

MUNICIPALITY OF ARCTIC BAY

**Environmental Monitoring Program and
Quality Assurance/Quality Control Plan for
Municipal Water Licence**

November 2024

Document Control

Date	Document Title	Author	Details
Unknown	QA/QC of Water Supply to the Hamlet of Arctic Bay	Unknown	Initial document
November 2024	Municipality of Arctic Bay Environmental Monitoring Program and Quality Assurance/Quality Control Plan for Municipal Water Licence	GN-CGS and Dillon Consulting Ltd.	Consolidation of information and update of previous manuals into standard template

Table of Contents

1.0	Introduction	1
2.0	Environmental Monitoring and Reporting	3
3.0	Sampling Procedures and Protocols	9
3.1	Sampling Location and Frequency	9
3.2	Sample Container Selection	9
3.3	Field Sample Log	9
3.4	General Procedures for Sample Collection	10
3.5	Surface Water Sampling Procedures	10
3.5.1	Freshwater Streams, Surface Drainage, and Wetlands	10
3.5.2	Lakes or Ponds	11
3.6	Sample Identification	11
3.7	Sample Preservation	12
3.8	Sample Transportation	12
3.9	Water Volume and Water Level Measurements	12
4.0	Quality Assurance and Quality Control	13
4.1	Quality Assurance	13
4.2	Quality Control	13
4.2.1	Field Blanks	14
4.2.2	Replicate or Duplicate Samples	14
4.3	Lab Accreditation	14
5.0	Laboratory Analysis and Reporting	15

Figures

Figure 1: Arctic Bay Monitoring Locations Google Earth, 2024	2
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Tables

Table 1: Water License Sampling Locations.....	3
Table 2: Water License Sampling Parameters ARC-3, ARC-4, and ARC-6b	6
Table 3: Water License Sampling Parameters ARC-7b and ARC-9.....	6

Appendices

A	Site Drawings
B	Laboratory Accreditation
C	Wastewater and Leachate Sampling Guide
D	Field Forms

1.0 Introduction

This quality assurance/quality control (QA/QC) plan for sampling and monitoring describes the procedures and protocols to be followed when conducting environmental sampling under the Nunavut Water Board (NWB) Water Licence monitoring program.

Although the QA/QC Plan is submitted to the NWB as a condition of the water license, it is primarily intended to be read, understood, and implemented by Municipality personnel responsible for environmental quality monitoring.

The water licence requires Hamlet personnel to adhere to these procedures, which should be applied to all water quality samples taken by the Hamlet. This document applies to the currently used infrastructure and environmental laboratory, and any changes will require this document to be updated.

Date this plan was prepared: 2024-Nov-15

Community: Municipality of Arctic Bay
Latitude: 73°02'15"N
Longitude: 85°08'53"W

This quality assurance/quality control (QA/QC) plan for sampling and monitoring was created to meet the requirements of the community's water licence:

Water licence number: 3BM-ARC1924
Issue date: August 29, 2019
Expiry date: August 28, 2024



Figure 1: Arctic Bay Monitoring Locations Google Earth, 2024

2.0 Environmental Monitoring and Reporting

Part I of the NWB licence provides specific requirements for the monitoring program. **Table 1** summarises the sampling locations, while **Table 2** details the water quality sampling parameters.

Table 1: Water License Sampling Locations

Monitoring Program Station	Description	Sample Type	Frequency	Status
ARC-1	Raw Water intake at Marcil Lake	Water	Daily, monthly, and annually	Active (Volume)
ARC-3	Raw Wastewater Discharge (South Berm)	Wastewater	<u>Volume</u> Monthly and Annually <u>Water Quality</u> Once prior to Licence renewal	Active (Volume, Water Quality)
ARC-4	Lagoon Pump Discharge (North Berm)	Wastewater	Once prior to decant	Active (Volume, Water Quality)
ARC-6b	Surface Water at the end of Wetland area	Wastewater	Three (3) times annually (once at the onset of decant; once during decant; and once at the end of decant)	Active (Water Quality)
ARC-7b	Runoff from the Quarry Site	Surface Water	Annually during periods of runoff or seepage	Active (Water Quality)

Municipality of Arctic Bay
Environmental Monitoring Program and Quality Assurance/Quality Control Plan for Municipal Water
Licence
November 2024

Monitoring Program Station	Description	Sample Type	Frequency	Status
ARC-8	Sewage Sludge	Wastewater/Sludge	Prior to removal from Lagoon	Active (Volume, Water Quality)
ARC-9	Runoff from the Solid Waste Disposal Facility	Leachate	Annually during periods of runoff or seepage	Active (Water Quality)
ARC-10	Thermistors in accordance with approved Instrumentation Monitoring and Surveillance Plan	Temperature		Inactive
ARC-11	Standpipes in accordance with approved Instrumentation Monitoring and Surveillance Plan	Seepage		Inactive
ARC-12	Settlement stations In accordance with approved Instrumentation Monitoring and Surveillance Plan	Location/Elevation		Inactive

Standpipe and monitoring location information is available in **Appendix A** on As-Built drawing L1; however, the monitoring stations are inactive. For monitoring program locations that that

are used to collect chemical data for surface water or groundwater, the parameters that will be analyzed are as follows:

Table 2: Water License Sampling Parameters ARC-3, ARC-4, and ARC-6b

MONITORING LOCATIONS	PARAMETERS
ARC-3, ARC-4, ARC-6B	<ul style="list-style-type: none"> BOD₅ TSS Conductivity Oil and Grease (Visual) Magnesium Sodium Chloride Total Hardness Ammonia Nitrogen Total Cadmium Total Cobalt Total Chromium Total Copper Total Aluminum Total Mercury Faecal Coliforms pH Nitrate-Nitrite Total Phenols Calcium Potassium Sulphate Total Alkalinity Total Zinc Total Iron Total Manganese Total Nickel Total lead Total Arsenic TOC

Table 3: Water License Sampling Parameters ARC-7b and ARC-9

MONITORING LOCATIONS	PARAMETERS
ARC-7B, ARC-9	<ul style="list-style-type: none"> BOD₅ TSS Conductivity Oil and Grease (Visual) Magnesium Sodium Total Hardness Ammonia Nitrogen Total Cadmium Total Chromium Total Copper Total Mercury Faecal Coliforms pH Nitrate-Nitrite Total Phenols Calcium Potassium Sulphate Total Alkalinity Total Iron Total Lead Total Arsenic TPH PAH BTEX

The environmental lab used to analyze the samples collected for the monitoring program must meet the accreditation requirements outlined in the community's water licence.

Proof of environmental lab's accreditation is attached to this plan in **Appendix B**.

The address and contact information for the environmental laboratory used for analysis by Arctic Bay is:

Caduceon Labs Ottawa
2387 Holly Ln
Ottawa, ON
K1V 7P1
(613) 526-1023

The guidelines or site-specific criteria will be used to interpret the analytical results are as follows:

All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of Standard Methods for the Examination of Water and Wastewater, or by such other methods approved by the Board in writing.

All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

Reports will be distributed to the municipality, Government of Nunavut, Department of Community and Government Services (GN-CGS), and the Nunavut Water Board.

Additional special conditions or requirements that have been noted in Arctic Bay's water license are as follows:

1. The Licensee shall submit to the Board, as part of the Annual Report required under Part B, Item 1, monitoring results for thermistor, standpipe, and settlement stations at Monitoring Program Stations ARC-10, ARC-11, and ARC-12. An annual assessment of the geotechnical and geothermal performance of the Wastewater Treatment Facility shall be provided as an Addendum to the Annual Report required as per Part B Item 1. This assessment shall include:
 - interpretation of unexpected monitoring results;
 - analyses of settlement station results on liner integrity; and
 - analyses of thermistor and seepage results on berm stability.

2. The detailed Instrumentation Monitoring and Surveillance Plans shall be incorporated into the Manuals referred to in Part F, Item 2, and Part F, Item 3, and shall include the following information where applicable:
 - details of the proposed instrumentation plan, the frequency of measurements and trigger values or observations for remedial action;
 - review of geothermal monitoring plans including the number of thermistors to be installed, the location of thermistor installations, the installation of thermistors within the key trench, the depth of thermistor strings in subgrade soils, justification for the final chosen depth of thermistor strings, and the final detailed design of thermistor strings, taking into consideration reviewer comments; and
 - details of settlement monitoring at the upstream and downstream toes of the berms.

3.0 Sampling Procedures and Protocols

To ensure quality of the monitoring program, the following procedures and protocols shall be used for field sampling. These methods are consistent with the Standard Methods for the Examination of Water and Wastewater (Eaton et al., 2005) and have been approved by the Nunavut Water Board.

3.1 Sampling Location and Frequency

The monitoring program included in the water license includes specific requirements regarding sampling locations, sampling frequency and parameters to be analyzed. These are provided in **Table 1** and **Table 2**. Monitoring locations are shown in **Figure 1**.

3.2 Sample Container Selection

Sample containers vary in size and material of construction depending on the specific type of analysis to be conducted. Containers to be used shall be obtained directly from the laboratory. The laboratory will provide the correct sizes and types of bottles based on the parameters required. The sample containers for specific analysis are provided in **Appendix C**. The laboratory shall be contacted at least one (1) month prior to the sampling event to ensure that containers are available for sampling.

3.3 Field Sample Log

The individual collecting the samples shall record the following at each location at the time of sampling:

- Date of sampling;
- Time of sampling;
- Weather conditions;
- Monitoring Station Number (i.e., ARC-1, ARC-2, etc.);
- Results of any field measurements;
- Sampler shall also indicate if sample used preservatives;
- Any unusual conditions; and
- Any deviation from standard procedures.

An example Sampling Log is included in **Appendix B**.

3.4 General Procedures for Sample Collection

General procedures for sample collection are outlined below. Different laboratories have slightly different bottle requirements and sample handling protocols. Sampling technicians must receive site specific training and laboratory procedures must take precedence over other protocols.

- Sample Locations and Sampling Frequency – The location and frequency of each sampling option has been carefully selected, and is part of site design and layout, as well as the Water Board License. Sampling will follow their requirements. Diversions must be recorded and submitted to the Water Board for approval;
- Preparation – Approximately one (1) month prior to the sampling event the laboratory will be notified, and the required bottles, blanks, and materials assembled. Plans for rapid return of the samples prepared;
- Field Collection – At each sampling station the specified samples will be collected, and field data recorded;
- Handling Storage and Transportation –Appropriate personal protective equipment (gloves, safety glasses, etc.) will be used when handling samples. Samples will be stored at 4°C and protected from freezing until delivered to the laboratory. Chain of custody for sampling, storage, and delivery must be maintained. Laboratory sample sheets will be filled in as per laboratory protocols; and
- Delivery to Laboratory – Samples will be delivered to the laboratory in the laboratory dictated method and within the hold times specified, as much as possible.

3.5 Surface Water Sampling Procedures

All the samples taken will be grab samples. Samples will normally be taken from natural lakes, streams, treatment ponds, or process streams. Where possible, samples shall be taken from just below the surface to avoid floating debris, which may contaminate the sample.

3.5.1 Freshwater Streams, Surface Drainage, and Wetlands

Guidelines for collecting samples from streams, surface drainage, and wetlands are as follows:

- The samples shall be collected as close to the middle of the stream where water flows freely and is free of debris.
- Samples shall be collected upstream of the sampler.
- After getting into position, the sampler shall wait to allow any stirred sediment that occurred from entering the stream to settle or wash away.

- The sample bottle shall be partially filled with the water to be sampled and rinsed with the lid in place.
- Rinse water shall be emptied downstream of the sampling point, so that stream sediments remain undisturbed.
- Prior to sampling for oil/grease, bacteria, and for any bottles containing preservative, the bottles shall not be rinsed.
- If possible, bottles shall be plunged into the stream to a depth of approximately half the total stream depth and allow it to fill with the mouth of the bottle facing upstream.
- If the stream is too shallow to allow for sample bottle to be filled completely, without disturbing bottom sediment of the streambed, the sampler may use a smaller container that has been properly rinsed to transfer sample to the larger bottle.
- Do not use a smaller sample bottle containing preservatives.
- When taking the sample, sufficient room shall be left to allow for the addition of preservatives, if required.

3.5.2 Lakes or Ponds

When collecting samples from lakes or ponds, the below procedures should be followed:

- Surface sampling shall be collected using the same procedures as streams.
- Sample bottles shall be plunged to approximately 150 mm (6 inches) below the water surface.

3.6 Sample Identification

All samples collected are to be labelled according to standard identification procedures (Name of sampler, time and date of sampling, sample identifier, sampling method and type of sample). Sample labels shall be water-resistant and prepared prior to going into the field. The individual samples will be labelled with the following information:

- Sample ID #;
- Monitoring Station Name (e.g., ARC-3);
- Date and time of collection;
- Parameter to be analyzed;
- Preservatives;
- Project number identifier; and
- Bottle number 1 of ____.

3.7 Sample Preservation

To obtain good results from a sampling program, timing is critical. All samples are to be shipped to the Laboratory that has been contracted to carry out the analysis the same day as they are collected. Samples must be protected from breakage and shall be shipped in an insulated cooler that can be provided by the Laboratory. If samples cannot be shipped until the next day, due to unavoidable events such as weather or mechanical problems with transport aircraft, all samples must be stored in a refrigerator at 4°C. Samples must not be frozen.

In all cases where samples cannot be delivered to the lab on the same day, specific preservatives must be added to the samples to prevent chemical changes that may alter the concentration of the parameters of interest. The samples must be preserved within two hours of sampling. Usually, samples can be preserved away from the field at the end of the site visit. In most cases, the laboratory can fill the bottles with preservative, and then ship them to the Municipality to be filled and sent back for analysis.

