

R.A. LaRosa Environmental Laboratory

Environmental Chemistry Unit

A Guide to Analytical Laboratory Services

**Vermont Department of Environmental Conservation
Waterbury, Vermont**

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Introduction

The Department of Environmental Conservation's (DEC) Environmental Laboratory is centrally located in Waterbury, Vermont at the southern end of the State Office Complex. This building houses the Department of Agriculture Laboratory and the R.A. LaRosa Environmental Laboratory.

The first floor of the environmental wing houses Laboratories for Biomonitoring and Aquatic Studies, Air Pollution, Forests and Parks, Fish and Wildlife and the Wastewater Treatment Facility training room. The second floor houses the Laboratory Services Unit, about which this guide is written; this Unit is referred to as the Laboratory throughout this guide. The Laboratory provides analytical support to divisions in DEC, other departments in ANR and State government, and other publicly funded projects. Analytical services are not available to private individuals or to non-publicly funded projects.

Organizational Structure

The Laboratory is divided into three analytical centers:

1. Metals Analysis Center

The metals Analysis Center supports Department of Environmental (DEC) programs including acid rain, landfill assessments, and hazardous waste investigations. Inductively coupled plasma mass spectroscopy, and the mercury cold vapor system are the current methods of analysis.

2. Inorganic Chemistry and Bacteriology Center

- a. Inorganic chemistry performs an array of non-automated chemical analyses for a number of water quality, wastewater, and solid waste programs.
- b. In Bacteriology, bacteria are quantified to monitor state park swimming waters, to aid in Department investigations, assist the Water Supply Division investigation of drinking water problems, and to support a variety of other programs.
- c. The Automated Inorganic Chemistry Center uses automated colorimetric and ion chromatographic techniques to perform analyses for diagnostic water quality studies, verification of wastewater treatment plant permit requirements, landfill assessments, and air pollution studies.

3. Organic Chemistry Center

The Organic Chemistry Center supports primarily the Air Pollution Control and Waste Divisions.

A Step-By-Step Guide to Laboratory Services

1. If a project receives EPA funding, submit and receive approval for a Quality Assurance Project Plan.
2. Contact Laboratory Supervisor for information regarding proposed testing, including costs per test.
3. Include funding for Laboratory work in grant proposal.
4. Submit a Seasonal Sampling Schedule, if appropriate.
5. Submit a Sampling Plan at least one week prior to sampling.
6. Pick up sample containers, preservatives, field labels, coolers and sampling equipment supplied by the Laboratory.
7. Collect samples.
8. Return samples to Laboratory.
9. Log-in samples into the LIMS (Laboratory Information Management System).
10. Analysis of samples by Laboratory
11. Issuance of final report of results by Laboratory.
12. Generate quarterly report of the cost for Laboratory services and generate invoices for non-DEC clients.
13. Approve the report or invoice so funds can be transferred to DEC. For non-State clients, a check is sent to the DEC Business Office.

Quality Assurance Project Plans

If a project is funded or partially funded by EPA and includes sampling and analysis activities, the US EPA requires that a satisfactory quality assurance project plan (QAPP) be submitted to EPA's Quality Assurance Office for approval prior to sampling. The Department/Agency supports this policy for projects funded in part or whole by State funds. The information in these QAPPs will allow EPA and State project officers to determine whether the data are of known and defensible quality.

This Laboratory has an EPA approved Quality Assurance Plan (QAP), which is designed to assist Laboratory users in the preparation of QAPPs. Vermont's environmental programs needing to meet EPA's / State requirement for a QAPP can reference the Laboratory QAPP and will only need to submit to EPA and/or the State a brief description of the project including its goals, its sampling program, and its relationship to the DEC Laboratory. This assumes that all analyses will be performed at the DEC Laboratory and

the data quality objectives of the project plan are met by the Laboratory method in use. The Laboratory QAP is located on the Laboratory's web site under Lab documents. The EPA provides guidance documents to assist in the writing of QAPPs.

