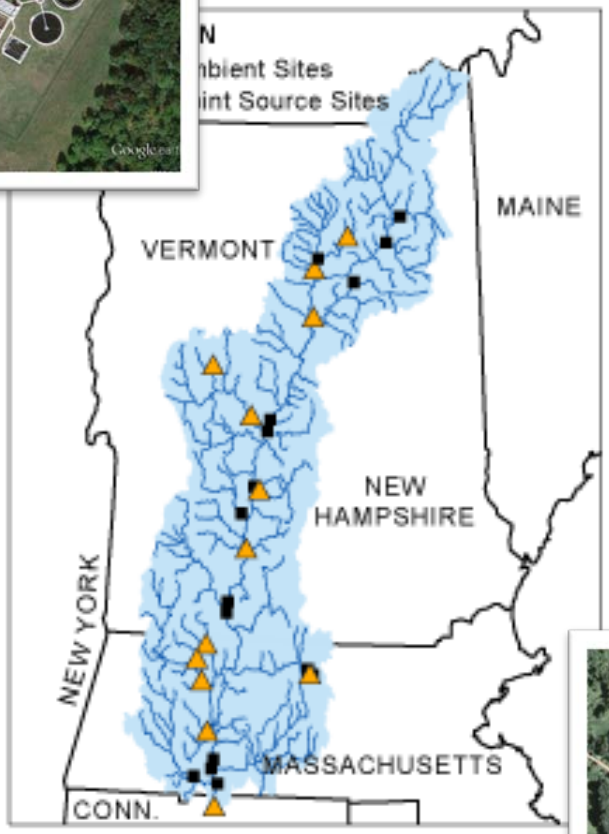
QUALITY ASSURANCE PROJECT PLAN (QAPP)

Low Cost Retrofits for Nitrogen Removal at Wastewater Treatment Plants in the Upper Long Island Sound Watershed



Prepared by Jeanette Brown, JJ Environmental, LLC
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NEIWPCC
New England Interstate Water Pollution Control Commission

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1. PROJECT OBJECTIVES, ORGANIZATION AND RESPONSIBILITIES, AND TASKS

1.1. Purpose of Study and Background Information

During the 1990's, nitrogen was identified as the cause of low dissolved oxygen in Long Island Sound,which resulted in fish/shellfish kills and changes in fish/shellfish populations and species. In 2001, USEPA approved a Total Maximum Daily Load (TMDL) for nitrogen in Long Island Sound (LIS). The TMDL specifies a 58.5% reduction in anthropogenic nitrogen from point and non-point sources. Wastewater treatment plants throughout Connecticut were required to upgrade treatment plants for nitrogen removal. The Connecticut River, which begins near the Canadian border and passes through Vermont, New Hampshire, Massachusetts and Connecticut, carries a significant nitrogen load to Long Island Sound. Soon after the approval of the TMDL, the Connecticut River Workgroup, a multistate entity, was created "to develop scientifically-defensible nitrogen load allocations, as well as an implementation strategy, for the Connecticut River Basin in Massachusetts, New Hampshire, and Vermont, which are consistent with TMDL allocations established for LIS" (NEIWPCC). With most Connecticut treatment plants now removing nitrogen, it is important to reduce the nitrogen load in LIS by reducing the load coming from treatment plants that discharge to the Connecticut River. These treatment plants in the upper regions of the Long Island Sound Watershed (LISW) (Figure 1) are facing the prospect of having to reduce nitrogen in their effluent without having the economic or recreational benefits of being located directly on Long Island Sound. Many of the LISW plants are small communities significantly impacted by the depressed economy. The purpose of this project is to explore ways to remove the largest quantity of nitrogen from the LISW at the lowest unit cost in order to protect water quality and minimize financial impacts on communities.

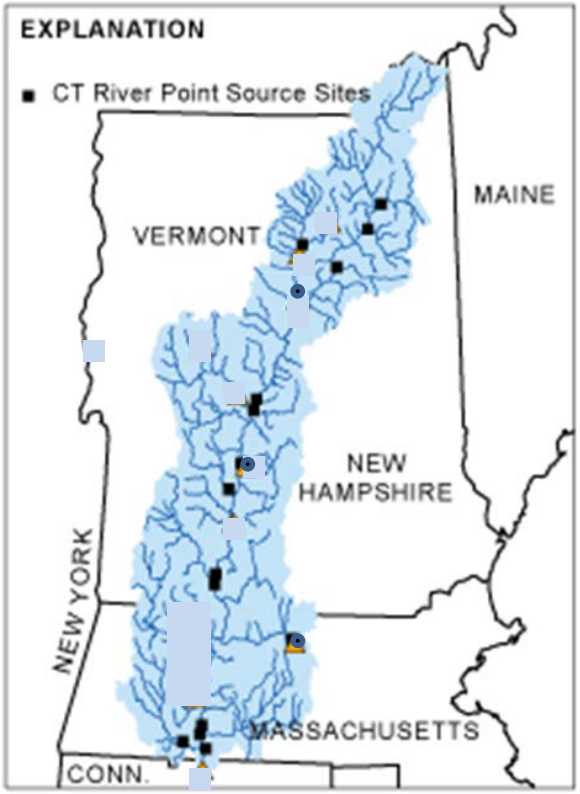


Figure 1: Upper Long Island Sound Watershed

The nitrogen removal process is a biological process using microorganisms inherent in wastewater and creating environmental conditions within the plant to encourage the growth of particular organisms. The biological nitrogen removal (BNR) process occurs in two steps, nitrification and denitrification (Figure 2). These processes require different environmental conditions. Nitrification requires an oxic environment usually defined as about 2.0 mg/L of dissolve oxygen (DO). Denitrification requires an anoxic environment defined as having less than 0.3 mg/L of DO and having nitrate (NO_3) or nitrite (NO_2) present.

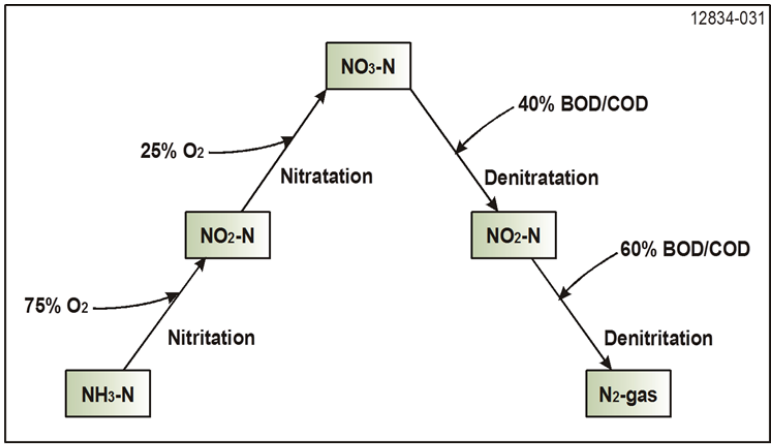


Figure 2: Biological Nitrogen Removal

Nitrification is also a two-step process. The first step converts ammonia nitrogen to nitrite nitrogen using ammonia-oxidizing bacteria (AOBs) and is called nitritation. The second step converts nitrite nitrogen to nitrate nitrogen using nitrite oxidizing bacteria (NOBs) and is called nitratation. Denitrification reduces the nitrate formed in the nitratation step to nitrite (denitratation) and then reduces it further to nitrogen gas (denitritation). The Team will evaluate each plant to determine possible modifications to achieve nitrification and denitrification.

1.2 Project Objectives

The objectives of this Project are to:

(1) Perform a detailed and accurate evaluation of the treatment plants including but not limited to existing and design capacity, expected near term future flows, seasonal flow and load variation, capacity of bioreactors and clarifiers and wastewater characteristics;
(2) Evaluate ability to configure existing tankage and pumps for nitrogen removal;
(3) Determine impact on operation and maintenance budgets;
(4) Determine training needs for plant staff;
(5) Recommend whether operational and/or low cost modifications will be practical; and
(6) Quantify the achievable reduction in effluent nitrogen concentrations and mass.

1.3 Organization and Responsibilities

Figure 2 shows the Table of Organization for this project. Region 1 of the US-EPA is funding this project. The Project Lead, JJ Environmental, LLC, is responsible for carrying out all tasks within this project including data gathering and analyses, coordinating with the Contract Laboratory (Chemserve), site visits, meetings, quality assurance, report writing and other elements of this project. The following is a detailed list of project participants and their responsibilities:

- **Project Manager**: Susannah King, Environmental Analyst, NEIWPCC, is responsible for overseeing implementation of the project work plan, reviewing draft reports, approving final report, managing the project budget, selecting and contracting directly with Chemserve for analysis of wastewater samples, providing necessary information to the Project Lead, processing invoices and meeting any obligations with US-EPA project officer.

- **Project Lead:** Jeanette Brown, President JJ Environmental, LLC, is responsible for all agreed upon tasks as outlined in the contract and approved statement of work (JJE Proposal). Those tasks including collecting and analyzing existing plant data, plant designs, performing site visits, developing nitrogen removal projections and costs, organizing project meetings, preparing cost estimates, writing reports, coordinating with Chemserve, preparing the QAPP and preparing final report. Two subcontractors, Stacy Passaro, Passaro Engineering and Dr. David Stensel, University of Washington, will assist JJE with the above tasks. The term "Team" used throughout this QAPP refers to the Project Lead and the subcontractors mentioned above.

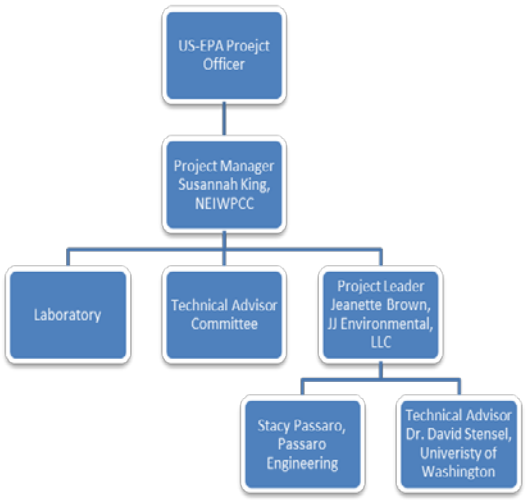


Figure 3: Project Organization

- **Project Officer**: Leah O'Neill, U.S. Environmental Protection Agency Region 1 is responsible for reviewing reports and other administrative requirements.

- **Technical Advisory Committee**: The Technical Advisory Committee is responsible for providing general guidance and advice on all technical aspects of the project, including: reviewing this Quality Assurance Project Plan and providing guidance as needed, reviewing draft reports, reviewing draft recommendations, reviewing final recommendations and reviewing and approving final report.

- **Contract Laboratory:** Chemserve is responsible for determining the specific analytes designated by the Team. They are responsible for the approved QA/QC procedures, responsible for adhering to all approved methodology, adhering to approved disposal procedures, and adhering to the project schedule.

1.4 Plant Selection

The regulatory agencies in each of the three states, Massachusetts, New Hampshire and Vermont selected the treatment plants for this study. Table 1 is a list of those treatment plants. The treatment plants, highlighted in yellow, have already been assessed for nitrogen removal potential. JJE is responsible for providing cost estimates for these assessments as part of this project.

Table 1-Selected Treatment Plants

Facility Name	State	Design Flow
Amherst	MA	7.10
Athol	MA	1.75
Belchertown	MA	1.00
Bellows Falls	VT	1.40
Claremont WWTF	NH	3.89
Easthampton	MA	3.80
Erving #2	MA	2.70
Gardner	MA	5.00
Great Barrington	MA	3.20
Hanover WWTF	NH	2.30
Hinsdale	NH	0.30
Keene WWTF	NH	6.00
Lee	MA	1.00
Lenox	MA	1.19
Littleton WWTF	NH	1.50
Montague	MA	1.83
Orange	MA	1.10
Palmer	MA	5.60
Pittsfield	MA	17.00
South Hadley	MA	4.20
Southbridge	MA	3.77
Spencer	MA	1.08
Templeton	MA	2.80
Town of Springfield	VT	2.20
Town of Windsor - Main	VT	1.13
Town St. Johnsbury	VT	1.60
Village of Ludlow	VT	1.05
Village of Lyndonville	VT	0.75
Ware	MA	1.00
Warren	MA	1.50
Webster	MA	6.00
Winchendon	MA	1.10

Note: Plants highlighted in yellow have already been assessed for nitrogen removal. The contractor will perform a cost estimate for these plants as part of this project, but they will not be plart of the sampling/ monitoring plan nor will there be any review of the assessments made by others

1.5 Project Tasks and Preliminary Schedule

Below is a detailed description of the project tasks and objectives. Appendix A is the Preliminary Schedule for this project. The Team will update the schedule monthly. The Team is comprised of Jeanette Brown, JJ Environmental, LLC, Stacy Passaro, Passaro Engineering and Dr. David Stensel, University of Washington. This team has extensive knowledge in the design and operation of BNR facilities, data collection and analysis for use in design models and low cost retrofits.

Task 1: QAPP: The Team will prepare the Quality Assurance Project Plan (QAPP) for approval by NEIWPCC and US-EPA.

Task Objective: The objective is to ensure that the activities associated with the collection, generation, use, and/or reporting of data will provide information suitable for assessing the ability of the treatment plants to remove nitrogen biologically.

Note: The Web-based meeting (Task 2) has been eliminated and the rest of the tasks renumbered.

Task 2: Kick-off meeting: At the Kick-off meeting, the Team will make a presentation on the basics of biological nitrogen removal and discuss terminology such as anoxic zones, nitrification, denitrification, internal recycle, etc. The Team will also explain the types and potential results of operational modifications using actual case studies. Modifications include creating a MLE – type process, cyclic processes and step feed processes. The Team will also describe how to create anoxic zones at very low costs and discuss the results of the initial data gathering describing which plants have the highest potential for

biological nutrient removal (BNR) and which plants face more challenges. At this meeting, the Team will describe the type of plant information needed and ask Plant Managers to have this information available during the site visits. This information includes:

- Drawings of bioreactors and clarifiers,
- Two years' (minimum) operating data and DMR's,
- Design information on bioreactors, clarifiers, WAS and RAS pumps, including size, capacity, age,
- Quantity and type of recycle or sidestreams returned to head of plant or prior to bioreactors,
- Types and age of blowers or mechanical aerators,
- Types of diffusers

The kickoff meetings will include the NEIWPCC project officer and one representative from each of the appropriate states.

Task Objective: The objective of the kickoff meeting is to educate the operators and ensure that the plants are prepared for the site visits. The Team will also present the initial schedule for site visits to ensure that the plants will be prepared and that there are no schedule conflicts.

Task 3: Site Visits: The Team will visit each plant. During these site visits, the Team will:

- Tour of the plant and interview the staff,
- Review operating data and discuss process challenges experienced by the plant,
- Review sewer system design (miles of sewer, number of pumping stations, combined versus separate)
- Review of historical sewer user demographics – number of individual homes, apartment buildings, industrial & commercial establishments.
- Review wet and/or cold weather events,
- Review equipment – type, age, run time and current operating strategy (e.g., two out of three pumps are needed for return sludge and third pump acts as installed spare for either of the others),
- Review of the plant's instrumentation/SCADA – type, age, reliability,
- Review of budgets - Capital and Operations & Maintenance,
- Review any planned treatment plan improvements or expansions,
- Review of type of operation-8 hrs/d, 5 days/week, 24/7, etc.,
- Review of past operating problems such as foam and bulking issues,
- Discuss questions and concerns about nitrogen removal, training needs

An individual from the state environmental agency in which the plant is located will participate in the site visits along with the Team provided their availability does not delay site visits. The

Team will create an individual binder and an electronic file for each treatment plant. That binder and electronic file will contain at least the following documents:

- Plant DMR data,
- completed survey forms,
- relevant drawings,
- equipment lists including age, capacity, type
- Interview notes including information on wet and cold weather operations, operating problems, foaming/bulking issues
- Budgets
- Collection system information
- Observations

The binders will become part of the contract documents and will be transferred to NEIWPCC at the end of this project.

Task Objective: The objective is for the Team to become familiar with the plant, personnel and operations. It is important for the Team to make the operators understand and feel comfortable with the process. Through these site visits, the Team will gather operating and design data, assess operator knowledge and skill level, assess the capabilities of on-site laboratory facilities, become familiar with equipment and instrumentation at the plant, assess the ability to add anoxic zones and turn aerators on and off and assess any limitations which might impact modifications.

Task 4: Coordinate Influent and Effluent Monitoring: The Team has recommended a revised Monitoring Plan as shown in Table 2. This table includes necessary data to enable the Team to assess nitrogen removal capabilities. The Plan recommends four consecutive days of samples at each treatment plant. In ensuring quality data, the Team will conduct a training program for the plant staff on "how to take samples". As part of the training process, the Team will work with plant operators to ensure they know the recommended sample location, how to take and preserve samples, which sampling containers should be used and how to pack samples for transport to Chemserve. The Team will develop a sampling SOP (standard operating procedure) for the plant. Correct sampling and sample handling are critical to ensure data are accurate and reproducible. The Team will coordinate with Chemserve to ensure samples arrive in the proper period so as not to violate holding times and negate accurate results. The Team will meet with the selected laboratory staff to discuss their needs and requirements and factor those needs into the coordination plan for sampling. The Team will develop a sampling form that, along with other information, requires the operator to *n*ote the instantaneous flow at the time grab samples are taken and the average daily flow for composite samples. The Team will review Chemserve's QA/QC procedure and ensure they run blanks and standards. The Team has had experience with contract laboratories and has found on split samples that there can be a wide range of results between two different laboratories especially in the lower concentrations. It is important that the chosen laboratory has had experience in analyzing wastewater samples especially for nutrients in the expected concentration range.

Task Objective: The objectives are to ensure that samples are taken, preserved and shipped properly; ensure that sampling times are coordinated with laboratory schedule and adhere to sample handing protocols; and that they are taken at the right locations to provide useful data.

Table 2-Monitoring Plan

			Analytes-Influent or Primary Effluent						Analytes-Final Effluent					
Facility Name	State	Design Flow	BOD5*	sCOD	NH4-N	TKN	TSS/VSS	Alkalinity	BOD5*	sCOD	NH4-N	SKN	NO2/NO3	Alkalinity
Amherst	MA	7.10	4	4	4	4	4	4	4	4	4	4	4	
Athol	MA	1.75	4	4	4	4	4	4	4	4	4	4	4	
Belchertown	MA	1.00	4	4	4	4	4	4	4	4	4	4	4	
Bellows Falls	VT	1.40	4	4	4	4	4	4	4	4	4	4	4	
Claremont WWTF	NH	3.89	4	4	4	4	4	4	4	4	4	4	4	
Easthampton	MA	3.80												
Erving #2	MA	2.70	4	4	4	4	4	4	4	4	4	4	4	
Gardner	MA	5.00	4	4	4	4	4	4	4	4	4	4	4	
Great Barrington	MA	3.20	4	4	4	4	4	4	4	4	4	4	4	
Hanover WWTF	NH	2.30	4	4	4	4	4	4	4	4	4	4	4	
Hinsdale	NH	0.30	4	4	4	4	4	4	4	4	4	4	4	
Keene WWTF	NH	6.00	4	4	4	4	4	4	4	4	4	4	4	
Lee	MA	1.00	4	4	4	4	4	4	4	4	4	4	4	
Lenox	MA	1.19	4	4	4	4	4	4	4	4	4	4	4	
Littleton WWTF	NH	1.50	4	4	4	4	4	4	4	4	4	4	4	
Montague	MA	1.83	4	4	4	4	4	4	4	4	4	4	4	
Orange	MA	1.10	4	4	4	4	4	4	4	4	4	4	4	
Palmer	MA	5.60												
Pittsfield	MA	17.00	4	4	4	4	4	4	4	4	4	4	4	
South Hadley	MA	4.20												
Southbridge	MA	3.77	4	4	4	4	4	4	4	4	4	4	4	
Spencer	MA	1.08	4	4	4	4	4	4	4	4	4	4	4	
Templeton	MA	2.80	4	4	4	4	4	4	4	4	4	4	4	
Town of Springfield	VT	2.20	4	4	4	4	4	4	4	4	4	4	4	
Town of Windsor - Main	VT	1.13	4	4	4	4	4	4	4	4	4	4	4	
Town St. Johnsbury	VT	1.60	4	4	4	4	4	4	4	4	4	4	4	
Village of Ludlow	VT	1.05	4	4	4	4	4	4	4	4	4	4	4	
Village of Lyndonville	VT	0.75	4	4	4	4	4	4	4	4	4	4	4	
Ware	MA	1.00												
Warren	MA	1.50	4	4	4	4	4	4	4	4	4	4	4	
Webster	MA	6.00	4	4	4	4	4	4	4	4	4	4	4	
Winchendon	MA	1.10	4	4	4	4	4	4	4	4	4	4	4	

* BOD5 testing will be performed by the treatment plants and not the contract laboratory

Task 5: Technical Memorandum and Quarterly Reports: The Team will prepare a technical memorandum and a PowerPoint presentation summarizing work performed to date. The memorandum will include a summary of findings from the initial data gathering task, the plant tours and interviews and the laboratory results. There will be detailed discussion about the processes and equipment at each treatment plant, results of the sampling program and recommendation and prioritization for plant/process modifications. The Team will be available to make a PowerPoint presentation to the Technical Advisory Committee and discuss the findings in detail. The Team will also prepare quarterly reports to provide a project status and document any problems or concerns.

