involves collection of fish and bacteria. Fish are collected primarily for the purpose of analyzing tissues for levels of bioaccumulated substances. Since fish are high on the aquatic food chain, analyses of the tissue may provide valuable toxicological information about substances which are difficult to measure in ambient waters.

Note: For collecting fish samples, permits are necessary from the appropriate agencies.

6.1 **Bacteriological Sampling**: Animals and humans may be sources of bacteria that compromise human health. Bacteria may be introduced through sources such as sewage, garbage, animal wastes, surface run off, pumps, pipes and soil during construction of new wells, non-sterile water sample containers and human contact. It is important to be sure that waters are free of such influences to ensure acceptable water quality for domestic consumption, recreational uses, and aquatic sustenance.

Waters are commonly tested for two types of bacteria, total coliform and faecal coliform.

Presence of either of these indicate that the water is unsafe for consumption. Total Coliform are bacteria that are present in human and animal waste as well as in soils and on vegetation. Faecal Coliform originate from the intestine of animals and humans. High counts of faecal bacteria indicate the presence of human or animal wastes, which may also support disease causing organisms.

6.2 **Analytical Parameters:** The analytical parameters tested in the bacteriological samples are faecal and total coliform. In Newfoundland the limits used are set by the Canadian Water Quality Guidelines.

6.2.1 **Sampling Methods:** Bacteriological sampling should be taken with aseptic technique. Sampling of this nature should be done with autoclaved bottles that contains 0.1 ml of 10% sodium thiosulphate to dechlorinate the sample. In Newfoundland these can be obtained free of charge at the Department of Health or any of the local Government Services Centres. Exposure of the inside of the bottle to the air is avoided as much as possible and special handling techniques are necessary to prevent contamination of the water sample.

Remove the cap of the bottle only when it is time to take the water sample, hold the cap down to prevent the cap from being contaminated and hold the bottle at an angle so that nothing drifts into the bottle. Do not rinse the bottle with the sample and avoid touching and/or passing objects or clothing over the spout of the bottle. Replace the cap on the

bottle as quickly as possible to prevent any contaminants from drifting or dropping into the sample.

If sampling tap water let the water run for two or three minutes to clear the pipes, uncap the bottle, fill and then recap quickly. For surface waters, uncap the bottle, plunge the bottle about 30 cm below the water (if there is a current, direct the bottle into the current) and recap quickly. Be sure to leave ample air space in the bottle for mixing during testing. Holding time for bacteriological sampling is 24hr.

6.2.2 **Sample Labelling:** The bacteriological water sample should be labelled clearly with a permanent felt tip marker on the labels provided on the bottles. The bottle should be labelled before sampling. Information should include the name of the sampler and the date and time the sample was collected The information sheet that accompanies the sample should record the date and time the sample was collected, location of the water supply, whether the supply was for drinking or non drinking purposes, collected from private or public source, and what type of body of water it was ie., lake, swimming pool, etc. The collector's name, mailing address and phone number to whom the results should be reported to are also completed on the form. A copy of the form required for submitting bacterial samples can be found in Appendix D.

6.2.3 **Sample Preservation:** While handling the bacteriological samples it should be kept in mind that the sample must be returned to the Department of Health laboratory within

24 hr of the sample collection to minimize the physical, chemical and biochemical changes that may take place in the sample container prior to analysis. If delivery of the samples is unavoidably delayed more than six hours the samples must be kept chilled until delivery. **Do not add ice or freeze the sample.** Samples older than 30 hr are not suitable for testing.

6.2.4 **Storage and Shipping:** Samples should be shipped within 24 hrs of the sample time and until such time it is advised that the bottles be packaged in a small cooler. Sample containers must be securely closed and packaged to ensure that there is no leakage, spillage or breakage in route to the laboratory. Samples should be shipped in a sturdy container or cooler. Freezer packs are recommended to keep the samples secure and cool. Pack the samples upright in the cooler with at least one to two times as much ice as the total volume of the samples. To ensure that glass containers are not broken in transport, plastic bottles, clean packaging material or ice packs are placed between them.

Put the requisition form it in a plastic bag and place it on top of the samples for transport.

Seal the cooler with packing tape to ensure that the container does not come open or get tampered with. Attach the address of the destination and sender to the outside of the cooler so that it is readily legible.

6.3. Fish Sampling

6.4 Sampling Equipment

The most common sampling equipment for collecting fish consists of gill nets, seine nets, Fyke nets, electrofishers, angling equipment, and minnow traps. All this equipment is suitable for lake or stream sampling, except electrofishers which are generally used in streams.

6.5. Analytical Parameters: Both organic and inorganic parameters are usually measured in fish samples. Under the Canada-Newfoundland Water Quality Monitoring Agreement fish sampling is usually performed during Recurrent Surveys or special projects. Parameters measured include: extractable non-residual metals, total mercury, Organochlorinated Pesticides, Polychlorinated Biphenyls, Polynuclear Aromatic Hydrocarbons, Chlorinated Phenols, and Chlorinated Benzenes. A more comprehensive listing of parameters, recommended containers, preservation and holding times can be found in Appendix B in the NLET 'Sample Collection Summary' submission (Table II and IV).

6.5.1 Sample Collection: Gill nets are constructed of fine monofilament line suspended between a buoyant 'float line' and a non-buoyant 'lead line'. They are suspended in the water column and capture fish by entangling them in the meshes of the net. The mesh size determines the size and type of species caught.

Seine nets are panels of netting which are pulled at each side, forming a pocket in which the fish become trapped. The upper line of the seine is equipped with floats and the lower with weights.

Fyke nets consist of an internal cone that directs the fish into a trap box. Wings and leaders can be used to direct the fish into the net.

Electrofishing is the technique of passing electric current through the water to attract and stun fish, thus facilitating their capture. Electrofishing is commonly done on foot using a backpacking shocking device. **Electrofishing is potentially dangerous and all members of the sampling team should be certified before using this technique**.

Basic angling equipment includes a fishing rod and reel, fish hooks, monofilament line, weights, bait and lures.

Minnow traps are are net or wire enclosures used to trap live fish. The fish swim through a large funnel shaped opening near the outside of the trap to the narrower opening close to the centre of the trap. Once inside it is difficult for the fish to locate the opening and escape.

Once fish have been captured, the species is identified, measured for length and weight,

their overall condition assessed (i.e. any signs of damage or unusual formations), and scales may be removed for ageing. Fish collected for metals analyses should be put in glass containers or plastic bags. Fish collected for organic analyses should be stored in glass containers. Samples should be labelled and immediately put in a cooler containing ice until they can be frozen.

6.5.2 **Sample Labelling:** See Section 4.3.2

6.5.3 **Preservation:** Preservation methods can be found in the National Laboratory for Environmental Testing document "Sample Collection Summary" in Appendix E Table (II and IV).

6.5.4 **Sample Documentation:** See Section 4.3.4

6.5.5 **Storage and Shipping:** Sample Submission Forms must accompany all samples sent to NLET for analysis. If there is more than one shipping container with samples to be submitted, enclose copies of the submission form in all containers. The Sample Submission Forms require various information. See Appendix D for an example of a Sample Submission Form and instructions on how to provide the required information.

Samples should be shipped within two weeks of the sample date and until such time the samples must be kept frozen. Samples should be shipped in a sturdy container or

cooler. Ice packs should be used instead of loose or bagged ice in order to prevent contamination of samples or breakage of glass containers. Pack samples upright ensuring that containers are separated by ice packs or other packing material to prevent shifting or breakage. Complete the laboratory requisition forms, enclose them in a sealed plastic bag, and place them in or on top of the cooler. A sample condition report, requesting information on date and condition of samples upon arrival at the laboratory, should also be included with the shipment. Seal the cooler with heavy packing tape to reduce accidental opening. Each shipping container should be labelled with the destination, the return address, and any required safety markings and labels as well as any special instructions to ensure the safety of the container's arrival

7.0 SAFETY

Personal safety is perhaps the most important component of any sampling program. Rivers and lakes are dynamic systems and constantly in a state of change. The sampler must be trained and properly equipped to face any conditions which may be presented at the time of sampling. No sample is worth risking one's life over.

Most common in winter sampling is having to sample through ice or venturing on to an ice shelf to collect a sample. First of all, it is recommended that at least two persons are present when working around ice. Ice thickness should be taken from the shoreline out to the sample point at least every metre. Ice thickness should at least be 12 cm and can be checked using an

ice pick or an axe. A rope or harness should be attached to the person leading. On rivers, sampling and measurement should be taken by only one person with the other tending the safety line. Proper survival suits or P.F.D's should be worn at all times.

All vehicles used for sampling, including trucks, boats, A.T.V's and snowmobiles, must be properly maintained and equipped with the necessary safety supplies such as Emergency First Aid Kits, blankets and extra clothing.

Employees should receive training in winter survival and water safety with refresher courses at timely intervals. Certification should be maintained and at least one sampler should be trained to instructor level to provide in house upgrading.

When working in remote areas the sampler must always have adequate communication equipment on hand in case of emergencies. Satellite technology is preferable, however cell and VHF equipment may be adequate depending on the location of towers. The sampler should always provide a detailed plan of daily activities to their headquarters when working in remote areas.

8.0 References

Cavanagh, N., R.N. Nordin, L.G.Swain & L.W. Pommen. 1994. **Ambient Freshwater and Effluent Sampling Manual.** Water Quality Branch, Ministry of Environment, Lands,& Parks,Victoria, B.C.

Cavanagh, N., R.N. Nordin, & P.D. Warrington. 1994. **Biological Sampling Manual.** Water Quality Branch, Ministry of Environment, Lands,& Parks,Victoria, B.C.

Cavanagh, N., R.N. Nordin, L.G.Swain & L.W. Pommen. 1994. **Lake and Stream BottomSediment Sampling Manual.** Water Quality Branch, Ministry of Environment, Lands,& Parks,Victoria, B.C.

Environment Canada. 1986. **A Basic Course in Water Quality Sampling.** Water Quality Branch, Moncton, N.B.

Environment Canada. 1983. **Sampling for Water Quality.** Water Quality Branch, Moncton, N.B.

APPENDIX A

Station Identification Form

STATION IDENTIFICATION

STATION TYPE CODE: 00

STATION NUMBER: NF02YG0016

TOPOGRAPHIC MAP NUMBER: 12H014

LATITUDE (N=+): DEG 49 MIN 51 SEC 42

LONGITUDE (W=-): DEG 57 MIN 17 SEC 21

UTM ZONE: 21

EASTING: 0479200

NORTHING: 5523100

STATION NAME (50 Characters): TRIBUTARY MAIN R. 3.5KM ABOVE EAGLE MTN. BK STN #7

STATION DESCRIPTION (240 Characters): SECONDARY TRIBUTARY WHICH DRAINS INTO PRIMARY TRIBUTARY WEST OF MAIN BROOK 3.5KM ABOVE EAGLE MOUNTAIN BROOK.

Station Type Codes

00 River or Stream
01 Lake
02 Estuary
03 Marine
04 Pond
05 Reservoir
06 Harbour
10 Groundwater
11 Spring
12 Piezometer well
13 Tile drains
14 Wetland
19 Lysimeter
20 Wastewater
30 Precipitation
40 Treated supply
99 Terrestrial station
15 RUNOFF
41 EFFLUENT

DATE: DD 16 - MON NOV - YY 98

AVERAGE DEPTH (M):

WSC STATION:

19/11/98

Completed by: D. Lockerbie

Checked by:

Agency:

APPENDIX B

Sample Field Sheets

CANADA - NFLD WATER QUALITY AGREEMENT

FIELD SHEET

SAMPLE NO: 199900 7100 X-REF SAMPLE NO: 9900 _____

GROUP SAMPLE NO: 9900 _____

STATION NO: NF00000000 Preservation Blank SUBSTATION NO: _____

PROJECT NO: AT0215 SCHEMA: A (B) C D

SAMPLE DATE: 25-Dec-99 SAMPLE TIME: 1000 ZONE: NDT (NST)

SAMPLE TYPE CODE: 20 SAMPLE MATRIX CODE: 0 0 COLLECTION CODE: 0 1 6

SAMPLE DEPTH: n/a (M) SAMPLED BY: P. Barnable

COMMENTS: n/a

FIELD PARAMETERS

*				*	
_____	02065	_____ TEMPERATURE	_____	02042	_____ CONDUCTIVITY
_____	10301	_____ PH	_____	10801	_____ SALINITY
_____	08102	_____ DISS. OXYGEN	_____	97020	_____ WATER TABLE
_____	88600	_____ HACH D.O.	_____	02073	_____ TURBIDITY
_____		_____	_____		_____

* Lab Codes: 80 - Field 81 - In Situ

SAMPLE BOTTLES/CONTAINERS

NATIONAL LAB

_____ MAJOR IONS (1000 ml)

__1__ METALS (500 ml)

__1__ T. PHOSPHOROUS (50 ml)

__1__ MERCURY (100 ml)

_____ OTHER

CANADA - NFLD WATER QUALITY AGREEMENT

FIELD SHEET

SAMPLE NO: 199900 7050 X-REF SAMPLE NO: 199900 7052

GROUP SAMPLE NO: 9900 _____

STATION NO: NF02YL0012 SUBSTATION NO: _____
HUMBER RIVER AT HUMBER VILLAGE BRIDGE

PROJECT NO: AT0215 SCHEMA: (A) B C D

SAMPLE DATE: 15-Nov-99 SAMPLE TIME: ____ ZONE: NDT NST

SAMPLE TYPE CODE: 04 SAMPLE MATRIX CODE: 0 0 COLLECTION CODE: 0 1 6

SAMPLE DEPTH: .20 (M) SAMPLED BY: P. BARNABLE

COMMENTS: sunny mod N. winds, Rain/Snow 24hrs

FIELD PARAMETERS

		*				*	
1.0	02065	80	TEMPERATURE	45.0	02042	81	CONDUCTIVITY
7.2	10301	80	PH	_____	10801	_____	SALINITY
10.0 (99.6)	08102	81	DISS. OXYGEN	_____	97020	_____	WATER TABLE
_____	88600	_____	HACH D.O.	_____	02073	_____	TURBIDITY
_____		_____		_____		_____	

* Lab Codes: 80 - Field 81 - In Situ

SAMPLE BOTTLES/CONTAINERS

NATIONAL LAB

1 MAJOR IONS (1000 ml)

1 METALS (500 ml)

1 T. PHOSPHOROUS (50 ml)

1 MERCURY (100 ml)

_____ OTHER

CANADA - NFLD WATER QUALITY AGREEMENT

FIELD SHEET

SAMPLE NO: 199900 7051 X-REF SAMPLE NO: 99900 7052

GROUP SAMPLE NO: 9900 _____

STATION NO: NF02YL0012 SUBSTATION NO: _____
HUMBER RIVER AT HUMBER VILLAGE BRIDGE

PROJECT NO: AT0215 SCHEMA: (A) B C D

SAMPLE DATE: 15-Nov-99 SAMPLE TIME: ____ ZONE: NDT NST

SAMPLE TYPE CODE: 04 SAMPLE MATRIX CODE: 0 0 COLLECTION CODE: 0 1 6

SAMPLE DEPTH: .20 (M) SAMPLED BY: P. BARNABLE

COMMENTS: sunny mod N. winds, rain/snow <24hrs

FIELD PARAMETERS

		*				*	
1.0	02065	80	TEMPERATURE	45.0	02042	81	CONDUCTIVITY
7.2	10301	80	PH		10801		SALINITY
10.8 (99.0%)	08102	81	DISS. OXYGEN		97020		WATER TABLE
	88600		HACH D.O.		02073		TURBIDITY

* Lab Codes: 80 - Field 81 - In Situ

SAMPLE BOTTLES/CONTAINERS

NATIONAL LAB

1 MAJOR IONS (1000 ml)

1 METALS (500 ml)

1 T. PHOSPHOROUS (50 ml)

1 MERCURY (100 ml)

_____ OTHER

CANADA - NFLD WATER QUALITY AGREEMENT

FIELD SHEET

SAMPLE NO: 199900 7052 X-REF SAMPLE NO: 99900 7052

GROUP SAMPLE NO: 9900 _____

STATION NO: NF02YL0012 SUBSTATION NO: _____
HUMBER RIVER AT HUMBER VILLAGE BRIDGE

PROJECT NO: AT0215 SCHEMA: (A) B C D

SAMPLE DATE: 15-Nov-99 SAMPLE TIME: ____ ZONE: NDT NST

SAMPLE TYPE CODE: 04 SAMPLE MATRIX CODE: 0 0 COLLECTION CODE: 0 1 6

SAMPLE DEPTH: .20 (M) SAMPLED BY: P. BARNABLE

COMMENTS: sunny mod N. winds, rain/snow <24hrs

FIELD PARAMETERS

		*				*	
1.0	02065	80	TEMPERATURE	45.0	02042	81	CONDUCTIVITY
7.2	10301	80	PH	_____	10801	_____	SALINITY
10.0 (99.0%)	08102	81	DISS. OXYGEN	_____	97020	_____	WATER TABLE
_____	88600	_____	HACH D.O.	_____	02073	_____	TURBIDITY
_____		_____		_____		_____	