Quality Control

The Laboratory is certified by the National Environmental Laboratory Accreditation Conference (NELAC) which is sponsored by the US EPA. The Laboratory's accrediting authority is the New Hampshire Environmental Laboratory Accreditation Program (NHELAP). A current list of analysis in which the Laboratory is accredited can be obtained from the Laboratory.

The Laboratory's Quality Assurance Plan describes methods used, reporting limits, accuracy and precision objectives and routine quality control procedures.

The Laboratory's policies and procedures outlined in the Lab Quality Assurance Plan meet or exceed NELAC standards that establish requirements for environmental testing Laboratories. The Laboratory has demonstrated and documented that it has a quality system, is technically competent and is able to generate technically valid results. The Laboratory must continue to demonstrate competency through proficiency evaluations and on-site audits that NELAC standards are being met.

Scheduling Samples

All programs which regularly use Laboratory services are requested to fill out a **Seasonal Sampling Schedule** (an example is shown on the next page). This schedule, which is completed every spring (spring – fall sampling) by program managers (personnel), is used by the Laboratory to plan personnel assignments and to order supplies. When exact dates and numbers of samples are not known, program personnel are asked to give a reasonable approximation.

Sampling Schedule

Program # _____ Contact Name _____ Phone # _____

Spring 2007	April				May				June				
	2 - 6	9 - 13	16 - 20	23 - 27	30 - 04	7 - 11	14 - 18	21 - 25	28 - 01	4 - 8	11 - 15	18 - 22	25 - 29
Phos													
TKN													
NH ₃													
NO _x													
TN													
SIO ₂													
CL/NO ₃ /SO ₄ /NO ₂													
CL													
Na-K-Mg-Ca													
Metals													
Mercury													
BOD													
COD													
TDS-TSS													
COND-TURB													
pH-Alk													
Chloro-A													
Ecoli													
Tot. Coliform													
8260													
8021													
Pesticide PCB/8081/8082													
TCLP													
DO													
T011													
TO15													
Other													

In addition to the Seasonal Sampling Schedule, Laboratory users are asked to submit a **Sampling Plan**, which is shown on the next page, at least one week prior to a sampling season (earlier if possible). The Sampling Plan is used to alert appropriate Laboratory analysts of the impending arrival of samples. The Plan gives the analysts specific information regarding dates, exact numbers of samples, analytical parameters requested, Chain of Custody status, project-specific quality control requirements, and sampling equipment needs. Each Sampling Plan must be specific to a single site or group of sites.

Details regarding sample container pick-up and sample delivery to the Laboratory should be addressed in the Sampling Plan and discussed in advance with the Laboratory Supervisor. For quality control reasons only sample containers provided by the Laboratory may be used. Labels will also be provided. When the Laboratory requires additional samples to perform internal quality control testing, sampling personnel will be provided extra containers and appropriate instructions.

Samplers should give advanced notice when bringing samples for tests such as BOD or bacteriology. These tests have short holding times and must be run close to arrival at the Laboratory. Appropriate Laboratory personnel need to be prepared for these tests.

**State of Vermont
R.A. LaRosa Environmental Laboratory**

Sampling Plan

Program Name:	Customer ID # (Program #):	Project Id (activity code):
Name of Contact Person:	Site Id:	
Address:		
Telephone # (include area code):	Fax #:	
E-mail address:		
Suspected contaminant(s) and concentration range:		
Comments:		

Parameter	Matrix	Total Number of Samples (Include Duplicates)	Frequency of Collection

Sampling equipment to be supplied by the Laboratory (check those needed – list others):

cooler ice Lab water pH paper

other _____

Pickup date(s) for sample containers:	Method of delivering samples to the Laboratory (courier, in person):	Date(s) of sample delivery:
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Is Project Specific QA/QC Required: Yes No