Task Objective: The objective is to inform the Technical Advisory Committee and other Project Personnel of the project status including initial observations and recommendations as well as problems or concerns.

Task 6: Conduct Detailed Site Visits: The Team will develop a prioritized list for plants in each state. The Team will revisit each of the plants for a more detailed examination of plant processes, review design drawings and field measure as necessary, review equipment capacity and repair history, and review all operating data and compliance history. A representative from the appropriate state regulatory agency will be invited to participate in these visits. The Team will use this information to determine plant modifications for nitrogen removal. The Team will concentrate on process control modifications and creation of anoxic zones; ability to return nitrate rich mixed liquor to the anoxic zone; and whether cyclic operation could be established. Cyclic operation is dependent on the type of aeration equipment and manufacturer's recommendations for turning equipment on and off. The Team will review all analytical data with special attention to key parameters, which affect nitrogen removal. For example, alkalinity is important to the nitrification process, so we will evaluate the alkalinity concentration to determine whether there is a need to add alkalinity to the process. Addition of alkalinity can result in a capital cost to the plant as well as increased operating costs. The Team will estimate the amount of nitrogen removed and the cost per pound and will take into consideration seasonal variations in temperature and flow.

The team will use at a minimum the following criteria for developing the prioritized List:

- Availability of aeration capacity
- Availability of blower capacity
- Favorable influent/primary effluent characteristics (BOD:N ratio, for example)
- Ability to turn aeration system on and off
- Severity of wet/cold weather events
- Sufficient clarifier capacity
- Severity of plant upsets and reasons
- Impact of sidestreams (digester supernatant, for example)

Task Objective: The objective is to ensure the treatment plant has the equipment, capacity, and manpower to achieve nitrogen removal, to ensure nitrogen removal can be achieved at low cost and to ensure the cost per pound for nitrogen removal is reasonable and within budget constraints for the individual treatment plant.

Task 7: Final Report: The Team will prepare a final report, which will contain the following information:

1.0 An Executive Summary;
2.0 A narrative on observations and results of plant interviews and site visits;
3.0 A detailed analysis of the analytical operating data, special sampling data, plant equipment and existing processes, and the conclusions drawn from those data and observations;
4.0 A list of all plants, the type of modifications recommended, the estimated mass of nitrogen removed by those modifications, and the estimated cost and period for implementation
5.0 Summary and Conclusion;

6.0 Appendix A-Individual Plant Survey Forms;
7.0 Appendix B-Significant Operating Data by Plant;
8.0 Appendix C-Special Sampling Data by Plant;
9.0 Appendix D-All calculations-cost, mass of nitrogen removed, etc.

***Task Objective: The objective is to ensure that all information obtained through this project is recorded and made available to the Project Officer, Project Manager and Technical Advisory Committee and to ensure that the plants have documentation to support the various recommendations so they can make informed decision on nitrogen removal modification*.**

2.0 DATA GENERATION AND ACQUISITION

This section discusses the various types of data that are to be collected under the "Low Cost Retrofits for Nitrogen Removal at Wastewater Treatment Plants in the Upper Long Island Sound Watershed" Project.

2.1 Data Types

2.1.1. New Data: As part of this project, each plant will provide samples of influent and/or primary effluent and final effluent to Chemserve. Chemserve will determine the following analytes on each sample: Total Kjeldahl Nitrogen (TKN), soluble Kjeldahl Nitrogen (SKN), nitrate-nitrogen (NO_3-N) + nitrite-nitrogen (NO_2-N), ammonia-nitrogen (NH_4-N), alkalinity, and soluble COD. Each treatment plant will analyze the same sample for BOD_5. Furthermore, the plant will filter samples for sKN and sCOD prior to preservation and shipment to Chemserve.

2.1.2 Existing Data: Existing data includes but is not limited to the following:

- All monitoring and compliance test reports, flow records, operational and maintenance logs
- Source, composition and quantity of sidestream flows including thickener overflow, digester supernatant, filtrate/centrate, etc.
- Most current process flow diagrams and plant drawings
- Most current process design information for bioreactors, clarifiers, RAS-WAS pumps
- Most current design information for the aeration system (blowers, diffusers, mechanical aerators, etc)

2.2 Data Acquisition

2.2.1 New Data: The JJE Team has assumed that most, if not all, of the project plants do not have sufficient data to characterize various nitrogen species and other critical wastewater characteristics entering and throughout the process. A critical part of this project is to collect data, which will enable the Team to make decisions as to the efficiency and effectiveness of low cost nitrogen removal. With that in mind, the New England Interstate Water Pollution Control

Commission (NEIWPCC) developed a monitoring plan. The JJE Team reviewed the monitoring plan and made changes. The monitoring plan now includes sampling and testing of influent, primary effluent and final effluent all nitrogen species, as well as other analytes, which are necessary for, decision making such alkalinity, soluble COD and BOD_5. Plant personnel will take a composite sample each 24-hr day for four consecutive days at various locations throughout the plant. Table 1 is a summary of the recommended monitoring plan. NEIWPCC hired a Chemserve that will perform the analysis.

2.2.2 Secondary Data (Existing Data):

Existing data will come from various sources - plant personnel, contract laboratories, equipment manufacturers/suppliers and consulting engineers.

The specific sources and data associated with each source follow:

- **Plant Personnel and/or contract laboratories:**
  - All monitoring and compliance test reports, flow records, operational and maintenance logs
  - Source, composition and quantity of sidestream flows including thickener overflow, digester supernatant, filtrate/centrate, etc.
- **Consulting Engineers:**
  - Current process flow diagrams and plant drawings.
  - Current process design information for bioreactors, clarifiers, RAS-WAS pumps.
  - Current mechanical design information for the aeration system (blowers, diffusers, mechanical aerators, etc).
- **Equipment Manufacturers/Suppliers:**
  - Current mechanical design information for the aeration system (blowers, diffusers, mechanical aerators, etc).
  - Current mechanical design information for the pumps.

2.3 Data Acquisition QA/QC

2.3.1 New Data: The Team needs to acquire new data to document the nitrogen load entering the plant from the collection system, entering the bioreactors (after removal in the primary clarifiers and/or after recycle streams are added in) and the current load that is leaving the plant (quantifying what the current process may be removing). Based on the flow diagram of each plant, the Team will select sample points at various points in the process to ensure representative samples, instruct the operators in proper sampling techniques and preservation and holding times. Table 3 is a summary of analytes, holding times, preservation and sampling containers.

The Team will coordinate with Chemserve to ensure samples arrive at Chemserve so as not to violate holding times and negate accurate results. The Team will meet with Chemserve to discuss their needs and requirements and factor those needs into the coordination plan for sampling. The Team will develop a sampling log form which requires the operator to note the

Table 3- Summary of Analytes, Sample Locations, Containers, Preservation and Holding Times

Analyte	Source	Volume	Containe	Preservative	Holding Tim
BOD_5	I or PE, F	500, 500	Plastic	Refrigeration, 4° C	48 hours
sCOD	I or PE, F	500, 500	Plastic	H_2SO_4 +Refrigeration,4° C	28 days
NH_4-N	I or PE, F	500, 500	Plastic	H_2SO_4 +Refrigeration,4° C	28 days
TKN	I or PE	500	Plastic	H_2SO_4 +Refrigeration,4° C	28 days
sKN	F	500	Plastic	H_2SO_4 +Refrigeration,4° C	28 days
Alkalinity	I or PE	500	Plastic	Refrigeration, 4° C	28 days
NO_2 + NO_3	F	250	Plastic	H_2SO_4 +Refrigeration,4° C	14 days
TSS/VSS	I or PE	1000, 1000	Plastic	Refrigeration, 4° C	7 days

I=Influent, PE = Primary Effluent, F= Final Effluent

instantaneous flow at the time grab samples are taken and the average daily flow for composite samples.

The Team will ensure that sample handling and testing follows the QA/QC procedure established by Chemserve. If the Team determines that Chemserve's QA/QC procedure is inadequate to ensure accuracy, they will include additional QA/QC requirements for Chemserve. At the very least, the Team will require chain of custody forms, uniform labeling requirement, proper sampling bottles, blanks, standards and duplicate samples. Table 4 is a summary of Chemserve's QC Acceptance Criteria.

Table 4 Quality Control Acceptance Criteria

Parameter	QC Checks	Frequency	Acceptance Criteria
COD	MB	every run	<RL
	LCS	every run	80-115% recovery
	MS & MSD*	every 20 samples	80-115% recovery, RPD ≤20%
	Known Std	new calibration	vendor specified limits
Ammonia	MB	every run	<RL
	LCS	every run	80-120% recovery
	MS & MSD*	every 20 samples	80-120% recovery, RPD ≤25%
	Known Std	every 20 samples	vendor specified limits
TKN	MB	every run	<RL
	LCS	every run	80-120% recovery
	MS & MSD*	every run	80-120% recovery, RPD ≤25%
	Known Std	every 20 samples	vendor specified limits
TSS & TVSS	MB	every run	<RL
	Known Std	every 20 samples	vendor specified limits
	Sample Dupe*	every run	5% of average
Alkalinity, Carb	MB	every run	<RL
	LCS	every run	80-120% recovery
	MS & MSD*	as needed	80-120% recovery
	Known Std	every 20 samples	vendor specified limits
	Sample Dupe	every run	RPD ≤20%
NO3/NO2	MB	every run	<RL
	LCS	every run	90-110% recovery
	CCV	every run	90-110% recovery
	MS & MSD*	every 20 samples	90-110% recovery, RPD ≤25%

*** Sample duplicates and spiked duplicates are chosen at random from all samples within a batch and may not be specific to a particular project.**

Attached in Appendix C is the QA/QC procedure for Chemserve. Since the treatment plants will be performing BOD5 testing, each state has certified the QA/QC procedures for the treatment plants. Letters certifying approved QA/QC are also in Appendix C.

Chemserve must designate in writing that they are using EPA Approved Analytical Methods or Standard Methods for all Chemserve analyses. Attached in Appendix C are all relevant methods. Chemserve must also state how they plan to dispose of excess samples. For example, some nonhazardous aqueous samples can be poured down the drain. Nonhazardous solids samples can be disposed of in the trash. However, samples or used reagents that contain any metals or other substances that are considered toxic or hazardous to living creatures or the environment will be disposed of properly, responsibly and legally. Chemserve must use appropriate containers for temporary storage of materials prior to disposal. Attached in Appendix C is Chemserve's disposal protocol.

2.3.1.1 Training: The first step in ensuring that new data are representative and will provide quality information to base decisions is to ensure the plant staff understands correct procedures for taking and handling samples. The Team will conduct a training program in which the plant staff are shown how to correctly take samples, how to preserve samples if necessary, what types of sampling containers should be used and how to pack the samples for shipment. Appendix D is an outline showing the contents of the training program.

2.3.1.2 Sampling Plan: The Team will develop a sampling plan for each facility. The components of the sampling plan are as follows:

- **Sampling Locations:** The Team will select the sampling locations at each plant. These locations will provide access to well mixed, representative samples. The operators at each facility will collect the samples. Team Members will review the sample location and proper sampling procedure with each operator so they understand the importance; for example, samples must be taken from well-mixed areas and from the center of a flow channel, not near the bottom and not near the surface.

- **Sample Identification:** Chemserve or the Team will provide pre-labeled sampling containers marked with permanent marker to each facility. At the time each sample is taken, the operator will be required to fill in various fields on each label as well as the information required on the Sample Log Sheet. Each plant will have a few extra sample containers and extra Sample Log Sheets. An example of the Sample Log Sheet is included in Appendix E.

- **Chain of Custody:** A chain of custody form will be required for each sample. Chemserve will provide the Chain of Custody forms which the operator taking

the samples must filled out completely. An example of the Chain of Custody Form for this project is included in Appendix F.

- **Sample Preservation:** All samples will be stored on-site at the treatment plant at 4°C immediately after they are taken. Depending upon the test and the frequency with which samples will be picked up by Chemserve, samples may need to be preserved by acid addition or other method. These preservation requirements will be outline on the Sample Plan developed for each individual plant.

2.3.2 Secondary Data (Existing Data)

Secondary data will come from the following sources:

- **DMR data:** The DMR data is subject to the QA/QC requirements of the agency overseeing the plants NPDES permit requirements. As such, the Team will use these data as part of the evaluation for the potential for nitrogen removal. As part of the Team's internal QA/QC, we will review the plant's protocols for collecting and testing wastewater samples including sampling locations, collection techniques, analytical methods and QA/QC procedures.

- **Plant Survey:** The Team will send a survey form to a representative from each plant. The purpose of this summary is to obtain initial information on the type of plant, the type of processes and average wastewater characteristics. The team will crosscheck these data against the DMR data or industry standards to determine if there are any inconsistencies. If so, the team will make every effort to resolve/understand these inconsistencies. The team will not use any data that is questionable in their assessment.

- **Additional process control data:** The Team will review plant operating logs, recorded instrument readings, maintenance logs and other plant generated non-DMR record. The Team will not directly use these data but will use them to develop trends and changes in flows, loads, temperatures and other variables, which influence plant performance. By reviewing this information, Team Members will also determine any critical data gaps.

- **Facility background information:** The Team will ensure that all existing record drawings, Operations Manuals and maintenance records represent the current plant configuration and operations. The Team will verify the record drawings by doing field measurements when necessary and checking equipment nameplates. Additionally, if possible, the Team will inspect tanks and witness equipment in operation. Furthermore, the Team will speak with the plant operators to determine current operations and maintenance protocols.

3.0 DATA USE AND MANAGEMENT

3.1 Data Use

3.1.1 New Data: The Team will obtain new data from composite samples taken by plant personnel and analyzed by Chemserve. The analytes include BOD_5, TSS/VSS, sCOD, SKN, TKN, NH_4-N, NO_2-N + NO_3-N and alkalinity for samples taken at various locations as outlined in the Monitoring Plan. The Team will used these data in both desktop and Biowin® modeling to determine nitrogen removal capabilities at each plant.

Biowin® is a Microsoft Windows-based simulator used worldwide in the analysis and design of wastewater treatment plants. This model has been used for many years and is considered "industry standard" by many consultants and academicians and allows both dynamic and steady-state simulations. By using this model, the team can assess the ability for nitrogen removal under various conditions such as cold weather and wet weather.

3.1.2 Secondary (Existing) Data:

- **All monitoring and compliance test reports, flow records, operational and maintenance logs:** The Team will use this information to establish historical trends, which may affect nitrogen removal including variation with seasons, plant performance under low temperature conditions, effects of inflow and infiltration, and issues with critical equipment and unit processes.

- **Source, composition and quantity of sidestream flows including thickener overflow, digester supernatant, filtrate/centrate, etc.:** This information is important since sidestreams can increase nitrogen concentration, sCOD and BOD_5 concentrations. It is important to understand where they enter the process, how frequently and at what quantity. The Team will use these data to assess the variability of loads to the bioreactors and their influence on the biological process. If necessary to ensure accurate predictions, the Team will require Chemserve analysis of these streams.

- **Current process flow diagrams and plant drawings:** The Team will use this information to learn the configuration of the process, the type of process, number of units per process, location of various structures, and other information which will help the Team understand process flow and layout.

- **Current process design information for bioreactors, clarifiers, RAS-WAS pumps:** The Team needs to know the process design for the bioreactors,

clarifiers and RAS-WAS pumps. For the bioreactors, the Team will review the design solids retention time (SRT), design hydraulic retention time (HRT), design mixed liquor suspended solids (MLSS), design temperature, and the design kinetics. The Team will then use this information and compare it to the minimum SRT, HRT, MLS and temperature required for nitrogen removal. For the clarifiers, the Team will review the design solids loading rate (SLR) and surface overflow rate (SOR) and compare it to the requirements for nitrogen removal. The return activated sludge (RAS) and waste activated sludge (WAS) pumps curves will be reviewed to ensure sufficient capacity for the biological nitrogen removal process.

- **Current mechanical design information for the aeration system (blowers, diffusers, mechanical aerators, etc.):** The success of a biological nitrogen removal process is dependent on the first step, nitrification. Nitrification is an aerobic process and the Team needs to ensure that the aeration system can maintain about 2.0 mg/L dissolve oxygen (DO) concentration within the bioreactors. By understanding the mechanical design information for the aeration system, the Team can evaluate the amount of air available to the process.

3.2 Data Management

3.2.1 New Data: The Team will ask the plant operators to fax or scan copies of the Sample Log Sheet and the Chain of Custody Forms supplied by Chemserve to a member of the Team prior to sending any samples to Chemserve. The Team will review these documents to ensure that the operator captured all necessary information required on the form. The Team will retain copies of these forms in the Project files and will use them for quality control.

The Team will require that Chemserve provide by email to them summaries of all analytical data within 24 hours of the completed analysis of an individual set of samples. The Team will review the data and discuss with Chemserve any data that is outside of normal ranges or inconsistent with historical data. If there anomalies in the data, e.g., outside of normal range or inconsistent with historical data the following actions will take place:

- JJE will review the sampling procedure, preservation and holding times
- JJE will review the QA/QC data from the contract lab, standards, calibrations, etc.

If it appears that the problem is due to sampling or holding times, JJE will request that NEIWPCC allow another day of testing for that plant. JJE will witness the sampling and ensure the operator adheres to the holding time and preservation requirement. If it appears the problem is due to a laboratory error, JJE will request that the Chemserve perform another test at their expense. If JJE finds no reason for the anomalous data, JJE will recommend another sampling day.

These data are so critical to the assessment that it is important to ensure accurate information on which to base the decisions on the removal of nitrogen at low cost.

Chemserve must include in the data set, the values obtained on standards and blanks for that particular data run. The Team will enter this information into an EXCEL spreadsheet. For Team QA/QC, the team will review both the spreadsheet and the original data sheet to ensure no errors in the transfer of these data. The Team will retain copies of the data sheets in the Project Files. If the data obtained in the sampling/testing program are still outside normal range or inconsistent with historical data after a review of all QA/QC data, then it may be a sampling or preservative issue. The treatment plants will be determining BOD on a portion of the same sample that is sent to Chemserve for other determinations. If the BOD is in normal range and other parameters are outside of the range, then it may be a preservative or holding time error. In conjunction with NEWIPCC, JJE will ask Chemserve to perform another set of samples.