* Lab Codes: 80 - Field 81 - In Situ

SAMPLE BOTTLES/CONTAINERS

NATIONAL LAB

1 MAJOR IONS (1000 ml)

1 METALS (500 ml)

1 T. PHOSPHOROUS (50 ml)

1 MERCURY (100 ml)

_____ OTHER

CANADA - NFLD WATER QUALITY AGREEMENT

FIELD SHEET

SAMPLE NO: 199900 7040 X-REF SAMPLE NO: 9900 _____

GROUP SAMPLE NO: 9900 _____

STATION NO: NF02YL0012 SUBSTATION NO: _____
HUMBER RIVER AT HUMBER VILLAGE BRIDGE

PROJECT NO: AT0215 SCHEMA: (A) B C D

SAMPLE DATE: 10-Oct-99 SAMPLE TIME: ____ ZONE: NDT NST

SAMPLE TYPE CODE: 01 SAMPLE MATRIX CODE: 0 0 COLLECTION CODE: 0 1 6

SAMPLE DEPTH: .20 (M) SAMPLED BY: P. BARNABLE

COMMENTS: 2/10 cloud, mod S.E winds, mod flow, Rain 1-2hrs

FIELD PARAMETERS

6.0	02065	81	TEMPERATURE	48.0	02042	81	CONDUCTIVITY
6.8	10301	80	PH	_____	10801	_____	SALINITY
10.2 (97.0%)	08102	81	DISS. OXYGEN	_____	97020	_____	WATER TABLE
_____	88600	_____	HACH D.O.	_____	02073	_____	TURBIDITY
_____		_____		_____		_____	

* Lab Codes: 80 - Field 81 - In Situ

SAMPLE BOTTLES/CONTAINERS

NATIONAL LAB

1 MAJOR IONS (1000 ml)

1 METALS (500 ml)

1 T. PHOSPHOROUS (50 ml)

1 MERCURY (100 ml)

_____ OTHER

Appendix C

Sample Submission Form

Environment Canada / Environnement Canada

SAMPLE SUBMISSION FORM - ENVIRODAT/MISCELLANEOUS
EXPÉDITION D'ÉCHANTILLONS PRÉLEVÉS DANS L'ENVIRONNEMENT

NATIONAL LABORATORY FOR ENVIRONMENTAL TESTING
LABORATOIRE NATIONAL DES ESSAIS ENVIRONNEMENTAUX

1 NLET Project No. - Projet de LNEE	2 Project Leader - Chef de projet	3 Sample Submitted by - Expediteur	4 Tel. No. - N° de tel

5 Date Shipped - Expédié le	6 Via - Par	7 Date Rec'd - Reçu le	8 ENVIRODAT Submitter ID - Id ENVIRODAT du client

9 NLET Sample No. No de LNEE	10 No. of Ctrs. No de récip.	11 Client Sample No. - No de l'echant. (max 12 characters)	12 NLET Schema Name(s) and/or Schema Number(s) - LNEE Schema(s) requises	13 ENVIRODAT Station ID - Id de la station ENVIRODAT (10 chars.)	14 Collected - Prélèvement: Date Date (YYMMDD)	Collected - Prélèvement: Time Heure (HH:MM)	Collected - Prélèvement: Zone Fuseau	15 Remarks - Remarques
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(01/00)

ENVIRODAT/MISCELLANEOUS
Sample Submission Form Explanation

1. NLET Project Number -
   The project to which the samples are to be submitted.
   Format: NNN-YYYY, where NNN = 3 digit number,
   YYYY = fiscal year
   e.g. 101-1993

2. Project Leader -
   The name of the person responsible for the project.

3. Sample Submitted by -
   The name of the person who collected/shipped samples.

4. Telephone Number -
   The telephone number of the contact person.

5. Date Shipped -
   Date sent by courier/submitted to NLET.

6. Via -
   Name and telephone number of courier (if shipped).

7. Date Rec'd - Lab use only.

8. ENVIRODAT Submitter ID -
   If ENVIRODAT samples: ENVIRODAT project number.
   Format: RRNNNN, where RR = region,
   NNNN = number
   e.g. HQ0001
   If non-ENVIRODAT samples: leave blank.

9. NLET Sample Number - Lab use only.

10. Number of Containers - Lab use only.

11. Client Sample Number - Client assigned identifier.
   If ENVIRODAT samples: format should be YYYYRRNNNNNN,
   where YYYY = year,
   RR = region
   NNNNNN = number
   e.g. 1993ON000001
   If non-ENVIRODAT: format is any combination of characters,
   up to maximum of 12,
   lowercase letters treated as uppercase,
   space is not a valid character.
   e.g. LAKE_ERIE, 92/005, RG-92R

12. NLET Schema Name(s) and/or Schema Number(s) -
   User may specify
   * schema number(s) only,
   e.g. S25, S45, S52, ...
   (The preceding 'S' stands for schema, and indicates that these are schema numbers)
   * schema name(s) only,
   e.g. CHN-W, TKN-W, PAH-S, ...
   * schema name(s) and schema number(s),
   e.g. S25 CHN-W, S45 TKN-W, S52 PAH-S, ...
   NOTE> Schema numbers must correspond to schema names specified
   in the NLET Project Description Report.

13. ENVIRODAT Station -
   ENVIRODAT: Format PPBBSSNNNN, where PP = province/state,
   BB = basin,
   SS = sub-basin,
   NNNN = number
   e.g. ON02HA0001, QU02MC0020
   If non-ENVIRODAT samples: leave blank.

14. Collected -
   Date: Date of Sampling.
   Format: YYYYMMDD where YYYY = year,
   MM = month,
   DD = day.
   e.g. 19931231, 19930101
   Time: Time of Sampling.
   Use 24 hour clock.
   Format: HH:MM
   e.g. 23:59, 01:15
   Zone: Time Zone
   ENVIRODAT: 3 character time zone.
   e.g. EST, PDT
   If non-ENVIRODAT: leave blank.

15. Remarks -
   Any comments pertaining to the sample.

ENVIRODAT/DIVERS
Explications de Formule de Soumission des Echantillons

1. Numéro du Projet/LNEE -
   Le projet ou les échantillons sont soumis.
   Format NNN-YYYY, NNN: 3 chiffres numériques,
   YYYY = année fiscale
   ex. 101-1993

2. Chef du Projet -
   Nom de la personne responsable du projet.

3. Echantillons soumis par -
   Nom de la personne qui a prélevé et envoie les échantillons.

4. Numéro du Téléphone -
   Numéro du téléphone de la personne à contacter.

5. Date expédié -
   Date expédié/reçu par LNEE.

6. Via -
   Nom et numéro du téléphone du courrier.

7. Date Reçu - Usage laboratoire seulement.

8. Identification livreur ENVIRODAT:
   Echantillons ENVIRODAT: numéro du project ENVIRODAT.
   Format: RRNNNN, RR = région,
   NNNN = numéros.
   ex. ON0001
   Echantillons non-ENVIRODAT: laisser blanc

9. Numéro d'échantillon/LNEE - Usage laboratoire seulement.

10. Nombre des récipients - Usage laboratoire seulement.

11. Numéro d'échantillon/Client - Numéro d'échantillon donné par client.
   Echantillons ENVIRODAT: format YYYYRRNNNNNN,
   YYYY = année fiscale,
   RR = région,
   NNNNNN = numéros.
   ex. 1993ON000001
   Echantillons non-ENVIRODAT: alphanumérique (max 12)
   - lettres magiscules ou minuscules peuvent servir.
   - l'espace est non-valide.
   ex. LAKE_ERIE, 92/005, RG-92R

12. Nom ou numéro du SCHEMA/LNEE -
   L'usage est par:
   * numéro(s) du schéma seulement,
   ex. S25, S45, S52, ...
   ("S" est l'abréviation du SCHEMA)
   * nom(s) du schéma seulement,
   ex. CHN-W, TKN-W, PAH-S, ...
   * numéro(s) du schéma et nom(s) du schéma,
   ex. S25 CHN-W, S45 TKN-W, S52 PAH-S, ...
   N.B. Numéro du schéma doit correspondre aux noms des schémas dans la "Liste des Projets LNEE"

13. Station ENVIRODAT -
   Echantillons ENVIRODAT: Format PPBBSSNNNN
   PP = province/etat,
   BB = bassin,
   SS = sous-basin,
   NNNN = numéro
   ex. ON02HA0001, QU02MC0020
   Echantillons non-ENVIRODAT: laisser blanc

14. Prélève -
   Date du prélèvement (Echantillonage).
   Format: YYYYMMDD
   YYYY = année,
   MM = mois,
   DD = jour.
   ex. 19931231, 19930101
   Heure: Heure du prélèvement (syst. de 24 hre)
   Format HH:MM
   ex. 23:59, 01:15
   Zone: Heure/Zone
   Echantillons ENVIRODAT: 3 lettres
   ex. EST, WST, PST
   Echantillons non-NAQUADAT: laisser blanc

15. Remarques -
   Informations concernants les échantillons.

(01/99)

APPENDIX D

Bacterial Sample Submission Form

NEWFOUNDLAND PUBLIC HEALTH LABORATORY
THE LEONARD A. MILLER CENTRE FOR HEALTH SERVICES
P.O. BOX 8800, 100 FOREST RD.,
ST. JOHN'S, NFLD. A1B 3T2 TELEPHONE: (709) 737-6577

BACTERIOLOGICAL WATER ANALYSIS

INSTRUCTIONS FOR THE COLLECTION OF WATER SAMPLES

PRIVATE DRINKING WATER SUPPLIES SHOULD NOT BE TESTED WITHIN THREE DAYS AFTER CHLORINATION OR WITHIN SEVEN DAYS FOLLOWING DRILLING OR DIGGING.

1. Use only the special sterile bottles available from the Public Health Laboratory. Do not open the bottle until ready to collect sample. Do not touch the inside of the screw-cap or the mouth of the bottle after cap removal.

2. Allow water to flow for about 5 minutes to clear the service line.

3. Reduce the flow and fill the bottle to indicator line. **Do not fill the bottle completely. Do not rinse out the bottle.** Replace the cap securely.

4. Identify the sample on the label and complete the form below.

5. Hand deliver the sample promptly to the Public Health Laboratory at the Miller Centre, Forest Road, St. John's. If delay of more than 6 hours is unavoidable, keep the sample chilled until delivery. **Do not add ice to the sample; do not freeze.** Samples older than 30 hours are not suitable for testing.

6. Routine water samples are accepted 8:30 a.m. to 4:00 p.m. Monday through Thursday. Samples cannot be accepted on Friday or on any day immediately preceding a public holiday. Reports will be mailed within 2 days but can be held for pick-up at the Laboratory Office, if so indicated. **Unsafe water test results will be telephoned. Samples from public water supplies will not be accepted from private individuals. The accompanying sample bottle is unsuitable for chemical analysis.**

DATE AND TIME SAMPLE COLLECTED _____

COLLECTED BY _____

LOCATION OF WATER SUPPLY _____

DRINKING WATER	☐ PRIVATE	☐ PUBLIC
NON-DRINKING WATER	☐ LAKE/RIVER	☐ SWIMMING POOL
	☐ SEWAGE	☐ OUTDOOR SWIMMING AREA
	☐ WHIRLPOOL/HOT TUB	☐ OTHER (SPECIFY) _____

☐ HOLD FOR PICK-UP

REPORT TO: _____
NAME

_____
ADDRESS

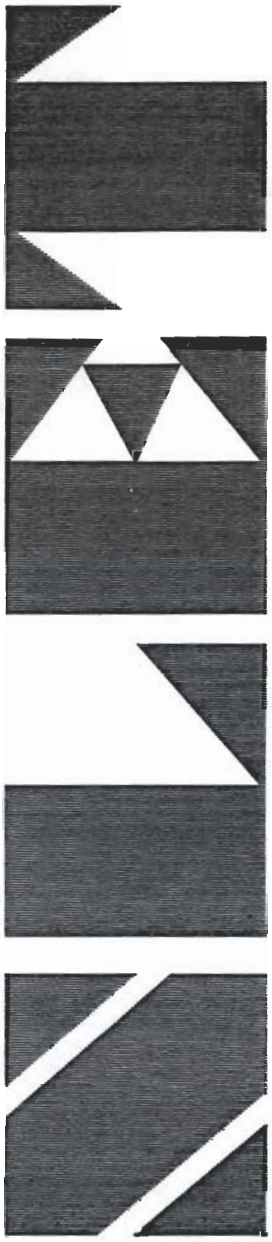
_____ NF _____
COMMUNITY POSTAL CODE

_____
TELEPHONE NUMBER

APPENDIX E

NLET 1998-99 Sample Collection Summary and Schedule of Services

1998-99
SAMPLE COLLECTION SUMMARY



The National Laboratory for Environmental Testing

867 Lakeshore Road, P.O. Box 5050
Burlington, Ontario L7R 4A6
Tel: (905) 336-4648
Fax: (905) 336-6404

Sample Collection Summary

Background Information

The National Laboratory for Environmental Testing (NLET) receives numerous requests for analytical services each year. Although these requests vary in nature and complexity, they generally are made in reference to the determination of environmental constituents found in water, sediment and biota. To ensure the integrity of samples and to apply the appropriate analytical procedures, good laboratory practices must be adhered to; preferably from the time of collection until the data has been returned to the client. The purpose of this document is to provide information to clients with regards to sending samples to the laboratory for analysis. The topics covered include a summary of the appropriate preservation, container type and container preparation for samples. Following the procedures outlined in this document should ensure that sources of contamination and degradation are minimized before sample arrival at the laboratory.

Scope

This document summarizes the requirements for samples being submitted to NLET for standard methods of analysis where appropriate national standards must be met. The requirements for samples submitted in support of research and development activities or project specific requests may be different and may not adhere to the same rigorous system of control.

Purpose

The purpose of this document is to inform clients of the requirements for samples submitted to NLET.

Sample Collection Summary

Fish or other biota samples must be homogenized before submitted for analysis. DFO (Burlington) is equipped to provide this service to clients at a charge. Contact Mike Whittle at (905) 336-4565 for details.

Container Types

The recommended container type for each analysis is shown in Tables I - IV.

Polypropylene containers may be used in place of polyethylene containers but are not recommended as they tend to become brittle and crack with age.

For metal analyses, no part of the container should be metal. Corrosion may occur which could taint the sample.

Do not submit samples in plastic containers for organic analyses. Plastics are organic compounds and can contaminate the sample.

If both organic and metal analyses are required for a fish or sediment sample use a glass or, preferably, a Teflon® type container. It is recommended that samples be subdivided for organic and metal analysis into two containers; a metal or Teflon® type container for organic analysis and a polyethylene or Teflon® type container for metal analysis.

Although glass containers can be used for wet substrates, there have been problems associated with substrates that have a high moisture content (e.g. on standing, the substrate has distinct solid and liquid phases). Expansion of the liquid phase on freezing often results in breakage with a corresponding loss of sample on thawing. It is helpful to leave at least one-half inch headspace but the degree of lateral expansion depends on the moisture content of the sample and breakage may still occur. The laboratory has encountered a 25% breakage rate for wet sediment samples submitted in glass containers. In these cases, analysis cannot proceed since a number of problems result which are related to: 1. Sample recovery; 2. The hazard posed by broken glass to the analyst; and 3. The potential for contamination. Most fish tissues generally have lower moisture content but the risk associated with any wet substrate submitted in glass containers remains.

Caps Cat. No. 232-755 RC (for the above bottle)(specify linerless caps)

Bottles from other sources may also be suitable. If you think that you have found an equivalent, please call Bert Francoeur at (905) 336-4557 of the Nutrients Section at NLET before ordering a large quantity to ensure that the specifications are met.

For the TKN method, the bottle caps used for the Flint Winchester sample bottle should be white polyethylene. The black polyethylene bottle caps are brittle and often break on the automated system.