3.8 Sample Transportation

The main objective of the sampler is to minimize any chemical changes to the sample between the time it is collected and delivery to the laboratory. Heat, light, and agitation can all impact the water chemistry, and the samples shall be protected from these effects.

Effluent and surface water samples shall be stored and transported at a temperature of 4°C. Coolers and ice packs need to be available and are usually provided by the laboratory. Upon arrival at the laboratory, samples shall be refrigerated as soon as possible.

3.9 Water Volume and Water Level Measurements

The NWB license includes measuring the monthly and annual volume of water pumped from ARC-1. This can be accomplished by installing a flow meter on the intake pipe.

4.0 Quality Assurance and Quality Control

Quality Assurance (QA) and Quality Control (QC) are vitally important components of environmental management.

4.1 Quality Assurance

Quality Assurance (QA) is a set of operating principles that, if strictly followed during sample collection and analysis, will produce data of known and defensible quality. As such the accuracy of the analytical results can be stated with a high level of confidence. A high level of quality assurance can be achieved by applying the following principles:

- Personnel involved in water sampling and analysis are well trained;
- Facilities and equipment required for sampling are suitable, well maintained, and always kept clean;
- Standard procedures are developed and implemented for the collection, transportation, and analysis of samples, based on recognized best management practices (BMP);
- Laboratory and field instruments are calibrated according to manufacturers recommendations or recognized as good operating practice; and
- Supplies used in sampling and analysis are of consistent high quality and are not expired.

4.2 Quality Control

Quality Control (QC) is a set of specific procedures used to measure the quality of the data produced and correct deficiencies in the sampling or analyses, as they occur. Quality control is used by the analyst and sampler to achieve standards of measurement for the three principles components of quality: precision, accuracy, and reliability.

Most commercial laboratories undertake QA/QC procedures with the volume of sample sent for analysis. Reports are usually provided with the Certificates of Analysis. It is recommended that the suggested QA/QC protocols by the laboratory be followed.

To ensure that the monitoring program maintains accepted quality control, field blanks and duplicate samples should be collected. These samples are collected and analyzed for the sample parameters listed in the monitoring program in the license as part of a quality control check on monitoring activities.

4.2.1 Field Blanks

Field Blanks are samples that the lab uses to identify any environmental impacts caused during sample collection or sample transportation. Field Blanks shall accompany the sampler into the field, labelled as field blanks, preserved in the field, and submitted to the laboratory with the field samples.

4.2.2 Replicate or Duplicate Samples

Replicate or duplicate samples involves collecting more than one sample for a given sampling station subject to specific analysis. Standard procedures used for the routine sampling shall be applied. The replicate or duplicate samples are useful in identifying problems with accuracy and sampling methods.

4.3 Lab Accreditation

Analytical methods and accreditation are usually dictated by the guideline criteria being followed. In most cases, the guideline criteria are the Canadian Environmental Quality Guidelines (CCME, 2007). These guidelines specify bottles, hold times, preservatives, sampling protocols, as well as lab accreditation, and analytical methodologies. These guidelines or equivalent standard will be used. Prior to any sampling, this information should be reviewed to ensure consistency with regulation and standards. Laboratory accreditation is included in **Appendix B**.

5.0 Laboratory Analysis and Reporting

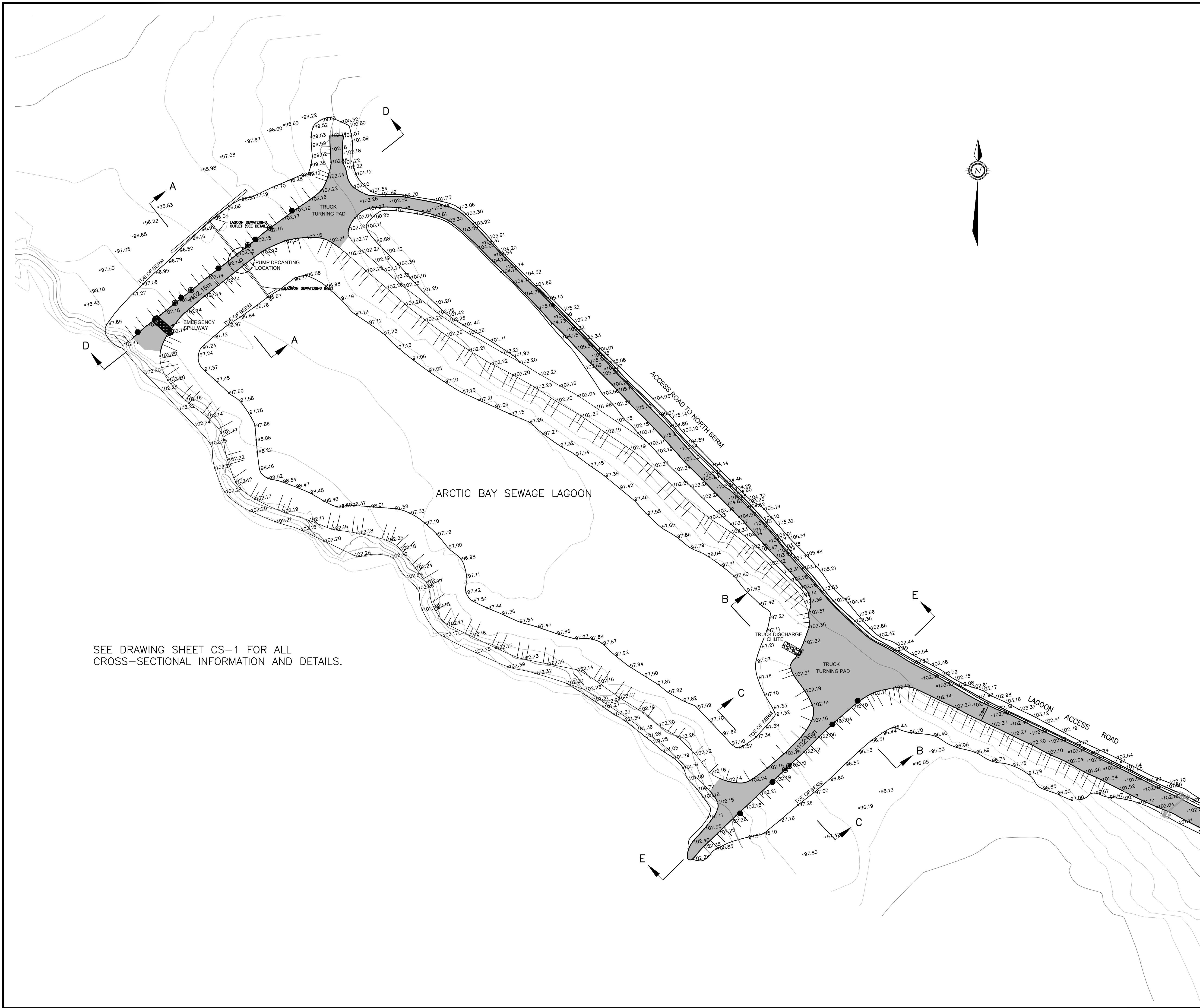
The laboratory will perform the analysis of all samples as outlined herein. The results shall be received by the Municipality within the time frame agreed to with the laboratory. The results shall contain the limits of detection used for analysis of each parameter as supplied by the laboratory. The Municipality may request clarification of the analysis by contacting the NWB Technical Advisor and a review of the analysis will be provided upon request. The laboratory results are compared to the limits of the Water Licence for each parameter, and/or to other comparative criteria such as the Canadian Environment Water Quality Guidelines. Results of the monitoring program are reported in the Annual Report as required in the water license. The Annual Report must be submitted by March 31 of the year following the calendar year for which the report has been submitted. The content of the Annual Report and Guideline Criteria is outlined in the following documents:

- Solid Waste Management Facility Operations and Maintenance Plan;
- Sewage Treatment Facility Operations and Maintenance Plan; and
- Water Supply Facility Operations and Maintenance Plan.

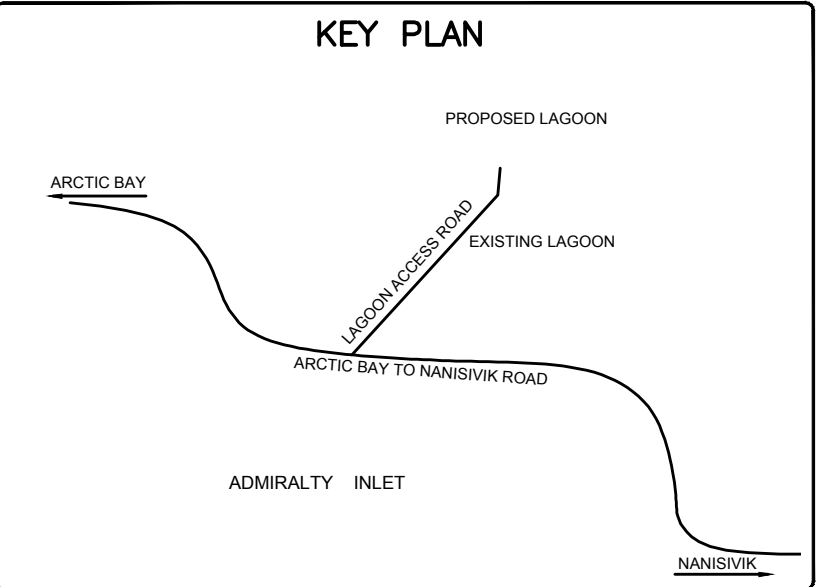
These reports will need to be updated upon NWB approval of this plan.

Appendix A

Site Drawing L1



SEE DRAWING SHEET CS-1 FOR ALL
CROSS-SECTIONAL INFORMATION AND DETAILS.



LEGEND

- BERM CORE DETECTION - THERMISTOR CASING GW THERMISTOR STRING AND DATA LOGGER CONNECTION
- SAMPLING POINT

AS-BUILT

DATE: NOVEMBER 30, 2011

BENCH MARK

BM 1 ELEV. = 59.12
CONTOUR ELEVATIONS WERE DRENNED FROM NAD 83 CONTROL MONUMENT 7038914 LOCATED NORTH OF THE ARCTIC BAY AIRPORT UNDER CONSTRUCTION.

R E V I S I O N S				
4	AS-BUILT	30/11/11	SAB	SLB
3	AS-CONSTRUCTED	17/11/11	MEB	SLB
2	TENDER SET	27/04/09	MMR	SLB
1	ISSUED FOR APPROVAL	24/04/08	MMR	SLB
No.	DESCRIPTION	DATE	BY	APP'D

DRAWINGS ORIGINALLY SEALED BY
S.L.BURDEN, P.eng. OF
exp. SERVICES Inc.
APRIL 27TH, 2009

Trow Associates Inc.
154 Colonnade Road South
Ottawa, Ont. K2E 7J5
Tel:(613)225-9940
Fax:(613)225-7337

CLIENT
GOVERNMENT OF NUNAVUT

PROJECT
ARCTIC BAY WASTEWATER LAGOON

TITLE
PROPOSED LAGOON

design by	SAD	project no.	OTCD000190544
drawn by	MEB	drawing no.	
checked by	SLB		
date	15/01/2008		
scale	HORIZ 1:750		

L-1

Appendix B

*Laboratory **Accreditation***

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

Caduceon Environmental Laboratories (Ottawa)
Caduceon Enterprises Inc.
2378 Holly Lane
Ottawa, Ontario



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Accreditation No.: 1002644
Issued On: 11/22/2024
Accreditation Date: 1/3/2005
Expiry Date: 5/22/2027

A handwritten signature in black ink, appearing to read "K. McKinley".

President and CEO



This certificate is the property of the Canadian Association for Laboratory Accreditation Inc. and must be returned on request; reproduction must follow policy in place at date of issue.
For the specific tests to which this accreditation applies, please refer to the laboratory's scope of accreditation at www.cala.ca.

Appendix C

Wastewater and Leachate Sampling Guide

Instructions

1. Label all bottles prior to going to sampling site.
2. Wear gloves when sampling/handling preservatives.
3. Plunge bottle to about 15 cm below surface, avoid floating debris.
4. Fill bottles partially with water and rinse with lid in place, empty water away from sampling hole, repeat 3 times.
5. **Do not rinse bottles when sampling if bottles contain preservatives.**
6. If preservative is already in the bottle, fill slowly so not to wash out preservative (can use rinsed General Chemistry bottle to fill bottles with preservatives).
7. Put bottles in cooler with icepacks.
8. Place Chain of Custody (COC) form in plastic bag and put in cooler.
9. Wash hands when done handling samples.
10. Send samples to lab as soon as possible (take samples on day there is a flight). Sample should be kept in cargo cooler – **do not freeze**.
11. Notify the lab that the sample was shipped, waybill #, and when it is expected to arrive (Sabina Islam sislam@caduceonlabs.com).