Chemserve uses an LIMS-generated reporting format, which provides the following information with each report:

- Client Identification
- Project Identification and Control Number
- Sample Identification/Description
- Dates and Times of Sample Collection and Receipt At Lab
- Sample Receiving Condition Summary
- Test Description and Method Reference including CAS Number if applicable
- Matrix Type
- Test Result with Reportable Units
- Reportable Detection Limit and any Dilution Factors
- Case Narrative confirming that analysis performance met requirements, or describing any non-conformances
- Batch QC report with results of Method Blank, Blank Spike and Blank Spike Duplicate, and RPD for each parameter

Each Chemserve report also includes a copy of the original Chain of Custody, showing signatures of each person responsible for collecting, receiving, and relinquishing samples. Any special data or handling requests can be noted on the COC.

The Team will ask the plant operators to fax or scan copies of any directly measured data and send them to the Team on a weekly basis. The Team will save electronic copies of all forms in the individual folder for that plant and hard copies in the Project Files. The Team will review the data and will discuss with the plant operators any discrepancies or issues noted during these reviews.

3.2.2 Secondary (Existing) Data:

- **Survey Forms:** The Team will ask the plant operators to send the survey forms electronically if possible and if not as hard copies. The Team will save the electronic or scanned copies to the Plant Folder in the Project Electronic Files and to the Project files by individual plant if hard copies.

- **DMR's and Past Data:** The Team will collect hard copies of two years of data and DMR's during the individual site visits. The Team will place the hard copies in the Project files by individual plant and will also scan these documents and place them in the Project Electronic Files by individual plant.

- **Plant Drawings, Design and Specifications:** The Team will obtain copies of plant relevant plant drawings, process design and mechanical equipment specifications. The Team will field measure critical structures and review equipment nameplate data to ensure the current design. The Team will document any anomalies and place that information into the Project Files. The Team will place the hard copies of all plant documents in the Project files by individual plant and will also scan these documents and place them in the Project Electronic Files by individual plant.

4.0 RECORDS MANAGEMENT

4.1 Project Electronic Files: The Team will keep the Project Electronic Files on one master hard disk drive as well as on one on-line data-sharing platform for easy sharing between Team Members. In addition, the Team will back up the electronic hard disk files once every 24 hours on an external hard drive.

4.2 Project Files: The Team will keep hard copies of any information in a Project File by individual plant. At the end of the project and after final payment, the Team will turn these files over to NEIWPCC.

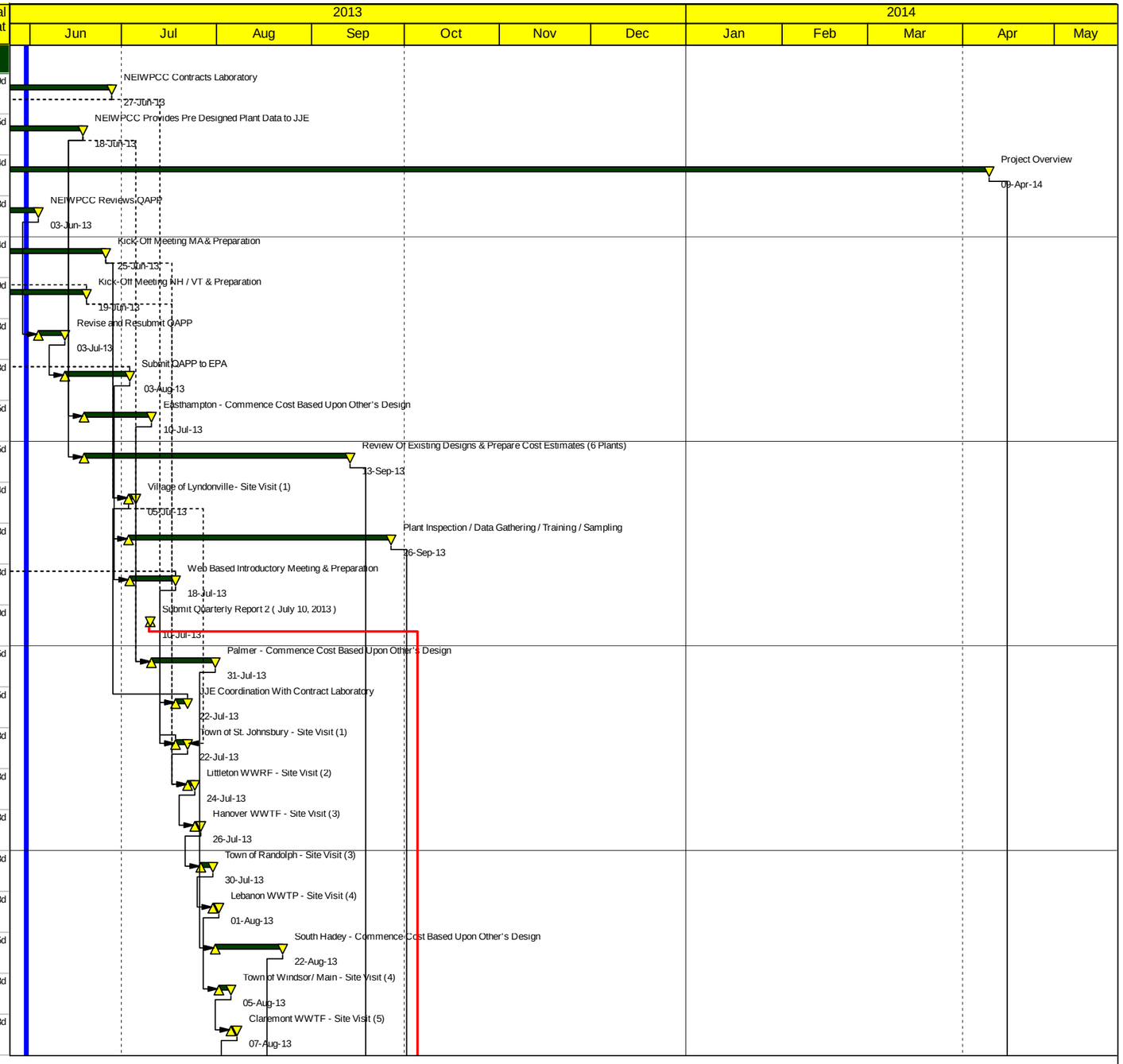
5.0 QAPP Conformance and Compliance

NEIWPCC may implement, at their discretion, various audits or reviews of this project to assess conformance and compliance to the quality assurance project plan in accordance with the NEIWPCC Quality Management Plan.

Appendix A
Preliminary Schedule

NEIWPCC - Nitrogen Removal Study

Activity ID	Activity Name	Original Duration	Activity % Complete	Early Start	Early Finish	Total Float
A1540	NEIWPCC Contracts Laboratory	40d	50%	31-May-13	27-Jun-13	209d
A1550	NEIWPCC Provides Pre Designed Plant Data to JJE	50d	75%	31-May-13	18-Jun-13	85d
A1530	Project Overview	304d	28.62%	31-May-13	09-Apr-14	14d
A1130	NEIWPCC Reviews QAPP	7d	75%	31-May-13	03-Jun-13	23d
A1050	Kick-Off Meeting MA& Preparation	3d	0%	31-May-13	25-Jun-13	34d
A1040	Kick-Off Meeting NH / VT & Preparation	15d	13%	31-May-13	19-Jun-13	39d
A1140	Revise and Resubmit QAPP	7d	0%	03-Jun-13	03-Jul-13	23d
A1150	Submit QAPP to EPA (completion of site visits listed below are contingent on QAPP approval from EPA and NEIWPCC)	15d	0%	03-Jul-13	03-Aug-13	23d
A1420	Easthampton - Commence Cost Based Upon Other's Design	15d	0%	18-Jun-13	10-Jul-13	85d
A1520	Review Of Existing Designs & Prepare Cost Estimates (6 Plants)	60d	0%	18-Jun-13	13-Sep-13	85d
A1160	Village of Lyndonville - Site Visit (1)	2d	0%	03-Jul-13	05-Jul-13	34d
A1060	Plant Inspection / Data Gathering / Training / Sampling	59d	0%	03-Jul-13	26-Sep-13	23d
A1020	Web Based Introductory Meeting & Preparation	10d	0%	03-Jul-13	18-Jul-13	23d
A1470	Submit Quarterly Report 2 (July 10, 2013)	0d	0%		10-Jul-13	0d
A1430	Palmer - Commence Cost Based Upon Other's Design	15d	0%	10-Jul-13	31-Jul-13	85d
A1030	JJE Coordination With Contract Laboratory	2d	0%	18-Jul-13	22-Jul-13	195d
A1070	Town of St. Johnsbury - Site Visit (1)	2d	0%	18-Jul-13	22-Jul-13	23d
A1180	Littleton WWRF - Site Visit (2)	2d	0%	22-Jul-13	24-Jul-13	23d
A1190	Hanover WWTF - Site Visit (3)	2d	0%	24-Jul-13	26-Jul-13	23d
A1200	Town of Randolph - Site Visit (3)	2d	0%	26-Jul-13	30-Jul-13	23d
A1210	Lebanon WWTP - Site Visit (4)	2d	0%	30-Jul-13	01-Aug-13	23d
A1440	South Hadey - Commence Cost Based Upon Other's Design	15d	0%	31-Jul-13	22-Aug-13	85d
A1220	Town of Windsor/ Main - Site Visit (4)	2d	0%	01-Aug-13	05-Aug-13	23d
A1230	Claremont WWTF - Site Visit (5)	2d	0%	05-Aug-13	07-Aug-13	23d



Actual & Forecast

CPM Schedule Update

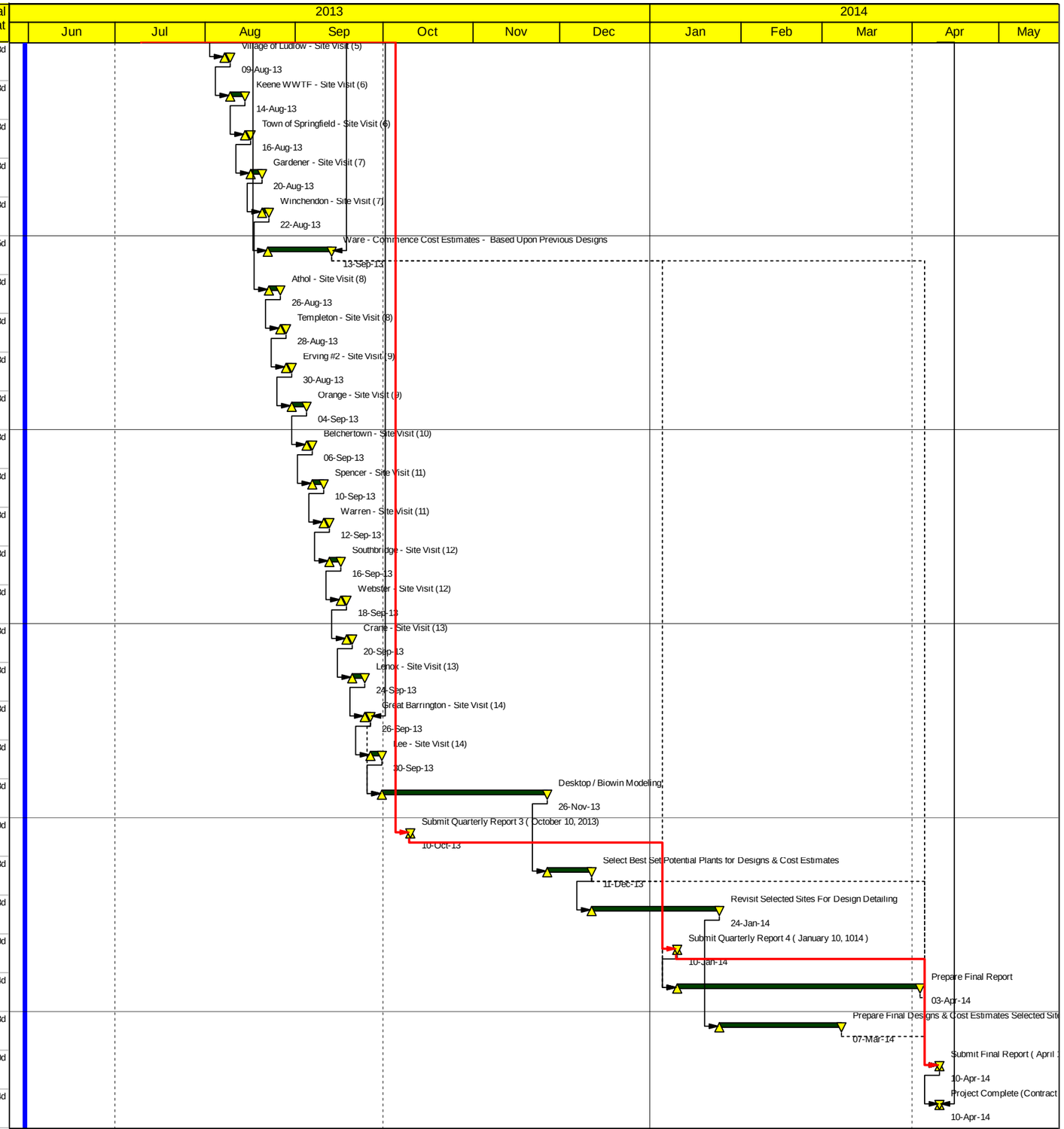
Date	Revision	Checked	Approved
31-May-13	May Update 2013	JRF	JB

NEIWPCC - Nitrogen Removal Study

JJ Environmental, LLC
17 Archer Lane
Darien, Ct 06820
(203) 309-8768

NEIWPCC
New England Interstate Water Pollution Control Commission

Activity ID	Activity Name	Original Duration	Activity % Complete	Early Start	Early Finish	Total Float
A1240	Village of Ludlow - Site Visit (5)	2d	0%	07-Aug-13	09-Aug-13	23d
A1250	Keene WWTF - Site Visit (6)	2d	0%	09-Aug-13	14-Aug-13	23d
A1260	Town of Springfield - Site Visit (6)	2d	0%	14-Aug-13	16-Aug-13	23d
A1270	Gardener - Site Visit (7)	2d	0%	16-Aug-13	20-Aug-13	23d
A1280	Winchendon - Site Visit (7)	2d	0%	20-Aug-13	22-Aug-13	23d
A1450	Ware - Commence Cost Estimates - Based Upon Previous Designs	15d	0%	22-Aug-13	13-Sep-13	85d
A1290	Athol - Site Visit (8)	2d	0%	22-Aug-13	26-Aug-13	23d
A1300	Templeton - Site Visit (8)	2d	0%	26-Aug-13	28-Aug-13	23d
A1310	Erving #2 - Site Visit (9)	2d	0%	28-Aug-13	30-Aug-13	23d
A1320	Orange - Site Visit (9)	2d	0%	30-Aug-13	04-Sep-13	23d
A1330	Belchertown - Site Visit (10)	2d	0%	04-Sep-13	06-Sep-13	23d
A1340	Spencer - Site Visit (11)	2d	0%	06-Sep-13	10-Sep-13	23d
A1350	Warren - Site Visit (11)	2d	0%	10-Sep-13	12-Sep-13	23d
A1360	Southbridge - Site Visit (12)	2d	0%	12-Sep-13	16-Sep-13	23d
A1370	Webster - Site Visit (12)	2d	0%	16-Sep-13	18-Sep-13	23d
A1380	Crane - Site Visit (13)	2d	0%	18-Sep-13	20-Sep-13	23d
A1390	Lenox - Site Visit (13)	2d	0%	20-Sep-13	24-Sep-13	23d
A1400	Great Barrington - Site Visit (14)	2d	0%	24-Sep-13	26-Sep-13	23d
A1410	Lee - Site Visit (14)	2d	0%	26-Sep-13	30-Sep-13	23d
A1080	Desktop / Biowin Modeling	40d	0%	30-Sep-13	26-Nov-13	23d
A1480	Submit Quarterly Report 3 (October 10, 2013)	0d	0%		10-Oct-13	0d
A1090	Select Best Set Potential Plants for Designs & Cost Estimates	10d	0%	26-Nov-13	11-Dec-13	23d
A1100	Revisit Selected Sites For Design Detailing	30d	0%	11-Dec-13	24-Jan-14	23d
A1490	Submit Quarterly Report 4 (January 10, 1014)	0d	0%		10-Jan-14	0d
A1110	Prepare Final Report	60d	0%	10-Jan-14	03-Apr-14	4d
A1170	Prepare Final Designs & Cost Estimates Selected Sites	30d	0%	24-Jan-14	07-Mar-14	23d
A1500	Submit Final Report (April 10, 2014)	0d	0%		10-Apr-14	0d
A1510	Project Complete (Contract April 30, 2014)	0d	0%		10-Apr-14	14d



Appendix B
Survey Form

Project Survey Form

Facility Name and Location

Facility Name	
Facility Owner	
City & State	
Contact Name	
Phone	
Email	

General Information

WWTP Design Capacity:		MGD
WWTP Current Average Flow:		MGD

Influent Information (Past 12 Month Average September 1, 2011 to August 31, 2012)

Enter Average Plant Influent Concentrations (leave empty if unknown)

COD		mg/L
TOC		mg/L
BOD		mg/L
SBOD		mg/L
TSS		mg/L
TKN		mg N/L
NH4-N		mg N/L
NO3-N		mg N/L
PO4-P		mg P/L
TP		mg P/L
Alkalinity		mg/L as $CaCO_3$

Which metals are routinely being measured? (Select all that apply)

- ☐ Calcium (Ca)
- ☐ Potassium (K)
- ☐ Magnesium (Mg)
- ☐ Iron (Fe)
- ☐ Aluminum (Al)

Secondary Treatment Process Information

Which of the following treatment processes are in your plant? (Select all that apply)

- ☐ Primary Clarifier
- ☐ Trickling Filter
- ☐ Oxidation Ditch
- ☐ Aeration Basin
- ☐ Sequencing Batch Reactor (SBR)
- ☐ Rotating Biological Contact (RBC)
- ☐ Membrane Bioreactor
- ☐ Secondary Clarifier
- ☐ Effluent Filtration
- ☐ Disinfection (Chlorine)
- ☐ Disinfection (Non-Chlorine)
- ☐ Dechlorination
- ☐ Other (please specify) _____

Total Aeration Tank Capacity: _____ gallons

Are there any empty/available tanks on site? If yes, please list tank dimensions:

_____

_____

_____

What type of aeration equipment is used at the plant?

- ☐ Centrifugal Blowers, Quantity & Size:

- ☐ Positive Displace. Blowers, Quant & Size:
- ☐ Membrane/Ceramic Fine Bubble Diffusers
- ☐ Course Bubble Diffusers
- ☐ Mechanical Aeration
- ☐ Other: ____

What is the sewage temperature range from January 1-March 31(Past 3-yr average)?

Minimum: ____ °C

Average: ____ °C

Maximum: ____ °C

What range of SRT is typically operated from January 1 – March 31 (past 3-yr average)?

- ☐ Don't know
- ☐ < 3 Days
- ☐ 3 – 5 Days
- ☐ 5 – 10 Days
- ☐ > 20 Days

Solids Handling Process Information

Select waste activated sludge thickening method

☐ Thickening Centrifuge ☐ Belt Thickener ☐ DAF ☐ Other

Characterize Biosolids Processing. (Select all that apply) Note: Check the "Recycle" column if the solids process returns recycle flow to the main liquid stream process (headworks, primary clarifiers, etc.).

	Primary Sludge	WAS	Recycle?
Anaerobic Digestion			
Aerobic Digestion			
Sludge Lagoon			
Sludge Incineration			
Lime Stabilization			

Additional comments: ____

Select biosolids dewatering method.