*This does not imply endorsement.

Miscellaneous

Particulate Organic Carbon and Nitrogen

Due to instrument limitations, samples for CHN analysis must be filtered on 2.5 cm GF/C filter papers or on 4.25 cm GF/C filter papers using a glass funnel with a rectangular base opening of 1x3 cm. The latter is custom-made. The volume of sample filtered must be included on the Sample Submission Forms to permit calculations for final results. Refer to the methodology for guidelines approximating the amount that should be filtered based on anticipated concentration levels of suspended matter.

Metals

Total Metals

Samples to be submitted for total metal analysis must not contain more than 1 mm of settled solids. It is recommended that samples with high suspended solids be filtered in the field and the filtered and solid fractions submitted separately for analysis.

QC Data

In the Trace Metals Laboratory, the QC data is available upon request in the ECOLIMS current format and must be arranged when the project is defined. A fee is attached to QC data requests from previous years.

Sample Collection Summary

Container Washing Procedures

Method 1 *Major Ions (Water)*

- Add 50 mL of 10% HCL per 1 litre bottle
- Fill the bottle to the rim with distilled deionized water (DDW)
- Cap and soak for at least three days
- Rinse 3-4 times with DDW

Method 2 *Total Phosphorus (Water)*

- Add 5 mL of 10% H_2SO_4 per 100 mL bottle
- Fill the bottle to the rim with DDW
- Cap and soak for at least three days
- Rinse 3-4 times with DDW

Method 3 *Nutrients (Water)*

- Add 5 mL of 10% H_2SO_4 per 100 mL bottle
- Fill the bottle to the rim with DDW
- Cap and soak for at least three days
- Rinse 3-4 times with DDW

Method 4 *Trace Metals (Water, Sediment*)*

- Add 50 mL of 10% HNO_3 per 1 litre bottle
- Fill the bottle to the rim with DDW
- Cap and soak for at least three days
- Rinse 3-4 times with DDW

* Residual sediment sample is first discarded.

(Containers with debris are rinsed with high pressure hot water before following the procedures above.)

Sample Collection Summary

Method 8 *Magnetic Stirrers (Water)*

- Wash with a phosphate free liquid soap and hot water
- Rinse with DDW
- Rinse twice with reagent grade acetone
- Rinse twice with reagent grade petroleum ether
- Place in proper bottle (before shipping)

Method 9 *Organic Constituents (Sediment*)*

- Wash with high pressure hot water
- Scrub with a phosphate free liquid soap and water
- Rinse with high pressure hot water
- Rinse three times with DDW
- Rinse two times with reagent grade acetone
- Rinse two times with reagent grade petroleum ether
- Evaporate solvents in fume hood or in an oven at 125°C
- Rinse Aluminum foil (or Teflon® lining) twice with acetone and twice with petroleum ether and let dry in the fume hood
- Wash bottle caps with soap and hot water and rinse with DDW
- Cut Aluminum foil (or Teflon® lining) into size with acetone washed scissors
- Use cleaned Aluminum foil (or Teflon® lining) between cap and bottle

* Residual sediment sample is first discarded.

TABLE I - INORGANIC ANALYSES OF WATER

Parameter or Parameter Grouping	Recommended Container Type	Required Amount for Analysis	Preservation Condition	Holding Time *	Container Washing Technique
3. Misc.					
Residue	Polyethylene 1000 mL	1000 mL	4°C - 6°C, Darkness [3] or Room Temperature [7]	7 days [3] 24 hours [7]	Method 1
Particulate Organic Carbon and Nitrogen	Plastic petri dish, filter on 2.5 cm GF/C filter paper or 4.25 cm GF/C filter paper with a rectangular sample area of 1x3 cm.	See Method for guidelines regarding volume to be filtered.	4°C - 6°C, Darkness [3]	6 months [3]	NA
Chlorophyll A	Plastic petri dish, filter on 4.25 cm GF/C filter paper.	1000 mL to be filtered.	1% (w/v) $MgCO_3$, Freeze, -20°C Darkness [3]	7 days [3]	NA
4. Nutrients					
Ammonia	Glass 100 mL, Round Flint Winchester	25 mL	4°C - 6°C [3]	24 hours [3]	Method 3
Nitrate-Nitrite					
Total Kjeldahl Nitrogen	Glass 100 mL, Round Flint Winchester	50 mL	4°C - 6°C [3]	24 hours [3]	Method 3
Total Nitrogen	Glass 100 mL, Round Flint Winchester	50 mL	4°C - 6°C [3]	24 hours [3]	Method 3
Soluble Reactive Phosphorus	Glass 100 mL, Round Flint Winchester	25 mL	4°C - 6°C [3]	24 hours [3]	Method 3
Dissolved Inorganic and Organic Carbon	Glass 100 mL, Round Flint Winchester	25 mL	4°C - 6°C [3]	24 hours [3]	Method 3

otnotes:

Use 125 mL flint glass wide mouth bottles, Catalogue No. B7786-120, with linerless caps, Catalogue No. 232-755RC, available from Canlab.

lpful Hints:

(i) One 500 mL container can be submitted for analysis of more than one major ion parameter with similar container type and preservation condition requirements.

(ii) One 100 mL container can be submitted for analysis of more than one nutrient parameter with similar container type and preservation condition requirements.

(iii) Two separate containers must be submitted for analysis of total and dissolved metals using the ICP.

(iv) One container may be used to submit samples for total and extractable metals using the ICP.

Elapsed time between sample collection and either sample preparation or analyses, as specified. [1]
Published reference <u>not</u> available.

TABLE II - INORGANIC ANALYSES OF SEDIMENT AND BIOTA

Parameter or Parameter Grouping	Recommended Container Type	Required Amount for Analysis	Preservation Condition	Holding Time *	Container Washing Technique
Mercury	Polyethylene (125 mL for wet)	**Sediment:** 15 g Wet or 3 g Freeze Dried. Homogeneous sample.	Freeze, -20°C (wet) or Room Temperature (freeze dried)	6 months [3]	Method 4
		Fish: 3 g Wet or 0.5 g Freeze Dried. Homogeneous sample.	Freeze, -20°C (wet) or Room Temperature (freeze dried)	6 months [3]	Method 4
2. Misc.					
Phosphorus in Sediment	Polyethylene bag or jar, Teflon®	3 g Freeze Dried or 10 g Wet. Homogeneous sample.	Room Temperature (freeze dried) or Freeze, -20°C (wet)	NA [5]	NA
Total Organic and Inorganic Carbon and Total Nitrogen	Polyethylene or Teflon® jar	**Sediment:** 0 .5 - 1 g Freeze Dried. Homogeneous sample.	Room Temperature (freeze dried)	6 months [2]	NA

elpful Hints:
- (i) **Leave room for expansion of frozen samples submitted in glass containers.**
- (ii) **Sediment, biota and fish samples should be FREEZE DRIED ONLY (not heat dried).**
- (iii) **Keep wet samples frozen at -20° C unless stated otherwise.**
- (iv) **Teflon® containers are <u>strongly</u> recommended, for samples submitted frozen, to prevent container breakage, especially during thawing.**
- (v) **Fish, biota and sediment samples must be homogenized before being submitted for analysis.**

Elapsed time between sample collection and either sample preparation or analyses, as specified. [1]
Published reference <u>not</u> available.

TABLE III - ORGANIC ANALYSES OF WATER

Parameter or Parameter Grouping	Recommended Container Type	Required Amount for Analysis	Preservation Condition	Holding Time *	Container Washing Technique
Immunoassay	NLET will supply field sampling kit	Greater than 1.0 mL	4°C - 6°C, Darkness [6]	7 days ⊕	NA

Elapsed time between sample collection and either sample preparation or analyses, as specified. [1]
Published reference <u>not</u> available.

TABLE V - METHOD TABLE FOR WATER

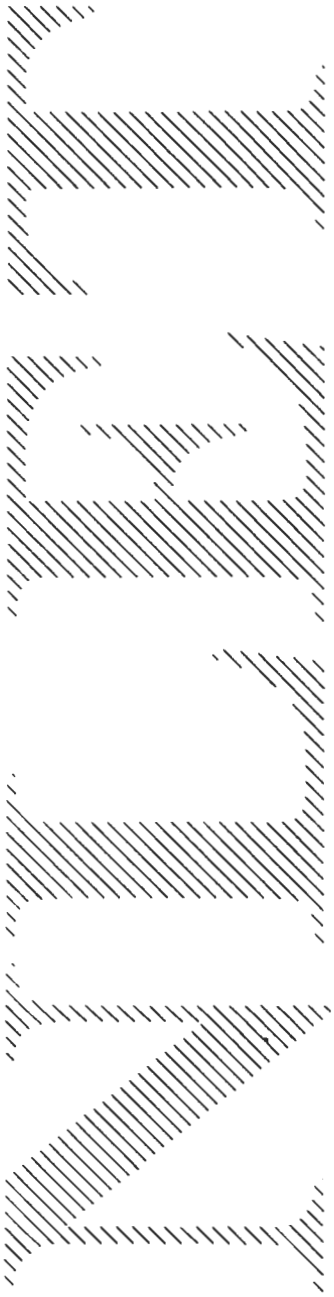
Parameter	Method Used
Extractable Metals	1. ICP 2. ICP/MS
Fluoride	Automated Selective Ion Electrode
Hardness	Calculated
Magnesium	ICP
Mercury	Cold Vapour Atomic Absorption
Neutral Herbicides	GC/ECD and GC/NPD
Nitrate	Ion Chromatographic
Organochlorine Pesticides, Chlorobenzenes and PCBs	GC/ECD
Nitrate-Nitrite	Automated Cadmium Reduction / Traacs 800
Organophosphorous Pesticides	GC/ECD and GC/NPD
Particulate Organic Carbon and Nitrogen	CHN Analyzer
pH	Electrometric, Isfet Probe
Polynuclear Aromatic Hydrocarbons	GC/MSD
Potassium	ICP

TABLE VI - METHOD TABLE FOR SEDIMENT AND FISH

Parameter	Method Used
Arsenic	Flameless Hydride Generation, ICP
Chlorophenols	GC/MSD
Extractable Metals in Sediment	Atomic Absorption
Mercury	Cold Vapour Atomic Absorption
Neutral Herbicides	GC/ECD and GC/NPD
Organochlorine Pesticides, Chlorobenzenes and PCBs	GC/ECD
Organophosphorous Pesticides	GC/ECD and GC/NPD
Particulate Carbon and Nitrogen	CHN Analyzer
Phosphorus in Sediment	Atomic Absorption
Selenium	Flameless Hydride Generation, ICP
Total Metals in Fish	Wet Digestion / Atomic Absorption
Total Metals in Sediment	Wet Digestion / Atomic Absorption

1998-99

SCHEDULE OF SERVICES



THE NATIONAL LABORATORY FOR ENVIRONMENTAL TESTING

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Environment Canada Environnement Canada

SCHEDULE OF SERVICES

Table of Contents

General Information

Our mission is to contribute to the development of sound, SCIENCE BASED KNOWLEDGE for EFFECTIVE ECOSYSTEM MANAGEMENT through the application of quality based analytical chemistry.

The National Laboratory for Environmental Testing (NLET):

- ★ **is a fully accredited laboratory through the National Canadian Standards Association (CSA) accreditation program;**
- ★ **uses CSA certified test methods that incorporate appropriate quality control for the analytical tests in this Schedule of Services;**
- ★ **carries out an ongoing comprehensive internal QA/QC program that meets or exceeds national and international standards;**
- ★ **participates in many different interlaboratory studies on a continuous basis;**
- ★ **provides information and advice to help develop innovative solutions to your analytical problems and to help you fulfil your program objectives.**

NLET continually works towards:

- **a decrease in cost per sample by developing and adapting new technologies;**
- **pursuing more innovative ways to deliver a wider range of client services through partnerships in both the public and private sectors.**

Analytical Capabilities - An Overview

The National Laboratory for Environmental Testing (NLET) provides analytical support to government agencies through the application of quality based science. Highly skilled professionals and technicians employ sophisticated instrumentation for low level measurements that are chemical or biological in nature and found in precipitation, surface and ground waters, sediment and biota. Quality data is assured through strict adherence to the comprehensive quality management program in place at NLET. A commitment to quality is further evident in NLET's continued support and participation in the accreditation activities of the Canadian Association of Environmental Analytical Laboratories (CAEAL).

In addition, the quality assurance development unit of NLET develops and supplies QA/QC tools and services (including certified reference materials) to promote greater accuracy, consistency and reliability of laboratory measurements.

NLET's organizational link with the research and development activities of the National Water Research Insitute (NWRI) and ties to departmental laboratories, universities and other agencies allow for technology and information interchange that can prove beneficial to clients in need of expert advice or who wish to collaborate on studies of mutual interest.

In the last few years the role of NLET has subtly shifted from simply being a "provider of data" to ensuring that analytical requests meet appropriate federal standards and are consistent with data quality objectives. The concept that quality data is a shared responsibility extending beyond the analytical work conducted at the laboratory is being promoted to ensure that final results have scientific value. Effective communication between the project managers and analytical chemists is key to the successful delivery of programs.

General Information on the Schedule of Services

The Schedule of Services lists representative or core schemas available at the National Laboratory for Environmental Testing (NLET). If you are unable to find a set of schemas that satisfies your needs, contact our client liaison office for assistance. It may be possible to custom design a set of schemas that will suit your unique program requirements. The schemas requested by you on the **Request for Analytical Support Forms** will be assigned to your project. Valid sample requests on the **Sample Submission Form** specify either the schema name or schema number assigned to your project. If program requirements change after your project has been established and different schemas are needed to fulfil the revised objectives, contact the client liaison office to ensure that the work can be completed and to update the schema listing and projected number of samples for your project.

8. The parameter label (see the Parameter Label Index on page 37 for the full parameter name).

9. The method abbreviation (see the Method Abbreviation Index on page 45 for the full method name).

10. The method detection limit.

11. The reporting units.

Sample Submissions

Sample requests are made on the **Sample Submission Form - ENVIRODAT/ MISCELLANEOUS** or the **STAR Submission Form** depending on the database destination for reported results. Refer to the instructions on the back of the forms if you need more information on completing the forms. If you are still unclear, contact the client liaison office. We will be happy to answer any questions that you may have.

The **Sample Submission Forms** must accompany **all** samples that are sent to NLET for analysis. If there is more than one box of samples submitted be sure to include copies of the submission forms in all boxes. Please complete the forms with care as samples will be initialized with the information that is included on the submission forms. For a summary of the requirements for samples submitted to NLET for analysis, consult the document entitled **Sample Collection Summary**. If you have not received a copy, let us know and we will send one to you.

The Schedule of Services displays columns for both the ENVIRODAT and STAR codes. If your results are destined for either database ensure that the appropriate code exists for the parameter you are interested in. If there is no corresponding code for ENVIRODAT we will make the request for you; if you require a STAR code contact Jim Byron at (905) 336-4671.

Turnaround Times

NLET offers two sample turnaround time options to clients:

- A default turnaround time of **eight weeks for inorganics** and **sixteen weeks for organics.**

- A turnaround time of four weeks (may not be available for all analyses).

High Level Samples

Request for analysis of wastewaters, effluent and other potentially high contaminated samples need to be brought to NLET's attention and program objectives reviewed before samples are submitted for analysis. The laboratory will determine whether the requests fall within their specialized realm of expertise and inform staff of any special precautions or arrangements that have been made. In the event that NLET is unable to accommodate analytical requests clients will be directed to appropriate facilities.

Schemas for High Level Samples

Schemas with greater TMUs will be assigned to projects submitting highly concentrated samples that have been approved for analysis. These schemas will better reflect the actual time spent in dilutions and reanalysis for concentrated samples. If you can't find a schema in the expected concentration range for your samples contact the client liaison office to find out how to proceed.

Results

All results are reported in concentration units. Please ensure that the **volumes** are included with your requests, where applicable, in the remarks column on the **Sample Submission Form**.

Supplementary Services

The following are supplementary services that are not included in the Time Measuring Unit (TMU). NLET will offer these services on an allocation or cost recovery basis. However, not all services can be offered on an allocation basis. Details will have to be worked out in each case.

- data verification and documentation
- sample filtration in the laboratory
- bottle washing
- Great Lakes field cruise support
- method comparison studies
- special method adaptation and set-up
- training of laboratory staff for special methods
- set-up and use of project specific analytical methods
- special services requested by the client
- MSD confirmation beyond routine analytical quality control
- reporting in non-standard formats

PROJECT, INFORMATION AND QUALITY MANAGEMENT (PIQM) CONTACTS:

Dave Warry (CHIEF) ..... (905) 336-6264
E-mail ..... Dave.Warry@cciw.ca

(for information pertaining to credits, special project needs, costing, technical advice, etc.)