Nunavut Wastewater Package

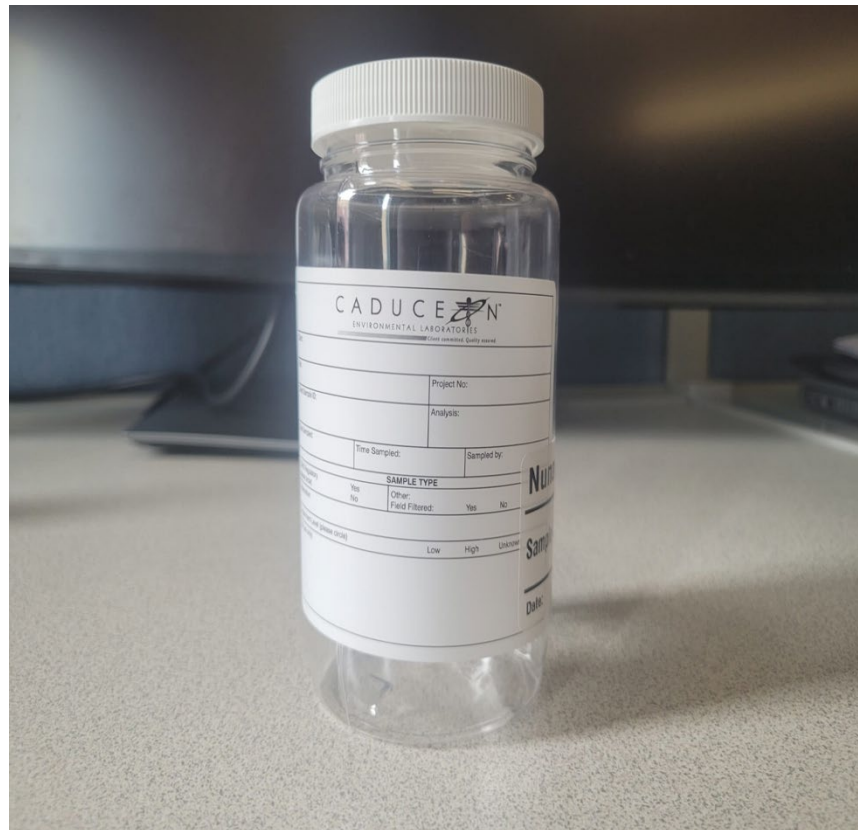


The wastewater package includes:

Test	Bottle Amounts
General Chemistry	1
Nutrients/TOC	2
Metals	1
Mercury	1
Phenols	1
Fecal Coliforms	1
Oil & Grease	1
Routine	1

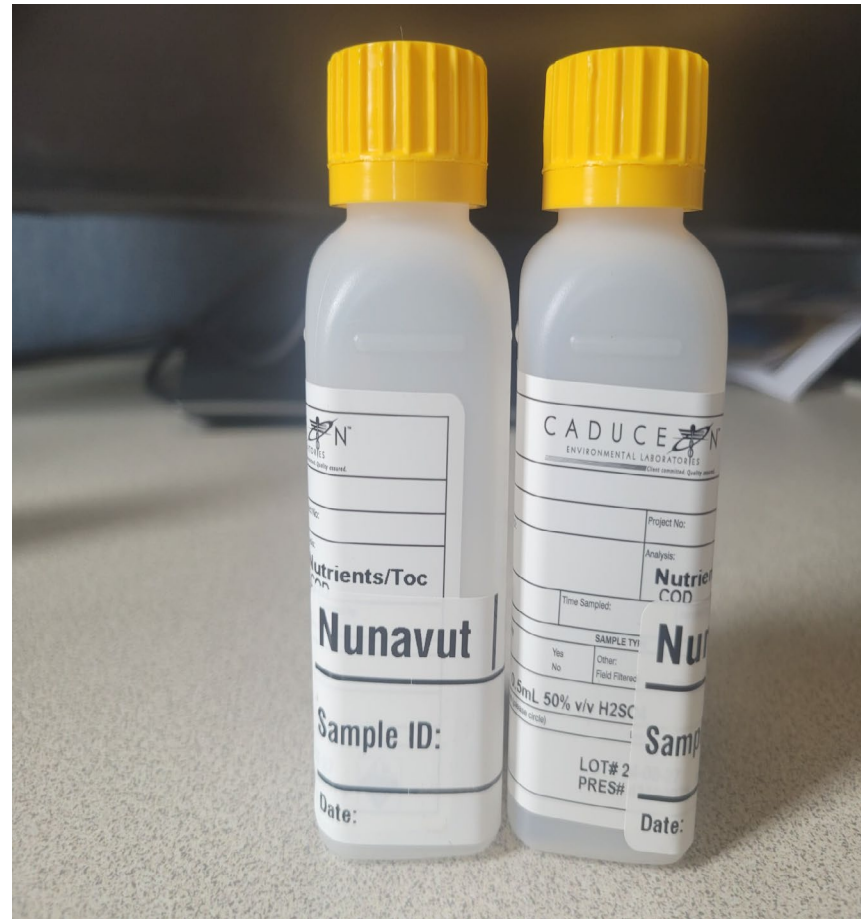
General Chemistry

- Rinse 3 times
- Fill to 95% capacity
- Cap tightly
- Store at 4°C



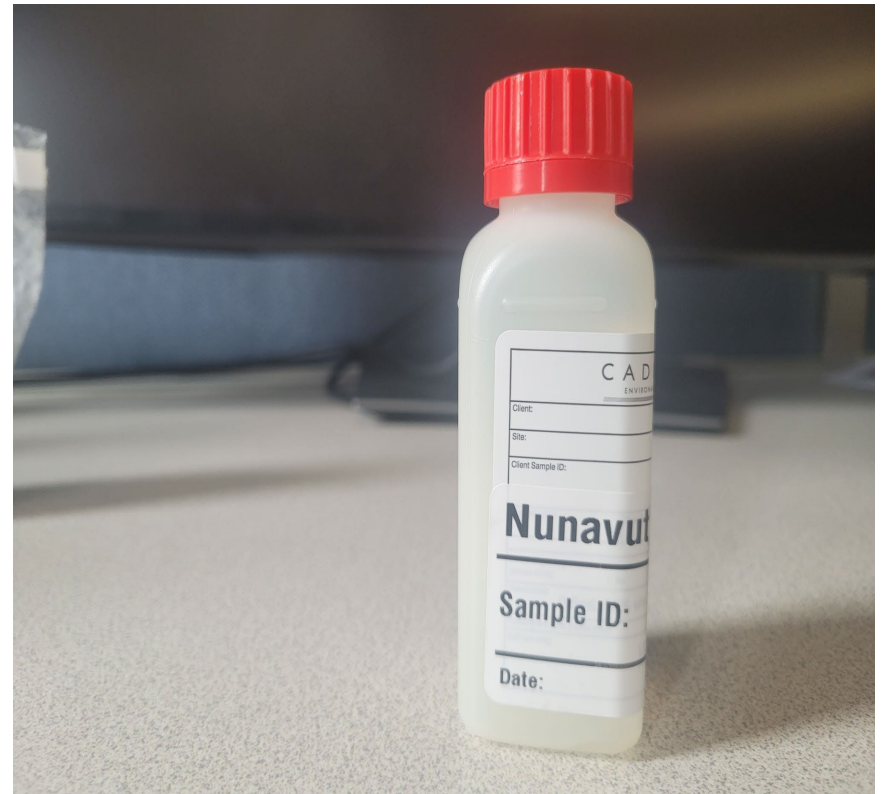
Nutrients/TOC (x2)

- Pre-charged with H₂SO₄. **Do not rinse.**
- Fill both bottles to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Store at 4°C



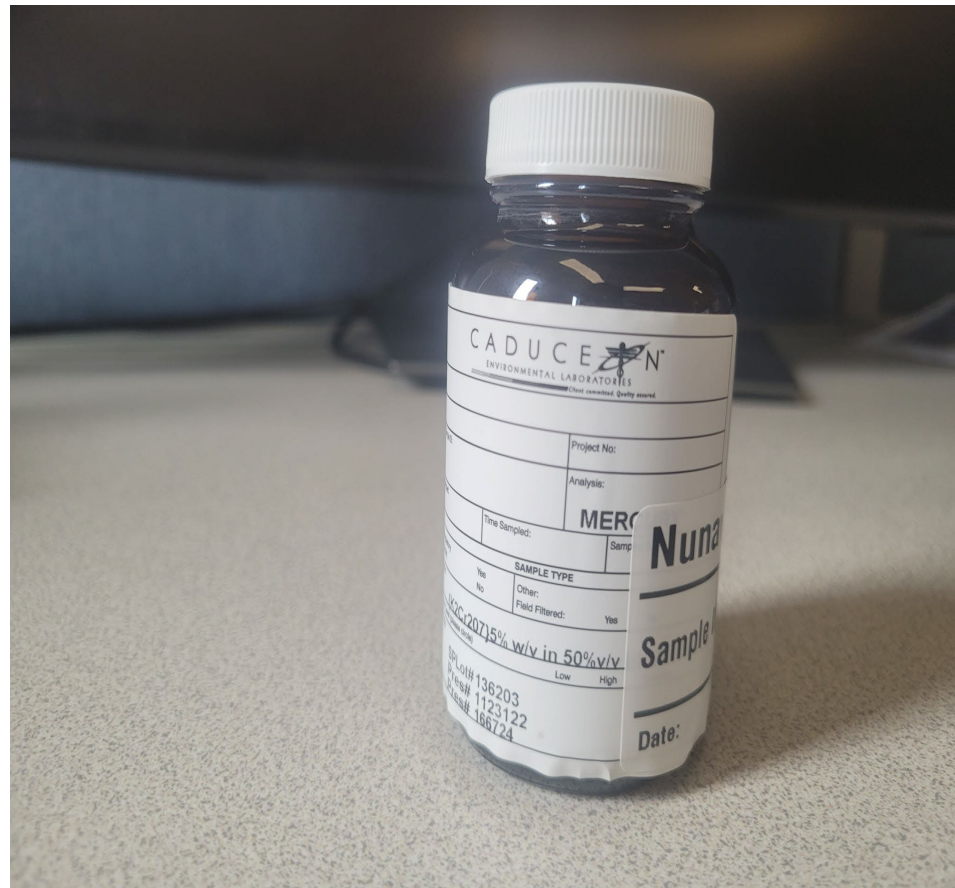
Metals

- Pre-charged with HNO_3 . **Do not rinse.**
- Fill bottle to where bottle neck begins to taper.
- Dissolved Metals analysis requires field filtration, therefore, samples from the general chemistry bottle will be filtered at the lab and then analysed for Dissolved Metals.
- Cap tightly and invert to mix.
- Store at 4°C



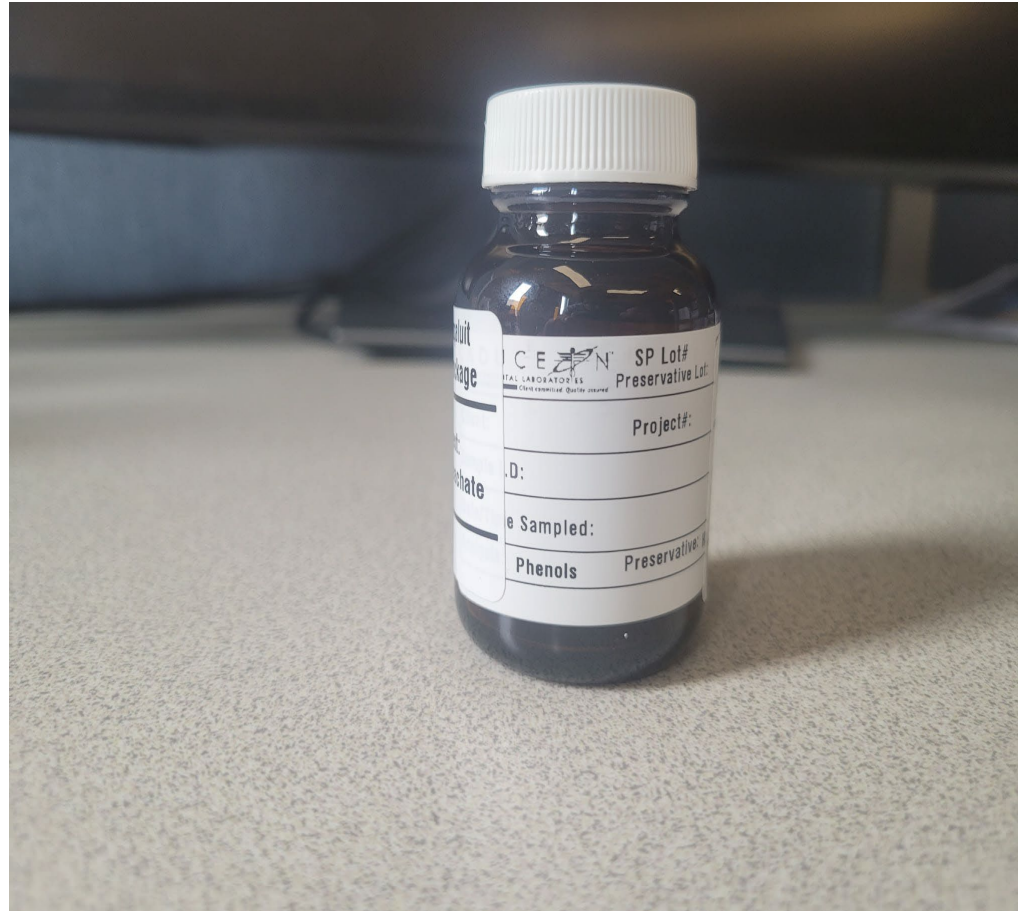
Mercury

- Pre-charged with $\text{K}_2\text{Cr}_2\text{O}_7/\text{HNO}_3$. **Do not rinse.**
- Fill to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C



Phenols

- Pre-charged with H_2SO_4 . **Do not rinse.**
- Fill to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C .