- ☐ Dewatering Centrifuge
- ☐ Belt Filter Press
- ☐ Recessed Chamber Filter Press
- ☐ Drying Bed
- ☐ Other

Return location for sludge thickening and dewatering recycle flows

- ☐ Primary Influent
- ☐ Primary Effluent
- ☐ Other (please specify) _____

Secondary and Plant Effluent (Past 12 Month Average September 1, 2011 to August 31, 2012)

Enter average secondary and/or final effluent concentrations. (Leave empty if unknown)

Secondary effluent COD		mg/L
Secondary Effluent TOC		mg/L
Secondary Effluent BOD		mg/L
Secondary Effluent TSS		mg/L
Secondary Effluent TKN		mg N/L
Secondary Effluent NH4-N		mg N/L
Secondary Effluent NO3-N		mg N/L
Secondary Effluent PO4-P		mg P/L
Secondary Effluent TP		mg P/L
Final Effluent COD		mg/L
Final Effluent TOC		mg/L
Final Effluent BOD		mg/L
Final Effluent TSS		mg/L
Final Effluent TKN		mg N/L
Final Effluent NH4-N		mg N/L
Final Effluent NO3-N		mg N/L
Final Effluent PO4-P		mg P/L
Final Effluent TP		mg P/L

Process Data Availability

Describe the available data. (Select all that apply)

	Paper Records	Electronic Records
Daily Values		
Monthly Average		
Special Study Data		

Project Participation Information

Could you provide a copy of these data to the NEIWPCC Team for statistical analysis?

☐ Yes ☐ No ☐ Not Sure

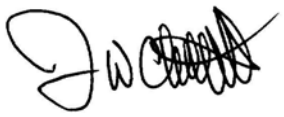
Thank you for completing this survey!

Appendix C
Chemserve QA/QC with Analytical Procedures and Disposal Protocol; NH, VT, MA BOD Certification Letters

QUALITY SYSTEMS MANUAL (QSM)
FOR

CHEMSERVE LABORATORY
317 ELM STREET
MILFORD, NEW HAMPSHIRE 03055
1-603-673-5440

Federal Tax ID#. 020397283



Laboratory Director **Date** **03/15/2013**

Quality Assurance Officer **Date** **3/15/2013**

This Quality Systems Manual is applicable to the Organics, Inorganics, Microbiology and Field Services Departments.

This document is a controlled document.
QSM001.4
Revised: 3/15/2013

TABLE OF CONTENTS

SECTION

1.0 Quality Policy Statement

ChemServe sets extremely high standards for quality analytical services. It is our philosophy that quality results are the most important service a laboratory can provide. We take great measures to assure our customers that we are providing the highest quality analysis available and are committed to compliance with ISO 17025 and regulations set forth by lab accreditation bodies.

To ensure proper QA/QC measures are followed, in the laboratory and in the field, ChemServe has developed a complete quality assurance program. This program incorporates strict procedures set forth by state and federal agencies, as well as further protocols required by industry and consulting firms. Because accurate results must not be compromised, we take the time to ensure the quality objectives for all data are met with every analysis.

Because the management and staff at ChemServe are committed to providing quality data for all clients, the analysts are aware that at no time should they be made to feel undue pressure or obligation to analyze or process more samples in a given work shift then they can accomplish providing acceptable data and quality control samples. At no time should analysts feel undue pressure from external sources, such as clients, to process samples faster or in a manner not compliant with current standard operating procedures.

In an effort to avoid external pressures and conflicts of interest communication between clients and analysts is kept to a minimum. All client inquiries are fielded through the front office and/or management. Analyst involvement is at the discretion of management. Any conflicts of interest, including those due to outside employment, should be brought to the attention of management as soon as the employee becomes aware of the situation. For more information please refer to sections 108 and 110 of the ChemServe Employee Manual.

We encourage our employees to actively participate in improving this program and to develop and advance our program with changing needs and regulations. ChemServe continually responds to client needs, from state, federal and local regulations.

1.1 Ethics Statement and Data Integrity

ChemServe has zero tolerance for unethical activities, scientific misconduct, and intentional lack of compliance with required procedures and policies.

Employees shall at all times conduct themselves and the business of ChemServe in an honest and ethical manner. Employees that are aware of unethical behavior or practices are encouraged to take action, either at the bench level (direct discussions with the employee) or by informing management. These issues can also be handled in a confidential manner if the employee prefers. The employee can either meet with a manager or send an anonymous note. The source of the information will be kept confidential.

Compliance with this policy shall be strictly enforced with individual disciplinary action, termination and civil and criminal punishment.

All reports of data integrity issues or unethical behavior will be thoroughly investigated by management and documentation will be maintained for 5 years.

1.2 Data Integrity and Ethics Training will be provided to all new employees. Retraining will also occur annually.

The remainder of this section will outline the ChemServe ethics and data integrity system.

DATA INTEGRITY AND ETHICS TRAINING

1) The Organization Mission and relationship to honesty and full disclosure in all analytical reporting

2) How to report data integrity and/or ethical issues

3) Data integrity procedures

4) Documentation

5) Penalties to include:
Immediate Termination
Debarment
Civil/criminal prosecution

Data Integrity and Ethics Training

Quality requirements for methods are included in SOP's and Quality Systems Manuals. These requirements allow the laboratory to produce acceptable data and behavior has been assumed to be ethical. Ethical conduct is usually assumed or not discussed until an issue develops.

Ethics is defined as a set of moral principles or a code of right and wrong. Ethical behavior is behavior that conforms to accepted professional standards of conduct.

Data integrity issues are a result of unethical behavior, either on the part of an individual or company culture.

Ethical behavior is an individual's decision to act properly. It is not and cannot be a group decision, as each individual must alone make the decision to act ethically or not.

Most unethical or fraudulent behavior is derived from the lack of knowledge or confidence in appropriate ways to handle problem situations.
Most individuals do not personally gain from unethical acts except to relieve some pressure they feel whether real or perceived.

A QA program includes proper procedures and acceptable technical standards. An ethics program identifies improper behavior and practices that are not acceptable and punishments. If a person is found to be behaving in an unethical manner disciplinary action, termination and civil or criminal action can be taken against them.

It is considered unethical to do or condone the following which result in data integrity issues:

1) Change an instrument's clock (in order to meet holding times)
2) Manipulate calibration data or QC data to make it acceptable (example: manually changing baselines or changing standard concentrations).
3) Mailing or faxing false data is wire fraud and mail fraud (federal crimes).
4) "Dry Labbing" –Making up data when no analysis was performed.
5) Misrepresenting QC data i.e.
   - Adding surrogates or spike after extraction rather than before extraction
   - Not processing QC data in the same way client samples are.

6) Peak shaving or enhancing; other than what is allowed in the method. See SOP on data calculation.
7) Manipulating Tune Data
8) Over diluting samples for the sole purpose of losing the spike or target analytes.
9) Manipulating computer software – removing codes and flags. i.e. “m” for manual integration.
10) Knowingly concealing a problem from management or client.
11) Recording false information in hand written logbooks. This can include analysis dates, times, results, dilutions etc.

1.2 Ethics Statement & Data Integrity

ChemServe has zero tolerance for unethical activities, scientific misconduct and intentional lack of compliance with required procedures and policies. ChemServe will act immediately and thoroughly to claims of unethical behavior by clients or fellow employees. Any investigations will be documented in personnel files.

ChemServe employees must be free to report data integrity or unethical behavior in a confidential environment.

Employees shall at all times conduct themselves and the business of ChemServe in an honest and ethical manner. Employees that are aware of unethical behavior or practices are encouraged to take action, either at the bench level (direct discussions with the employee) or by informing management.

All accusations of unethical behavior or data integrity issues will be thoroughly investigated and documented. Clients will be informed in a timely manner if data has been affected.

Compliance with this policy shall be strictly enforced with individual disciplinary action, termination and or civil or criminal punishment.

I have been trained on what behavior ChemServe deems unethical. I have read, acknowledge and understand my personal ethical and legal responsibilities. I am aware of the penalties of said behavior.

_____ _____

Printed Name Signature & Date

_____

Jay Chrystal, President/Lab Director

_____

Heather Marmorstein, QA Manager

_____

Paul Fyfe, Director of Operations

Guidelines for Ethical Laboratory Behavior and Data Integrity Issues

UNACCEPTABLE LABORATORY PRACTICE	LABORATORY POLICY
Making up data, (Dry Labbing) or other information. Creating data for an analysis that was not performed or creating information that is not true.	Analytical results for all samples and quality control must be based on actual analyses that were performed. Documented data must match actual data and events. Sampling information must be based on actual sampling events.
Misrepresentation of QC samples – misrepresenting QC samples or spikes as being digested when they were not digested or extracted. Ex.: a)adding surrogates to samples after extraction rather than prior to sample extraction b) Reporting post digested spiked or duplicates as pre-digested spikes or duplicates. c) Not preparing or analyzing method blanks and LCS the same way that samples are prepared or analyzed.	QC samples and spikes must be prepared and analyzed and reported according to appropriate procedures. a) Surrogates must be added prior to sample extraction. b) Post digestion spikes and duplicates must be reported as post digested. c) Method blanks and LCSs must be prepared and analyzed the same way that samples are prepared and analyzed. Any QC results outside of acceptance criteria must be reported as such.
Improper Clock Setting (Time Traveling) Resetting the internal clock on an instrument to make it appear that a sample(s) was analyzed within a specified holding time, changing the sampling time, or recording a false time of analysis.	The recorded date and time of collection, preparation or analysis must match the actual date and time that the action was performed. Documented dates and times must represent actual dates and times. Samples exceeding holding times must be reported as such.
Improper peak integration (peak shaving or enhancing) -Artificially subtracting or adding peak area to produce an erroneous area that forces data to meet specific QC criteria when in fact the criteria was not met.	Instrument peaks must be <u>consistently</u> integrated and reported to proper techniques generally baseline to baseline, valley to valley or a combination of the two. Peak area should not be subtracted or added to force the data to meet specific criteria. Preventive action must be taken on instrument data not meeting required criteria.
Improper GC/MS tuning - Artificially manipulating tune data to produce an ion abundance result that appears to meet specific QC criteria.	GC/MS tune data must be generated and reported according to proper techniques without manipulation to the peak or mass spectrum. Preventive/corrective action must be taken on an instrument not meeting required criteria.
Over dilution of samples; intentionally diluting a sample to such an extent that no analytes (target or non-target) are detected with no justification as to why the high dilution was made.	Dilutions must be made on a reasonable basis, such as high concentrations of target or non-target compounds, matrix interferences as evidences in sample chromatogram, oily samples and other components in the sample that could harm the instrument.

Improper Calibration/QC Analysis a) Performing multiple analyses on calibration or QC samples until data passes, rather than perform instrument maintenance after the second failed run. b) Using incorrect initial calibration data to make calibration verification data appear to be in control. c) Discarding points in the initial cal to force the calibration to meet acceptance criteria.	a) All calibration and QC data associated with sample analyses must be documented. Preventive/correction action must be taken and documented if calibration and or QC criteria are not met. b) Acceptance of calibration verification data must be based on the correct initial calibration. c) Calibration points can only be rejected if a known error was made. When multiple target analytes are included in each calibration standard it may become necessary to discard upper or lower points for individual target analytes if the linear range or capability of the detector has been exceeded. The reporting limit and linear range must reflect these changes.
Deletion of Non-compliant Data – Intentional deletion or non-recording of non-compliant data to conceal the fact that analyses of samples or QC was non-compliant.	All data associated with sample collection and analysis including and non-compliant data , or out of control events must be documented and retained. Preventive/corrective action must be taken and documented for any non-compliant data.
Unwarranted Manipulation of Computer Software. Unwarranted manipulation of computer software to force calibration or QC data to meet criteria, and removing computer operational codes, such as “M” flag.	Computer manipulation is allowed only for warranted reasons and any manipulation should be minimal and traceable. Removal of operational codes is not permitted.
Concealment of a Known Problem. Concealing a known analytical or sample problem from laboratory management and/or client. Concealing a known unethical behavior or action from laboratory management.	Any knowledge of analytical or sample problems must be communicated or documented to the laboratory management and the client. Any knowledge of unethical behavior or actions must be fully communicated to management.

All changes to data will be done by a single line drawn through. Do not obliterate original data. Date and initials will be included.

A brief explanation must also be included unless it is a simple transcription issue.

All data that is not electronically generated shall be recorded directly, promptly and in permanent ink.

Periodic monitoring of data integrity will be carried out during second analyst and/or management review of logbooks and raw data.

2.0 Organizational and Management Structure

2.1 Organizational Chart

See Attachment 1

2.2 Management Responsibilities

2.2.1 Responsibilities of Laboratory Management

a) The laboratory management ensures the supervision of all personnel employed by the laboratory. The ratio of supervisory to non-supervisory personnel shall be such as to ensure adequate supervision to ensure adherence to all lab procedures.

b) The laboratory management is responsible for ensuring the quality of data produced by the laboratory. This is done by ensuring employee compliance with all EPA approved methods, policies of accrediting bodies, company established SOP's & data integrity issues.

c) The quality of data produced by the lab is also a function of the analysts work load. Laboratory management must balance the work load such that the lab maintains profitability but the analyst is not overwhelmed with work on a daily basis, resulting in rushing and poor quality data.

d) Laboratory management will be responsible for training and keeping personnel up to date on laboratory procedures, operation of instrumentation and laboratory support equipment plus having sufficiently trained personnel for their assigned duties.

e) Data validation is performed by the laboratory management or their designees.

f) Investigate and resolve all complaints, both internal and external, concerning data integrity or unethical behavior.

g) Purchasing of all goods and services required for the laboratory will be done by the lab management. All sales calls (for equipment and goods) will be handled by the lab management. This practice will keep the analyst from being pressured or offered gifts for purchasing from any particular company.

2.2.2 Quality Assurance Officer (QAO)

a) The QAO is the person responsible for the laboratory's quality assurance program and its implementation. The quality assurance program must ensure compliance with state, federal, and local regulations and certifying agencies. The QAO is a full time, on site employee.

b) The QAO reviews laboratory data and conducts annual internal laboratory audits. The QAO ensures any corrective action arising from internal audits is implemented in a timely manner.

c) The QAO is free from internal and external influences when evaluating data and conducting audits and works independently from laboratory operations for which they have quality assurance oversight.

d) The QAO has training and/or experience in quality assurance/quality control procedures and is knowledgeable of the approved analytical methods and quality assurance program requirements.

e) The QAO has direct access to the laboratory management.

f) All reports are reviewed by the QAO for accuracy and completeness before release to the customer.

g) Investigates customer concerns regarding data, and implements corrective action if needed.

h) The QAO or designee updates the QA manual annually and has documentation on file demonstrating that employees have read and understood and agree to follow the most current version.

2.3 Job Description of Staff Positions

SAMPLE RECEIVING
Responsible for the receipt and storage of all incoming samples.
Responsible for following the Sample Receipt SOP.
Ensure Chain of Custody is filled out completely and relinquished by person delivering samples.
Responsible for notation of any deviations of the sample, including but not limited to holding time issues, temperature, preservation or container issues.

CUSTOMER SERVICE
Responsible for responding to customer requests and complaints in a timely manner.
Responsible for obtaining all pertinent information regarding sampling, analysis, permits etc. so work can proceed in a smooth fashion.
Track the due dates of reports to ensure proper turnaround time and inform clients when dates will be missed.

Notify customers of any deviations that occurred during sample receipt.
Responsible for notifying the lab of any changes.
Keeping all necessary parties informed of changes to scope of work.

LABORATORY ANALYSTS
Responsible for performing analysis according to EPA, State and NH-ELAP approved methods and company established SOP's.
Following all QA/QC procedures as outlined in the QA manual.
Documentation of all analysis, calibration and QC data in bench logs.
Troubleshoot out of compliance instruments and analysis. This includes documentation of all instrument maintenance and implementation of corrective action.

Have the responsibility to inform the lab manager and/or the QAO if they feel rushed or the work load is such that they cannot produce quality data.
Following all safety procedures as outlined in the ChemServe Chemical Hygiene Plan.
Perform all responsibilities in an ethical manner.

FIELD SERVICES
Work closely with the Customer Service Manager on a daily basis to ensure "on time quality" field services.
Collect samples according to EPA, state and local regulations and company SOP's.
Responsible for the maintenance and cleaning of all sampling equipment and vehicles.
Documentation of all field activities and any deviations.
Maintain samples according to regulations during transportation.
Completed and accurate COC preparation, where applicable

A more in-depth job description signed by the employee is kept on file at the lab.

2.4 Personnel Qualification Summary

Attachment #2

2.5 Identification of Approved Signatories

The following individuals are authorized to sign laboratory reports

Jay Chrystal – President is authorized for signing his name and for the QAO if unavailable.

Heather Marmorstein – QA Manager is authorized for signing her name and for Jay Chrystal if he is unavailable.

Paul Fyfe – Director of Operations is authorized for signing his name and for Heather Marmorstein and Jay Chrystal if they are unavailable.

2.6 Quote, Contracts and Bid Review

All requests for quotes, contracts and bids will be reviewed by the Customer Service Representative, Lab Director and if necessary the Director of Operations and QA Manager. This review will be done to see if the lab is certified to perform the requested analysis and/or to see if there is enough capacity in the lab to perform the work. Also if special or additional supplies are needed, they can be accounted for at this time.

A) All quotes, contract and bids will be reviewed for and signed off for

Accreditation
Capacity
Technical Issues
Changes in scope of work

B) All information and conversations concerning the work will be kept on file either electronically or manually. The electronic file is called “Quote Log” and states whether or not the quote has been reviewed for all required criteria. This is done by typing “done” in the appropriate field. Quotes can also be found in a “Quickbooks” pending sale file.

C) The same review process will also include any work subcontracted to another laboratory. Any work requiring NLLAP certification will only be subcontracted; if needed to another NLLAP certified laboratory.

3.0 Procedures for Record Management

The laboratory has implemented a record management system that allows the historical reconstruction of all laboratory activities. Raw data can be accessed by employees on the ChemServe database or in associated log books. Raw data for samples will be accompanied by a unique laboratory identification number. A record for each environmental analysis will be kept by the laboratory for not less than 10 years. In the event that records need to be disposed of after 10 years time, they will be completely destroyed by incineration. The following records will be maintained by the laboratory:

a) Personnel Records

b) Equipment and reference materials:

- **1)** The name of the item
- **2)** The manufacture's name, identification and serial number
- **3)** Date received and date placed in service
- **4)** Condition when placed in service (new, used, re-conditioned)
- **5)** Current location
- **6)** Location of manufacturer's instruction manual, when available
- **7)** Details of maintenance
- **8)** Calibrations with acceptance criteria.

c) For reagents and reference materials, the laboratory will retain the manufacturer's statement of purity and traceability (if applicable), the date of receipt, storage conditions, date opened (when applicable), and name of analyst.

d) Preparation of stock and working stock solutions. The laboratory will maintain a preparation log which will include traceability to purchased reagent or reference material, date of preparation, expiration date and name of analyst.

e) Sample collection and handling. The laboratory will maintain sufficient records to demonstrate samples were properly collected, handled and preserved. This information can be found on the Chain of Custody. This will include:

- **1)** Date, place, and time of sampling. The name of the person who collected the sample.
- **2)** Laboratory sample identification and field identification
- **3)** Signature of person responsible for receiving the samples.
- **4)** Date and time of sample receipt

5) Analysis or analytical method requested
6) Laboratory name or place of analysis
7) Sample collection forms
8) All information regarding sample integrity and sample acceptance as defined under sample collection, preservation, holding times and handling of this document.

f) Analytical procedures. This will include:

1) Sample identification with date and time of sample preparation and analysis. Initials or signature of the analyst involved in preparation of samples and the analyst involved in the analysis of the samples.

2) The analytical method used.

3) Results of the analysis and the raw data generated. This will include calibrations with acceptance criteria and identification of the instrument.

4) Results of quality control and acceptance criteria.

5) All calculations.

6) Validation of data and initial or signature of the data reviewer.

g) Internal audits and Quality Assurance Program reviews. All reviews, audits, audit findings and corrective action taken will be documented by the laboratory.

h) Proficiency testing. The laboratory will maintain all information resulting from the analysis of proficiency testing samples. This will include a copy of the proficiency testing study forms, and documentation of investigations and corrective actions for failed studies.

i) All electronic hardware and software to reconstruct the analytical data will be available at the laboratory.

j) Records of record storage and access of these records.

k) Copies of final reports and amendments.

l) Copies of historical QA documents

m) Correspondence relating to laboratory activities for a specific project.