Computer Services

(for computer related problems, data transfer, etc.)

Jennifer Fang ..... (905) 336-4505
E-mail ..... Jennifer.Fang@cciw.ca

Margaret Duffield ..... (905) 336-4672
E-mail ..... Margaret.Duffield@cciw.ca

Quality Management Section

(for QA information, etc.)

Cynthia Young ..... (905) 336-4761
E-mail ..... Cynthia.Young@cciw.ca

Client Liaison

(for project set up, schema selection and related paperwork, technical advice information and costing, and issues regarding shipping, container and bottle washing, etc.)

Sharon Carrier ..... (905) 336-6261
E-mail ..... Sharon.Carrier@cciw.ca

Shipping and Receiving

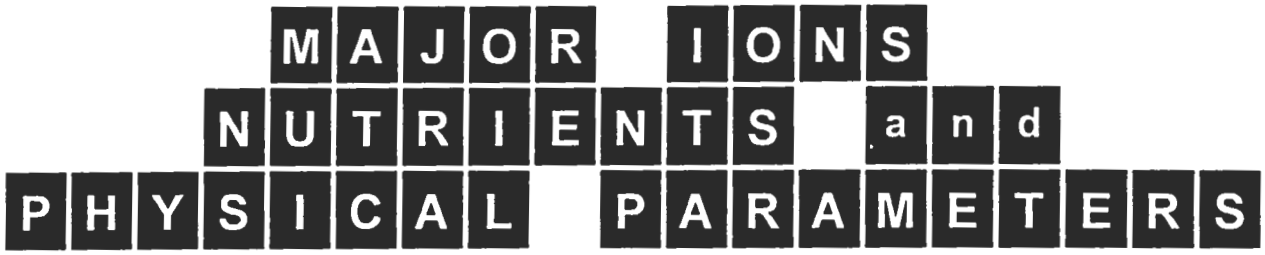
Don Marsh ..... (905) 336-4614
E-mail ..... Don.Marsh@cciw.ca

Part 1: Current Analytical Methods

Find information on:

- ✔Schema Names
- ✔ECOLIMS Codes
- ✔ENVIRODAT Codes
- ✔STAR Codes
- ✔Parameter Labels
- ✔Method Abbreviations
- ✔Detection Limits
- ✔Reporting Units
- ✔TMUs

SECTION I



Helpful Hint: Use Table 1 as a quick schema selection guide for major ion analysis.

Table 1: Schemas for Major Ions in Water

GROUP A											
Matrix	**Precipitation and Soft Surface Waters**										
	Filtered										
Schema Name	Parameter										
	Cl	SO4	SiO2	NO3	Ca	Mg	Na	K	ALK-T	ALK-G	Method No.
ALK-T-POT (p4)	-	-	-	-	-	-	-	-	X	-	01-1001
ALK-GRAN-POT (p4)	-	-	-	-	-	-	-	-	-	X	01-1010
ANION-F-AA (p4)	X	X	X	-	-	-	-	-	-	-	01-1070, 01-1230, 01-1250
ANION-IC-DNX (p5)	X	X	-	X	-	-	-	-	-	-	01-1080
SIO2-F-COBAS (p4)	-	-	X	-	-	-	-	-	-	-	
MIICPCAT/FH (p5)	-	-	-	-	X	X	X	X	-	-	
	Unfiltered										
ALK-T-POT (p4)	-	-	-	-	-	-	-	-	X	-	01-1001
ALK-GRAN-POT (p4)	-	-	-	-	-	-	-	-	-	X	01-1010
ANION-UF-AA (p4)	X	X	X	-	-	-	-	-	-	-	01-1070, 01-1230, 01-1250
ANION-IC-DNX (p5)	X	X	-	X	-	-	-	-	-	-	01-1080
SIO2-U-COBAS (p4)	-	-	X	-	-	-	-	-	-	-	
MIICPCAT/UFH (p5)	-	-	-	-	X	X	X	X	-	-	

GROUP B											
Matrix	**Surface Waters (LAKES AND RIVERS)**										
	Filtered										
Schema Name	Parameter										
	Cl	SO4	SiO2	NO3	Ca	Mg	Na	K	Alk-T	Alk-G	Method No.
ALK-T-COND (p4)	-	-	-	-	-	-	-	-	X	-	01-1030
ANION-F-AA (p4)	X	X	X	-	-	-	-	-	-	-	01-1070, 01-1230, 01-1250
ANION-F-COB (p5)	X	X	X	-	-	-	-	-	-	-	
MIICPCAT/FH (p5)	-	-	-	-	X	X	X	X	-	-	
	Unfiltered										
ANION-UF-AA (p4)	X	X	X	-	-	-	-	-	-	-	01-1070, 01-1230, 01-1250
ANION-UF-COB (p5)	X	X	X	-	-	-	-	-	-	-	
MIICPCAT/UFH (p5)	-	-	-	-	X	X	X	X	-	-	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

SECTION I: MAJOR IONS, NUTRIENTS AND PHYSICAL PARAMETERS

WATER: MAJOR IONS - PRECIPITATION AND SOFT SURFACE WATERS

ALK-T-POT	**T.ALK.-POT.TIT.**								**0.34**
	A0466	010111	00243	.....	ALKCACO3	POT.TIT'N	0.1	MG/L	
ALK-P-POT	**ALKCACO3-PHEN-TT**								**0.34**
	A0011	010151	00221	.....	ALKCACO3	PHEN.TIT'N	0.1	MG/L	
ALK-T-COND	**T.ALK.-COND.TIT.**								**0.2**
	A1724	000078	.....	.....	ALKCACO3	COND-TT	0.3	MG/L	
ALK-GRAN-POT	**ALK-GRAN-TITR.**								**0.34**
	A0938	010110	.....	.....	ALKCACO3	POT.TIT'N		MG/L	
F-F-ISE	**FLUORIDE-FILTERED**								**0.14**
	A1507	009117	.....	.....	F	AUTO.ISE	0.01	MG/L	
F-UF-ISE	**FLUORIDE-UNFILTERED**								**0.14**
	A1508	009118	.....	.....	F	AUTO.ISE	0.01	MG/L	
ANION-F-AA	**CL,SO4&SIO2FILT., AUTO ANALYZER**								**0.15**
	A0033	017206	00284	00287	CL	COL-FLT	0.05	MG/L	
	A0040	016306	00283	00293	SO4	COL-FLT	0.2	MG/L	
	A1523	014108	00296	00298	SIO2	COL-AAI	0.02	MG/L	
ANION-UF-AA	**CL,SO4&SIO2UNFILT., AUTO ANALYZER**								**0.15**
	A0034	017208	00290	.....	CL	COL-UNF	0.05	MG/L	
	A0041	016307	00280	.....	SO4	COL-UNF	0.2	MG/L	
	A1524	014109	00595	.....	SIO2	COL-AAI	0.02	MG/L	
CL-F-COBAS	**CHLORIDE-FLT-COBAS**								**0.07**
	A1974	100408	.....	.....	CL	COL-FLT	0.06	MG/L	
CL-U-COBAS	**CHLORIDE-UNF-COBAS**								**0.07**
	A1975	100409	.....	.....	CL	COL-UNF	0.06	MG/L	
SIO2-F-COBAS	**SILICA-FLT-COBAS**								**0.08**
	A1978	100412	.....	.....	SIO2	COL-FLT	0.01	MG/L	
SIO2-U-COBAS	**SILICA-UNF-COBAS**								**0.08**
	A1979	100413	.....	.....	SIO2	COL-UNF	0.01	MG/L	
SO4-F-COBAS	**SULPHATE-FLT-COBAS**								**0.08**
	A1976	100410	.....	.....	SO4	COL-FLT	0.3	MG/L	
SO4-U-COBAS	**SULPHATE-UNF-COBAS**								**0.08**
	A1977	100411	.....	.....	SO4	COL-UNF	0.3	MG/L	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)
SO4-F-COB-VH	**SULPHATE-FLT-COBAS**								**0.1**
	A1976	100410	.....	.....	SO4	COL-FLT	0.3	MG/L	
SO4-U-COB-VH	**SULPHATE-UNF-COBAS**								**0.1**
	A1977	100411	.....	.....	SO4	COL-UNF	0.3	MG/L	
ANION-COB-FH	**CL,SO4&SIO2-FILT., CENTRIFUG. ANALYZER**								**0.18**
	A1974	100408	.....	.....	CL	COL-FLT	0.06	MG/L	
	A1976	100410	.....	.....	SO4	COL-FLT	0.3	MG/L	
	A1978	100412	.....	.....	SIO2	COL-FLT	0.01	MG/L	
ANION-COB-UH	**CL,SO4&SIO2-UNFILT., CENTRIFUG. ANALYZER**								**0.18**
	A1975	100409	.....	.....	CL	COL-UNF	0.06	MG/L	
	A1977	100411	.....	.....	SO4	COL-UNF	0.3	MG/L	
	A1979	100413	.....	.....	SIO2	COL-UNF	0.01	MG/L	

WATER: MAJOR IONS - PHYSICALS AND RESIDUES

COLOR-TRUE	**COLOR-TRUE**								**0.14**
NEW	A2952	102559	.....	.....	COLOR-TR	COLOURIMETRIC	0.5	PT-CO	
COLOR-APP	**COLOR-APP**								**0.14**
NEW	A2951	102558	.....	.....	COLOR-AP	COLOURIMETRIC	0.5	PT-CO	
PH	**PH**								**0.06**
	A0003	010301	00215	.....	PH	ELECTRO	0	PHUNITS	
SP.COND.	**SPECIFIC CONDUCTIVITY**								**0.06**
	A0005	002041	00160	.....	SPCOND	???	0.1	US/CM	
TURBIDITY	**TURBIDITY**								**0.06**
	A0007	002073	00123	.....	TURB	???	0.05	JTU	
HARDNESS	**HARD.**								**0.03**
	A0016	010606	00300	.....	HRDCACO3	CALCULATED	0.5	MG/L	
RES/FB-2	**RESIDUE FILTERABLE-105**								**0.68**
	A1835	100405	00449	.....	RESIDUE	FIL-105	1	MG/L	
RES/NFB-2	**RESIDUE NON-FILTERABLE-105**								**0.27**
	A1834	010405	00448	.....	RESIDUE	NF-105	1	MG/L	
RES/FXD/FB-2	**RESIDUE FIXED FILTERABLE**								**0.34**
	A1837	100407	00778	.....	RESIDUE	FLT-550	1	MG/L	
RES/FXD/NFB2	**RESIDUE FIXED NON-FILTERABLE**								**0.07**
	A1836	100406	00777	.....	RESIDUE	NF-550	1	MG/L	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)
NSRP-F	**FILTERED SOLUBLE REACTIVE PHOSPHORUS**								**0.07**
	A2223	100302	00263	00257	SRP-P-F	SRP-FLT	0.0002	MG/L	
NSRP-U	**UNFILTERED SOLUBLE REACTIVE PHOSPHORUS**								**0.07**
	A2222	100301	00262	00447	SRP-P-UF	SRP-UNF	0.0002	MG/L	
TP-F	**FILTERED TOTAL PHOSPHORUS**								**0.07**
	A0074	015463	00264	00258	TP-P-F	FLT	0.0002	MG/L	
TP-U	**UNFILTERED TOTAL PHOSPHORUS**								**0.07**
	A0073	015413	00260	00259	TP-P-UF	UNF	0.0002	MG/L	
TKN-FVH-W	**TKN FILTERED VERY HIGH LEVEL**								**0.6**
	A0054	007014	00265	00253	TKN-N-F	TKN-FLT	0.014	MG/L	
TKN-UVH-W	**TKN UNFILTERED VERY HIGH LEVEL**								**0.6**
	A0053	007010	00254	00255	TKN-N-UF	TKN-UNF	0.014	MG/L	
NSRP-FVH-W	**SRP FILTERED VERY HIGH LEVEL**								**0.14**
	A2223	100302	00263	00257	SRP-P-F	SRP-FLT	0.0002	MG/L	
NSRP-UVH-W	**SRP UNFILTERED VERY HIGH LEVEL**								**0.14**
	A2222	100301	00262	00447	SRP-P-UF	SRP-UNF	0.0002	MG/L	
TP/TFP	**TOTAL PHOSPHORUS FILTERED AND UNFILTERED**								**0.07**
	A0073	015413	00260	00259	TP-P-UF	UNF	0.0002	MG/L	
	A0074	015463	00264	00258	TP-P-F	FLT	0.0002	MG/L	
TP-PART	**TOTAL PARTICULATE PHOSPHORUS**								**0.18**
	A0465	.....	00294	00249	P	TOT-PART	0.0004	MG/L	

WATER: NUTRIENTS - INFRARED DETECTION

NDOC/DIC	**DISSOLVED ORGANIC AND INORGANIC CARBON**								**0.1**
	A0049	006104	00226	00238	DOC	DOC-FLT	0.1	MG/L	
	A2220	100300	00236	00237	DIC	DIC-FLT	0.1	MG/L	
DOC/ALK	**DISS. ORGANIC CARBON & ALKALINITY**								**0.1**
	A0049	006104	00226	00238	DOC	DOC-FLT	0.1	MG/L	
	A0462	010116	00220	.....	ALKCACO3	IR-UNF	0.1	MG/L	
DOC	**NUTRIENT (DISSOLVED ORGANIC CARBON)**								**0.1**
	A0049	006104	00226	00238	DOC	DOC-FLT	0.1	MG/L	
NALKF-CO2	**FILT. ALKALINITY-CO2**								**0.1**
	A2232	100303	00223	00224	ALKCACO3	IR-FLT	0.1	MG/L	

** Refer to General Information beginning on page v for Sample Submission Information annd Restrictions. **

SECTION II

Helpful Hint: Read the special considerations on page 10 before selecting schemas and use Table 2 as a quick schema selection guide for trace metal analysis in water.

Special Considerations in the Selection of Trace Metal Schemas

To simplify the schema selection process for trace metal analysis in water by ICP-OES your choice should be based on the following considerations:

I: Parameter Type

a) **Total** — The unfiltered sample is shaken and a representative portion which includes the particulate matter is taken for analysis.

b) **Dissolved** — Particulates are removed by filtration before preservation of the sample.

c) **Extractable** — Sample is extracted with 0.2% Nitric Acid. A decanted portion of unfiltered sample is analyzed.

II: Matrix

The sample matrix is identified and rated on expected dissolved salt content.
Eg. Rated low to high: precipitation → surface waters → ground waters

III: Detection Limit

The detection limit of the method is improved by the following preconcentration techniques:

a) concentration of analytes by reduction of the sample volume at the digestion step

b) formation of a dry aerosol by ultrasonic nebulization/desolvation (USN)

c) combination of (a) and (b).

Limitations: *Preconcentration also increases the concentration of easily ionizable elements (EIEs) and the amount of dissolved salts that must be delivered to the plasma. These have the effect of suppressing or enhancing the emission signals of some analytes. Samples of high matrix are especially susceptible and lower detection limits are not available.*

As a result of the aforementioned and to facilitate their selection, the schemas have been conveniently grouped. The primary key for the grouping is the detection limit with Group A giving the lowest detection limits. The applicability is determined by the matrix and the group letter increases as the complexity of the sample increases.