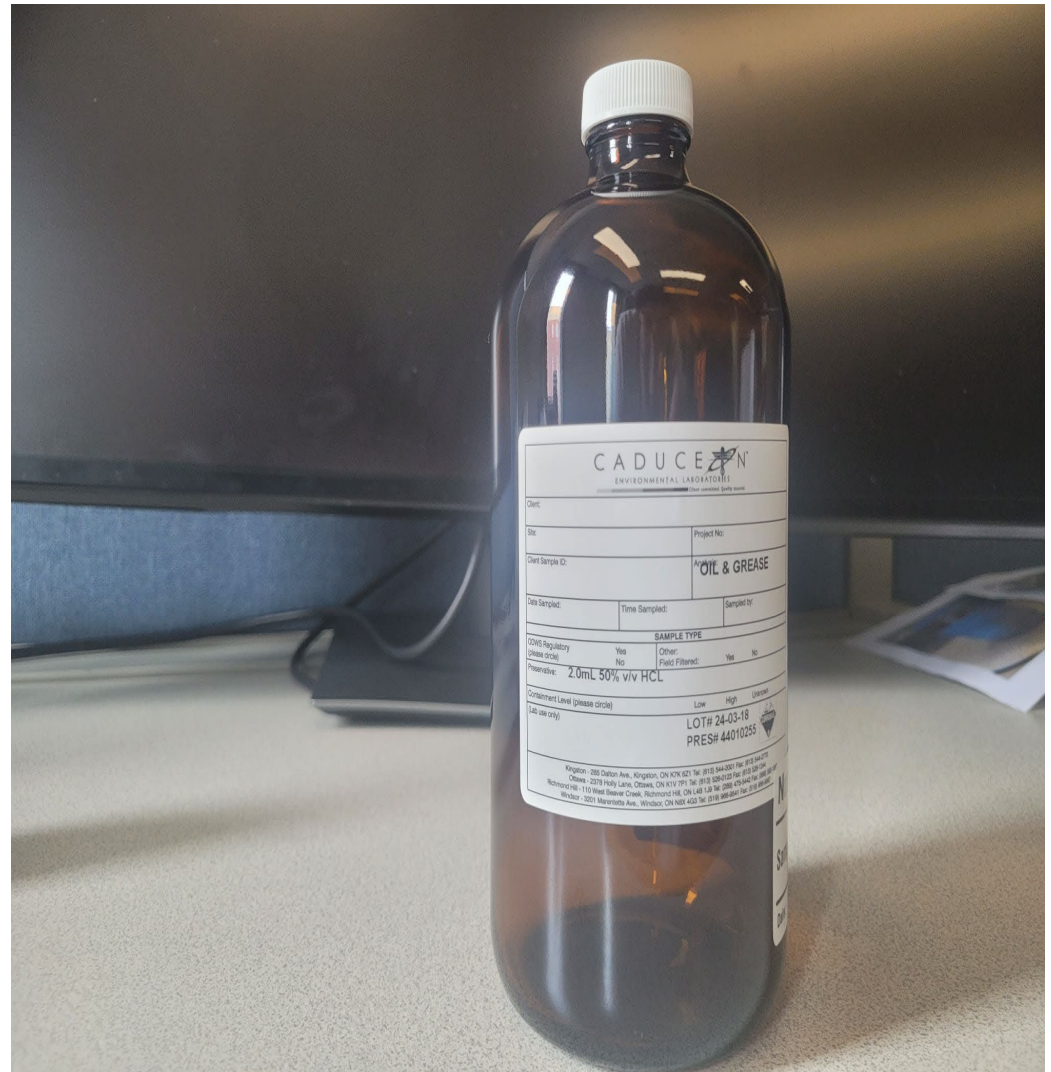
Fecal coliforms

- Pre-charged with Sodium Thiosulfate. **Do not rinse.**
- To prevent contamination, refrain from inserting your hands into the bottle, please wear gloves.
- Fill up to the 200 ml mark on the bottle.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C.



Oil & Grease

- Pre-charged with HCL. **Do not rinse.**
- Fill to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C



Routine

- Rinse 3 times
- Fill to 95% capacity
- Cap tightly
- Store at 4°C



Leachate Package

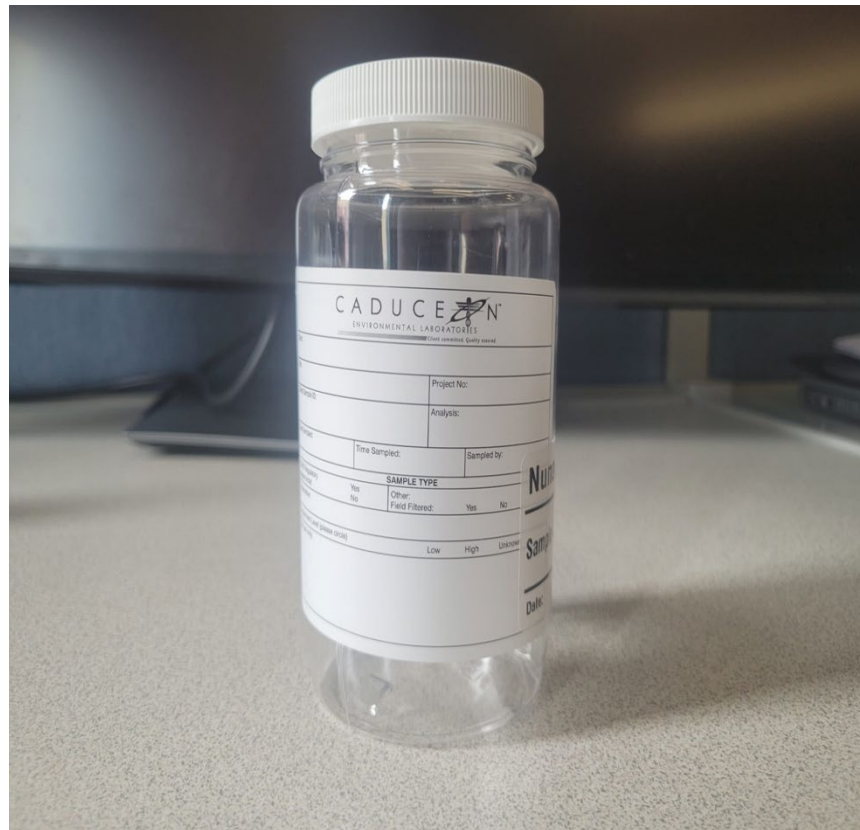


The Leachate package includes:

Test	Bottle Amounts
General Chemistry	1
Nutrients/TOC	2
Metals	1
Mercury	1
Phenols	1
Fecal Coliforms	1
Oil & Grease	1
BTEX/PHC (F1)	2
PHC F2-F4	1
PAHs	2
Routine	1

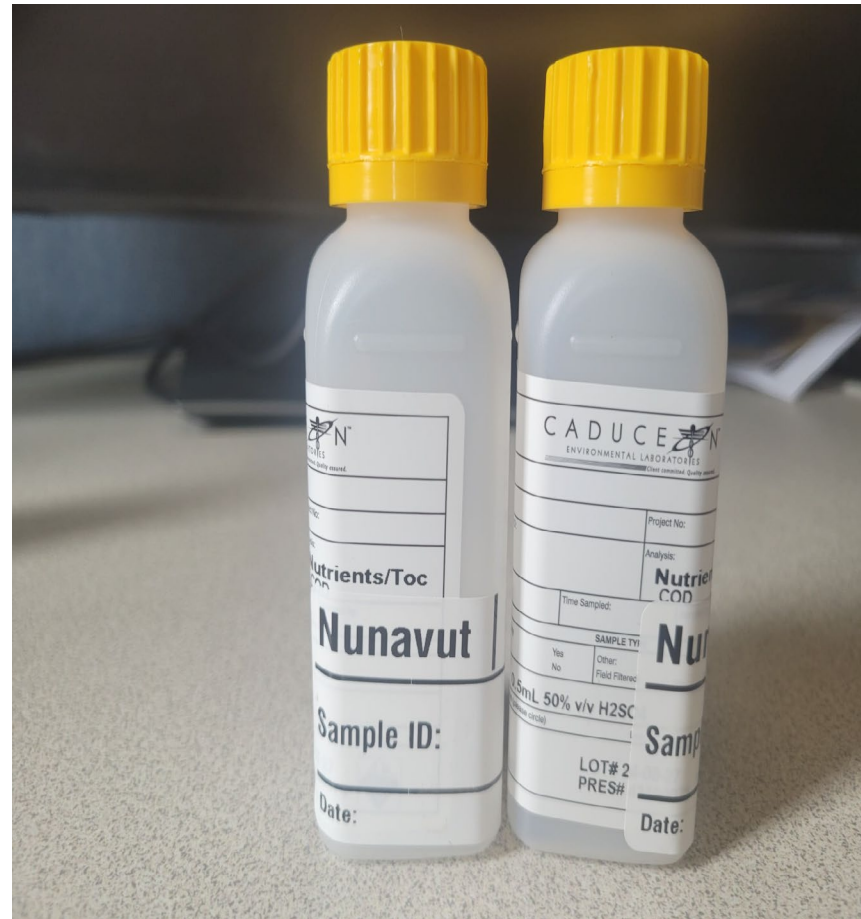
General Chemistry

- Rinse 3 times
- Fill to 95% capacity
- Cap tightly
- Store at 4°C



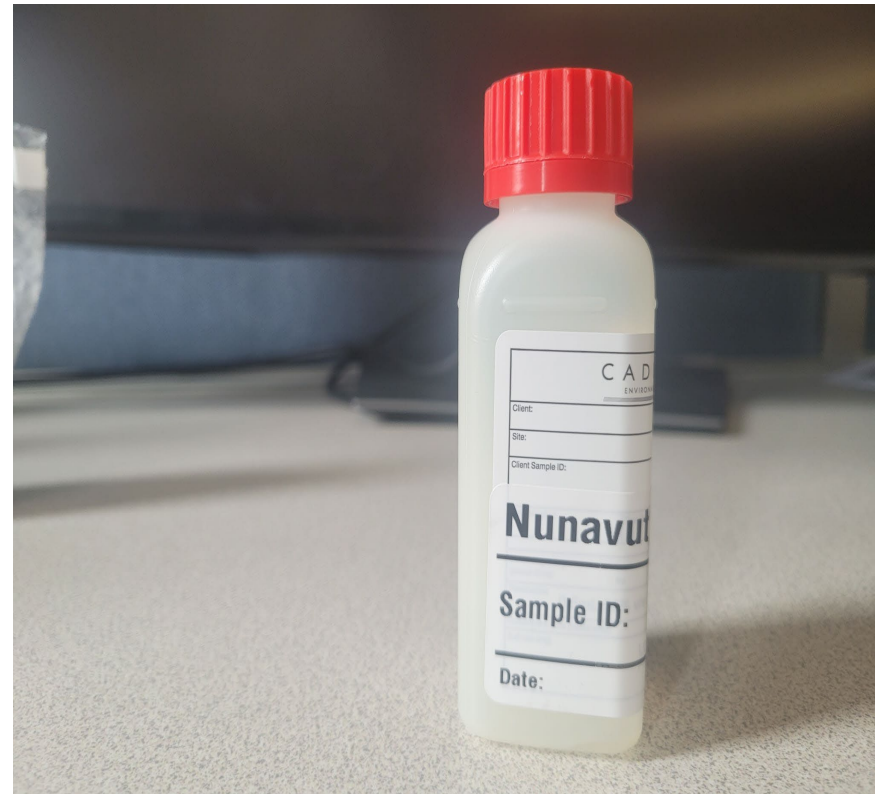
Nutrients/TOC (x2)

- Pre-charged with H₂SO₄. **Do not rinse.**
- Fill both bottles to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Store at 4°C



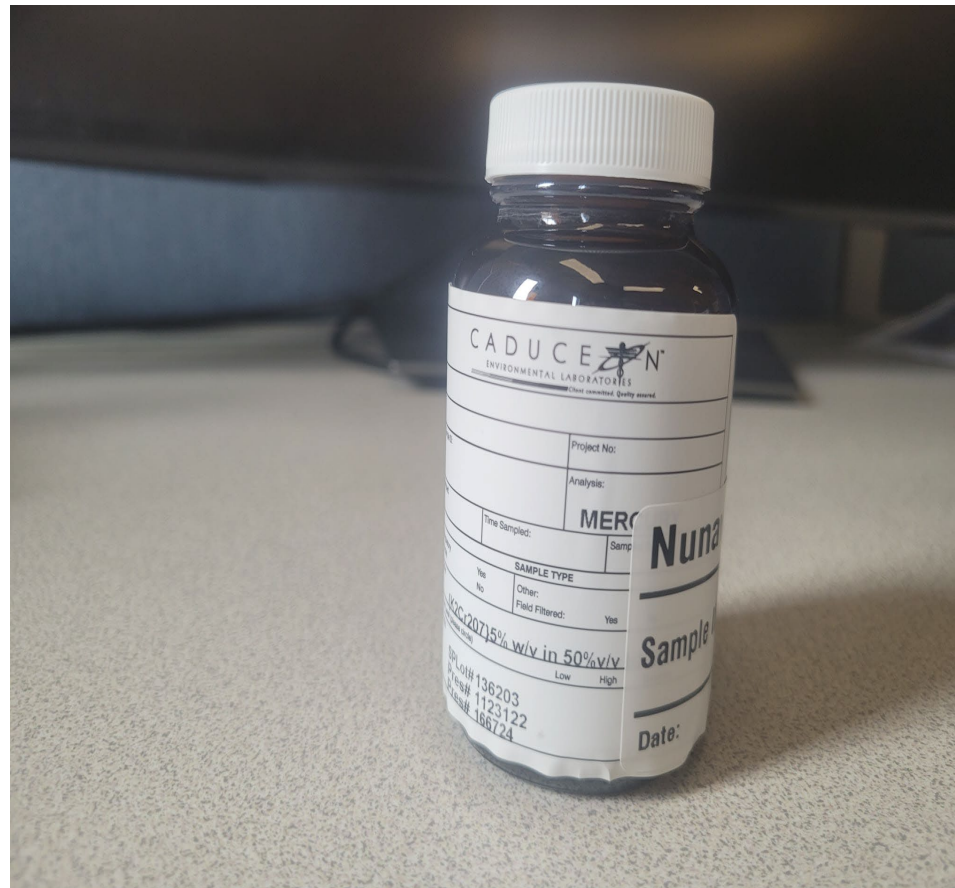
Metals

- Pre-charged with HNO_3 . **Do not rinse.**
- Fill bottle to where bottle neck begins to taper.
- Dissolved Metals analysis requires field filtration, therefore, samples from the general chemistry bottle will be filtered at the lab and then analysed for Dissolved Metals.
- Cap tightly and invert to mix.
- Store at 4°C