All data not generated electronically, will be recorded in a legible manner using permanent ink.

All corrections to records will be made by crossing the error with a single line, the date of the correction will be noted and the individual making the correction will initial or sign the record. An explanation of the change will also be recorded unless the change is just a transcription error.

Records will be stored securely and safely to prevent loss or potential tampering.

Computer and electronic systems used by the laboratory for recording, processing, reporting, storage or retrieval of data will comply with sections 8.1 through 8.11 of EPA document 2185-Good Automated Laboratory Practices (1995). All records will be kept for a minimum of 10 years.

n) All electronic records are backed up on a “RAID” drive on the server as well as backed up nightly to an offsite location.

3.1 Document Control

a) Document control is an important process for the management of laboratory documents and to ensure the laboratory staff has knowledge of and access to the most current laboratory adopted procedures.

All documents will follow a uniformed document control procedure.

Each document will include a title, a revision number, creation date, page number and total number of pages. This will be in the header of each document.

Ex. Procedures for the Determination of XX
Rev. No.:GN001.01
Date: 12/09/99
Page 1 of 5

All QA documents will be approved and initialed by the QA manager and the Dept. manager.

Documents that will be controlled are as follows:

SOP’s
Help Notes
Policy Notes
QA Manual

Worksheets, forms and logbooks will be designed to include all information pertinent to the analysis or task performed. Each worksheet, form and logbook will include a unique identifier. Worksheets and forms will have a revision number and or date.

b) All individual controlled documents such as SOP's will be stamped accordingly with the word "CONTROLLED" with the effective date. Any out of use or out dated documents that are filed away will be marked as "OBSOLETE" with the date the document is no longer valid. Any bound document or manual that may have one or more controlled documents in it will be marked as "CONTROLLED" **for the entire document or manual.** Any controlled individual documents within any given larger document or manual will have a specific revision number and date.

c) In the event that an immediate change to a document is necessary hand amending the document is permitted. Information to be removed should be indicated with a single line through. Information to be added must be clearly written in ink. All amendments must be approved and initialed by the Lab Director or QAO and include the date the new information became effective. An official revision of the document should be produced as soon as feasible.

3.2 Record Retrieval

In the event the laboratory is sold or acquired producing new ownership, all records, files, computer tapes, computer backups, written material, and all other forms of customer records, will be transferred as part of the transaction.

Any archived data wishing to be removed from its permanent location should be signed out using the form located in the document storage area. This will include the date taken, by whom, and date returned.

In the event that the laboratory ceases to exist, prior to shutting down, all records, files, computer tapes, computer backups, written material and all other forms of customer records will be stored at a commercial storage facility for ten years. The agreement with the storage facility will have specific instructions on access restrictions and contacts. These contacts will be updated when necessary.

3.3 Proper Use of the A2LA Logo

The A2LA symbol is authorized for use on final reports, certificates, and the ChemServe website. The A2LA symbol must also be accompanied by the testing lab accreditation number. This symbol can only be used for samples that have been exclusively analyzed using A2LA protocol for the parameters the lab is accredited for. If accredited and non-accredited analyses are performed, the non-accredited results must be clearly stated as such.

In the event that the lab chooses to display the symbol on any other materials, use will be limited to what is acceptable according to P101 – Reference to A2LA Accredited Status – A2LA Advertising Policy.

4.0 Laboratory Equipment, Reagents, Supplies and Reference Materials

All equipment, reagents, supplies and reference materials necessary for analyses are kept on hand for the specific analysis for which ChemServe is accredited.

Management is responsible for ordering and purchasing supplies and materials.

Employees and analysts who use and come in contact with supplies and materials on a regular basis are responsible for informing management when more need to be ordered. This can be accomplished in two ways:

1) Add the item to the supply list
2) Fill out a purchase order and submit it to the Lab Director

When materials and supplies are received at the laboratory they will be documented in the chemical receipt log book and assigned a unique identifier as needed.

Storage of chemical will be in accordance with manufacturer recommendations. Flammable materials are to be stored in the designated area under the hoods. Explosives are stored in accordance with ATF requirements.

4.1 General

a) Laboratory Equipment

1) All equipment is properly maintained. Procedures for maintenance of equipment are documented in method SOP's and the manufactures operational manuals can be found with each instrument.

2) Any defective equipment or parts will be removed from service and labeled until repaired. Equipment or parts will not be put back into service until the laboratory demonstrates that it is functioning correctly. Any maintenance performed on instrumentation will be documented in maintenance logs.

3) Calibration records are maintained for all measuring equipment.

b) Laboratory Support Equipment

All laboratory support equipment will be calibrated or verified, or both, before being put into service, and on a continuing basis. The procedures for the calibration and verification of the laboratory support equipment are found in SOP's.

c) Reagents and Supplies

1) Glassware will be properly cleaned and maintained as specified in the SOP. Any cleaning or maintenance requirements specified in the approved test procedure will be followed. Special cleaning instructions will be stated in the SOP.

2) Reagents, solvents and acids used by the laboratory will be at a minimum; ACS grade. Some analysis may require the use of Trace metal, HPLC, Pesticide, or purge and trap grade. Specific purity for each test can be found in the method specific SOP.

3) The laboratory will not use prepared reagents, standards, or purchased chemicals beyond the assigned expiration date of the material.

4) All stock and standard solution containers will be labeled with content, preparation date, concentration and initials of the analyst preparing the solution.

5) Compressed gases will meet the requirements specified in the approved method.

6) For the preparation of reagents, standards and rinsing glassware, the laboratory uses a laboratory grade DI water system that meets or exceeds ASTM type II standards.

d) Reference materials

1) To ensure accurate and precise measurements, the laboratory uses reference materials that are traceable to NIST.

2) The laboratory will keep the calibration certificates of reference materials to demonstrate the traceability to NIST.

3) Reference materials (such as class S weights or equivalent, or thermometers) will go through periodic re-certifications that are traceable to NIST.

4) The original containers will be labeled with the date opened and the expiration date (when applicable).

4.2 Listing of Laboratory Equipment and Reference Materials

See Attachment #3

4.3 Description of Facilities and Services Used by the Laboratory

a) Description and floor plan of laboratory

Attachment #4

b) General

1) The laboratory will be kept clean. Although the nature of the samples that are analyzed can contribute to a less than perfect housekeeping environment, attention is given to good housekeeping at all times.

2) The laboratory has adequate lights and ventilation. Laboratory temperature and humidity will be maintained within adequate range for the analysis performed at the laboratory and for the proper operation of instrumentation. There are 4 exhaust hoods in the extraction laboratory. The inorganic/wet chemistry lab has 1 exhaust hood.

3) The laboratory has 5000 ft of work space which is considered sufficient for conducting all laboratory activities.

4) The laboratory has 6000 ft of storage space which is considered sufficient to contain and store all needed supplies, reagents, and equipment.

5) Each area of the laboratory has secondary waste containers that are checked on a weekly basis and emptied on an as needed basis. These secondary waste containers are emptied into larger drums in the waste storage area of the warehouse if necessary. All biological wastes are autoclaved for a minimum of 30 minutes at 245°F. This waste is then disposed of in the dumpster. Samples are treated with Clorox and disposed of down the drain.

6) The laboratory is designed and activities are conducted so sample contamination is avoided. Samples for volatile analysis are stored in a separate refrigerator to avoid contamination. The VOA analysis room is segregated from the semi-volatiles room and is off limits to anyone from the extraction lab.

7) Due to the size of the laboratory access to the analytical and sample storage areas are available to all laboratory personnel.

4.4 Approved Vendor List

The list of approved vendors along with the criteria used to approve them can be found within “vendor notes” section in Quickbooks.

5.0 Procedures for Dealing with Complaints

Calls from customers may be taken by all personnel in the front office. All information is recorded on a Quality Control Check Request Form or Change Order Form, based on the individual issue(s). These forms are forwarded to the QAO. The QAO investigates all client concerns. Based on what is found, a client call will be made to inform the client of the outcome. Resulting action from a customer complaint can vary from a reissued report, data reanalysis, client error, re-sampling or modification to laboratory procedures. A record of this information is kept on file by the QAO.

If the client is not satisfied with the response the laboratory director will be notified. All official complaints are also forwarded to the President and/or Director of Operations and an official complaint can also be made to the accrediting body should the customer choose to do so.

6.0 Procedures for Protecting Client Confidentiality and Proprietary Rights

6.1 Analytical reports will only be mailed to and discussed with the customer indicated on the report or customer authorized individuals. In the event that the data must be discussed with someone other than the customer written authorization from the customer must be received before any discussion takes place.

6.2 Customer information will be blacked out on any reports used as examples.

6.3 Raw data requested by the customer will only contain the data pertinent to their samples. In the case of logbook data, all identifying information from other clients will be blacked out.

6.4 Building security is maintained by having visitors received at the reception area and accompanied into the building. All entrances are locked during non-business hours.

6.5 All employees are required to sign a confidentiality agreement upon hiring.

7.0 Procedures for Personnel Training

a) Before conducting any analysis, each analyst will receive training by another analyst or supervisor who has completed training. An analyst in training will be supervised by an experienced individual. All data produced by the trainee will be reviewed and signed off by an experienced analyst. All required reading such as SOP's, Help Notes etc. will require a "Read and Sign" form. This form will be kept on file by the QAO as proof of training. All analysts will also be required to do a Precision and Accuracy study for each method as an Initial Demonstration of Proficiency and then annually thereafter. Quality control data can be used for continuing studies.

b) In addition to in-house training, some additional training may be provided to the analyst in the form of education courses and professional seminars.

c) Analyst training and performance will be considered complete after the analyst has produced a successful initial demonstration of method performance for the analysis for which they are responsible. All training will be documented and kept on file. At a minimum documentation will include the name of the analyst, the reference method/SOP, the dates of training, the person providing training, initial demonstration of method performance(if appropriate) and PT results (if appropriate).

d) Training goals for all employees are determined by, but not limited to the following;

1) Educational requirements and/or the ability to perform a particular method according to NELAC and any other accrediting bodies.

2) Having as many analysts cross trained on a regular basis to have the ability to meet holding times and client deadlines during normal operating hours in the absence of the regular analyst.

3) Interviewing an in-house candidate for a potential position opening up within the laboratory, assessing the employee's educational requirements and the potential ability to perform that particular job to expectations.

8.0 Sampling Procedures

To ensure the quality of environmental analysis, the laboratory will ensure each sample is properly collected, handled, and preserved. Procedures are in place for the collection of the samples, sample handling, preservation and holding time and for sample acceptance criteria.

8.1 Sampling Equipment, Containers, Preservation and Holding Times

a) Samples that are collected by the Field Sampling Personnel use the equipment found in Attachment #5.

b) A sample collection form and/or COC shall be completed for each sampling event. This form shall contain sampling location, date and time of collection, collector's name, method of preservation and any special remarks concerning the sample.

8.2 Sampling Collection Procedures

See Field Sampling SOP's

8.3 Sample Handling Procedures Including Sub-sampling and Sample Acceptance Criteria

a) Each sample is uniquely identified from collection through disposal.

1) A completed chain of custody (COC) accompanies samples. Each section of the COC must be checked for completeness. Any deviations with sample containers, preservation, holding times or sample integrity will be noted on the COC during sample receipt.

2) Each COC (job) is assigned a unique number, with each sample being assigned a unique number. This identification is used to track the sample from receipt, storage, analysis, reporting and disposal.

Example 08050357-001

The first two digits refer to the year of receipt, the second two digits refer to the month of receipt and the last four digits are in the order the jobs are logged into the LIMS system. The three digits after the hyphen indicate the individual sample numbers within the given project. These digits are assigned sequentially on the COC.

Labels for sample containers are printed using a laser jet printer. The labels are chemical and water resistant. If a sample container is coated with product such that a label will not stick to it, the sample will be put in a ziplock bag and the label will go on the bag. The client sample label contains the unique number which can be used to trace the sample in the event the other label becomes unreadable.

3) The client will be notified of any sample deviations. It will be the client's decision to continue analysis. This should be done in writing.

4) A Change Order or sample discrepancy form will be filled out and attached to the COC if the client requests any additional analysis or deletes any analysis.

b) Sample Acceptance Criteria - After sample collection and transportation to the facility, the laboratory will check the integrity of the sample by checking the following items:

1) Signs of leakage or breakage.

2) Completeness of sample collection forms including date and time sampled, collector's name, sample identification, special reporting requirements, special detection limits, requested analysis and appropriate signatures.

3) Sample identification label is legible and on a water resistant surface or other suitable surface with non-running ink.

4) Receipt of all samples listed on the COC.

5) Use of appropriate sample containers, adequate volume, and preservation.

6) Adherence to specified holding times.

7) Temperature of samples requiring thermal preservation will be checked and recorded.

8) Chemical preservation will be checked if appropriate. The pH of VOA samples will be checked at analysis. Results will be recorded on the COC or in the VOA logbook.

8.4 Storage of Samples in the Laboratory

a) The laboratory will store samples, sub-samples, extracts and digestates according to the specified conditions in the approved methodology. All samples, sub-samples, extracts and digestates will be protected from all potential sources of contamination.

Volatile samples will be stored separately from all other samples. Each method SOP indicates storage temperature and holding time.

In general all samples are stored at 4±2°C. Extracts are stored at -10°C. All digestates are stored at room temperature.The exception to this rule is any hazardous material that would not require refrigeration and should be isolated or any samples for the Consumer Product Safety Commission. CPSC samples will be stored and categorized in the warehouse until such time they can be disposed of or returned.

8.5 Sample Disposal

All samples are stored in the refrigerators for a minimum of 30 days after the report has been issued. Extracts are stored for 40 days or longer. Digestates are stored for a minimum of 30 days.

Samples that need to be held for longer than the standard amount of time shall be boxed and labeled with the appropriate sample numbers or “do not dispose until” with an appropriate date. Samples shall be kept refrigerated if possible.

8.6 Forwarding Samples to another Laboratory for Analysis

Samples will be sent to another laboratory for analysis according to the Sub-Contracting SOP.

When the laboratory forwards collected samples to another laboratory for analysis, a ChemServe COC will be used.

The Laboratory receiving the samples must be NELAC, or state specific certified for the analysis being requested, unless otherwise noted by the client. The final report must state what was subcontracted and to which lab.

9.0 Calibration Procedures of Analytical Instrumentation

For calibration of analytical instrumentation, the laboratory will use NIST traceable standards or an A2LA accredited vendor (when available).

Calibration procedures are established for all applicable tests. These procedures are detailed in the SOP for the analysis. The calibration requirements of the USEPA and or ISO 17025 approved procedures are followed by the laboratory.

If the continuing calibration verification is out of control high, but the sample result is below the detection limit or reporting limit; the result will be reported as an acceptable (BDL) value. This rule is applied to all instrumental analysis performed within the lab.

9.1 CALIBRATION AND MAINTENANCE OF SUPPORT EQUIPMENT

Calibration and Maintenance			
INSTRUMENT	ACTIVITY	FREQUENCY	DOCUMENTATION
Balance	1.Clean 2.Check Alignment 3.Service Contract 4. Calibrate	1.Before Use 2.Before Use 3.Annual 4.Before Use	 3.Post service date on balance 4.Worksheet/logbook
Class S Weights	1.Only use for intended purpose 2.Use plastic forceps to handle 3.Keep in case 4.Re-calibrate	 4.Every two years	 4.Keep certificate on file
Thermometers 1.Glass and electronic 2.Dial thermometer	Check at the temperature used, against a reference NIST thermometer	1.Annually for glass and electronic 2.Quarterly for dial thermometers	Calibration factor and date of calibration on thermometer and work sheet/logbook
pH electrometers	Calibration: 1. pH buffer aliquots are used only once 2. Buffers used for calibration will bracket the pH of the media, reagent or sample tested. 3.Service contract	Before use	Logbook 3.Post service date on instrument
pH probe	Maintenance: Use manufacturers specifications	As needed	Logbook

Calibration and Maintenance			
INSTRUMENT	ACTIVITY	FREQUENCY	DOCUMENTATION
Spectrophotometer	1. Keep cells clean 2. Service contract. Check wavelength settings with color standards.	2.Annual	2.Post service date on instrument
Automatic or digital type pipettes	Calibrate for accuracy and precision using reagent water and analytical balance	Quarterly	Logbook
Refrigerators, freezers, incubators, micro-water baths	1. Thermometers are immersed in liquid. 2. The thermometers are graduated in increments of 0.1C.	Temperatures are recorded twice each day	Worksheet
Autoclave	1.Use a maximum temperature registering thermometer 2.Use spore strips or ampules* 3. In house maintenance of autoclave or service contract.	1. Each cycle 2. Sterilization cycles according to specific state requirements. 3.Once per year	Logbook Logbook 3. Post service date on autoclave
DO electrometer	Calibrate as specified in SOP	Before use	Worksheet/logbook
DO probe	Maintenance as specified by manufacturer	As needed	Worksheet/logbook

* Ampules are any brand containing Geobacillus stearothermophilus

10.0 Analytical Methods

Drinking water samples analyzed under the safe drinking water act will be analyzed in accordance with USEPA approved methods.

Wastewater samples analyzed under the clean water act will be analyzed in accordance with USEPA approved methods.

10.1 List of Analytical Tests, Parameters, Method References and Reporting Limits

See attachment # 6

10.2 Written Procedures for Conducting Analytical Testing

A written procedure for conducting each of the analytical tests performed at the laboratory is available. All test specific criteria and measurement uncertainty can be found in each individual standard operating procedure for a specific analysis.

See attachment #7 for the master document list

10.3 Written Procedure for Conducting Method Validation and/or Initial Demonstration of Performance

a) Prior to the implementation of a method, the laboratory will prepare an initial demonstration of method performance in accordance with method specification. When the USEPA approved method does not specify initial demonstration of performance, the laboratory will use the following guidelines:

1) Determination of method detection limits
2) Precision
3) Bias
4) LOD and LOQ as required by NELAC

b) Initial demonstration of method performance will be repeated each time significant changes are made to instrumentation, personnel, or the method. Initial demonstration of performance will be documented. The documentation will include the following initial demonstration of capability form.

See attachment #9

c) Initial demonstration of capability for chemical analyses is achieved by successfully analyzing four LCS samples or four known standards, whichever is appropriate for the analysis. Initial demonstration of capability for microbiology is achieved by successfully analyzing a Proficiency Evaluation sample or known Quality Control sample.

10.4 Exceptionally Permitting Departures from Documented Procedures or Standard Specifications

a) The laboratory's goal is to produce the highest quality data possible following NELAC guidance, state and method requirements. On occasion there are problems with sample integrity, method QC, etc. Each situation is unique and will be handled on a case by case basis. The QA Manager and or the Laboratory Manager will be notified of the situation and the course of action will be developed. All information will be documented on the appropriate paperwork, i.e. chain of custody, log books, quality control check request form etc. Many SOP's have method specific situations were deviations may occur, for example if a CCV is out of control on the high side and data that has been analyzed is clean, the results can be reported.

Every effort should and will be made to re-sample, re-analyze etc., to produce acceptable data. But in the event none of these are possible the client will be made aware of the problem. All data reported with quality, integrity etc. issues will be flagged as such. This can include notations on the COC of incorrect sample containers or preservation etc.

Any situation that does occur is also an opportunity to review the way samples are handled from receipt through reporting to see if better processes can be implemented.

11.0 Internal Quality Control Procedures

11.1 Internal Quality Control Procedures and Frequency of Use

The laboratory will demonstrate the quality of analytical results through the implementation of an internal quality control plan.

a) Chemical Testing

1) Method blanks- Method blanks will be performed each day to demonstrate that the analytical system, and/or reagents are not contaminated. When the result of a method blank exceeds a concentration greater than 1/10 of the measured concentration of any sample in the associated batch and 1/10 of the regulatory limit, the laboratory will minimize or eliminate the contamination problem (when possible) and determine the effect of a contaminated method blank on the samples tested. Any samples affected by a contaminated method blank will be re-analyzed (when possible) or sample results will be qualified. Blank subtraction is not allowed.