Table 2: Schemas for Trace Metals in Water Using ICP-OES

GROUP A																								
Matrix	**Precipitation Samples Only**																							
	Total *(Digestion - Preconc- USN)*																							
Schema Name	Parameter																							
	Al	Ba	Be	Cd	Co	Cr	Cu	Fe	Li	Mn	Mo	Ni	Pb	Sr	V	Zn	Ag	Ca	Mg	Na	K	-	-	Method No.
TM2001/T21W (p15)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	02-2001
	Dissolved *(Digestion - Preconc- USN)*																							
TM2001/D21W (p15)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	02-2001
GROUP B																								
Matrix	**Surface Waters**																							
Low Detection Limits																								
	Total *(Digestion -Preconc- USN)*																							
Schema Name	Parameter																							
	Al	Ba	Be	Cd	Co	Cr	Cu	Fe	Li	Mn	Mo	Ni	Pb	Sr	V	Zn	Ag	Ca	Mg	Na	K	B	Tl	Method No.
TM2001/T17W (p16)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	02-2001
TM2101/T1BW (p16)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	02-2101
TM2060/E1TLW (p16)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	02-2060
TM2051/E4MIW (p16)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	02-2051
	Dissolved *(Digestion - Preconc- USN)*																							
TM2001/D17W (p16)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-	02-2001
TM2101/D1BW (p17)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	02-2101
TM2060/DDTLW (p17)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	02-2060
TM2051/DDMIW (p17)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	02-2051
Medium Detection Limits																								
	Al	Ba	Be	Cd	Co	Cr	Cu	Fe	Li	Mn	Mo	Ni	Pb	Sr	V	Zn	Ag	Ca	Mg	Na	K	B	Tl	Method No.
	Dissolved *(Direct- USN)*																							
TM2051/DD21W (p17)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	02-2051
	Extractable *(Direct- USN)*																							
TM2051/E21W (p18)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	02-2051

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

SECTION II: METALS

WATER SAMPLES BY ATOMIC ABSORPTION: DIRECT ASPIRATION

TM-AA/D/HGW	HG- DISS./COLD VAP./AA								0.1
	A0150	080111	00361	.....	HG-DISS	FLAMELESS	0.005	UG/L	
TM-AA/E/HGW	HG-EXT./COLD VAP./AA								0.1
	A0151	080311	00365	.....	HG-EXT	FLAMELESS	0.005	UG/L	
TM1AA/T/HGW	HG-TOT./COLD VAP./AA								0.1
	A2140	100249	00431	.....	HG-TOT	FLAMELESS	0.005	UG/L	

WATER SAMPLES BY ICP

Samples to be submitted for Total Metal Analysis must not contain more than 1 mm of settled solids. It is recommended that samples with high suspended solids be filtered in the field and the filtered and solid fractions submitted separately for analysis.

TM1ICPO/DASW	AS/SE-DISS./ICPO,HYDRD.FORM.-WAT								0.4
	A2147	100253	00428	.....	AS-DISS	ACID-DIGN	0.0001	MG/L	
	A2148	100254	00429	.....	SE-DISS	ACID-DIGN	0.0001	MG/L	
TM1ICPO/TASW	AS/SE-TOT/ICPO,HYDRD.FORM-WAT								0.4
	A2136	100250	00314	.....	AS-TOT	ACID-DIGN	0.0001	MG/L	
	A2137	100251	00380	.....	SE-TOT	ACID-DIGN	0.0001	MG/L	
TM1ICP/DSBW	SB-DISS./ICPO,HYDRD.FOR.-WAT								0.4
NEW	A2150	100255	.....	.....	SB-DISS	ACID-DIGN	0.0002	MG/L	
TM1ICP/TSBW	SB-TOT./ICPO,HYDRD.FOR.-WAT								0.4
NEW	A2149	100252	.....	.....	SB-TOT	ACID-DIGN	0.0002	MG/L	

** Refer to General Information beginning on page v for Sample Submission Information annd Restrictions. **

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)
TM2001/T17W	**17TM-TOT-DIG-PRECONC-USN-(ICP-OES)**								**0.4**
	A2005	100216	.....	.....	AL/T-ICP	10X-CONCN	0.002	MG/L	
	A2006	100217	.....	.....	BA/T-ICP	10X-CONCN	0.0002	MG/L	
	A2007	100218	.....	.....	BE/T-ICP	10X-CONCN	0.05	UG/L	
	A2008	100219	.....	.....	CD/T-ICP	10X-CONCN	0.0001	MG/L	
	A2009	100220	.....	.....	CO/T-ICP	10X-CONCN	0.0001	MG/L	
	A2010	100221	.....	.....	CR/T-ICP	10X-CONCN	0.0002	MG/L	
	A2011	100222	.....	.....	CU/T-ICP	10X-CONCN	0.0002	MG/L	
	A2012	100223	.....	.....	FE/T-ICP	10X-CONCN	0.0004	MG/L	
	A2013	100224	.....	.....	LI/T-ICP	10X-CONCN	0.0001	MG/L	
	A2014	100225	.....	.....	MN/T-ICP	10X-CONCN	0.0001	MG/L	
	A2015	100226	.....	.....	MO/T-ICP	10X-CONCN	0.0001	MG/L	
	A2016	100227	.....	.....	NI/T-ICP	10X-CONCN	0.0002	MG/L	
	A2017	100228	.....	.....	PB/T-ICP	10X-CONCN	0.0005	MG/L	
	A2018	100229	.....	.....	SR/T-ICP	10X-CONCN	0.0001	MG/L	
	A2019	100230	.....	.....	V/T-ICP	10X-CONCN	0.0001	MG/L	
	A2020	100231	.....	.....	ZN/T-ICP	10X-CONCN	0.0002	MG/L	
	A0539	100324	.....	.....	AG/T-ICP	10X-CONCN	0.0001	MG/L	
TM2101/T1BW	**BORON-TOT-DIG-PRECONC-SSC-(ICP-OES)**								**0.3**
	A2099	100170	.....	.....	B/T-ICP	10X-CONCN	0.002	MG/L	
TM2060/E1TLW	**THALLIUM-EXT-DIRECT-(ICP-MS)**								
	A2295	.....	.....	.....	TL/E-IMS	DIR.ASPIRN	0.001	UG/L	
TM2051/E4MIW	**4MI-EXT-DIRECT-USN-(ICP-OES)**								**0.2**
	A1037	20321	.....	.....	CA-ICP	DIR.ASPIRN	0.1	MG/L	
	A1038	12321	.....	.....	MG-ICP	DIR.ASPIRN	0.1	MG/L	
	A1039	11321	.....	.....	NA-ICP	DIR.ASPIRN	0.2	MG/L	
	A1040	19321	.....	.....	K-ICP	DIR.ASPIRN	0.2	MG/L	
TM2001/D17W	**17TM-DISS-DIG-PRECONC-USN-(ICP-OES)**								**0.4**
	A1985	100175	.....	.....	AL/D-ICP	10X-CONCN	0.002	MG/L	
	A1986	100176	.....	.....	BA/D-ICP	10X-CONCN	0.0002	MG/L	
	A1987	100177	.....	.....	BE/D-ICP	10X-CONCN	0.05	UG/L	
	A1988	100178	.....	.....	CD/D-ICP	10X-CONCN	0.0001	MG/L	
	A1989	100179	.....	.....	CO/D-ICP	10X-CONCN	0.0001	MG/L	
	A1990	100180	.....	.....	CR/D-ICP	10X-CONCN	0.0002	MG/L	
	A1991	100181	.....	.....	CU/D-ICP	10X-CONCN	0.0002	MG/L	
	A1992	100182	.....	.....	FE/D-ICP	10X-CONCN	0.0004	MG/L	
	A1993	100183	.....	.....	LI/D-ICP	10X-CONCN	0.0001	MG/L	
	A1994	100184	.....	.....	MN/D-ICP	10X-CONCN	0.0001	MG/L	
	A1995	100185	.....	.....	MO/D-ICP	10X-CONCN	0.0001	MG/L	
	A1996	100186	.....	.....	NI/D-ICP	10X-CONCN	0.0002	MG/L	
	A1997	100187	.....	.....	PB/D-ICP	10X-CONCN	0.0005	MG/L	
	A1998	100188	.....	.....	SR/D-ICP	10X-CONCN	0.0001	MG/L	
	A1999	100189	.....	.....	V/D-ICP	10X-CONCN	0.0001	MG/L	
	A2000	100190	.....	.....	ZN/D-ICP	10X-CONCN	0.0002	MG/L	
	A2238	100325	.....	.....	AG/D-ICP	10X-CONCN	0.0001	MG/L	

THE REPORTING UNITS FOR Be ARE ug/L.

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)
TM2051/E21W	17TM+4MI-EXT-DIRECT-USN-(ICP-OES)								0.26
	A1021	13321	.....	.....	AL/E-ICP	DIR.ASPIRN	0.01	MG/L	
	A1022	56321	.....	.....	BA/E-ICP	DIR.ASPIRN	0.0005	MG/L	
	A1023	4311	.....	.....	BE/E-ICP	DIR.ASPIRN	0.0002	MG/L	
	A1024	48321	.....	.....	CD/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1025	27321	.....	.....	CO/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1026	24321	.....	.....	CR/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1027	29321	.....	.....	CU/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1028	26321	.....	.....	FE/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1029	3311	.....	.....	LI/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1030	25321	.....	.....	MN/E-ICP	DIR.ASPIRN	0.0005	MG/L	
	A1031	42121	.....	.....	MO/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1032	28321	.....	.....	NI/E-ICP	DIR.ASPIRN	0.002	MG/L	
	A1033	82321	.....	.....	PB/E-ICP	DIR.ASPIRN	0.005	MG/L	
	A1034	38321	.....	.....	SR/E-ICP	DIR.ASPIRN	0.0005	MG/L	
	A1035	23321	.....	.....	V/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1036	30321	.....	.....	ZN/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A2419	100425	.....	.....	AG/E-ICP	DIR.ASPIRN	0.001	MG/L	
	A1037	20321	.....	.....	CA-ICP	DIR.ASPIRN	0.1	MG/L	
	A1038	12321	.....	.....	MG-ICP	DIR.ASPIRN	0.1	MG/L	
	A1040	19321	.....	.....	K-ICP	DIR.ASPIRN	0.2	MG/L	
	A1039	11321	.....	.....	NA-ICP	DIR.ASPIRN	0.2	MG/L	
TM2101/T17W	16 TM+BORON-TOT-DIG-PRECONC-SSC-(ICP-OES)								0.4
	A2083	100154	.....	.....	AL/T-ICP	10X-CONCN	0.02	MG/L	
	A2084	100155	.....	.....	BA/T-ICP	10X-CONCN	0.001	MG/L	
	A2085	100156	.....	.....	BE/T-ICP	10X-CONCN	0.5	UG/L	
	A2086	100157	.....	.....	CD/T-ICP	10X-CONCN	0.001	MG/L	
	A2087	100158	.....	.....	CO/T-ICP	10X-CONCN	0.001	MG/L	
	A2088	100159	.....	.....	CR/T-ICP	10X-CONCN	0.001	MG/L	
	A2089	100160	.....	.....	CU/T-ICP	10X-CONCN	0.001	MG/L	
	A2090	100161	.....	.....	FE/T-ICP	10X-CONCN	0.004	MG/L	
	A2091	100162	.....	.....	LI/T-ICP	10X-CONCN	0.001	MG/L	
	A2092	100163	.....	.....	MN/T-ICP	10X-CONCN	0.001	MG/L	
	A2093	100164	.....	.....	MO/T-ICP	10X-CONCN	0.001	MG/L	
	A2094	100165	.....	.....	NI/T-ICP	10X-CONCN	0.002	MG/L	
	A2095	100166	.....	.....	PB/T-ICP	10X-CONCN	0.002	MG/L	
	A2096	100167	.....	.....	SR/T-ICP	10X-CONCN	0.001	MG/L	
	A2097	100168	.....	.....	V/T-ICP	10X-CONCN	0.001	MG/L	
	A2098	100169	.....	.....	ZN/T-ICP	10X-CONCN	0.002	MG/L	
	A2099	100170	.....	.....	B/T-ICP	10X-CONCN	0.002	MG/L	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

WATER SAMPLES BY ICP-MS

BEFORE SAMPLING AND SELECTING THESE SCHEMAS CONTACT TML FOR METHOD LIMITATIONS AND SPECIAL INSTRUCTIONS.

TM-IMS/E20W	**20,EXTR.TM. BY ICP-MS/ DIR.ASP.***SEE TML HEAD*****								**0.5**
	A2272	.....	.....	.....	LI/E-IMS	DIR.ASPIRN	0.02	UG/L	
	A2273	.....	.....	.....	BE/E-IMS	DIR.ASPIRN	0.002	UG/L	
	A2274	.....	.....	.....	B/E-IMS	DIR.ASPIRN	0.07	UG/L	
	A2276	.....	.....	.....	V/E-IMS	DIR.ASPIRN	0.01	UG/L	
	A2277	.....	.....	.....	CR/E-IMS	DIR.ASPIRN	0.02	UG/L	
	A2278	.....	.....	.....	MN/E-IMS	DIR.ASPIRN	0.005	UG/L	
	A2279	.....	.....	.....	CO/E-IMS	DIR.ASPIRN	0.002	UG/L	
	A2280	.....	.....	.....	NI/E-IMS	DIR.ASPIRN	0.02	UG/L	
	A2281	.....	.....	.....	CU/E-IMS	DIR.ASPIRN	0.04	UG/L	
	A2282	.....	.....	.....	ZN/E-IMS	DIR.ASPIRN	0.04	UG/L	
	A2283	.....	.....	.....	GA/E-IMS	DIR.ASPIRN	0.002	UG/L	
	A2286	.....	.....	.....	RB/E-IMS	DIR.ASPIRN	0.002	UG/L	
	A2287	.....	.....	.....	SR/E-IMS	DIR.ASPIRN	0.01	UG/L	
	A2289	.....	.....	.....	AG/E-IMS	DIR.ASPIRN	0.005	UG/L	
	A2290	.....	.....	.....	CD/E-IMS	DIR.ASPIRN	0.005	UG/L	
	A2293	.....	.....	.....	BA/E-IMS	DIR.ASPIRN	0.01	UG/L	
	A2294	.....	.....	.....	LA/E-IMS	DIR.ASPIRN	0.001	UG/L	
	A2295	.....	.....	.....	TL/E-IMS	DIR.ASPIRN	0.001	UG/L	
	A2296	.....	.....	.....	PB/E-IMS	DIR.ASPIRN	0.01	UG/L	
	A2298	.....	.....	.....	U/E-IMS	DIR.ASPIRN	0.001	UG/L	
TM-IMS/DD20W	**20,DISS.TM. BY ICP-MS/ DIR.ASP.***SEE TML HEAD*****								**0.5**
	A2245	.....	.....	.....	LI-DDIMS	DIR.ASPIRN	0.02	UG/L	
	A2246	.....	.....	.....	BE-DDIMS	DIR.ASPIRN	0.002	UG/L	
	A2247	.....	.....	.....	B-DDIMS	DIR.ASPIRN	0.07	UG/L	
	A2249	.....	.....	.....	V-DDIMS	DIR.ASPIRN	0.01	UG/L	
	A2250	.....	.....	.....	CR-DDIMS	DIR.ASPIRN	0.02	UG/L	
	A2251	.....	.....	.....	MN-DDIMS	DIR.ASPIRN	0.005	UG/L	
	A2252	.....	.....	.....	CO-DDIMS	DIR.ASPIRN	0.002	UG/L	
	A2253	.....	.....	.....	NI-DDIMS	DIR.ASPIRN	0.02	UG/L	
	A2254	.....	.....	.....	CU-DDIMS	DIR.ASPIRN	0.04	UG/L	
	A2255	.....	.....	.....	ZN-DDIMS	DIR.ASPIRN	0.04	UG/L	
	A2256	.....	.....	.....	GA-DDIMS	DIR.ASPIRN	0.002	UG/L	
	A2259	.....	.....	.....	RB-DDIMS	DIR.ASPIRN	0.002	UG/L	
	A2260	.....	.....	.....	SR-DDIMS	DIR.ASPIRN	0.01	UG/L	
	A2262	.....	.....	.....	AG-DDIMS	DIR.ASPIRN	0.005	UG/L	
	A2263	.....	.....	.....	CD-DDIMS	DIR.ASPIRN	0.005	UG/L	
	A2266	.....	.....	.....	BA-DDIMS	DIR.ASPIRN	0.01	UG/L	
	A2267	.....	.....	.....	LA-DDIMS	DIR.ASPIRN	0.001	UG/L	
	A2268	.....	.....	.....	TL-DDIMS	DIR.ASPIRN	0.001	UG/L	
	A2269	.....	.....	.....	PB-DDIMS	DIR.ASPIRN	0.01	UG/L	
	A2271	.....	.....	.....	U-DDIMS	DIR.ASPIRN	0.001	UG/L	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)
TM1AA/E8S	**AL/CD/CU/FE/MN/NI/PB/ZN-EXTR/HCL-SED**								**2.5**
	A2125	100264	.....	.....	AL-EXT/S	HCL-EXTRN	2	MG/KG	
	A2126	100265	.....	.....	CD-EXT/S	HCL-EXTRN	0.2	MG/KG	
	A2129	100268	.....	.....	CU-EXT/S	HCL-EXTRN	0.2	MG/KG	
	A2130	100269	.....	.....	FE-EXT/S	HCL-EXTRN	1	MG/KG	
	A2131	100270	.....	.....	PB-EXT/S	HCL-EXTRN	1	MG/KG	
	A2132	100271	.....	.....	MN-EXT/S	HCL-EXTRN	0.2	MG/KG	
	A2133	100272	.....	.....	NI-EXT/S	HCL-EXTRN	0.6	MG/KG	
	A2134	100273	.....	.....	ZN-EXT/S	HCL-EXTRN	0.2	MG/KG	

SEDIMENT - TOTAL METALS - OPEN DIGESTION

The minimum number of trace metal parameters provided is five. The time per sample for 5 parameters is 2.25 hr/sample.
Each additional parameter is 0.25 hr/sample.