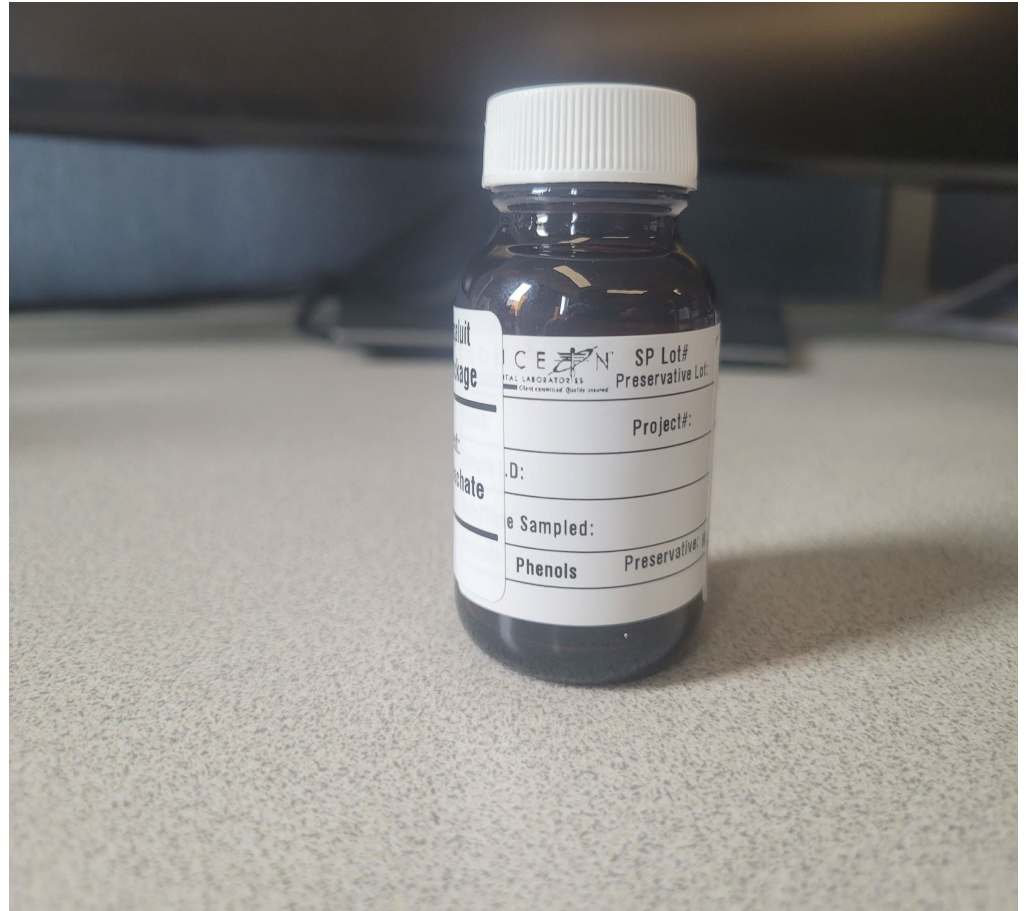
Mercury

- Pre-charged with $\text{K}_2\text{Cr}_2\text{O}_7/\text{HNO}_3$. **Do not rinse.**
- Fill to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C



Phenols

- Pre-charged with H_2SO_4 . **Do not rinse.**
- Fill to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C .



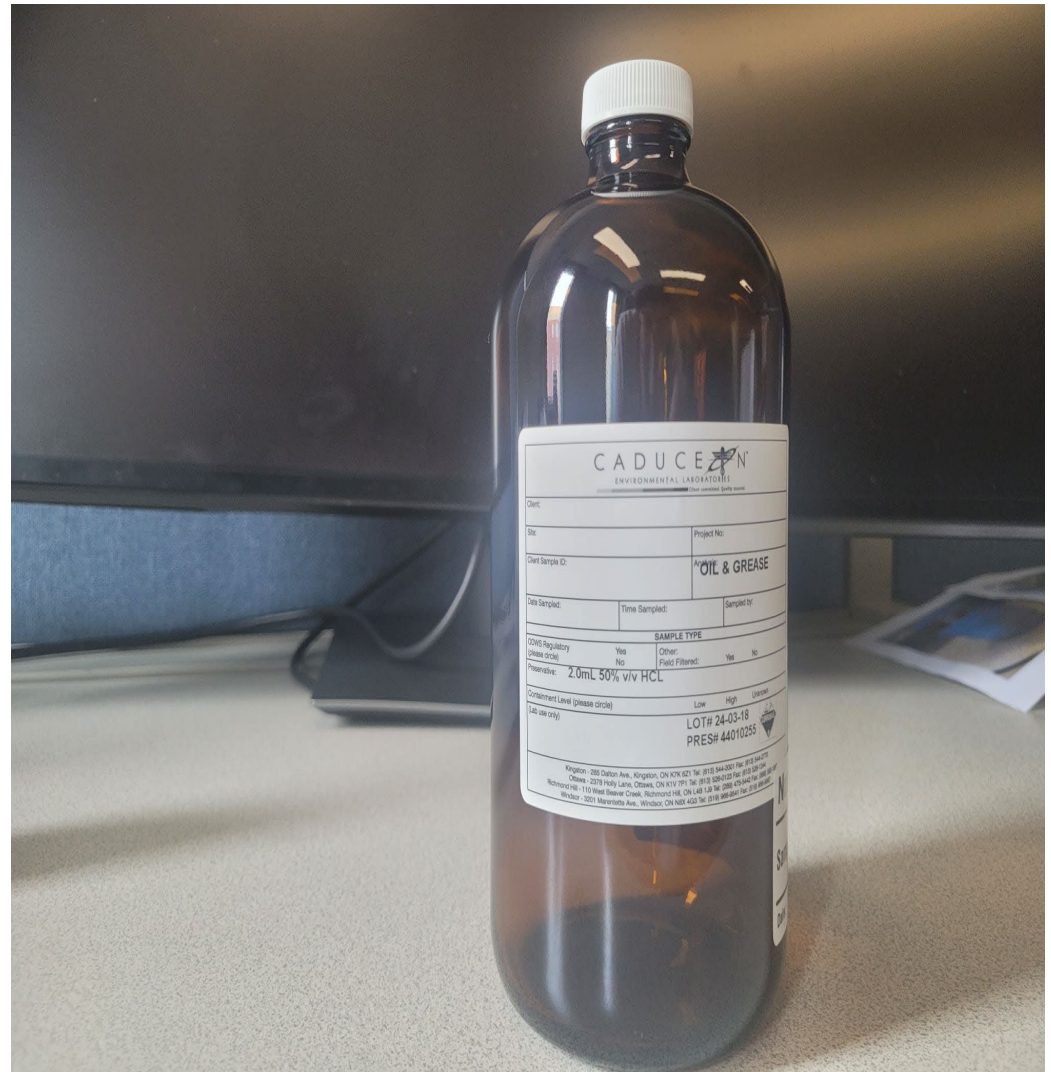
Fecal coliforms

- Pre-charged with Sodium Thiosulfate. **Do not rinse.**
- To prevent contamination, refrain from inserting your hands into the bottle, please wear gloves.
- Fill up to the 200 ml mark on the bottle.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C.



Oil & Grease

- Pre-charged with HCL. **Do not rinse.**
- Fill to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C



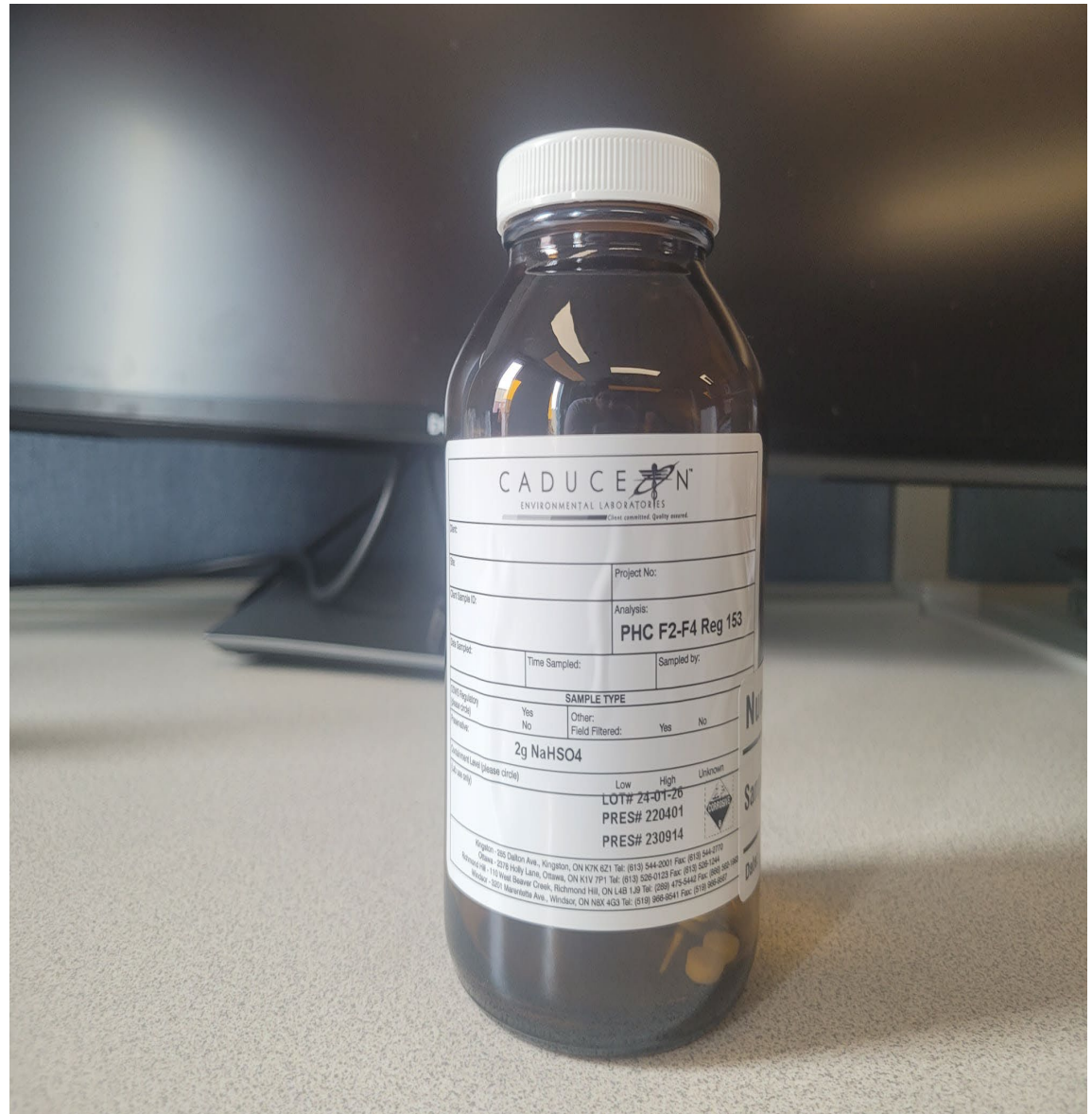
BTEX/PHC (F1)

- Pre-charged with NaHSO₄. **Do not rinse.**
- Fill vial until just prior to overflowing.
- There should be minimal to no headspace.
- Cap and invert the vial to verify no air space.
- If air space is present, uncap the vial and add more sample water.
- Cap tightly.
- Place in bubble wrap and seal.
- Store at 4°C



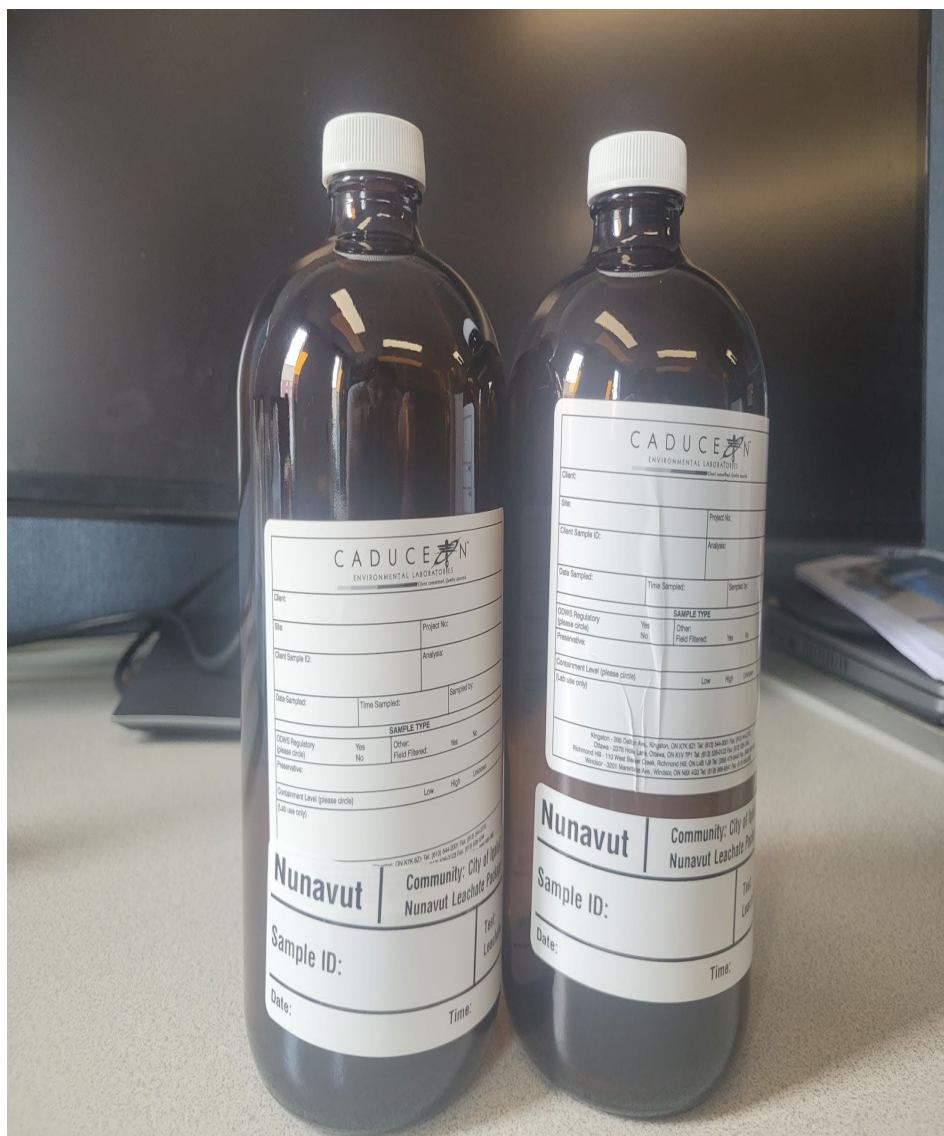
PHC (F2-F4)