2) Matrix spikes – will be used to determine analytical accuracy and potential matrix interference. Percent recovery will be calculated by the laboratory. Most analysis the lab performs have method specific limits of criteria that must be met. These criteria can be found in each method specific SOP. In the event method specific limits do not exist for tests the lab performs the acceptance limits will be calculated annually. Sample results will be qualified when matrix spike recovery is outside the acceptance limits.

   Matrix spike and matrix spike duplicates will be selected at random from the batch of client samples to be prepared or analyzed that day. This procedure will be followed unless the client specifies on the COC one of their samples are to be analyzed as the MS/MSD.

   a) The following calculation will be used to determine Percent Recovery:

      %R = [(SSR-SR)/SA] * 100

      SSR = Spiked Sample Result
      SR = Sample Result
      SA = Spike Added

The laboratory will spike all target analytes during the course of a year at a minimum.

b) Most analysis the lab performs have method specific limits of criteria that must be met. These criteria can be found in each method specific SOP. In the event limits do not exist for tests the lab performs the acceptance limits will be calculated annually using the following calculation:

Upper Control Limits = p + 3s
Lower Control Limits = p – 3s

Where p = the average percent recovery of at least 15 results
s = the standard deviation of the percent recoveries.

3) Laboratory control samples – Laboratory control samples will be used to determine the accuracy of the analysis. Most analysis the lab performs have method specific limits of criteria that must be met. These criteria can be found in each method specific SOP. In the event method specific limits do not exist for tests the lab performs the acceptance limits will be calculated annually. The following calculation will be used to determine percent recovery.

%R = (Conc. found ÷True Conc.) * 100

Acceptance limits will be calculated using the same calculation as for the matrix spike limits.

4) Matrix spike duplicate or laboratory duplicates – Matrix spike duplicates or laboratory duplicates will be used to determine analytical precision. Relative percent difference or percent difference will be calculated by the laboratory. Most analyses the lab performs have method specific %RSD criteria that must be met. These criteria can be found in each method specific SOP. In the event method-specific limits do not exist for tests the lab performs the acceptance limits will be calculated annually. Sample results will be qualified when %RPD are outside the laboratory's acceptance limits. The following calculation will be used to determine %RPD:

%D = [|S-D| ÷ (S+D) ÷] *100

S = Original Sample Result

D = Duplicate sample result

%RPD = [|MS – MSD| ÷ (MS + MSD) ÷ 2] * 100

MS = % Rec. of Matrix Spike Sample
MSD = % Rec. of Matrix Spike Duplicate Sample

5) Surrogates – For the analysis of organic compounds, surrogate compounds shall be spiked into each sample, standard, QC sample, and blank. Most analysis the lab performs have method specific limits of criteria that must be met. These criteria can be found in each method specific SOP. In the event limits do not exist for tests the lab performs the acceptance limits will be calculated annually.

6) Method blanks, matrix spikes, matrix spike duplicates, laboratory control samples and laboratory duplicates will be performed at a frequency of one per batch or as stated in the method.

7) Method detection limits (MDL) will be calculated for a new analysis method, change in equipment, or major change to a procedure according to 40CFR Part 136, Appendix B (Oct. 26, 1984) or according to method specifications. The laboratory will document the matrix used for the MDL studies. MDL's are not required for analysis used to determine physical properties such as residues, Dissolved oxygen and pH.

MDL's are calculated (method specific) by analyzing 7 replicates that are 2-5 times the lowest calibration standard or reporting limit. The MDL is calculated by multiplying the Standard Deviation for the multiple measurements by the student's T value (3.14 for seven measurements). MDL studies for any Ion Chromatographic analysis should be performed semi-annually.

The laboratory reporting limit must be higher than the calculated MDL. Ideally it should be 3-5 times higher than the calculated MDL. At no time can the reporting limit (LOQ) be less than the MDL.

The laboratory will retain MDL studies on file to prove that the stated MDL's can be achieved as well as show that it can accurately quantitate below a specific action limit.

8) Selectivity – For the analysis of organic compounds, the laboratory will develop and document acceptance criteria for retention time windows as determined by the approved method. When mass spectrometers are used for the analysis of samples, the laboratory will develop and document acceptance criteria for mass tuning. Confirmation is required for all positive results on samples from locations where previous data is not available. Confirmation is not required when mass spectrometers are used for the analysis.

9) Limit of Quantitation (LOQ) equals the lowest calibration point. At least annually, analyze a LOQ check sample. The concentration of this is 1-2x the lowest calibration point. This must go through the entire sample prep procedure. The acceptable recovery ranges are method specific and can be found on file with the MDL studies. When enough points (20) have been generated calculate laboratory limits.

Limit of Detection (LOD) – Any analyte that is reported below the calibration range must have the LOD determined annually. The LOD is 1-4x the concentration requested. This must go through the entire sample prep procedure. This is a qualitative measurement (must be distinguishable from background noise).

Any data reported at the LOD must be flagged. Ex. Analyte reported below an LOQ or reporting limit.

10) Specific acceptance limits and QC criteria can be found in each method specific SOP which will also include actions that should be taken in the event the QC is not within expected limits.

b) Microbiological Testing

1) Uninoculated controls, laboratory water, and sterilized equipment and supplies will be tested as provided for in the approved method.

2) Confirmation/verification tests – The laboratory will perform confirmation and verification tests as specified by the approved methods.

3) Media – All test media (lab prepared and commercially prepared) will be checked with a positive-reacting and a negative-reacting pure culture to ensure the target organisms respond in an acceptable and predictable manner. These controls will be run with

each new lot of media. Laboratories will use reference cultures of micro-organisms obtained from a reputable certified vendor.

4) Precision – Monthly, a positive control sample is duplicated to determine precision. Comparison analysis between multiple analysts will be conducted on at least one sample per month.

11.2 Procedures to Determine Acceptance Criteria

a) Precision is used as a data quality indicator to determine the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

b) ChemServe will determine precision through the use of duplicates and/or matrix spike duplicates. Percent difference (%D) between duplicates and Relative Percent Differences (RPD) between matrix spike duplicates will be calculated.

c) Most analysis the lab performs have method specific limits of criteria that must be met. These criteria can be found in each method specific SOP. In the event method specific limits do not exist for tests the lab performs the acceptance limits will be calculated annually for duplicate analysis and will be established at a warning limit of two standard deviations, and a control limit of three standard deviations of the %D or RPD. Acceptance criteria will be monitored daily by observing the results of the daily QC samples.

d) Accuracy is used as a data quality indicator to determine the degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations.

e) ChemServe will determine accuracy through the use of standards of known concentrations. Percent recoveries (%Rec) will be calculated. Most analysis the lab performs have method specific limits of criteria that must be met. These criteria can be found in each method specific SOP. In the event method specific limits do not exist for tests the lab performs the acceptance limits will be calculated annually. Acceptance criteria for LCS, MS and surrogates will be established using warning limits set at two standard deviations and control limits set at three standard deviations of the %Rec. Acceptance criteria will be monitored daily by observing the results of the daily QC samples.

f) Acceptance Limits will be established using the following calculations:

Calculate the average % Recovery of at least 15-20 data points.

$$\text{Mean} = \frac{\bar{x}}{n}$$

Calculate the Standard Deviation:

$$\sqrt{\frac{\sum_{i=1}^{n}(x - mean)^2}{n-1}}$$

x = each data point
mean = average of all data points
n = number of data points

Calculate the Upper control Limit (UCL) and the Lower Control Limit as ±3 SD

UCL = Mean + 3SD
LCL = Mean – 3SD

Calculate the Upper Warning Limits (UWL) and the Lower Warning Limits (LWL) as ±2 SD.

UWL = mean + 2SD
LWL = mean – 2SD

11.3 Acceptance Criteria Reviews

Acceptance criteria will be reviewed (and updated if necessary) annually where required. Batch QC data will be reviewed daily to verify that it meets the acceptance limits set by the laboratory. Analytical data will be reanalyzed or flagged as necessary based on this review.

11.4 Measurement Uncertainty

The lab shall have the ability to report the measurement of uncertainty if requested by the customer. This can be measured by means such as

control charting of laboratory control spikes and/or matrix spikes, or other acceptable procedure(s).

12.0 Data Reduction and Reporting

12.1 Procedures for Data Reduction

Any calculations that are required to convert raw data to reportable data can be found in the SOPs.

12.2 Reporting Procedures and Format

a) All data is reported with all the following sample information:

1) Report Title, name of the laboratory, and accreditation number
2) Location of sample test
3) Contact person and phone number at the laboratory
4) Unique identification number of the report
5) The laboratory shall provide the total number of pages on the report
6) Identification of the client or project name, or both (when applicable)
7) Identification of the sample with field sample number (when available)
8) Description of the sample matrix (water, solid, product)
9) Date the sample was received
10) Date and Time of collection is noted on the COC. The date of collection is noted on reports.
11) Date(s) and time(if required) of analysis
12) Identification of the method used, or method number
13) Reference to sampling procedure when relevant
14) Data qualifiers to describe analytical conditions
15) Analytical data is reported in units consistent with monitoring program requirement

16) Signature and title of the person accepting responsibility for the content of the report

17) Date issued

18) Any reports issued by the laboratory with amendments to a previous report, shall be clearly identified as an amended report.

19) When reporting to the State of NH DES reporting form, the above requirements are not all applicable. The state form must be filled out as required. The laboratory may report and sign forms for only data generated by the laboratory.

b) If the laboratory subcontracts part or all of the sample to another laboratory:

1) The test report must indicate any subcontracted data if the data is submitted on the laboratory's reporting form.

2) Only the laboratory actually doing the analysis will sign state form, copies of the state form will be provided to each subcontract laboratory, as needed.

12.3 Procedures to Ensure Data is Free from Errors. Data Validation

a) All data is first reviewed by the analyst performing the analysis. The data review will include the following items.

1) Calibration of the instrumentation

2) Quality control data. Confirm QC data meets the acceptance limits.

3) Calculation, check for calculation errors.

4) Documentation, Check worksheets/logbooks and printouts for completeness including sample number, dilution factors and comments.

5) The data is then entered into the LIMS system by the analyst. The LIMS system is updated from entered to edit, to reflect the changed status of the sample.

b) The dept. manager or qualified analyst does a second review of the data. This includes the following items

1) The LIMS results are verified to the raw data.

2) All header information is verified, this includes sampling date, date of analysis, sample ID, dilution factors, etc.

3) Surrogates results and Batch QC are verified for control.

4) Data is updated to approved in LIMS

5) Results are forwarded to QA for final compilation and approval.

c) Final QA Review

1) QA reviews all data turned in from the various departments for completeness and accuracy.

2) All data is compiled and compared to the original COC for completeness

3) The entire report is approved in LIMS and the final report is printed.

4) Results are reviewed to raw data for accuracy.

5) All header information is reviewed for accuracy.

6) QA signs the final report

d) The lab director or designee does a final review and signs the final report.

12.4 Procedures for Data Qualifiers

Data qualifiers will be added to all data not meeting collection, analytical or internal QC acceptance criteria. Data qualifiers can be added to the system at the time of login, by the analyst, data reviewer or by QC. These qualifiers can be found on the final report page and/or in the final report sample comment summary.

13.0 Proficiency Testing

13.1 The Type and Frequency of Proficiency Testing

a) ChemServe will obtain Performance Evaluation samples from only NELAC approved providers.

b) Performance Evaluation samples for Drinking water for microbiology and chemistry will be analyzed in March and September of each year.

c) Performance Evaluation samples for Wastewater will be analyzed in June and December of each year.

d) PT studies will be analyzed in the same manner and at the same frequency as regular samples.

e) The same calibration procedures and the same internal QC protocol will be used when analyzing PT studies.

13.2 Procedures for the Determination of a Failed Study and Corrective Action

a) If the laboratory fails a PT study, an investigation of the cause will be conducted. Corrective action will be documented on the Quality Control Check form.

b) Documentation of the PT analysis will be reviewed and the way the analysis was conducted will be investigated. When problems are identified, a corrective action plan will be outlined and put in place in a timely manner.

c) A corrective action letter will be prepared and sent to NH ELAP within 30 days of receiving the unacceptable result.

d) The failed PT analyte will be repeated after corrective action has been completed. Results will be sent to NH-ELAP directly from the PT provider.

13.3 A2LA certification requires specific proficiency testing different than that of some other accrediting bodies. Listed below is a four year rotating testing plan. This plan will go for the four years and then start from the beginning (year 1) again. The specific years of analysis and data can be found on file at the laboratory.

Year	Proficiency Test
Year 1	Metals in Paint Matrix *and* GCMS compounds in Non-Metal Matrix
Year 2	Metals in Non-Metal Matrix *and* Elements by XRF
Year 3	Metals in Metal Matrix *and* ASTM F963 by ICP
Year 4	Elements by XRF *and* ASTM Glazed Ceramic Leachability

a) For reporting proficiency testing specifically for A2LA, The lab must complete a Proficiency Testing Data Submission Form (F104) along with the data and any corrective actions required. Also note the program name, report date and if there were any outliers.

b) Should commercially available testing not be available at the required time, the lab will use their organized inter-laboratory studies for precision and accuracy such as matrix spike samples and duplicates.

c) National Lead Laboratory Accreditation Program (NLLAP) requirements for participation in the Environmental Lead Proficiency Analytical Testing Program (ELPAT) will be met quarterly.

14.0 Preventative and Corrective Action

a) All ChemServe employees are encouraged to take actions which prevent the occurrence of non-conforming work. When an employee is aware that an area of work needs improvement or closer attention in order to prevent non-conforming work they will fill out a Quality Control Check form citing the nature of the problem, associated data, root cause, and action to be taken to resolve the problem. The effectiveness of the action will be verified by the Lab Director or QAO.

b) The laboratory will take corrective action whenever unacceptable conditions exist. The laboratory will start an investigation by determining the root cause of the problem and progress through the investigation as it deems appropriate to the given issue. The following indicators will be used to determine unacceptable conditions:

1) QC samples outside the established acceptance criteria.

2) Calibration outside acceptable criteria.
No analysis will occur if the calibration does not fall within acceptable limits. In most cases, instrument maintenance may be required. New calibration standards will be prepared or purchased as necessary. A valid calibration curve will be completed and verified before analysis can occur.

3) Equipment failure
Instrument maintenance will be completed as required. Outside service calls will be completed as needed. Instruments must be re-calibrated after equipment failure and/or repairs.

4) PT studies outside acceptable limits
See section 13.2

5) Deficiencies identified during internal reviews
Deficiencies found during internal reviews will be addressed as needed. This could include SOP revisions, analyst retraining, Logbook revisions, etc. All corrective actions will be put in writing and be included with the internal review report.

6) Deficiencies identified during on-site assessments.

7) Deficiencies or problems identified after receiving a complaint.

All client complaints will be documented on the Quality Control Check Request form. This form is forwarded to the QAO. The QAO will investigate the complaint, reviewing data, logbooks, calibrations, etc.

Re-analysis or re-sampling may be required. The client will be informed of the results either verbally or in writing. Reports will be reissued as necessary. If laboratory procedures require changes, they will be put in writing and require sign off by the laboratory manager and analysts. The Quality Control Check Request form and all associated documentation will be kept on file.

c) All corrective action taken by the laboratory will be documented.

d) If the laboratory determines the validity of the data is compromised, the laboratory will take corrective action and make written notification to any affected clients. This notification will take place within a week of the laboratory's findings.

14.1 In the event of non-conforming work or data not meeting the quality objectives specified in the SOP the following steps should be taken:

1) Analyst must note the non-conformance on worksheets or data packages as appropriate.

2) The Lab Director or QAO must review the data and determine the best course of corrective actions based on the significance of the non-conformity.

3) Where applicable, the corrective actions described in the following chart may be used. In other instances the Lab Director or QAO may devise a more appropriate course of action.

4) Clients are notified of non-conforming work through qualifiers or comments on reports. Revised reports would be distributed to clients in the event that non-conforming work affected data which had already been released.

SPECIFIC CORRECTIVE ACTION		
TYPE	**RECOMMENDED ACTION**	**DOCUMENTATION**
Contaminated Method Blank	1. Determine source of contamination. 2. Eliminate source of contamination	Logbook

	3. Re-analyze blank	
LCS outside acceptance limits	1. Check preparation log for errors 2. Check analysis for errors. 3. Check calculations 4. Remake standard or use a different standard. 5. Re-analyze standard and all affected samples.	Logbook Flag data if necessary
Analyst not following SOP	1. Provide additional training with train and sign form 2. Do demonstration of analysis 3. Analyze a PT sample.	Training File, Logbook Personnel file if necessary
Positive/Negative controls	4. Check expiration date of the media 5. Check media preparation 6. Confirm incubator temps. 7. Prepare new media from same lot, if still not acceptable, prepare media from different lot. 8. Examine analytical technique.	Logbook Quality control of supplies file.

15.0 Internal Audits

15.1.a Internal Audits of the Quality System

The laboratory will conduct internal audits to verify that its operation continues to comply with the requirements of the Quality System as well as the SOP's. This will include annual review of the Quality System Manual to ensure its continued compliance with all the accrediting bodies' such as NELAC and ISO 17025 requirements, performance audits (to include log-in and sampling dept), method audits, data audits and SOP updates. The annual certification renewal will be the starting point for the annual reviews. Such audits will be conducted by the QAO or the QAO's qualified designee on an annual basis. Where the audit identifies problems with correctness or validity of the laboratory's calibration or test results, the laboratory will implement a corrective action plan to solve the problems.

15.1.b ChemServe's Quality System will be reviewed by the QAO on an annual basis using the NELAP Chapter 5 checklist and/or the A2LA C101 checklist. All findings will be documented and any issues requiring corrective action will be addressed. All changes made to the Quality System Manual will be reviewed by the Director of Operations and the Laboratory Director. Documentation of any changes will be kept on file. All attachments such as equipment lists, SOP lists, etc., that are subject to change during the year will be updated as needed in the computer. The printed version will be replaced annually.

15.1.c The internal audit will be initiated and performed using the "Internal Audit Checklist". This checklist will be used to address items such as SOP,s equipment, reference materials, traceability, technical requirements, QSM items, and environment. If corrective or preventative actions are found, this information will then initiate a "Quality Control Check Form" which will address the issue using; documentation review, root cause, action, taken, follow-up results, and closure. These internal audits will be kept on file.

15.2 Performance Audits

On an on going basis, ChemServe will ensure the quality of the data by implementing the following checks:

a) Participation in proficiency testing or other inter-laboratory comparisons
b) Use of certified reference materials and/or in-house quality control using secondary reference materials.

c) Replicate testing using the same or different test methods.
d) Re-testing of retained samples
e) Correlation of results for different parameters of a sample (for example Chrome-6 should be less than or equal to total chrome)

15.3 Documentation of Audits or Reviews

All audit and review findings and any corrective actions that arise from them will be documented.

The laboratory management will ensure that these corrective actions are implemented within the agreed time frame.

Where the audit or review identifies problems with correctness or validity of the data, the laboratory will immediately notify, in writing, the client whose work may have been affected.

15.4 Management Reviews

Management Reviews will be conducted by the President and the Director of Operations at a minimum of once a year. These periods of time are used for discussion on policies, procedures, internal audits, corrective action, preventative action, external audits, PE testing, changes in scope or volume of work, customer feedback, QA issues, training, and any other pertinent information to the operation of the facility. Any action items decided upon during this meeting will be documented.

16.0 Document Revision History

9/15/2010

- A document number was added to the cover of the manual.
- Section 16.0 was added to track the revision history of the document.
- Sections no longer have independent page numbering. The manual will be page numbered from beginning to end.
- The manual is no longer revised on a section by section basis. It will be revised as an entire document.

2/3/2011

- Section 9.0 edited for spelling errors.
- Section 11.0 – LOQ acceptance criteria updated to be method specific.