TM-AA/T5-S	**CU/FE/NI/PB/ZN-TOT/OP.DIG.-SED**								**2.25**
	A0549	029053	.....	.....	CU-TOT/S	OPEN-DIGN	1	MG/KG	
	A0550	026053	.....	.....	FE-TOT/S	OPEN-DIGN	5	MG/KG	
	A0551	082053	.....	.....	PB-TOT/S	OPEN-DIGN	5	MG/KG	
	A0554	028053	.....	.....	NI-TOT/S	OPEN-DIGN	3	MG/KG	
	A0556	030053	.....	.....	ZN-TOT/S	OPEN-DIGN	1	MG/KG	
TM-AA/T6S	**CD/CO/CU/NI/PB/V-TOT/OP.DIG.-SED**								**2.5**
	A0547	048053	.....	.....	CD-TOT/S	OPEN-DIGN	1	MG/KG	
	A0548	027053	.....	.....	CO-TOT/S	OPEN-DIGN	2	MG/KG	
	A0549	029053	.....	.....	CU-TOT/S	OPEN-DIGN	1	MG/KG	
	A0554	028053	.....	.....	NI-TOT/S	OPEN-DIGN	3	MG/KG	
	A0551	082053	.....	.....	PB-TOT/S	OPEN-DIGN	5	MG/KG	
	A0555	023053	.....	.....	V-TOT/S	OPEN-DIGN	10	MG/KG	
TM-AA/T8S	**CD/CO/CU/FE/MN/NI/PB/ZN-TOT/OP.DIG-SED**								**3**
	A0547	048053	.....	.....	CD-TOT/S	OPEN-DIGN	1	MG/KG	
	A0548	027053	.....	.....	CO-TOT/S	OPEN-DIGN	2	MG/KG	
	A0549	029053	.....	.....	CU-TOT/S	OPEN-DIGN	1	MG/KG	
	A0550	026053	.....	.....	FE-TOT/S	OPEN-DIGN	5	MG/KG	
	A0552	025053	.....	.....	MN-TOT/S	OPEN-DIGN	1	MG/KG	
	A0554	028053	.....	.....	NI-TOT/S	OPEN-DIGN	3	MG/KG	
	A0551	082053	.....	.....	PB-TOT/S	OPEN-DIGN	5	MG/KG	
	A0556	030053	.....	.....	ZN-TOT/S	OPEN-DIGN	1	MG/KG	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

The minimum number of trace metal parameters provided is five. The time per sample for 5 parameters is 1.4 hr/sample. Each additional parameter is 0.2 hr/sample.

TM1AA/T5-F	**CD,CR,CU,PB,ZN-TOT./FISH**								**1.4**
	A2121	100237	.....	.....	CD-TOT/F	ACID-DIGN	0.01	MG/KG	
	A0414	024601	.....	.....	CR-TOT/F	ACID-DIGN	0.2	MG/KG	
	A0415	029601	.....	.....	CU-TOT/F	ACID-DIGN	0.2	MG/KG	
	A2123	100239	.....	.....	PB-TOT/F	ACID-DIGN	0.05	MG/KG	
	A0418	030601	.....	.....	ZN-TOT/F	ACID-DIGN	0.2	MG/KG	
TM1AA/T6DF	**CD/CU/FE/MN/PB/ZN- TOT/FISH**								**1.6**
	A1980	100414	.....	.....	FE-TOT/F	ACID-DIGN	0.2	MG/KG	
	A1981	100415	.....	.....	MN-TOT/F	ACID-DIGN	0.2	MG/KG	
	A2121	100237	.....	.....	CD-TOT/F	ACID-DIGN	0.01	MG/KG	
	A0415	029601	.....	.....	CU-TOT/F	ACID-DIGN	0.2	MG/KG	
	A2123	100239	.....	.....	PB-TOT/F	ACID-DIGN	0.05	MG/KG	
	A0418	030601	.....	.....	ZN-TOT/F	ACID-DIGN	0.2	MG/KG	
TM1AA/T8BF	**CD/CR/CU/FE/MN/NI/PB/ZN -TOT/FISH**								**2**
	A1980	100414	.....	.....	FE-TOT/F	ACID-DIGN	0.2	MG/KG	
	A1981	100415	.....	.....	MN-TOT/F	ACID-DIGN	0.2	MG/KG	
	A2121	100237	.....	.....	CD-TOT/F	ACID-DIGN	0.01	MG/KG	
	A0414	024601	.....	.....	CR-TOT/F	ACID-DIGN	0.2	MG/KG	
	A0415	029601	.....	.....	CU-TOT/F	ACID-DIGN	0.2	MG/KG	
	A2122	100238	.....	.....	NI-TOT/F	ACID-DIGN	0.02	MG/KG	
	A2123	100239	.....	.....	PB-TOT/F	ACID-DIGN	0.05	MG/KG	
	A0418	030601	.....	.....	ZN-TOT/F	ACID-DIGN	0.2	MG/KG	
TM1AA/T8CF	**CD/CR/CU/FE/MN/PB/SR/ZN-TOT/FISH**								**2**
	A1980	100414	.....	.....	FE-TOT/F	ACID-DIGN	0.2	MG/KG	
	A1981	100415	.....	.....	MN-TOT/F	ACID-DIGN	0.2	MG/KG	
	A1982	.....	.....	.....	SR-TOT/F	ACID-DIGN	0.2	MG/KG	
	A2121	100237	.....	.....	CD-TOT/F	ACID-DIGN	0.01	MG/KG	
	A0414	024601	.....	.....	CR-TOT/F	ACID-DIGN	0.2	MG/KG	
	A0415	029601	.....	.....	CU-TOT/F	ACID-DIGN	0.2	MG/KG	
	A2123	100239	.....	.....	PB-TOT/F	ACID-DIGN	0.05	MG/KG	
	A0418	030601	.....	.....	ZN-TOT/F	ACID-DIGN	0.2	MG/KG	

Combinations of trace metals will be provided at client's request.

SECTION III

ORGANICS

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

SECTION III: ORGANICS

WATER SAMPLES (1 TO 4 L)

Method detection limits are based on 1 L samples.

WATER: ORGANOCHLORINE PESTICIDES & TOTAL PCBS BY EXTRACTION, CLEAN-UP

OCSPCBS-W	ORGANOCHLORINE PESTICIDES & TOTAL PCBS IN WATER								4.1
	A2572	.....	.....	.....	A-HCH	SOLV.EXTN	0.20	NG/L	
	A2573	.....	.....	.....	HCB	SOLV.EXTN	0.62	NG/L	
	A2574	.....	.....	.....	1245TTBB	SOLV.EXTN	1	%	
	A2575	.....	.....	.....	G-HCH	SOLV.EXTN	0.15	NG/L	
	A2576	.....	.....	.....	D-HCH	SOLV.EXTN	1	%	
	A2577	.....	.....	.....	HEPTCHLR	SOLV.EXTN	0.82	NG/L	
	A2578	.....	.....	.....	ALDRIN	SOLV.EXTN	0.61	NG/L	
	A2579	.....	.....	.....	HPTCLEPX	SOLV.EXTN	0.17	NG/L	
	A2580	.....	.....	.....	G-CHLRDN	SOLV.EXTN	0.33	NG/L	
	A2581	.....	.....	.....	A-ENDSLF	SOLV.EXTN	0.22	NG/L	
	A2582	.....	.....	.....	A-CHLRDN	SOLV.EXTN	0.31	NG/L	
	A2583	.....	.....	.....	DIELDRIN	SOLV.EXTN	0.35	NG/L	
	A2584	.....	.....	.....	P,P-DDE	SOLV.EXTN	1.28	NG/L	
	A2585	.....	.....	.....	ENDRIN	SOLV.EXTN	0.55	NG/L	
	A2586	.....	.....	.....	B-ENDSLF	SOLV.EXTN	0.88	NG/L	
	A2587	.....	.....	.....	P,P-DDD	SOLV.EXTN	2.24	NG/L	
	A2588	.....	.....	.....	O,P-DDT	SOLV.EXTN	0.75	NG/L	
	A2589	.....	.....	.....	P,P-DDT	SOLV.EXTN	1.30	NG/L	
	A2590	.....	.....	.....	END-KETO	SOLV.EXTN	1	%	
	A2591	.....	.....	.....	MTHXYCHL	SOLV.EXTN	7.90	NG/L	
	A2592	.....	.....	.....	MIREX	SOLV.EXTN	1.41	NG/L	
	A2593	.....	.....	.....	T-PCB	SOLV.EXTN	11.2	NG/L	

For PCB congeners refer to page 55.

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)
WATER: ORGANOCHLORINE PESTICIDES & TOTAL PCBS BY HEXANE EXTRACTION, NO CLEAN-UP									
OCSHEX-W	ORGANOCHLORINE PESTICIDES & TOTAL PCBS IN WATER (HEX)								2.9
	A2617	.....	.....	.....	A-HCH	HEX.EXTN	0.16	NG/L	
	A2618	.....	.....	.....	HCB	HEX.EXTN	0.15	NG/L	
	A2619	.....	.....	.....	G-HCH	HEX.EXTN	0.12	NG/L	
	A2620	.....	.....	.....	HPTCHLR	HEX.EXTN	0.14	NG/L	
	A2621	.....	.....	.....	ALDRIN	HEX.EXTN	0.13	NG/L	
	A2622	.....	.....	.....	HPTCLEPX	HEX.EXTN	0.14	NG/L	
	A2623	.....	.....	.....	G-CHLRDN	HEX.EXTN	0.14	NG/L	
	A2624	.....	.....	.....	A-ENDSLF	HEX.EXTN	0.13	NG/L	
	A2625	.....	.....	.....	A-CHLRDN	HEX.EXTN	0.14	NG/L	
	A2626	.....	.....	.....	DIELDRIN	HEX.EXTN	0.28	NG/L	
	A2627	.....	.....	.....	P,P-DDE	HEX.EXTN	0.17	NG/L	
	A2628	.....	.....	.....	ENDRIN	HEX.EXTN	0.27	NG/L	
	A2629	.....	.....	.....	B-ENDSLF	HEX.EXTN	0.25	NG/L	
	A2630	.....	.....	.....	P,P-DDD	HEX.EXTN	2.34	NG/L	
	A2631	.....	.....	.....	O,P-DDT	HEX.EXTN	1.12	NG/L	
	A2632	.....	.....	.....	P,P-DDT	HEX.EXTN	3.24	NG/L	
	A2633	.....	.....	.....	MTHXYCHL	HEX.EXTN	2.89	NG/L	
	A2634	.....	.....	.....	MIREX	HEX.EXTN	2.88	NG/L	
	A2635	.....	.....	.....	T-PCB	HEX.EXTN	10.2	NG/L	
	A2567	.....	.....	.....	13-DBB	SOLV.EXTN	1	%	
	A2570	.....	.....	.....	135-TBB	SOLV.EXTN	1	%	
	A2574	.....	.....	.....	1245TTBB	SOLV.EXTN	1	%	
	A2576	.....	.....	.....	D-HCH	SOLV.EXTN	1	%	
	A2590	.....	.....	.....	END-KETO	SOLV.EXTN	1	%	
WATER: ACID HERBICIDES BY EXTRACTION, DERIVATIZATION (PFBBr)									
AHS-W	ACID HERBICIDES IN WATER								4.2
	A2636	.....	.....	.....	DICAMBA	SOLV.EXTN/PFB	7.60	NG/L	
	A2637	.....	.....	.....	MCPA	SOLV.EXTN/PFB	16.2	NG/L	
	A2638	.....	.....	.....	24-DP	SOLV.EXTN/PFB	15.9	NG/L	
	A2639	.....	.....	.....	236-TBA	SOLV.EXTN/PFB	11.1	NG/L	
	A2640	.....	.....	.....	24-D	SOLV.EXTN/PFB	14.7	NG/L	
	A2641	.....	.....	.....	BRMXYNL	SOLV.EXTN/PFB	21.3	NG/L	
	A2642	.....	.....	.....	23-D	SOLV.EXTN/PFB	1	%	
	A2643	.....	.....	.....	SILVEX	SOLV.EXTN/PFB	19.7	NG/L	
	A2644	.....	.....	.....	245-T	SOLV.EXTN/PFB	31.8	NG/L	
	A2645	.....	.....	.....	MCPB	SOLV.EXTN/PFB	26.5	NG/L	
	A2646	.....	.....	.....	24-DB	SOLV.EXTN/PFB	47.0	NG/L	
	A2647	.....	.....	.....	PICLORAM	SOLV.EXTN/PFB	15.5	NG/L	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

WATER: NEUTRAL HERBICIDES

NH-W	NEUTRAL HERBICIDES IN WATER								3.3
NEW	A2681	102219	.....	.....	TRIFLRLN	SOLV.EXTN	8.38	NG/L	
	A2949	102606	.....	.....	DLATE I	SOLV.EXTN	8.64	NG/L	
	A2950	102607	.....	.....	DLATE II	SOLV.EXTN	8.64	NG/L	
	A2683	102221	.....	.....	TRIALLAT	SOLV.EXTN	8.64	NG/L	
	A2684	102222	.....	.....	HOEGRASS	SOLV.EXTN	45.2	NG/L	
	A2685	102223	.....	.....	ENDAVEN	SOLV.EXTN	36.2	NG/L	
	A2686	102224	.....	.....	BUTYLATE	SOLV.EXTN	50	NG/L	
	A2687	102225	.....	.....	D-SIMAZN	SOLV.EXTN	50	NG/L	
	A2688	102226	.....	.....	D-ATRAZN	SOLV.EXTN	50	NG/L	
	A2689	102227	.....	.....	SIMAZINE	SOLV.EXTN	50	NG/L	
	A2690	102228	.....	.....	ATRAZINE	SOLV.EXTN	242	NG/L	
	A2691	102229	.....	.....	METRIBZN	SOLV.EXTN	50	NG/L	
	A2692	102230	.....	.....	METLCHLR	SOLV.EXTN	116	NG/L	

Note: Diallate is reported as two isomeric compounds.

WATER: IMMUNOASSAYS

CONTACT PIQM (905-336-6261) AT LEAST FOUR WEEKS PRIOR TO SAMPLING TO RECEIVE KIT.

Other immunoassay kits are available and can be used at client's request.