- Pre-charged with NaHSO_4 . **Do not rinse.**
- Fill to where bottle neck begins to taper.
- Cap tightly and invert to mix.
- Place in bubble wrap and seal.
- Store at 4°C



PAHs (x2)

- Rinse 3 times
- Fill to 95% capacity
- Cap tightly
- Place in bubble wrap and seal
- Store at 4°C



Routine

- Rinse 3 times
- Fill to 95% capacity
- Cap tightly
- Store at 4°C



Appendix D

Field Forms

Field Log

Name of Sampler(s): _____

Date of Sampling: _____

Time of Sampling: _____

Monitoring Station Number: _____

GPS Coordinates: N _____ ° _____ ' _____ " W _____ ° _____ ' _____ "

Weather Conditions: _____

Samples:

- | | |
|--------------------------|--------------------------------------|
| <input type="checkbox"/> | 500 mL BOD |
| <input type="checkbox"/> | 500 mL Routine |
| <input type="checkbox"/> | 500 mL CBOD |
| <input type="checkbox"/> | 40 mL Glass Mercury Vial + Pres |
| <input type="checkbox"/> | 100 mL Amber Nutrients + Pres |
| <input type="checkbox"/> | 100 mL Amber Phenols + Pres |
| <input type="checkbox"/> | 250 mL Sterile Bacteria Bottle |
| <input type="checkbox"/> | 2 x 250 mL Amber Oil & Grease + Pres |

- | | |
|--------------------------|-------------------------------------|
| <input type="checkbox"/> | 60 mL Metals + Pres |
| <input type="checkbox"/> | 3 x 40 mL BTEX, F1 Vials + Pres |
| <input type="checkbox"/> | 2 x 100 mL Amber F2-F4 Vials + Pres |
| <input type="checkbox"/> | 2 x 250 mL Amber PAH + Pres |

Other:

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

Other Notes: (any unusual conditions, any deviation from standard procedures, reason sample was not taken, etc.)

Appendix E

Thermistor Data Collection

Quickstart for Installation Validation of the Thermistor String

1.0 Installation Validation Steps

- Installation of the loggernet software on the computer
- Connect the thermistor string to the test box (using the rectangular-shaped connector)
- Turn the power on with the terminal block blade
- Start the computer and the LoggerNet Software (setup the connection)
- Monitor data
- Collect data

2.0 LoggerNet Software

2.1 Description

The LoggerNet is a fully featured Windows-based software package that allows direct communication with the test box using a RS-232 connection. A “Connect” screen provides real-time tools to set the datalogger clock in order to send the program to the datalogger and manually collect data using a computer. In addition, data can also be retrieved automatically, based on a predefined schedule. Measurements can be viewed in real-time on both numeric and graphical displays. In addition to these basic tools, the software package includes a datalogger program editor, a report generation tool and a data viewer with basic plotting capabilities.

This application note is intended to give the user a quickstart in getting the datalogger powered up and running. However, we strongly recommend that the user read the LoggerNet manual in order to get familiar with its features.

2.2 Software Installation

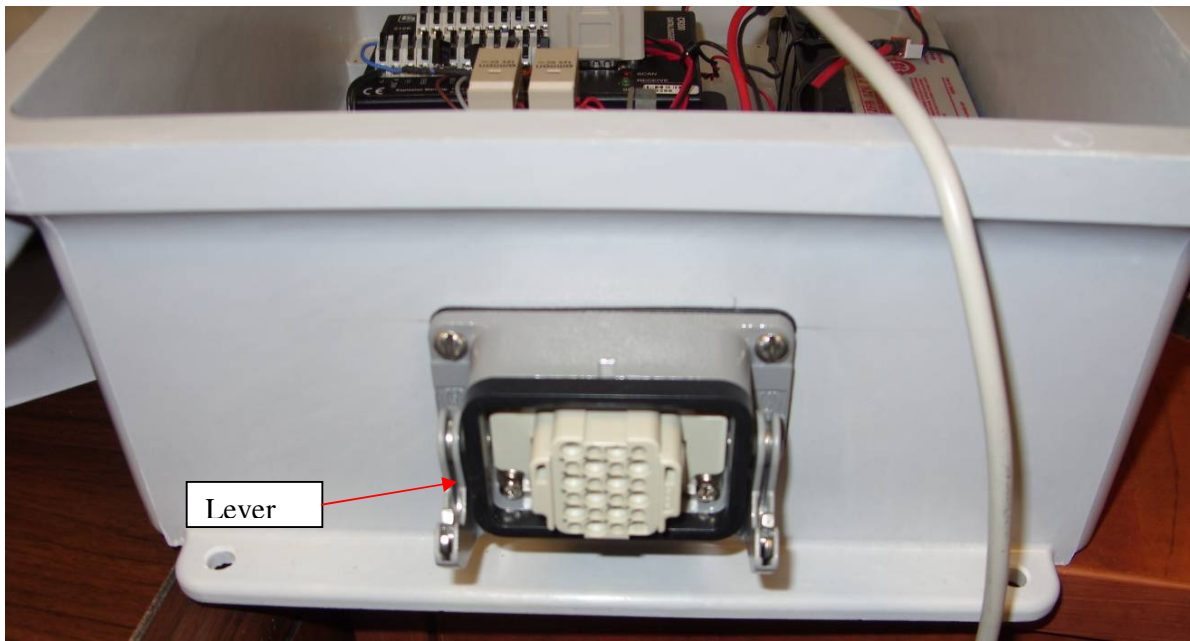
The LoggerNet is a collection of 32-bit programs designed for Intel-based computers running Microsoft Windows 2000, Windows XP or Vista.

As with all softwares, we strongly recommend that a back-up of critical files be performed before software installation. Place the installation disk in your computer's CD/DVD drive. If autorun is enabled, LoggerNet installation will start. If it does not start, select START > RUN from the Windows's START menu. Locate the SETUP.EXE file on the CD/DVD drive and click OK. Follow the instructions on the screen. Refer to the LoggerNet manual for further details.

When the installation is done, a LoggerNet icon will be placed on your desktop.

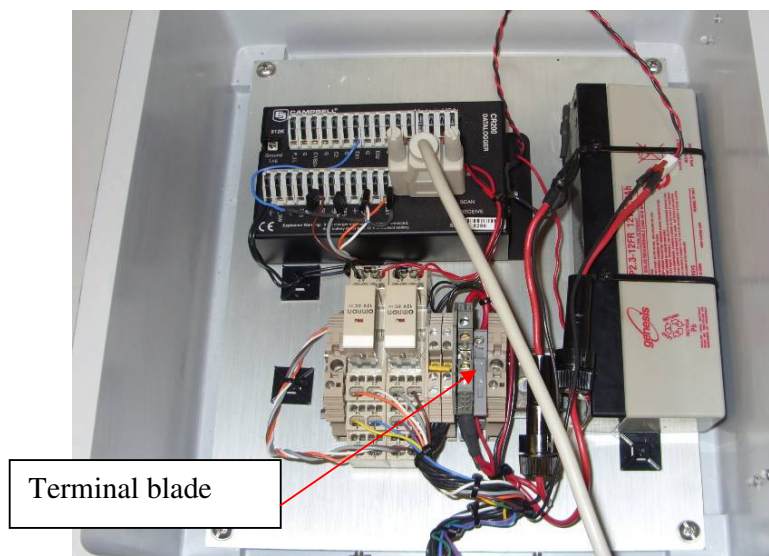


3.0 Connection of the Thermistor String to the Test Box



Connect the connector to the mating on the test box and lift up the lever to secure the connector in place. *NOTE: make sure to seal back the connector of the thermistor string to avoid any water infiltration in the connector before the final installation.*

4.0 Turn the Power On on the Test Box



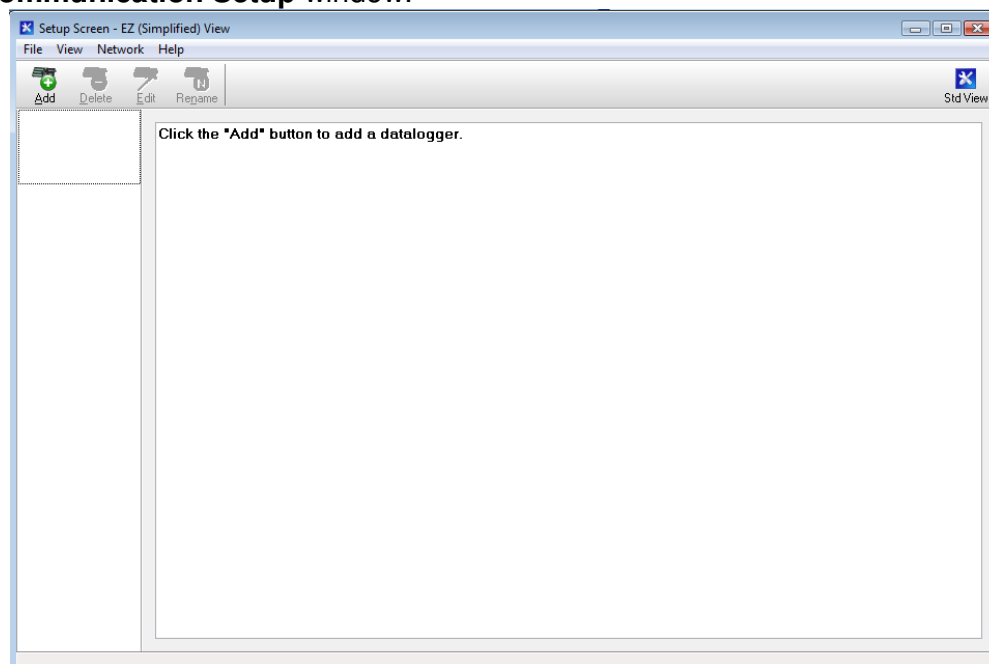
The terminal blade is used to turn the power OFF. Lower the blade to turn the unit ON. Make sure to raise the blade at the end of the test to avoid any battery drainage.

5.0 Setup the Connection

The hardware and software setups are done. The following steps describe the instructions to connect the datalogger, to collect or monitor data

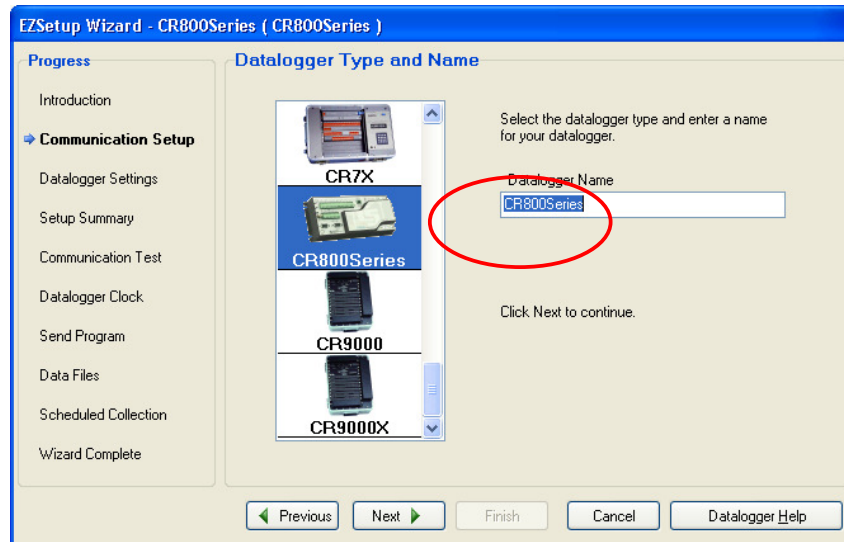
To start the LoggerNet, double click on the LoggerNet desktop icon.

- From the **MAIN / SETUP**, click **Add** and then click **Next**, which will get you to the **Communication Setup** window.