1/27/2012

- The following sections have been updated:
  1.0, 3.0, 3.1.c, 3.3, 4.0, 4.4, 10.3.c, 13.3, 14.1.1-4, 15.1.b, and 15.4

01/31/2013

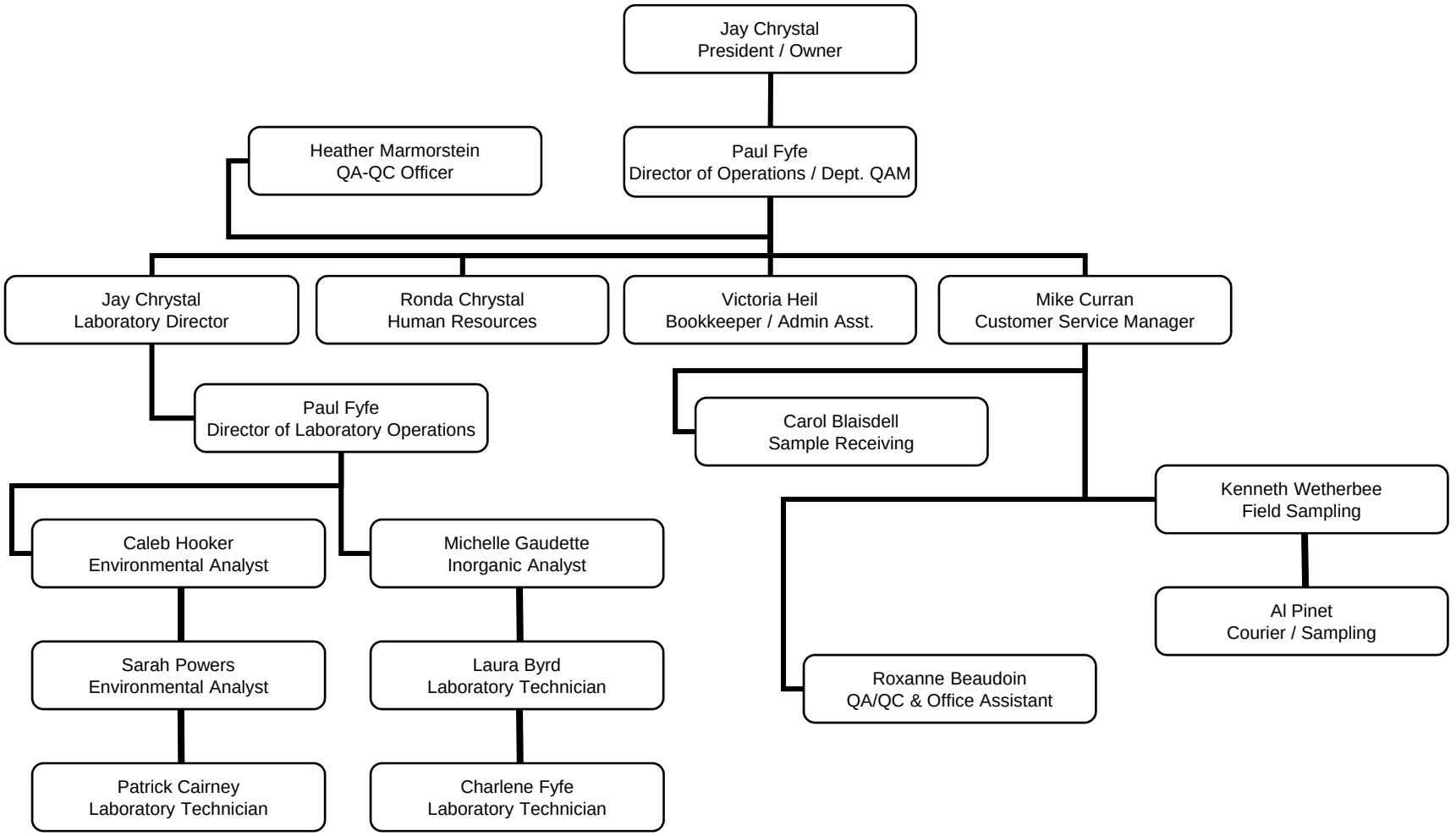
- The following sections have been updated:
  2.5, 4.1.c.3, 11.7, 11.b.3, 11.b.5(eliminated), Attachment #1, Attachment #2, Attachment #3, Attachment #7, Attachment #9 , Attachment #5-container prep updated O-phos.

03/15/13

- The following sections have been updated:
  2.0 (sub-work procedure), 3.0 (Off site back-up, archived data access log), 4.0 (reagent grades, expiration dates, instrument manuals),5.0 (complaints to accrediting body), 11.0 (uncertainty, QC non-conformances, acceptance criteria), 15.0 (internal audit procedure), 16.0 (revision page).

ATTACHMENT #1

ChemServe Organizational Chart January 2013



ATTACHMENT #2

KEY PERSONNEL QUALIFICATIONS

Updated January 2013

Name	Position	Degree	Years Experience
Jay Chrystal	Lab Director / Owner	BS Biology / Chemistry	30
Paul Fyfe	Director of Operations	AS Chemistry Vocational degree	26
Heather Marmorstein	Quality Assurance Officer	AS Liberal Arts	6

ATTACHMENT #3

Equipment	Make & Model	Location
Autoclave	Market Forge 010084	Prep Lab
Balance	Acculab La-110 (Analytical)	Wet Chem Lab
Balance	Mettler P2000 Top Loading	Warehouse
Balance	Sartorius Top Loader	Prep Lab
Block Digestor 54 place	Environmental Express	Metals Prep
BOD Meter	Ysi Model 50 B	Org. Lab
BOD Stirring Probes	BOD Stirring Probes	Org. Lab
Buchi K-355	Distillation Apparatus	Prep Lab
Buchi K-355	Distillation Apparatus	Prep Lab
Buchi K-435	Kjeldhal Infrared Digestion Unit	Prep Lab
Compressor	A. Shield Compressor Oil-less	Warehouse
Conductivity Meter	Fisher Scientific 97056846	Wet Chem Lab
Cyanide Midi Distillation Unit	Lab Crest Andrew Glass Co. #A370132	ICP Room
Cyanide Minidistillation	Labline 1096-00	ICP Room
Depth Indicator	Slope Indicator Co. Depth Indicator	Warehouse
Dessicator	Dessicators-VWR	Prep Lab
Dionex ICS 2000	Dionex #04020051	Wet Chem Lab
Drying Oven	Precision	Warehouse
Eye Wash/Shower	VWR Eye Wash Shower Unit	Prep Lab
Filters-Membrane	Millipore Filter Apparatus	Bact. Room
Flashpoint	Fisher Scientific Flashpoint Analyzer	Prep Lab
Freezer	Amana	Prep Lab
Freezer	GE Chest Type	Warehouse
Freezer	GE Stand-Up	Wet Chem Lab
Fume Hood	8 Foot Kewanee	Prep Lab
Fume Hood	8 Foot Kewanee	Prep Lab
Fume Hood	8 Foot Kewanee	Prep Lab
Fume Hood	8 Foot Kewanee	Prep Lab
Fume Hood	8 Foot Kewanee	Prep Lab
Fume Hood	8 Foot Kewanee	Prep Lab
Fume Hood	2 Foot Stainless	Org. Lab
Furnace	Fisher Isotemp Muffle Furnace	Prep Lab
G.C.- Evaporator	Zymark Turbo Vap -Solvent Concentrators	Prep Lab
G.C. Evaporators	Zymark Turbo Vap Solvent Concentrators	Prep Lab

Equipment	Make & Model	Location
G.C. Evaporators	Zymark Turbo Vap Solvent Concentrators	Prep Lab
G.C. FID	H.P. 5890 Series Ii Plus Epc Gc Fid Dual Detector W/Chemstation Datastation	Org. Lab
G.C. FID	H.P. 7673 Autosampler	Org. Lab
G.C. FID/TCD	H.P. 5890 Series Ii Gc Fid/Tcd Dual Detector W/Chemstation Datastation	Org. Lab
G.C. FID/TCD	H.P. 7673 Autosampler	Org. Lab
G.C.-Ultrasonic Extractor	Tekmar-Ultrasonic Extraction Probe	Prep Lab
G.C.-Ultrasonic Extractor	Sonicator-Ultrasonic Extraction Probe	Prep Lab
GC PID/FID	5890 Series Ii Gc W/Chemstation Datastation	Org. Lab
GC PID/FID	Tekmar 2016 Autosampler	Voa Room
GC PID/FID	Tekmar 3000 Concentrator	Voa Room
GC/MS-5971	H.P. Model 5890 Series Ii Epc Gc W/Chemstation Datastation	Org. Lab
GC/MS-5971	H.P. Model 5971 Series Msd	Org. Lab
GC/MS-5971	H.P. Model 7673 100Sk Auto Sampler	Org. Lab
GC/MS-5972	5890 Series Ii Plus Epc Gc W/Chemstation Datastation	Org. Lab
GC/MS-5972	Tekmar 2016 Autosampler	Voa Room
GC/MS-5972	Tekmar 3000 Concentrator	Voa Room
GC/MS-5972	5972 Mass Selective Detector	Voa Room
GC/MS-5972	5890 Series Ii Plus Epc Gc W/Chemstation Datastation	Org. Lab
GC/MS-5972	Tekmar 2016 Autosampler	Voa Room
GC/MS-5972	Tekmar 3000 Concentrator	Voa Room
GC/MS-5972	5972 Mass Selective Detector	Voa Room
GC/MS-5971	H.P. Model 5890 Series Ii Epc Gc W/Chemstation Datastation	Org. Lab
GC/MS-5973	H.P. Model 5973 Series Msd	Org. Lab
GC/MS-5971	H.P. Model 7673 100Sk Auto Sampler	Org. Lab
GC-ECD	H.P. Model 7673 100Sk Autosampler	Org. Lab
GC-ECD	5890 Series Ii Gc Ecd-Dual Detector W/ Chemstation Data Station	Org. Lab
Glassware	Large Inventory Of All Types Of Glassware, Class "A" Pipets, Distilation Setups E	All Labs
Heat Block	Technicon Bd-40	Prep Lab
Hot Plate	Cimarec-3 Thermolyne Hot Plate	Prep Lab
Hot Plates	Corning	Prep & Wet Chem Labs
Hotplate	Bronwill Hot Plate	"
Hotplate/Stirplate	Pc-101 Corning Hot Plate	"
HPLC	Waters Multiwavelength Uv/Vis Detector	Org. Lab

Equipment	Make & Model	Location
HPLC	Detector Uv/Vis Millipore Waters M-486	Org. Lab
HPLC	Hp 1050 W/Quad Pumps	Org. Lab
HPLC	Windows 2000 Professional W/Chemstation Datastation	
Imoff Cones	Imoff Cones	Wet Chem Lab
Imoff Rack	Imoff Rack	Wet Chem Lab
Incubator	Incubator Oven-Precision Scientific-Coliform	Bact. Room
Incubator	VWR Model 2020	Bact. Room
Inductively Coupled Plasma	Spectro Blue FME16 SN/11010217	ICP Room
Ion Chromatograph	Dionex DX120 W/ Chromelean Windows Data Station	Wet Chem Lab
Magnetic Stirrer	Round Magnetic Stirrer-Fisher	Prep & Wet Chem Labs
Magnetic Stirrer	Corning	“
Magnetic Stirrer	Thermolyne (Round)	“
Magnetic Strrer	Thermolyne Magnetic Stirrer-Lighted	“
Mercury Cold Vapor Analyzer	Leeman Labs Inc. Hydra AA S/N 5018	ICP room
Mercury Cold Vapor Analyzer	Dell Dimension 3000	ICP Room
Micro Scope	Bausch & Lomb Microscope	Bact. Room
Micro Scope	A.O. Disection Scope	Bact. Room
Microwave Unit	Milestone	Metals Prep
Mtl-Mcrowave	Cem Mds 2100 Microwave Digestion Oven	Prep Lab
Oven	Fisher Isotemp Model 300	Prep Lab
Parr Bomb	Oxygen Bomb Calorimeter	ICP Room
pH Meter	Extech Oyster Multimeter	Field Services
pH Meter	Orion E.A. 940	Wet Chem Lab
pH Meter	Accumet 915	Field Services
Pipet Washer	Pipet Washer VWR	Wet Chem Lab
Probes-Ion Selective	Assorted Ion Selective, Ref & Ph	Wet Chem Lab
Quanti-Tray Sealer	Model 2X #89-10894-02	Bact. Room
Refrigerators	Explosion Proof	Org. Lab
Refrigerators	Revco 3 Bay	Warehouse
SpectroBlue ICP	Spectro	Metals Lab
Sample Master LIMS System	Sample Master Instrument Intergratable Client Accessable LIMS System	Entire Facility
Sampler-Field	Isco Sequential/Composite Sampler (2)2700 & (2)3700	Warehouse
Spectronic 21	Milton Roy Spectrophotometer #0401418	ICP Room
Spectronic 21	Bausch & Lomb #0602274N	ICP Room

Equipment	Make & Model	Location
Spectrophotometer	HACH DR/3000 #9002702540	Prep Lab
TCLP Filter	Millipore Filter Apperatus	Prep Lab
TCLP Filter	Associated Design Filter Apparatus	Prep Lab
TCLP Rotory Agitator	Advanced Design	ICP Room
TCLP Rotory Agitator	Advanced Design	ICP Room
TCLP Rotory Agitator	Analytical Testing	ICP Room
TCLP Rotory Agitator	Analytical Testing	ICP Room
TCLP Rotory Agitator	Analytical Testing 8 Liter Size	ICP Room
TCLP Zhe Extractors	Millipore	ICP Room
TCLP Zhe Tumbler	Milipore	ICP Room
Teflon Bailers	Norco	Field Services
Turbidimeter	Hach Ratio Xr	Wet Chem Lab
Ultrasonic Bath	Branson	Org.Lab
Vacuum Pump	Gast 9.0 Amp	Org. Lab
Vacuum Pump	Edwards	Org. Lab
Vacuum Pump	Gast 4.2 Amp	Bact. Room
Walk-In Cooler	Built-In	Wet Chem Lab
Water Bath	Magni-Whirl Blue M Bath	Bact. Room
Wrist Shaker	Burell Model Dd	Prep Lab
XRF Analyzer	Spectro	Metals Lab

ATTACHMENT #4

Description of Laboratory

	Area Sq. Feet.	Bench Area, Linear ft.
Office Space	2,000	
Record Space	500	
Reception Room	100	
Lunch Room	120	
Conference Room	264	
Laboratory Room #1	680	30
Laboratory Room #2	450	33
Laboratory Room #3	525	71
Laboratory Room #4	100	20
Laboratory Room #5	655	120
Laboratory Room #6	120	17
Storage Area	6,200	
BOD/Bacteria Room	330	68
Extraction Lab	480	84

Utilities

1) Seven sinks with hot and cold water
2) Heating and air conditioning
3) US filter DI water system generating ASTM type II water or better
4) Cement flooring with tile and carpet
5) Fluorescent overhead lighting

ATTACHMENT #5

CONTAINER PREPARATION GUIDE

SENDING CONTAINERS

New Customer - check for quote and/or get list of parameters, # of sites and matrix
Existing Customer - check sample, self sampling or quote, customers request, customer information sheet
State Drinking Water - see container chart for proper state
Place a TEMPERATURE BLANK in each cooler with ice packs.

INORGANIC ANALYSES

Analysis	Emergency Min. Vol(ml)	Container	Preservative	Type	HoldTime	Notes
Alkalinity (caustic,carbonate)	200	500ml (P)	No Pres	Comp	14 days	
BOD	500	1L (P)	No Pres	Comp	48 hrs	If all analyses
Bromide	100	500ml (P)	No Pres	Comp	28 days	are required
Chloride	100	500ml (P)	No Pres	Comp	28 days	take 2 Qts
Fluoride	100	500ml (P)	No Pres	Comp	28 days	
Sulfate	200	500ml (P)	No Pres	Comp	28 days	
Surfactants	200	500ml (P)	No Pres	Comp	48 hrs	
TSS, TS, TDS	200, 200, 200	1L (P)	No Pres	Comp	7 days	
Setteable Solids	1000	1L (P)	No Pres	Grab	7 days	
Ammonia	500	500ml (P)	H_2SO_4 1/2 squirt pH<2	Grab	28 days	If all analyses
TKN	500	500ml (P)	H_2SO_4 1/2 squirt pH<2	Grab	28 days	are required
Phosphorous-P (total)	100	500ml (P)	H_2SO_4 1/2 squirt pH<2	Grab	28 days	take 1 Qt
Cyanide (TCN)	100	500ml (P)	NaOH 5 pellets pH>12	Grab	14 days	*1
Cr VI	100	500ml (P)	No Pres	Grab	ASAP	If all analyses
Nitrate, Nitrite	100, 100	500ml (P)	No Pres	Grab	48 hrs	are required
Orthophosphate-P (ortho)	100	500ml (P)+	Filter within 15min	Grab	48 hrs	take 1 Qt
Spec. Con.	100	500ml (P)	No Pres	Grab	28 days	
Turbidity	50	500ml (P)	No Pres	Grab	48 hrs	
pH	50	500ml (P)	No Pres	Grab	ASAP	
Oil & Grease HEM SGT-HEM	1 L	2x 1L (G)	H_2SO_4 2 squirt pH<2	Grab	28 days	*2
Phenol	500	1L (AG)	H2SO4 2 squirt pH<2	Grab	28 days	*1
Sulfite	100	500ml (P)	EDTA 1 squirt	Grab	ASAP	
Sulfide	100	500ml (P)	ZnAC 1 squirt NaOH 1 squirt pH>9	Grab	7 days	
Bacteria (MF, HPC, P/A)	100	100 ml sterile	No Pres	Grab	30 hrs	*1
Bacteria (MPN)	100	100 ml sterile	No Pres	Grab	6 hrs	
COD	25	500ml (P)	H_2SO_4 1 squirt pH<2	Comp	28 days	
Metals / Hardness	200	500ml (P)	HNO_3 1 squirt pH<2	Comp	6 mo.	
Total Residual Cl	50	250 ml(AG)	No Pres		ASAP	

ORGANIC ANALYSES

Analysis	Matrix	Container	Preservative	Type	HoldTime	Notes
Semi-Volatiles	Liquid Solid	2 x 1L (G) (T) 125ml (G) (T)	No Pres	Comp	7 days 14 days	*2
Volatiles	Liquid (524.2) Solid	2x40ml vial (T) 3x40ml vial (T) 1 x 40ml (T)& 1x40ml w/meoh (T)	HCl 5 drops pH<2 HCl 5 drops pH<2 No Pres	Grab	14 days	*1
Herbicides	Liquid Solid	2 x 1L (G) (T) 125 ml (G) (T)	No Pres No Pres		7 days 14 days	*2
Pest/PCB	Liquid Solid	2 x 1L (G) (T) 125ml (G) (T)	No Pres pH 5-9 No Pres	Comp	7 days 14 days	*2
TPH 8015 DRO MADEP EPH	Liquid Liquid	2 x 1L (G) (T) 2 x 1LAmb (G) (T)	HCl 2 squirts pH<2 HCl 2 squirts pH<2		7 days 14 days	*2 *3
TPH 8015 DRO MADEP EPH	Solid Solid	125ml (G) (T) 125ml (G) (T)	No Pres No Pres		14 days 14 days	
MADEP VPH	Liqiud	2x40ml vial (T)	HCl 5 drops pH<2		14 days	
MADEP VPH	Solid	1 x 40ml (T)& 1x40ml w/meoh (T)	1ml methanol/g		14 days	*4
Formaldehyde	Liquid Solid	1L (G) (T) 125ml (G)	No Pres No Pres	Grab	3 days	
Propylene Glycol	Liquid	2 x 40ml (T)	HCl 2 squirts pH<2			

CONTAINER PREPARATION GUIDE

SUB WORK

Analysis	Matrix	Container	Preservative	Type	HoldTime	Notes
Radon	Liquid	Radon Water Kit				
Radon / Gross Alpha	Liquid	1 L (P) 2 x 40 ml vial	Nitric Acid Pres.		30 days 72 hrs	
TOC	Liquid	2x 40ml vial	H_2SO_4 5 drops pH<2	Grab	28 Days	
TOC	Solid	125ml (G)	No Pres		28 Days	
Toxicity		Gallon cubes	No Pres		Permit specific	
Dioxin		125ml (G)	No Pres			

COMMON PACKAGE ANALYSES

Analysis	Matrix	Container	Preservative	Type	HoldTime	Notes
NH Virgin Petroleum Contaminated Soil (NH VPCS) (Table IV) (MTS specs) (Asphalt Batching)	Solid	500ml (G)	No Pres			
NH VPCS Certified Non-Hazardous	Solid	250ml (G)	No Pres			
Complete TCLP	Solid	1 x L (G) & 1 x 4 oz(G)	No Pres			
AMREC Acceptance Package	Solid	500ml (G)	No Pres			
NH DES Tank Closure Table III						
- Gasoline	Liquid	2x40ml vial (T)	HCL			
	Solid	500ml (G)	No Pres			
- Waste Oil	Liquid	2x40ml vial (T) 1L (G) (T)	HCL No Pres			
	Solid	500ml Glass	No Pres			
- Diesel, Kerosene, heating	Liquid	2x40ml vial (T) 1L (G) (T)	HCL No Pres			
	Solid	125ml (G)	No Pres			
Specification Used Oil	Solid	250ml (G)	No Pres			
RCRA Waste Characterization Profile	Solid	500ml (G)	No Pres			
TCLP Metals	Solid	500ml (G) 105g min.	No Pres			
RCRA Metal	Solid	125ml (G)				
RCRA Metal	Liquid	500ml (P)	HNO_3 1 squirt pH<2			

$CuSO_4$	Cupric Sulfate	H_3PO_4	Phosphoric Acid	NaOH	Sodium Hydroxide
HCl	Hydrochloric Acid	H_2SO_4	Sulfuric Acid	$Na_2S_2O_3$	Sodium Thiosulfate
HNO_3	Nitric Acid	$C_6H_8O_6$	Ascorbic Acid	ZnAC	Zinc Acetate

1 Squirt ≈ 2.5 ml by disposable plastic eye dropper

***1 Check for presence of and eliminate chlorine prior to preservation. If chlorine is present add the following. DO NOT COMBINE THE DECHLORINATING AGENT AND THE PRESERVATIVE IN THE SAMPLE VIAL PRIOR TO SAMPLING.**

Phenol - ferrous sulfate ($FeSO_4$)
VOA 624, Coliform - sodium thiosulfate ($Na_2S_2O_3$) Recheck before preserving!
VOA 524, Cyanide - ascorbic acid ($C_6H_8O_6$) Recheck before preserving!