IA-MET-W	METOLACHLOR IN WATER BY IMMUNOASSAY								0.6
	A2413	.....	.....	.....	MHR	IMMUNOASSAY	0.25	NG/L	
IA-TRIHS-W	TRIAZINES IN WATER BY IMMUNOASSAY (HIGH SENS.)								0.6
	A2416	.....	.....	.....	TRIHS	IMMUNOASSAY	0.05	NG/L	

** Refer to General Information beginning on page v for Sample Submission Information annd Restrictions. **

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

SEDIMENT SAMPLES

SEDIMENT: ORGANOCHLORINE PESTICIDES, TOTAL PCBs AND CHLOROBENZENES BY SONIFICATION, CLEAN-UP

OCSCBSPCBS-S	OCS, CBS AND TOTAL PCBS IN SEDIMENT								7.5
	A2781	.....	.....	.....	13-DCB	U.EXTN	1.66	NG/G	
	A2782	.....	.....	.....	14-DCB	U.EXTN	4.89	NG/G	
	A2783	.....	.....	.....	12-DCB	U.EXTN	4.01	NG/G	
	A2784	.....	.....	.....	135-TCB	U.EXTN	1.16	NG/G	
	A2785	.....	.....	.....	124-TCB	U.EXTN	0.94	NG/G	
	A2786	.....	.....	.....	13-DBB	U.EXTN	1	%	
	A2787	.....	.....	.....	123-TCB	U.EXTN	1.87	NG/G	
	A2788	.....	.....	.....	1234TTCB	U.EXTN	0.69	NG/G	
	A2789	.....	.....	.....	135-TBB	U.EXTN	1	%	
	A2790	.....	.....	.....	PECB	U.EXTN	0.46	NG/G	
	A2791	.....	.....	.....	A-HCH	U.EXTN	1.02	NG/G	
	A2792	.....	.....	.....	HCB	U.EXTN	0.49	NG/G	
	A2793	.....	.....	.....	1245TTBB	U.EXTN	1	%	
	A2794	.....	.....	.....	G-HCH	U.EXTN	0.80	NG/G	
	A2795	.....	.....	.....	HEPTCHLR	U.EXTN	1.12	NG/G	
	A2796	.....	.....	.....	ALDRIN	U.EXTN	0.91	NG/G	
	A2797	.....	.....	.....	HPTCLEPX	U.EXTN	0.96	NG/G	
	A2798	.....	.....	.....	G-CHLRDN	U.EXTN	1.16	NG/G	
	A2799	.....	.....	.....	A-ENDSLF	U.EXTN	1.50	NG/G	
	A2800	.....	.....	.....	A-CHLRDN	U.EXTN	1.23	NG/G	
	A2801	.....	.....	.....	DIELDRIN	U.EXTN	1.52	NG/G	
	A2802	.....	.....	.....	P,P-DDE	U.EXTN	2.25	NG/G	
	A2803	.....	.....	.....	ENDRIN	U.EXTN	2.49	NG/G	
	A2804	.....	.....	.....	B-ENDSLF	U.EXTN	2.85	NG/G	
	A2805	.....	.....	.....	P,P-DDD	U.EXTN	0.76	NG/G	
	A2806	.....	.....	.....	O,P-DDT	U.EXTN	4.85	NG/G	
	A2807	.....	.....	.....	P,P-DDT	U.EXTN	2.07	NG/G	
	A2808	.....	.....	.....	END-KETO	U.EXTN	1	%	
	A2809	.....	.....	.....	MTHXYCHL	U.EXTN	15.1	NG/G	
	A2810	.....	.....	.....	MIREX	U.EXTN	1.30	NG/G	
	A2811	.....	.....	.....	T-PCB	U.EXTN	21.9	NG/G	
	A2884	.....	.....	.....	D-HCH	U.EXTN	1	%	

For PCB congeners or toxaphene refer to page 55.

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

SEDIMENT: CHLOROPHENOLS BY SONIFICATION, ESTERIFICATION

CPS-S	CHLOROPHENOLS IN SEDIMENTS								7.5
	A2839	.....	.....	.....	2-CP	SOX.EXTN	87.8	NG/G	
	A2840	.....	.....	.....	3-CP	SOX.EXTN	24.9	NG/G	
	A2841	.....	.....	.....	4-CP	SOX.EXTN	27.4	NG/G	
	A2842	.....	.....	.....	5MET-2CP	SOX.EXTN	36.4	NG/G	
	A2843	.....	.....	.....	26-DCP	SOX.EXTN	34.9	NG/G	
	A2844	.....	.....	.....	3MET-4CP	SOX.EXTN	39.0	NG/G	
	A2845	.....	.....	.....	24-DCP	SOX.EXTN	28.6	NG/G	
	A2846	.....	.....	.....	35-DCP	SOX.EXTN	41.5	NG/G	
	A2847	.....	.....	.....	23-DCP	SOX.EXTN	34.9	NG/G	
	A2848	.....	.....	.....	34-DCP	SOX.EXTN	39.0	NG/G	
	A2849	.....	.....	.....	246-TCP	SOX.EXTN	29.8	NG/G	
	A2850	.....	.....	.....	236-TCP	SOX.EXTN	32.4	NG/G	
	A2851	.....	.....	.....	235-TCP	SOX.EXTN	37.7	NG/G	
	A2852	.....	.....	.....	245-TCP	SOX.EXTN	44.3	NG/G	
	A2853	.....	.....	.....	234-TCP	SOX.EXTN	34.1	NG/G	
	A2854	.....	.....	.....	345-TCP	SOX.EXTN	40.9	NG/G	
	A2855	.....	.....	.....	2356TTCP	SOX.EXTN	25.3	NG/G	
	A2856	.....	.....	.....	2346TTCP	SOX.EXTN	46.3	NG/G	
	A2857	.....	.....	.....	2345TTCP	SOX.EXTN	42.6	NG/G	
	A2858	.....	.....	.....	PCP	SOX.EXTN	32.3	NG/G	

SEDIMENT: NEUTRAL HERBICIDES BY SONIFICATION, CLEAN-UP

NHS-S	NEUTRAL HERBICIDES IN SEDIMENT								5.5
	A2859	.....	.....	.....	TRIFLRLN	U.EXTN	0.6	NG/G	
	A2860	.....	.....	.....	DIALLATE	U.EXTN	5.8	NG/G	
	A2861	.....	.....	.....	TRIALLAT	U.EXTN	1.6	NG/G	
	A2862	.....	.....	.....	HOEGRASS	U.EXTN	6.2	NG/G	
	A2863	.....	.....	.....	ENDAVEN	U.EXTN	2.7	NG/G	
	A2864	.....	.....	.....	BUTYLATE	U.EXTN	10.0	NG/G	
	A2865	.....	.....	.....	D-SIMAZN	U.EXTN	10.0	NG/G	
	A2866	.....	.....	.....	D-ATRAZN	U.EXTN	10.0	NG/G	
	A2867	.....	.....	.....	SIMAZINE	U.EXTN	10.0	NG/G	
	A2868	.....	.....	.....	ATRAZINE	U.EXTN	18.0	NG/G	
	A2869	.....	.....	.....	METRIBZN	U.EXTN	10.0	NG/G	
	A2870	.....	.....	.....	METLCHLR	U.EXTN	17.7	NG/G	

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

BIOTA SAMPLES

BIOTA: ORGANOCHLORINE PESTICIDES, TOTAL PCBS AND CHLOROBENZENES BY POLYTRON EXTRACTION, GPC

OCSCBSPCBS-B	OCS, CBS & TOTAL PCBS IN BIOTA								7.5
	A2693	.....	.....	.....	13-DCB	POLYTRON.EXTN	4.27	NG/G	
	A2694	.....	.....	.....	14-DCB	POLYTRON.EXTN	4.77	NG/G	
	A2695	.....	.....	.....	12-DCB	POLYTRON.EXTN	2.03	NG/G	
	A2696	.....	.....	.....	135-TCB	POLYTRON.EXTN	0.63	NG/G	
	A2697	.....	.....	.....	124-TCB	POLYTRON.EXTN	0.72	NG/G	
	A2698	.....	.....	.....	13-DBB	POLYTRON.EXTN	1	%	
	A2699	.....	.....	.....	123-TCB	POLYTRON.EXTN	0.53	NG/G	
	A2700	.....	.....	.....	1234TTCB	POLYTRON.EXTN	0.55	NG/G	
	A2701	.....	.....	.....	135-TBB	POLYTRON.EXTN	1	%	
	A2702	.....	.....	.....	PECB	POLYTRON.EXTN	0.68	NG/G	
	A2703	.....	.....	.....	A-HCH	POLYTRON.EXTN	0.34	NG/G	
	A2704	.....	.....	.....	HCB	POLYTRON.EXTN	0.88	NG/G	
	A2705	.....	.....	.....	1245TTBB	POLYTRON.EXTN	1	%	
	A2706	.....	.....	.....	G-HCH	POLYTRON.EXTN	0.25	NG/G	
	A2707	.....	.....	.....	D-HCH	POLYTRON.EXTN	1	%	
	A2708	.....	.....	.....	HEPTCHLR	POLYTRON.EXTN	1.81	NG/G	
	A2709	.....	.....	.....	ALDRIN	POLYTRON.EXTN	0.71	NG/G	
	A2710	.....	.....	.....	HPTCLEPX	POLYTRON.EXTN	0.37	NG/G	
	A2711	.....	.....	.....	G-CHLRDN	POLYTRON.EXTN	0.45	NG/G	
	A2712	.....	.....	.....	A-ENDSLF	POLYTRON.EXTN	1.49	NG/G	
	A2713	.....	.....	.....	A-CHLRDN	POLYTRON.EXTN	0.41	NG/G	
	A2714	.....	.....	.....	DIELDRIN	POLYTRON.EXTN	0.67	NG/G	
	A2715	.....	.....	.....	P,P-DDE	POLYTRON.EXTN	2.45	NG/G	
	A2716	.....	.....	.....	ENDRIN	POLYTRON.EXTN	0.76	NG/G	
	A2717	.....	.....	.....	B-ENDSLF	POLYTRON.EXTN	1.30	NG/G	
	A2718	.....	.....	.....	P,P-DDD	POLYTRON.EXTN	2.32	NG/G	
	A2719	.....	.....	.....	O,P-DDT	POLYTRON.EXTN	0.82	NG/G	
	A2720	.....	.....	.....	P,P-DDT	POLYTRON.EXTN	3.02	NG/G	
	A2721	.....	.....	.....	END-KETO	POLYTRON.EXTN	1	%	
	A2722	.....	.....	.....	MTHXYCHL	POLYTRON.EXTN	3.66	NG/G	
	A2723	.....	.....	.....	MIREX	POLYTRON.EXTN	2.14	NG/G	
	A2724	.....	.....	.....	T-PCB	POLYTRON.EXTN	22.6	NG/G	

For PCB congeners or toxaphene refer to page 55.

Schema Name	Ecolims Code	Envirodat Code	Star Code	Integ Code	Parameter Label	Method Abbrev	Detect'n Limit	Reporting Units	TMU (hrs)

BIOTA: NEUTRAL HERBICIDES BY POLYTRON EXTRACTION, GPC

NHS-B	**NEUTRAL HERBICIDES IN BIOTA**								**5.5**
	A2761	.....	.....	.....	TRIFLRLN	POLYTRON.EXTN	1.00	NG/G	
	A2762	.....	.....	.....	DIALLATE	POLYTRON.EXTN	1.00	NG/G	
	A2763	.....	.....	.....	TRIALLAT	POLYTRON.EXTN	11.0	NG/G	
	A2764	.....	.....	.....	HOEGRASS	POLYTRON.EXTN	4.00	NG/G	
	A2765	.....	.....	.....	ENDAVEN	POLYTRON.EXTN	2.00	NG/G	
	A2766	.....	.....	.....	BUTYLATE	POLYTRON.EXTN	50.0	NG/G	
	A2767	.....	.....	.....	D-SIMAZN	POLYTRON.EXTN	50.0	NG/G	
	A2768	.....	.....	.....	D-ATRAZN	POLYTRON.EXTN	50.0	NG/G	
	A2769	.....	.....	.....	SIMAZINE	POLYTRON.EXTN	50.0	NG/G	
	A2770	.....	.....	.....	ATRAZINE	POLYTRON.EXTN	31.0	NG/G	
	A2771	.....	.....	.....	METRIBZN	POLYTRON.EXTN	50.0	NG/G	
	A2772	.....	.....	.....	METLCHLR	POLYTRON.EXTN	95.0	NG/G	

SOLIDS: MISCELLANEOUS ANALYSIS

LIPIDS-B	**LIPIDS IN BIOTA**								**1.4**
	A0719	000250	.....	.....	LIPIDS	%LIPIDSW	0.1	%	
MOIST-B	**MOISTURE CONTENT IN BIOTA**								**0.5**
	A0718	.....	.....	.....	MOISTURE	%H2O	0.1	%	

Part 2: Special Analytical Services

Mass Spectrometry:

- ✔Residue Confirmation
- ✔Target Compound Analysis
- ✔Investigative Mass Spectrometry

Mass Spectrometry Services

These services are provided in three basic categories:

A. Residue confirmation

Positive detection of organic contaminants obtained as a result of applying analytical methodologies not normally incorporating mass spectrometry may be confirmed with this technique. This is done as a matter of course if the compound in question is found in a particular location for the first time, if the quantitated value is unusually high or if the analyst detects an anomaly during the testing that place the result(s) under suspicion.

B. Target compound analysis with mass spectrometric detection

This service is offered where the method employed by NLET specifically requires mass selective detection, such as PAHs. In such instances, there is no cost incurred over and above that quoted in terms of time for testing. The use of mass spectrometry constitutes an integral part of the analytical technique. Should the analysis reveal the presence of additional but unidentified components, the client agency will be informed and the concentrated extract retained for a period of time (typically three months). If further work up is requested, this will be performed under the next category of mass spectrometry services.

C. Investigative mass spectrometry

The objective of this activity is to identify contaminants present in an organic concentrate obtained from a particular sample. It might be used to develop a contaminant profile for selected sites as a guide to future monitoring work, to identify the cause of a particular problem or identify degradation products and metabolites of contaminants with a known history of use or application. This work is normally carried out in conjunction with members of the research groups within the NWRI and NLET. Services are charged back to requesting agencies on an hourly basis. This approach is governed by consultation between the client agency and NLET. As a result, the total cost of this type of service can only be estimated <u>after</u> this consultation has taken place.

Parameter Label Index

Parameter Label Abbreviation

Parameter Description

PARAMETER LABEL INDEX

PARAMETER LABEL	PARAMETER DESCRIPTION
1-MTHNPH	1-METHYLNAPHTHALENE
12-DCB	1,2-DICHLOROBENZENE
123-TCB	1,2,3-TRICHLOROBENZENE
1234THNP	1,2,3,4-TETRAHYDRONAPHTHALENE
1234TTCB	1,2,3,4-TETRACHLOROBENZENE
124-TCB	1,2,4-TRICHLOROBENZENE
1245TTBB	1,2,4,5-TETRABROMOBENZENE
13-DBB	1,3-DIBROMOBENZENE
13-DCB	1,3-DICHLOROBENZENE
135-TBB	1,3,5-TRIBROMOBENZENE
135-TCB	1,3,5-TRICHLOROBENZENE
14-DCB	1,4-DICHLOROBENZENE
2-CHLNPH	2-CHLORONAPHTHALENE
2-CP	2-CHLOROPHENOL
2-MTHNPH	2-METHYLNAPHTHALENE
23-D	2,3-DICHLOROPHENOXYACETIC ACID
23-DCP	2,3-DICHLOROPHENOL
234-TCP	2,3,4-TRICHLOROPHENOL
2345TTCP	2,3,4,5-TETRACHLOROPHENOL
2346TTCP	2,3,4,6-TETRACHLOROPHENOL
235-TCP	2,3,5-TRICHLOROPHENOL
2356TTCP	2,3,5,6-TETRACHLOROPHENOL
236-TBA	2,3,6-TRICHLOROBENZOIC ACID
236-TCP	2,3,6-TRICHLOROPHENOL
24-D	2,4-DICHLOROPHENOXYACETIC ACID
24-DB	4-(2,4-DICHLOROPHENOXY)-BUTYRIC ACID
24-DCP	2,4-DICHLOROPHENOL
24-DP	2-(2,4-DICHLOROPHENOXY)-PROPIONIC ACID
245-T	2,4,5-TRICHLOROPHENOXYACETIC ACID
245-TCP	2,4,5-TRICHLOROPHENOL
246-TCP	2,4,6-TRICHLOROPHENOL
26-DCP	2,6-DICHLOROPHENOL
3-CP	3-CHLOROPHENOL
34-DCP	3,4-DICHLOROPHENOL
345-TCP	3,4,5-TRICHLOROPHENOL
35-DCP	3,5-DICHLOROPHENOL
3MET-4CP	3-METHYL-4-CHLOROPHENOL
4-CP	4-CHLOROPHENOL
5MET-2CP	2-CHLORO-5-METHYLPHENOL
A-CHLRDN	ALPHA-CHLORDANE
A-ENDSLF	ALPHA-ENDOSULFAN
A-HCH	ALPHA-1,2,3,4,5,6-HEXACHLOROCYCLOHEXANE
ACNPHTHN	ACENAPHTHENE
ACNPHTHY	ACENAPHTHYLENE
AG/E-ICP	SILVER - EXTRACTABLE - ICP
AG/E-IMS	SILVER - EXTRACTABLE - ICP/MS
AG/T-ICP	SILVER - TOTAL - ICP