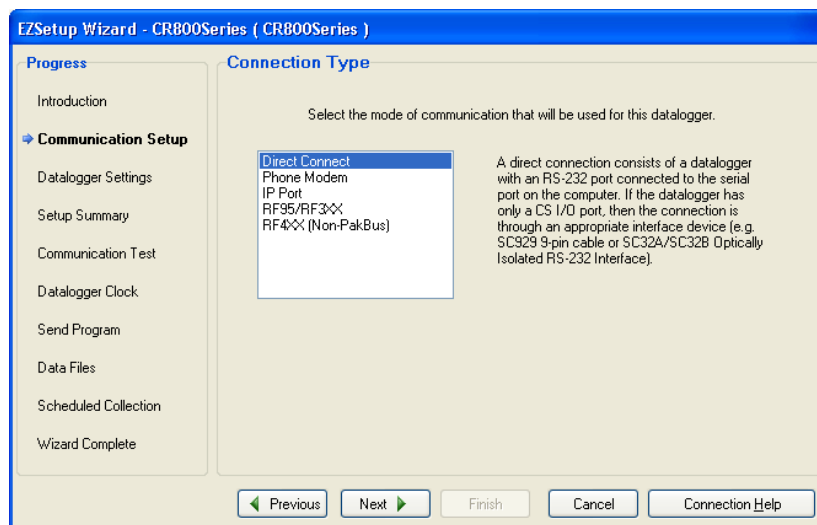


- Wait at least 15 seconds after powering up the unit before attempting to communicate with it.

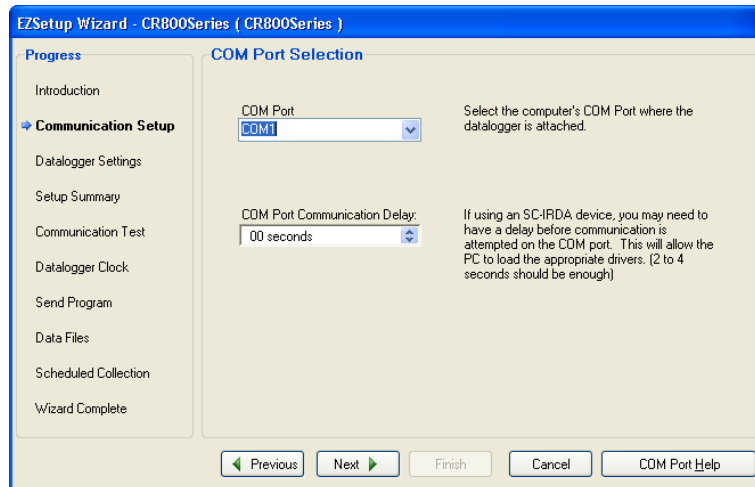
- Under **Datalogger Type and Name**, select **CR200 Series**, and next under **Datalogger Name**, choose a name that best represents your application. For example, type **Thermistor** and click **Next**. This datalogger name will be used later to connect to the Thermistor datalogger.



- Select **Direct Connect** and click **Next**.

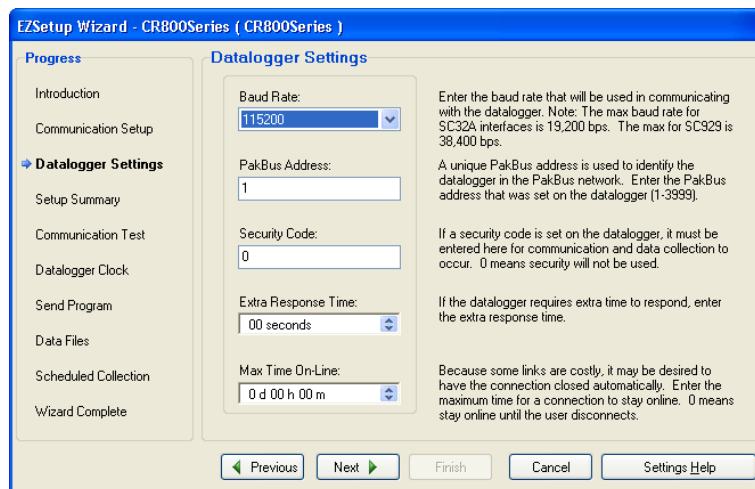


- Select the appropriate **COM port** on your computer. Usually, if you have a serial port on your computer, **COM 1** will be available. However, if you use a USB Serial adaptor, a virtual port will be created and a new COM port number will be assigned. Click **Next** when done.

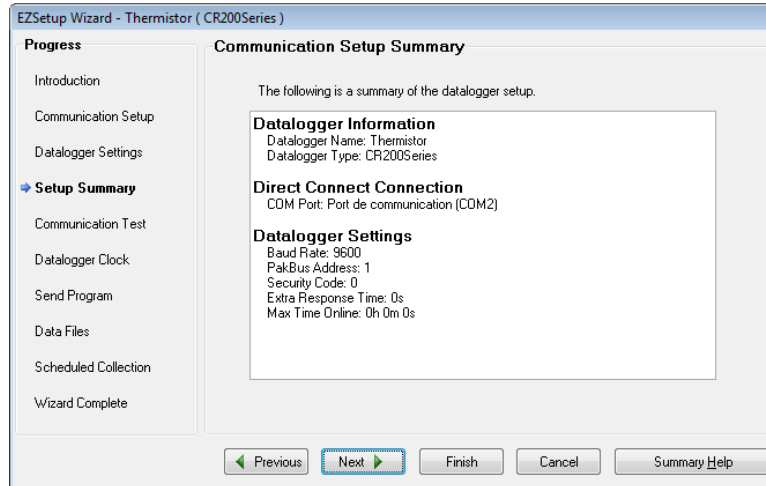


- Use the default parameters and click **Next**.

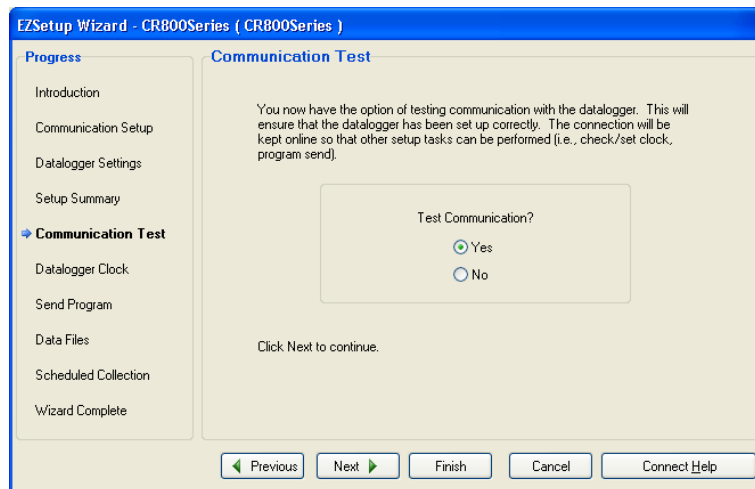
Note: If you use a USB Serial adapter you may need to lower the Baud Rate, in general **9600** works fine with the adapter.



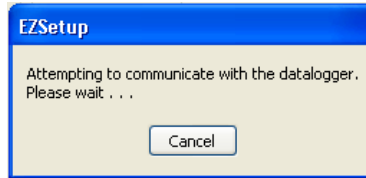
- The following window displays the Communication Setup Summary. Click **Next**.



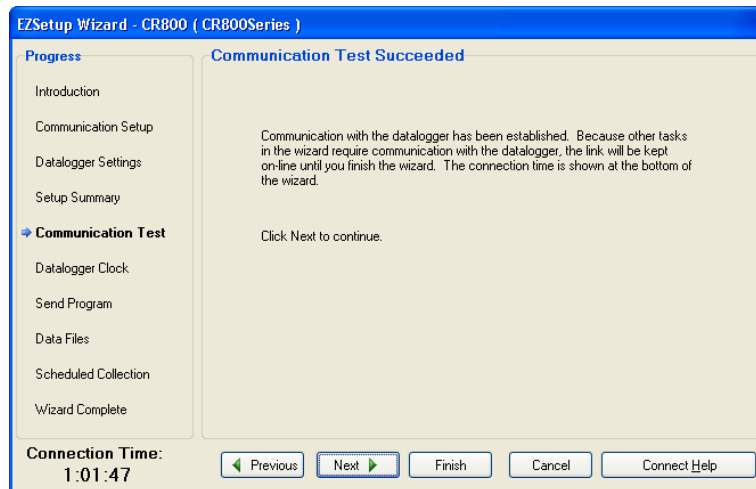
- To test the communication, select **Yes** and click **Next**.



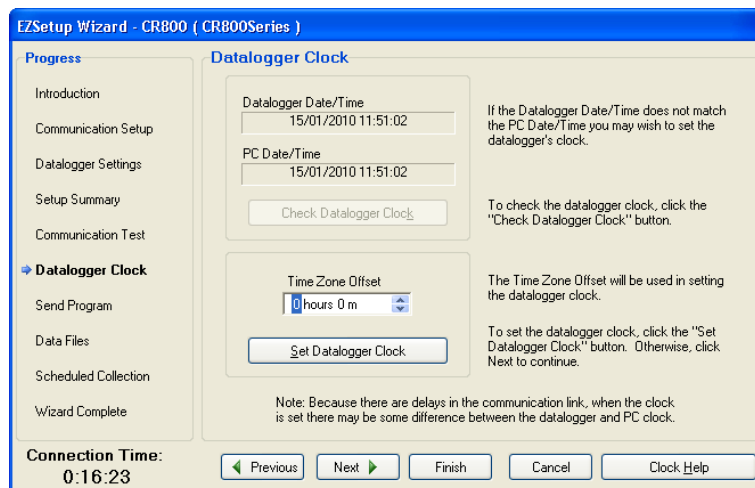
The following message will appear on the screen while your computer is attempting to communicate with the Thermistor datalogger.



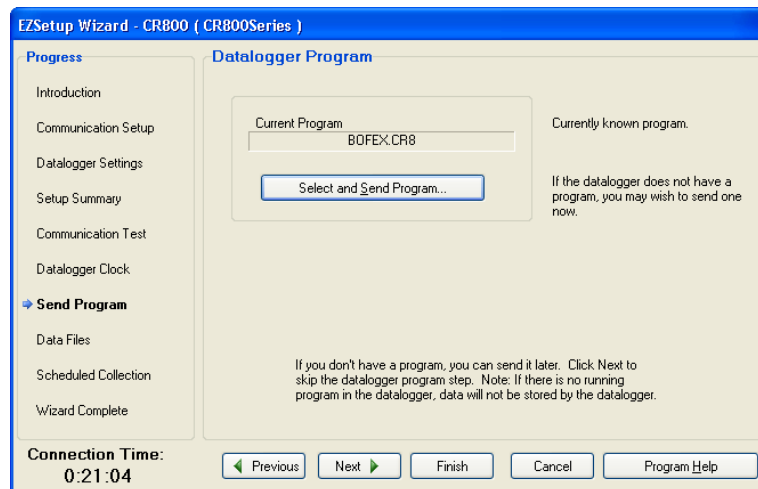
- The next windows will indicate if communication is successful. Click **Next**.



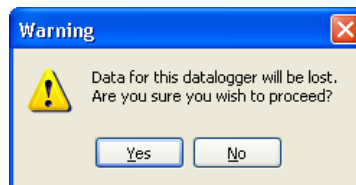
- Adjust the clock to set it at your local time zone. Make sure your computer is adjusted to your local time, then click **Set Datalogger Clock**. When done, click **Next**.



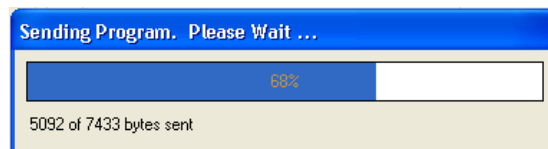
- The datalogger is usually shipped with the Application Program pre-loaded in the datalogger. The program will be displayed under **Current Program**. If it shows **no program** or if the program name shown is not for your application, you will need to upload your Application Program in the datalogger. Click **Finish** to save your settings. At this point, the datalogger setup is completed. To quit the **EZSetup** wizard, select **File** from the menu and click **Exit**. Proceed to section 4.2.



- To download your application program, click **Select and Send Program**. Locate the program on your computer's HD drive or on the one supplied by email, and click **Open**. The following warning message will be displayed on your screen. Click **Yes**.

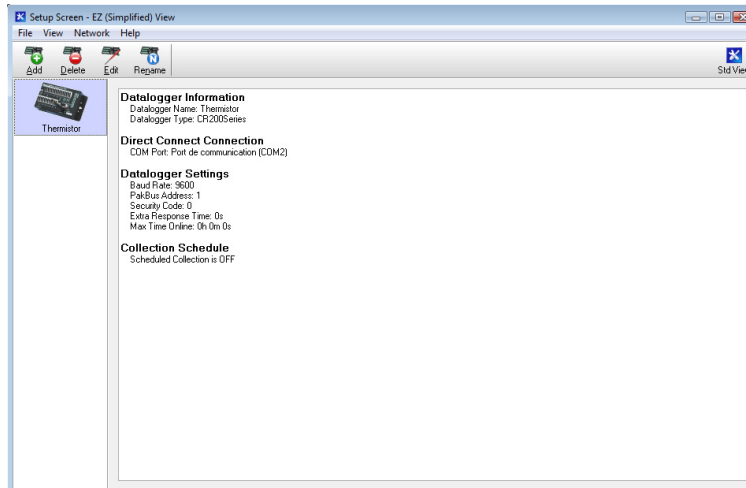


- A progress bar will display the download progress. If successful, a message will indicate it.



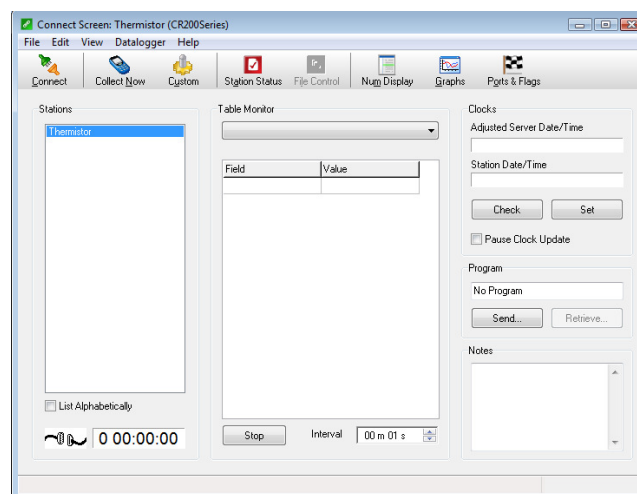
- Click **Finish** to save your settings. This completes the datalogger setup using the **EZSetup** wizard.