Faster than 30-day turn-around required: Yes No

Chain of Custody Required: Yes No

Is this a regularly scheduled sampling event Yes No If Yes, no additional sampling plan is required.

please discuss if answer is Yes

Which EPA regulations need to be followed (check one): Refer to Quality Assurance Plan for default procedure if nothing is checked:

CWA RCRA CERCLA CAA

Other _____

Send completed Sampling Plan at least one week prior to sampling event to:

Gerald DiVincenzo
R.A. LaRosa Environmental Laboratory
103 South Main Street
Waterbury, VT 05671-0409
Tel: (802) 241-1380
Fax: (802) 241-1365
e-mail: jerry.divincenzo@state.vt.us

Sample Turn-Around Time

The standard sample turn-around time is thirty calendar days. That is, results of Laboratory analyses will be reported within thirty days of receiving the sample. Under unusual circumstances and in periods of heavy workload if all Laboratory tests will not be completed within 30 days, a preliminary report may be issued, showing the results of all tests completed to date. The final report will be sent out upon the completion of 100% of the required analyses.

If circumstances permit, sample turn-around times of less than thirty days may be arranged on request.

Sample Priorities

The following represents a prioritized arrangement for the processing of program samples by the Laboratory when a conflict for analytical services arises. Program samples shall be ranked according to the final disposition of the results in accordance with the following criteria which are listed in descending order of importance.

1. The data will be used to determine corrective action related to an environmental and/or health emergency, i.e., treatment plant failure, groundwater contamination, chemical spill.
2. The data are required for permit, certification or other regulatory purposes.
3. The data directly impact the Agency's mandate to protect the State's environment.
4. The data are part of a clearly defined grant program.
5. The data are disseminated to the public to keep them informed regarding the quality of Vermont's environment.
6. The data are incorporated into an archival data base for future use.

Non-Analytical Services

The Laboratory provides all the materials (except sampling equipment) needed for sampling personnel to return valid environmental samples to the Laboratory. Sample containers, preservation chemicals, coolers, thermometers, pH paper, etc., are obtained by submitting a request with a Sampling Plan at least one week prior to sampling.

The DEC's Quality Control Manual describes: procedures necessary to bring samples into the Laboratory, lists of required containers and preservation methods and Chain-of-Custody requirements. The Laboratory also maintains a list of field equipment, such as meters, pumps and samplers, which can be borrowed from divisions within the DEC. A list of available field equipment and contact personnel appears in Appendix I. Program personnel are responsible for securing needed sampling equipment.

Upon request, the Laboratory will review data the DEC receives from consultant Laboratories.

The Laboratory periodically hosts Laboratory Services Meetings to discuss Laboratory related topics of interest to program personnel.

Regular Laboratory users, and all new Laboratory employees, are required to read the Laboratory's Chemical Hygiene and Safety Plan. They are also required to take a Laboratory safety orientation tour, conducted by the Laboratory Safety Officer or Laboratory Supervisor. The safety orientation tour is designed to familiarize Laboratory users and new employees with safety features, and practices, and also emergency contingencies. Non-prescription safety glasses are also issued at this time.

For additional information regarding the Laboratory, users may request a copy of the following:

1. Laboratory Quality Assurance Plan - www.anr.state.vt.us/dec/lab/index.htm
2. Standard Operating Procedures (SOPs)
3. Laboratory Chemical Hygiene and Safety Plan - www.anr.state.vt.us/dec/lab/index.htm

Data Management

The Laboratory uses a LIMS (Laboratory Information Management System) to log-in samples, compile data files, and print final reports. The system also maintains the accounting files necessary to invoice users for Laboratory services and to generate summary reports by program. Summary reports are available to users on request. Approved data files may be transferred directly to a user's computer files, if the user is linked to the LIMS.