PARAMETER LABEL INDEX

PARAMETER LABEL	PARAMETER DESCRIPTION
CA/T-ICP	CALCIUM - TOTAL - ICP
CA-DDICP	CALCIUM - DISSOLVED - DIRECT ASP./ICP
CA-F/ICP	CALCIUM-FILTERED - DIRECT ASP./ICP
CA-ICP	CALCIUM - ICP
CA-UFICP	CALCIUM - UNFILTERED - DIRECT ASP./ICP
CD/D-ICP	CADMIUM - DISSOLVED - ICP
CD/T-ICP	CADMIUM - TOTAL - ICP
CD/E-IMS	CADMIUM - EXTRACTABLE - ICP/MS
CD/E-ICP	CADMIUM - EXTRACTABLE - ICP
CD-DDICP	CADMIUM - DISSOLVED - DIRECT ASP./ICP
CD-DDIMS	CADMIUM - DISSOLVED-DIRECT ASP.-ICP/MS
CD-EXT/S	CADMIUM - EXTRACTABLE/SEDIMENT
CD-TGF/P	CADMIUM - TOTAL GRAPHITE FURNACE/PLANT
CD-TOT//F	CADMIUM - TOTAL/FISH
CD-TOT/P	CADMIUM - TOTAL/PLANT
CD-TOT/S	CADMIUM - TOTAL/SEDIMENT
CHLA	CHLOROPHYLL A
CHLA-COR	CHLOROPHYLL A
CHRYSENE	CHRYSENE
CL	CHLORIDE
CO/T-ICP	COBALT - TOTAL - ICP
CO/D-ICP	COBALT - DISSOLVED - ICP
CO/E-ICP	COBALT - EXTRACTABLE - ICP
CO/E-IMS	COBALT - EXTRACTABLE - ICP/MS
CO-DDICP	COBALT - DISSOLVED - DIRECT ASP./ICP
CO-DDIMS	COBALT - DISSOLVED-DIRECT ASP.-ICP/MS
CO-TOT/S	COBALT - TOTAL/SEDIMENT
COLOR-AP	APPARENT COLOUR - COLOURIMETRIC
COLOR-TR	TRUE COLOUR - COLOURIMETRIC
CR/E-IMS	CHROMIUM - EXTRACTABLE - ICP/MS
CR/E-ICP	CHROMIUM - EXTRACTABLE - ICP
CR/T-ICP	CHROMIUM - TOTAL - ICP
CR/D-ICP	CHROMIUM - DISSOLVED - ICP
CR-DDICP	CHROMIUM - DISSOLVED - DIRECT ASP./ICP
CR-DDIMS	CHROMIUM - DISSOLVED-DIRECT ASP.-ICP/MS
CR-TOT/S	CHROMIUM - TOTAL/SEDIMENT
CR-TOT/P	CHROMIUM - TOTAL/PLANT
CR-TOT/F	CHROMIUM - TOTAL/FISH
CU/D-ICP	COPPER - DISSOLVED - ICP
CU/T-ICP	COPPER - TOTAL - ICP
CU/E-IMS	COPPER - EXTRACTABLE - ICP/MS
CU/E-ICP	COPPER - EXTRACTABLE - ICP
CU-DDICP	COPPER - DISSOLVED - DIRECT ASP. /ICP
CU-DDIMS	COPPER - DISSOLVED-DIRECT ASP.-ICP/MS
CU-EXT/S	COPPER - EXTRACTABLE/SEDIMENT
CU-TOT/F	COPPER - TOTAL/FISH
CU-TOT/P	COPPER - TOTAL/PLANT
CU-TOT/S	COPPER - TOTAL/SEDIMENT
D-ATRAZN	DESETHYLATRAZINE

PARAMETER LABEL INDEX

PARAMETER LABEL	PARAMETER DESCRIPTION
INDENE	INDENE
INDNOPYR	INDENO(1,2,3-CD)PYRENE
K/D-ICP	POTASSIUM - DISSOLVED - ICP
K/E-ICP	POTASSIUM - EXTRACTABLE - ICP
K/T-ICP	POTASSIUM - TOTAL - ICP
K-DDICP	POTASSIUM - DISSOLVED - DIRECT ASP./ICP
K-F/ICP	POTASSIUM - FILTERED - DIRECT ASP./ICP
K-ICP	POTASSIUM - ICP
K-UFICP	POTASSIUM - UNFILTERED - DIRECT ASP./ICP
LA/E-IMS	LANTHANUM - EXTRACTABLE - ICP/MS
LA-DDIMS	LANTHANUM - DISSOLVED-DIRECT ASP.-ICP/MS
LI/D-ICP	LITHIUM - DISSOLVED - ICP
LI/E-ICP	LITHIUM - EXTRACTABLE - ICP
LI/E-IMS	LITHIUM - EXTRACTABLE - ICP/MS
LI/T-ICP	LITHIUM - TOTAL - ICP
LI-DDICP	LITHIUM - DISSOLVED - DIRECT ASP./ICP
LI-DDIMS	LITHIUM - DISSOLVED - DIRECT ASP.-ICP/MS
LIPIDS	LIPIDS
MALATHON	MALATHION
MCPA	4-CHLORO-2-METHYL PHENOXY ACETIC ACID
MCPB	4-(4-CHLORO-2-METHYL-PHENOXY)BUTYRIC ACID
METLCHLR	METOLACHLOR
METRIBZN	METRIBUZIN
MG/D-ICP	MAGNESIUM - DISSOLVED - ICP
MG/E-ICP	MAGNESIUM - EXTRACTABLE - ICP
MG/T-ICP	MAGNESIUM - TOTAL - ICP
MG-DDICP	MAGNESIUM - DISSOLVED-DIRECT ASP.-ICP/MS
MG-F/ICP	MAGNESIUM - FILTERED - DIRECT ASP./ICP
MG-ICP	MAGNESIUM - ICP
MG-UFICP	MAGNESIUM - UNFILTERED - DIRECT ASP./ICP
MHR	METOLACHLOR
MIREX	MIREX
MN/D-ICP	MANGANESE - DISSOLVED - ICP
MN/T-ICP	MANGANESE - TOTAL - ICP
MN/E-IMS	MANGANESE - EXTRACTABLE - ICP/MS
MN/E-ICP	MANGANESE - EXTRACTABLE - ICP
MN-DDICP	MANGANESE - DISSOLVED - DIRECT ASP./ICP
MN-DDIMS	MANGANESE - DISSOLVED-DIRECT ASP.-ICP/MS
MN-EXT/S	MANGANESE - EXTRACTABLE/SEDIMENT
MN-TOT/F	MANGANESE - TOTAL/FISH
MN-TOT/P	MANGANESE - TOTAL/PLANT
MN-TOT/S	MANGANESE - TOTAL/SEDIMENT
MO/E-ICP	MOLYBDENUM - EXTRACTABLE - ICP
MO/T-ICP	MOLYBDENUM - TOTAL - ICP
MO/D-ICP	MOLYBDENUM - DISSOLVED - ICP
MO-DDICP	MOLYBDENUM - DISSOLVED - DIRECT ASP./ICP
MOIST-AH	MOISTURE FOR ACID HERBICIDES
MOIST-CP	MOISTURE FOR CHLOROPHENOLS
MOIST-NH	MOISTURE FOR NEUTRAL HERBICIDES

PARAMETER LABEL INDEX

PARAMETER LABEL	PARAMETER DESCRIPTION
PCP	PENTACHLOROPHENOL
PECB	PENTACHLOROBENZENE
PERYLENE	PERYLENE
PH	PH
PHNNTHRN	PHENANTHRENE
PHORATE	PHORATE
PHOSMET	PHOSMET
PICLORAM	4-AMINO-3,5,6-TRICHLOROPICOLINIC ACID
POC	PARTICULATE ORGANIC CARBON
PON	PARTICULATE ORGANIC NITROGEN
PYRENE	PYRENE
RB/E-IMS	RUBIDIUM - EXTRACTABLE - ICP/MS
RB-DDIMS	RUBIDIUM - DISSOLVED-DIRECT ASP.-ICP/MS
RESIDUE	RESIDUE
SB-DISS	ANTIMONY - DISSOLVED
SB-TOT	ANTIMONY - TOTAL
SE-DISS	SELENIUM - DISSOLVED
SE-TOT/S	SELENIUM - TOTAL/SEDIMENT
SE-TOT	SELENIUM - TOTAL
SILVEX	2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID
SIMAZINE	SIMAZINE
SIO2	SILICA
SO4	SULPHATE
SPCOND	SPECIFIC CONDUCTIVITY
SR/T-ICP	STRONTIUM - TOTAL - ICP
SR/D-ICP	STRONTIUM - DISSOLVED - ICP
SR/E-ICP	STRONTIUM - EXTRACTABLE - ICP
SR/E-IMS	STRONTIUM - EXTRACTABLE - ICP/MS
SR-DDICP	STRONTIUM - DISSOLVED - DIRECT ASP./ICP
SR-DDIMS	STRONTIUM - DISSOLVED-DIRECT ASP.-ICP/MS
SR-TOT/F	STRONTIUM - TOTAL/FISH
SRP-P-F	SOLUBLE REACTIVE PHOSPHORUS - FILTERED
SRP-P-UF	SOLUBLE REACTIVE PHOSPHORUS - UNFILTERED
T-PCB	T-POLYCHLORINATED BIPHENYL
TERBUFOS	TERBUFOS
TKN-N-F	TOTAL KJELDAHL NITROGEN - FILTERED
TKN-N-UF	TOTAL KJELDAHL NITROGEN - UNFILTERED
TL/T-ICP	THALLIUM - TOTAL - ICP
TL/E-IMS	THALLIUM - EXTRACTABLE - ICP/MS
TL/D-ICP	THALLIUM - DISSOLVED - ICP
TL-DDIMS	THALLIUM - DISSOLVED-DIRECT ASP.-ICP/MS
TN-N-F	TOTAL NITROGEN - FILTERED
TN-N-UF	TOTAL NITROGEN - UNFILTERED
TP-P-F	TOTAL PHOSPHORUS - FILTERED
TP-P-UF	TOTAL PHOSPHORUS - UNFILTERED
TRIALLAT	TRIALLATE
TRIFLRLN	TRIFLURALIN
TRIHS	TRIAZINES-HIGH SENSITIVITY
TURB	TURBIDITY

Method Abbreviation Index

Method Abbreviation

Abbreviation Description

METHOD ABBREVIATION INDEX

METHOD ABBREVIATION	METHOD DESCRIPTION
%H2O	PERCENT MOISTURE
%LIPIDSW	PERCENT LIPIDS
10X-CONCN	10X CONCENTRATION
A.EXTN	ACETONE EXTRACTION
ACID-DIGN	ACID DIGESTION
ALK.FUSION	ALKALINE FUSION
AUTO.ISE	AUTOMATED ION SELECTIVE ELECTRODE
CALCULATED	CALCULATED
COL-AA1	COLORIMETRIC - TECHNICON AUTOANALYZER I
COL-FLT	COLORIMETRIC - FILTERED
COL-UNF	COLORIMETRIC - UNFILTERED
COLAUTLV	TOTAL NITROGEN - COLORIMETRIC - AUTOCLAVE DIGESTION
COND-TT	CONDUCTOMETRIC TITRATION
DA-FLT	DIRECT ASPIRATION - FILTERED
DA-UNF	DIRECT ASPIRATION - UNFILTERED
DIC-FLT	DISSOLVED INORGANIC CARBON - FILTERED
DIR.ASPIRN	DIRECT ASPIRATION
DOC-FLT	DISSOLVED ORGANIC CARBON - FILTERED
ELECTRO	ELECTROMETRIC
EMPOREDISK.EXTN	EMPORE DISK EXTRACTION
FIL-105	RESIDUE FILTERABLE - 105° C
FLAMELESS	FLAMELESS ATOMIC ABSORPTION
FLT	FILTERED
FLT-550	RESIDUE FIXED FILTERABLE - 550° C
GR.FURNACE	GRAPHITE FURNACE
HCL-EXTRN	HYDROCHLORIC ACID EXTRACTION
HEX.EXTN	HEXANE EXTRACTION
IMMUNOASSAY	IMMUNOASSAY
INF.RED	INFRARED
INORG	INORGANIC
INSTR.ONLY	INSTRUMENT ONLY
IONCHROM-DNX	DIONEX - ION CHROMATOGRAPHY
IR-FLT	INFRARED DETECTION - FILTERED
IR-UNF	INFRARED DETECTION - UNFILTERED
LVX/PFB	PENTAFLUOROBENZYL BROMIDE DERIVATIZATION
LVX	LARGE VOLUME EXTRACTION
NF-105	RESIDUE NON-FILTERABLE - 105° C
NF-550	RESIDUE FIXED NON-FILTERABLE - 550° C
NH3-FLT	AMMONIA - FILTERED
NH3-UNF	AMMONIA - UNFILTERED
NO2-FLT	NITRITE - FILTERED
NO2-UNF	NITRITE - UNFILTERED
NO3/2FLT	NITRATE - NITRITE - FILTERED
NO3/2UNF	NITRATE - NITRITE - UNFILTERED
OPEN-DIGN	OPEN DIGESTION
ORGANIC	ORGANIC
PARTIC.O	PARTICULATE ORGANIC

Glossary

Find Definitions for:

- ✔Current Analytical Methods
- ✔ECOLIMS Code
- ✔ENVIRODAT Code
- ✔STAR Code
- ✔Detection Limit
- ✔Time Measuring Unit (TMU)

GLOSSARY

Definition of Terms

Current Analytical Methods: Analytical methods which are performed on an ongoing basis and are readily available upon request.

ECOLIMS Code: Parameter code used in the laboratory management system ECOLIMS.

ENVIRODAT Code: Parameter code defined in the ENVIRODAT database.

STAR Code: Parameter code defined in the STAR database.

Detection Limit: Laboratory method detection limit is the lowest concentration of an analyte in an idealized substrate (ie. Type I water) that a method can reliably detect and that is statistically different from the response obtained from a blank carried through the complete method, including chemical extraction and/or pretreatment of the sample. The 95% level of confidence is used to calculate the method detection limit.

Time Measuring Unit (TMU): The average amount of time used to perform a test for a given parameter and a given substrate. This includes the following time elements:

* Instrument maintenance and calibration
* Method set-up
* Sample preparation
* Analysis
* Quantitation and data entry
* Quality control
* Supervision and data verification/reporting
* Miscellaneous

New Services

Introducing...

- ★ PCB Congeners
- ★ Toxaphene

Congener Analysis

A number of alternative methods of measuring PCB will be offered in 1998. PCB methods are calibrated using multi-level mixtures of all 209 congeners. However, of 209 possible PCB congeners only 129 are prevalent in environmental samples (see table of PCB congeners). The number of congener or congener combinations reported are a function of Aroclor® type and the PCB method selected. Coplanar PCB measurements are not offered. A choice of single (DB-5) or dual capillary column (DB-5, DB-1) PCB congener measurements using electron capture detection can be selected. Congener separations are conditional to sample matrix and relative concentrations. Methods are available for most sample matrices, including air (Puffs)(A), water (W), sediment (S), biota (B) and plants (P). At present, the laboratory has insufficient data to provide clients with a direct comparison of congener and non congener PCB based results. Preliminary data is expected to be available for biota and sediment by December, 1998.

Clients wanting specific congener measurements should request clarification prior to sample submission. Contact Mike Comba at 905-336-4617 for more information.

Alternative schemas now offered.

TCPCB	Measurement of total PCB based on single column-ECD congener method. No congener report issued. (*Replacement of TPCB estimation method).*

Select the appropriate schema based on the sample matrix from the following list. TMU = 5.0.

TCPCP-A
TCPCB-W
TCPCB-S
TCPCB-B
TCPB-P

CPCBS	Measurement of PCB congeners using single column ECD procedure. (*CPCB method for analysis not requiring separation of specific bio-active isomers).*

Select the appropriate schema based on the sample matrix from the following list. TMU = 6.0.

CPCPS-A
CPCBS-W
CPCBS-S
CPCBS-B
CPCBS-P

CPCBD	Measurement of PCB congeners using dual column ECD procedure. (*CPCB analysis for analyses requiring separations of most bio-active isomers*).

Select the appropriate schema based on the sample matrix from the following list. TMU = 7.0.

CPCBD-A
CPCBD-W
CPCBD-S
CPCBD-B
CPCBD-P

Additional PCB options.

PCBH*	PCB homologue distributions by congener class. TMU = 1.5
ACLOR*	Estimation of Aroclor® content, based on % chlorine and homologue distribution. TMU = 1.0
UT	Ultra-trace analyses for samples requiring lower detection limits. Analyses performed with ultra-clean adsorbents and controlled atmosphere to reduce background contamination. Final sample extract volume 200 µL. Prefix the schema of choice with the two letter designation (UT) and add 1.25 to the TMU value (e.g. UTCPCBD-A, TMU = 8.25).

* Does not apply to TCPCP