- To quit the **EZSetup**, select **File** from the **Menu**, and click **Exit**.

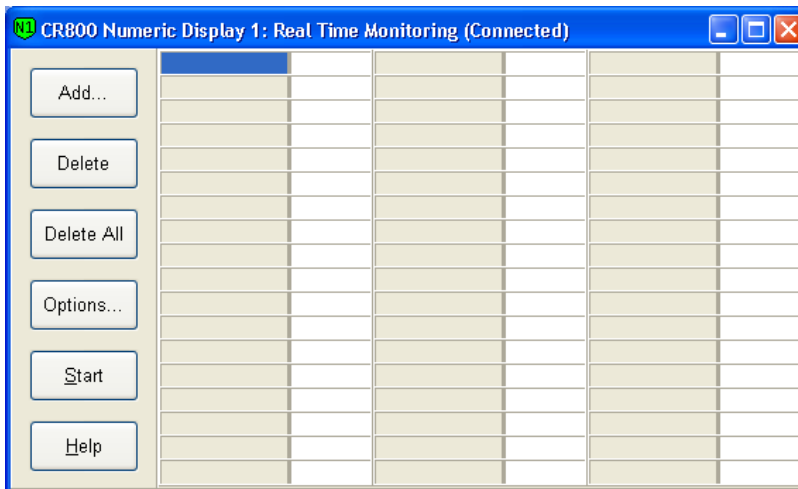


6.0 Monitoring Data With a Computer

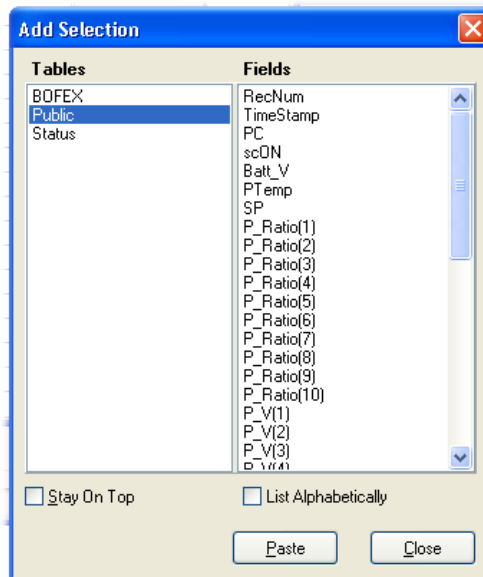
- Connect the supplied Serial Cable between the RS232 Input on the CR200 datalogger and your computer's serial port or USB Serial Adapter.
- Start the LoggerNet by double clicking on the LoggerNet desktop icon.
- From the **MAIN/CONNECT**, click on the station **Thermistor**, then **Connect**



- The cable at the bottom of the screen will be connected when the link will be established. Click **Num.Display/Display 1**. The following window should appear.



- Click the **Add** button and under **Tables**, highlight **Public**. The following window should appear.

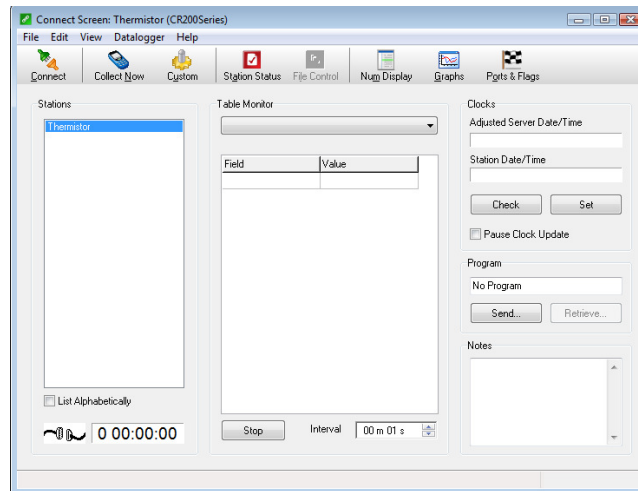


- Under **Fields**, select (highlight) the sensors (labels) you wish to view during the Test. You can use a combination of Shift & Ctrl keys on the computer's keyboard to select multiple labels. Next, on the **Display 1** window, highlight the location where you want to place the labels and finally, from the **Add Selection** window, click **Paste**. We recommend you to monitor the entire content in **Public**. The variable **Thermistor** represents the temperature and the value **Resistor** represents the resistor value of the thermistor.

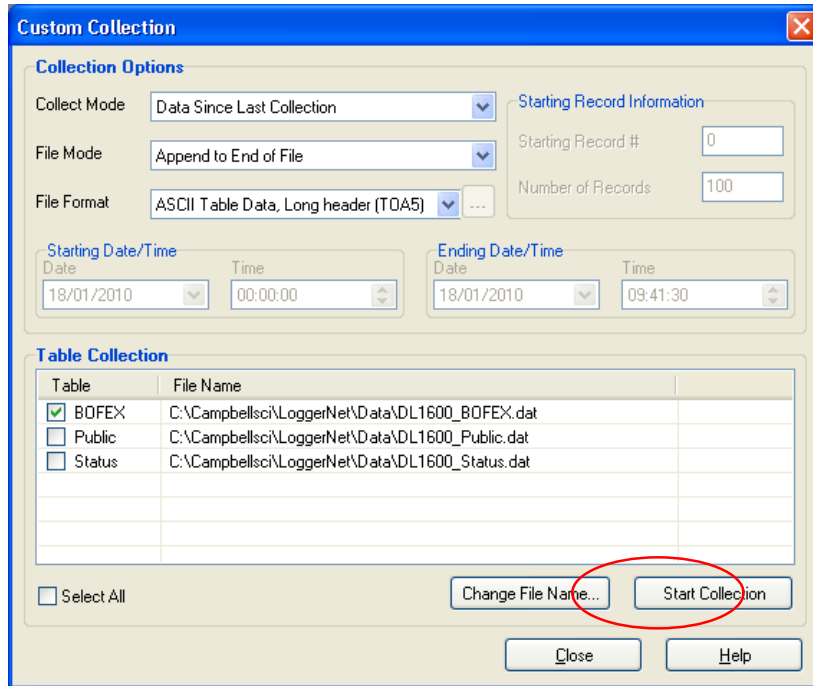
7.0 Collect Data

When a Test is completed, readings should be collected immediately. The following steps assume that the computer is already connected and that the LoggerNet is already running.

- From the **Connect Screen**, click the **Collect Now** button.



- Click on the Data_X.dat file to see the content. The records are displayed in a table.
- To modify the data output, click **Custom** in the connect screen. The following screen will appear.



Custom Collection

Collection Options

Collect Mode: Data Since Last Collection

File Mode: Append to End of File

File Format: ASCII Table Data, Long header (TOA5)

Starting Record Information

Starting Record #: 0

Number of Records: 100

Starting Date/Time

Date: 18/01/2010 Time: 00:00:00

Ending Date/Time

Date: 18/01/2010 Time: 09:41:30

Table Collection

Table	File Name
<input checked="" type="checkbox"/> BOFEX	C:\Campbellsci\LoggerNet\Data\DL1600_BOFEX.dat
<input type="checkbox"/> Public	C:\Campbellsci\LoggerNet\Data\DL1600_Public.dat
<input type="checkbox"/> Status	C:\Campbellsci\LoggerNet\Data\DL1600_Status.dat

☐ Select All

Change File Name... Start Collection

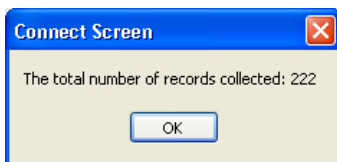
Close Help

- Under **Collection Options**, make sure the following options are selected:
 - **Data Since Last Collection**
 - **Append to End of File**
 - **ASCII Table Data, Long header (TOA5)**
- Under **Table Collection**, make sure that **Data_X** is checked and that the file path where to save the file is defined. You do not need to check the **Public** and **Status** boxes.

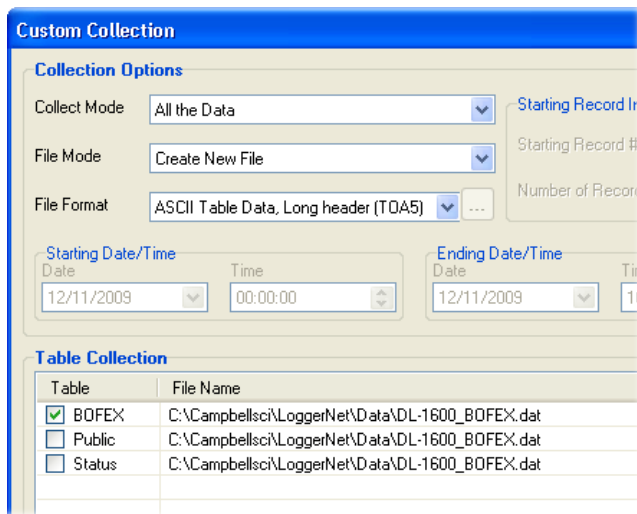
When collecting readings for the first time, you may need to collect all the data from the test box. This will set all memory pointers so that the next time you collect readings, the datalogger will know what readings were previously collected, and only new readings will be collected. All new readings will be appended to the previously collected file, or a new file will be created.

- Click **Start Collection**. The following message will appear, showing the collection progress and total records collected.

Note: A single record includes the timestamp, the record number, all sensors readings in Celcius degrees, and finally, the datalogger's battery voltage.



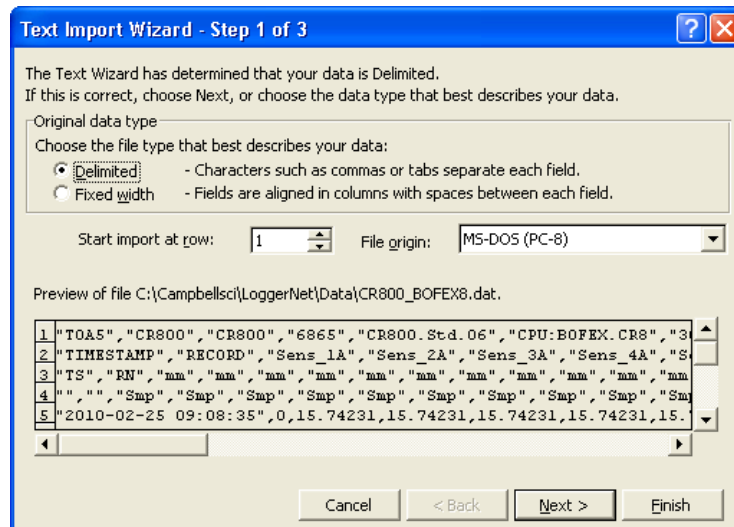
If the message window shows zero records collected, set the **Collection Options** as follow and do the **Start Collection** again.



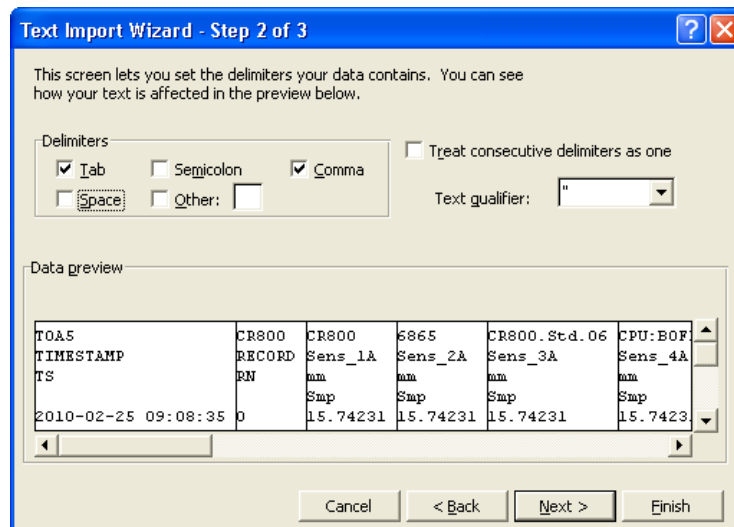
All collected readings are saved in the file specified under Table Collection. The readings saved with the file format **ASCII Table Data, Long header (TOA5)** are separated by commas (CSV) and can be imported into Microsoft Excel for data reduction.

7.1 Import Readings Into Excel

- Start Excel, go to **File > Open**, in the **Files of type** field, then select **All Files (*)**.
- Locate and select the file to import and click **Open**. The Text Import Wizard will open.



- Select **Delimited** and click **Next**.



- Select **Tab**, **Comma** and click **Finish**.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	TOA5	CR800	CR800	6865	CR800	Stc	CPU:BOF	3022	BOFEX					
2	TIMESTAMP	RECORD	Sens_1A	Sens_2A	Sens_3A	Sens_4A	Sens_5A	Sens_1B	Sens_2B	Sens_3B	Sens_4B	Sens_5B	S_Range	Load
3	TS	RN	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
4			Smp	Smp	Smp	Smp	Smp	Smp	Smp	Smp	Smp	Smp	Smp	Smp
5	25/09/2009 09:08	0	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	50	0
6	25/09/2009 09:08	1	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	50	0
7	25/09/2009 09:08	2	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	50	0
8	25/09/2009 09:08	3	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	50	0
9	25/09/2009 09:08	4	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	15.74231	50	0
10														