Laboratory users normally interface with the LIMS while logging in samples. The computer terminals used for log-in are located in the second floor rotunda (Room 224). The log-in system enables Laboratory users to title their reports, to code location information for inclusion in the user's own data management system, alter the Laboratory's priority system for analysis (with prior approval), track samples by program and project ID, print labels and receipts, choose tests, and a mechanism for the receipt of reports. Users who monitor the same parameters on a regular basis can request a custom code, which allows them to use a single test code entry to request a specific set of parameters. Laboratory staff will log-in and prepare samples which arrive by mail or are brought in by personnel who do not use the Laboratory regularly.

After appropriate information is typed in for each set of samples, the data management system is directed to log-in. The computer responds by assigning a unique sample number to each sample, and also by generating a record of the receipt for log-in and printed label(s).

An option to receive paper or electronic reports exists.

Contracting Policy

The State of Vermont's Agency of Administration Bulletin 3.5, "Contracting Procedures for Services", requires:

Personal services should be obtained from State employees rather than contractors. Contractors should not be used to do the continuing work of the government nor when an agency of the State is able to provide quality services at competitive market rates.

Cost Accounting System

The Laboratory maintains an EPA-approved cost accounting system, which is used to:

1. facilitate the planning of future Laboratory work;
2. aid in the management of current activities with the Laboratory;
3. assess percentage of Laboratory use by DEC divisions;
4. recover a portion of the Laboratory's costs; and
5. estimate the cost of in-kind services to provide a match to Federal grants.

The cost accounting system quantifies the cost per work time unit (WTU), which is defined as the Laboratory's cost to produce one minute of revenue-producing work, for each of the three analytical centers: Metals, Inorganic Chemistry/Bacteriology and Organic Chemistry. Knowing the cost/WTU makes possible the development of an accurate cost for each test the Laboratory performs. As a result, each program the Laboratory serves receives a quarterly invoice or summary for all analyses completed in the previous quarter.

Program managers writing grant proposals are expected to include adequate funding for Laboratory work in their grant requests. The cost accounting system allows managers to predict Laboratory costs in advance.

Additional Assistance

(802) 244-4522

For General Information:

Laboratory Supervisor	Dr. Gerald DiVincenzo	241-1380
Administrative	Alison Farnsworth	244-4523

Quality Control/Quality Assurance Information:

Quality Control Officer	Chris Russo	241-1381
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Technical Information:

Metals	Anne Charbonneau	241-1370
Non-Automated (Wet) Inorganic Chemistry & Bacteriology	Dan Needham	241-1385
Automated Inorganic Chemistry	Dan McAvinney	241-1383
Organic Chemistry	Sandra Lewis	241-1387
	Walter Zorn	241-1386
	Tracey Wawrzeniak	241-1599
	Jenny Berschling	241-1382

Appendix I

Equipment	Contact Person(s)
pH Meters	Kevin Kelsey, Jim Surwilo, Jim Kellogg, Andy Fish, Neil Kamman
Conductivity Meters	Jim Surwilo, Tim Cropley, Neil Kamman, Steve Fiske
Imhoff Cones	Kevin Kelsey, Andy Fish
ISCO Samplers	Kevin Kelsey, Andy Fish, Neil Kamman
Thermistors	Neil Kamman, Steve Fiske
Bailers	Tim Cropley
HNU	Tim Cropley
Peristaltic Pumps	Jim Surwilo, Tim Cropley
Fluorometer	Eric Smeltzer
Threaded PVC Pipe and Fittings	Jim Surwilo
Combustible Gas Indicators	Mark Roy
Metal Detector	Tim Cropley
Flow Meters/Flumes	Andy Fish, Steve Fiske
Kemmerer Sampler	Neil Kamman, Jim Kellogg
Benthic Dredge	Steve Fiske
Plankton Nets	Steve Fiske
Benthic Nets	Steve Fiske

Refer to the State telephone directory and the State's Outlook e-mail directory for contact personnel's telephone number and e-mail address.