***2 Take one duplicate per job**
***3 Take one duplicate per sample ID**
***4 Please see procedure for the preparation of VPH sampling vials and/or the organic department**
+ Also supply a 0.45um syringe filter and 60ml disposable syringe for sampling. Filter within 15 minutes of sampling.

(AG) = AMBER GLASS (G) = GLASS (P) = PLASTIC (T) = container must have a teflon liner in the cap

FIELD SAMPLING SOP LIST

SOP NUMBER	REV. DATE	REV. NUMBER	DESCRIPTION
FS001	1/30/00	0.1	Field Sampling Duties
FS002	1/30/99	0.1	Seasonal Sampling requirements
FS003	1/30/99	0.1	Maintenance Logs
FS004	1/30/99	0.1	Client Self Sampling and Shipping Instructions
FS005	1/30/99	0.1	Reagent Guide
FS006	1/30/99	0.1	Decontamination of Equipment
FS007	1/30/99	0.1	Sample Collection
FS008	1/30/99	0.1	Field Measurements

Field Sampling Equipment List

ChemServe owns, operates and maintains equipment, instrumentation, appropriate for most of the services we provide. Some rentals may be required.

Inventory

Item	Quantity
ISCO 2700 Autosampler	3
ISCO GLS w/ Lid	1
ISCO 3700 Autosampler w/ Lid	2
Bases w/ jug adapters	4
Bases w/ 24 plastic containers & retention rings	8
Set of 24 glass containers & retention rings	2
10,000ml plastic jug	6
6,500ml glass jug	6
5 gallon plastic jug	1
NiCd rechargeable batteries	6
Battery Charger	6
Deep cycle marine battery	1
Foam insulated hut	2
Heated hut	2
2’ Teflon bailers w/ sleeves	12
1’ PVC bailer	1
Teflon bailer couples	2
Teflon bailer leads	4
Slope indicator	2
100 ft. electric water level indicator	1
Tape measure 100ft.	1
Soil sampler/ soil ram rod soil plug sampler	1
pH meter	3
Conductivity meter	2
Residual chlorine colorimeter	2

ATTACHMENT #6

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

CHEMSERVE ENVIRONMENTAL ANALYSIS
317 Elm Street
Milford, NH 03055
Heather Marmorstein Phone: 603 673 5440
heatherm@chemservelab.com

CHEMICAL

Valid To: August 31, 2013 Certificate Number: 2891.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on consumer and children's products:

Test Technology	Test Methods
Lead in Paint by ICP	CPSC-CH-E1003-09; EPA 200.7, EPA 6010C
Lead in Children's Metal Products by ICP (including jewelry)	CPSC-CH-E1001-08.1; EPA 200.7, EPA 6010C
Total Lead in Non-Metal Children's Products by ICP	CPSC-CH-E1002-08.1; EPA 200.7, EPA 6010C
Extractable Cadmium in Children's Metal Products by ICP	CPSC-CH-E1004-01; EPA 200.7, EPA 6010C
Phthalates in Children's Products by GC/MS	CPSC-CH-C1001-09.3; SW-846 8270D
Standard Consumer Safety Specification for Toy Safety - Metals in Toys by ICP (As, Ba, Cd, Cr, Hg, Sb, Se)	ASTM F963-08 Sections 4.3.5.2, 8.3; EPA 200.7, EPA 6010C
Elements in Paint, Metal Products and Non-Metal Products by ICP (As, Ba, Cd, Cr, Cu, Hg, Ni, Sb, Se, Zn)	SW-846 3052, SW-846 6010C
Extractable Lead and Cadmium from Glazed Ceramic Surfaces	ASTM C738-94 (extraction); EPA 200.7, EPA 6010C
Elements in Polymeric Materials by XRF (Br, Cd, Cr, Hg, Pb)	ASTM F2617-08; CPSC-CH-E1002-08.1
PBB/PBDE in Non-Metal Products by GC/MS	SW-846 3546, SW-846 8270D

5301 Buckeystown Pike, Suite 350 | Frederick, Maryland 21704-8373 | Phone: 301 644 3248 | Fax: 301 662 2974 | www.A2LA.org

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

CHEMSERVE ENVIRONMENTAL ANALYSIS

Milford, NH

for technical competence in the field of

Chemical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 29th day of December 2011.

President & CEO
For the Accreditation Council
Certificate Number 2891.01
Valid to August 31, 2013

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Chemical Scope of Accreditation.

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 18 SEP 2012

M-NH023 CHEMSERVE
MILFORD NH

NON POTABLE WATER (CHEMISTRY) Effective Date 01 JUL 2012 Expiration Date 30 JUN 2013

Analytes	Methods
ALUMINUM	EPA 200.7
ANTIMONY	EPA 200.7
ARSENIC	EPA 200.7
BERYLLIUM	EPA 200.7
CADMIUM	EPA 200.7
CHROMIUM	EPA 200.7
COBALT	EPA 200.7
COPPER	EPA 200.7
IRON	EPA 200.7
LEAD	EPA 200.7
MANGANESE	EPA 200.7
MERCURY	EPA 245.1
MOLYBDENUM	EPA 200.7
NICKEL	EPA 200.7
SELENIUM	EPA 200.7
SILVER	EPA 200.7
THALLIUM	EPA 200.7
TITANIUM	EPA 200.7
VANADIUM	EPA 200.7
ZINC	EPA 200.7
PH	SM 4500-H-B
SPECIFIC CONDUCTIVITY	SM 2510B
TOTAL DISSOLVED SOLIDS	SM 2540C
HARDNESS (CACO3), TOTAL	SM 2340B
CALCIUM	EPA 200.7
MAGNESIUM	EPA 200.7
SODIUM	EPA 200.7
POTASSIUM	EPA 200.7
ALKALINITY, TOTAL	SM 2320B
SULFATE	EPA 300.0
NITRATE-N	EPA 300.0
ORTHOPHOSPHATE	SM 4500-P-E
PHOSPHORUS, TOTAL	SM 4500-P-B,E
CHEMICAL OXYGEN DEMAND	SM 5220D
BIOCHEMICAL OXYGEN DEMAND	SM 5210B
CYANIDE, TOTAL	SM 4500-CN-C,E
NON-FILTERABLE RESIDUE	SM 2540D
OIL AND GREASE	EPA 1664
PHENOLICS, TOTAL	EPA 420.1
VOLATILE HALOCARBONS	EPA 624
VOLATILE AROMATICS	EPA 624
CHLORDANE	EPA 608
ALDRIN	EPA 608

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 18 SEP 2012

M-NH023 CHEMSERVE
MILFORD NH

NON POTABLE WATER (CHEMISTRY) **Effective Date** **01 JUL 2012** **Expiration Date** **30 JUN 2013**

Analytes	Methods
DIELDRIN	EPA 608
DDD	EPA 608
DDE	EPA 608
DDT	EPA 608
HEPTACHLOR	EPA 608
HEPTACHLOR EPOXIDE	EPA 608
POLYCHLORINATED BIPHENYLS (WATEI	EPA 608

POTABLE WATER (CHEMISTRY) **Effective Date** **18 SEP 2012** **Expiration Date** **30 JUN 2013**

Analytes	Methods
BARIUM	EPA 200.7
BERYLLIUM	EPA 200.7
CADMIUM	EPA 200.7
CHROMIUM	EPA 200.7
COPPER	EPA 200.7
MERCURY	EPA 245.1
NICKEL	EPA 200.7
NITRATE-N	EPA 300.0
NITRITE-N	EPA 300.0
FLUORIDE	EPA 300.0
SULFATE	EPA 300.0
CALCIUM	EPA 200.7
ALKALINITY, TOTAL	SM 2320B
TOTAL DISSOLVED SOLIDS	SM 2540C
PH	SM 4500-H-B
TRIHALOMETHANES	EPA 524.2
VOLATILE ORGANIC COMPOUNDS	EPA 524.2
PERCHLORATE	EPA 314.0

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Certified Parameter List as of: 01 JUL 2012

M-NH023 CHEMSERVE
MILFORD NH

NON POTABLE WATER (MICROBIOLOGY) **Effective Date 01 JUL 2012** **Expiration Date 30 JUN 2013**

Analytes		Methods
E. COLI	AMBIENT WATER	SM 9223B-COLILERT
FECAL COLIFORM	WASTEWATER	MPN-SM9221E
FECAL COLIFORM	WASTEWATER	MF-SM9222D
E. COLI	WASTEWATER	SM 9223B-COLILERT

POTABLE WATER (MICROBIOLOGY) **Effective Date 01 JUL 2012** **Expiration Date 30 JUN 2013**

Analytes		Methods
HETEROTROPHIC PLATE COUNT		SM9215B
TOTAL COLIFORM	WATER TREATMENT AND DISTRIBUTION (P/A)	ENZ. SUB. SM9223
E. COLI	WATER TREATMENT AND DISTRIBUTION (P/A)	ENZ. SUB. SM9223

ATTACHMENT #7

AA001	6010C/200.7	01/10/13	0.20	Determination of Metals and Trace Elements by ICP	2 copies – Lab and QA
AA004	245.1	01/30/13	0.13	Determination of Mercury by Manual Cold Vapor	2 copies – Lab and QA
AA0085	EPA 200.7	03/05/13	11.0	Hot Plate / Block Digestion of Liquid & Solid Samples.	2 copies – Lab and QA
AA0094	SW7471	01/30/13	0.8	Determination of Mercury in Solids	2 copies – Lab and QA
AA017	7000 200.9	12/31/08	0.4	Metals by GFAA	2 copies – Lab and QA
AA071	SW 3050	11/19/2012	0.9	Hot Plate Digestion for Metals-Solids	2 copies – Lab and QA
AA072	CPSC-CH-E1003-09	10/03/11	0.5	Microwave Digestion for Lead in Paint (CPSC)	2 copies – Lab and QA
AA073	CPSC-CH-E1001-08	10/03/11	0.7	Microwave Digestion for Lead in Metal (CPSC)	2 copies – Lab and QA
AA074	CPSC-CH-E1002-08	10/03/11	0.8	Microwave Digestion for Lead in non-metal children's products (CPSC)	2 copies – Lab and QA
AA075	ASTM F963-08	12/09/10	0.2	Soluble Metals Extraction in Toys (CPSC)	2 copies – Lab and QA
AA076	SW 3050 mod.	06/01/10	0	Hot plate digestion for solder profile metals	2 copies – Lab and QA
AA077	ASTM C738-94	11/19/2012	0.1	Metals Extracted from Glazed Ceramic Surfaces (Leech)	2 copies – Lab and QA
AA078	EPA 200.5	11/16/12	0.3	Drinking Water Metals by ICP Analysis	2 copies – Lab and QA
AA079	In House	03/06/13	0	Preparation of photo silvers for ICP analysis	2 copies – Lab and QA
AA080	SW 3050B	In Progress	0	Hot Block Digestion for Lead in Wipes - ELPAT	2 copies – Lab and QA
AA081	SW 3050B	In Progress	0	Hot Block Digestion for Lead in Paint – ELPAT	2 copies – Lab and QA
AA082	SW 3050B	In Progress	0	Hot Block Digestion for Lead in Soil - ELPAT	2 copies – Lab and QA
GC0080		09/30/00	0.1	VOA Analysis by GC-FID Direct Inject	2 copies – Lab and QA
GC027	MADEP EPH	02/11/10	0.7	Determination of Extractable Petroleum Hydrocarbons (EPH) Analysis	2 copies – Lab and QA
GC033	SW846 8015	05/10/05	0.1	Determination of Non-Halogenated Volatile Organic Compounds by 8015 direct inject.	2 copies – Lab and QA
GC050	SW8270D	01/18/13	0.7	Analysis of Semivolatile compounds by 8270D.	2 copies – Lab and QA
GC051	SW8260	05/05/11	0.5	Analysis of Volatile compounds by 8260C.	2 copies – Lab and QA
GC064	SW 8081B	10/17/11	0.6	Determination of Pesticides	2 copies – Lab and QA
GC065	SW 8082	10/17/11	0.5	Determination of PCB's	2 copies – Lab and QA
GC066	EPA 524.2	02/04/13	0.12	Volatile Organic Compounds in Drinking Water 524	2 copies – Lab and QA
GC067	EPA 624	12/05/12	0.11	Volatile Organics 624	2 copies – Lab and QA
GC068	EPA 625	01/18/13	0.10	Determination of Semi-Volatile Organic Compounds	2 copies – Lab and QA

				625	
GC069	EPA 608	01/18/13	0.11	Determination of Pesticides/PCBs	2 copies – Lab and QA
GC070	SW 8315A	07/12/11	0.1	Determination of Formaldehyde	2 copies – Lab and QA
GC077	SW 8151A	06/05/00	0.0	Determination of Herbicides	2 copies – Lab and QA
GC107	527	06/27/06	0.0	Pest/Flame Retardants SPE Cartridges	2 copies – Lab and QA
GC108	515.2 mod	04/08/09	0.1	Extraction of Herbicides in Drinking Water	2 copies – Lab and QA
GC109	US EPA R1	11/20/09	0.1	Methane in Water	2 copies – Lab and QA
GC110	MADEP	04/08/08	0.1	MADEP EPH Analysis for PAH using SIM	2 copies – Lab and QA
GC111	MAVPH	01/25/10	0.1	MADEP VPH Analysis with presumptive cert.	2 copies – Lab and QA
GC112	SW8015C	04/09/08	0.0	Total Petroleum Hydrocarbon Analysis DRO	2 copies – Lab and QA
GC113	EPA 25 mod	05/13/08	0.1	Methane in Air	2 copies – Lab and QA
GC114	CPSC-CH-C1001-09.3	10/03/11	0.5	Determination of Phthalates in Child Care Items	2 copies – Lab and QA
GC117	In House	05/15/12	0.2	Determination of PBDE and PBB compounds using SIM GC/MS analysis for ISO 17025 & RoHS	2 copies – Lab and QA
GC118	EPA 524.2M	09/12/12	0.3	Determination of 1-4 Dioxane by 8260/524/624 SIM	2 copies – Lab and QA
GC119	EPA 552.2	12/12/11	1	Determination of Haloacetic Acids in Drinking Water	2 copies – Lab and QA
GC120	SW846-8015	09/11/12	0.0	Total Petroleum Hydrocarbon Analysis GRO	2 copies – Lab and QA
GN003	SM18th 4500-CN C&E	01/08/13	0.12	Determination of Cyanide	2 copies – Lab and QA
GN005	300.0	01/04/11	0.12	Determination of Inorganic Anions by Ion Chromatography	2 copies – Lab and QA
GN007	SM18th 4500-H^+B	02/16/11	0.8	Determination of pH by Electrode	2 copies – Lab and QA
GN0086	EPA 24	03/09/01	0.0	Determination of Volatile Matter content, Water content, Density and Weight solids of surface coatings.	2 copies – Lab and QA
GN009	9222B SM18th	09/20/2012	0.8	Membrane Filtration for members of the Total Coliform Group	2 copies – Lab and QA
GN011	9222D SM18th	09/20/2012	0.9	Fecal Coliform Bacteria by Membrane Filtration	2 copies – Lab and QA
GN013	SM18th 2540D	03/23/11	0.9	Determination of Total Suspended Solids	2 copies – Lab and QA
GN015	9223B Sm18th.	11/01/02	0.3	Coliform-MPN by Colilert multiple tube fermentation.	2 copies – Lab and QA
GN016	180.1 EPA	12/05/12	0.7	Determination of Turbidity	2 copies – Lab and QA
GN019	SM18th 2540C	03/23/11	0.9	Determination of Total Dissolved Solids (TDS)	2 copies – Lab and QA
GN020	SW-846 1311	11/19/2012	0.3	TCLP extraction	2 copies – Lab and QA

GN022	310.1 EPA SM 2320B	03/23/11	0.8	Determination of Alkalinity	2 copies – Lab and QA
GN023	SM18th 5210B	08/01/12	0.13	Determination of BOD & CBOD	2 copies – Lab and QA
GN025	330.5 EPA SM4500-Cl G	07/22/03	0.4	Determination of Residual Free Chlorine	2 copies – Lab and QA
GN026	SM4500-Cl G	01/10/13	0.10	Determination of Total Residual Chlorine	2 copies – Lab and QA
GN028	SM3500-Cr D	01/04/13	0.11	Determination of Hexavalent Chromium – HACH	2 copies – Lab and QA
GN029	SM5220D	01/03/2013	0.11	Determination of Chemical Oxygen Demand	2 copies – Lab and QA
GN030	SM2340B EPA 200.7	11/12/02	0.3	Determination of Hardness	2 copies – Lab and QA
GN031	SW846 1010	01/21/06	0.4	Determination of Flashpoint	2 copies – Lab and QA
GN032	SM4500-NH_3 B,C	04/25/11	0.13	Determination of Nitrogen –Ammonia	2 copies – Lab and QA
GN034	EPA1664 Rev. 2/99	03/23/11	0.13	Determination of HEM (O&G) and SGT-HEM (non polar material) by extraction and gravimetric.	2 copies – Lab and QA
GN035	EPA 420.1	01/10/13	0.11	Determination of Phenols Spectrophotometer with distillation.	2 copies – Lab and QA
GN036	SM18th 4500-P B&E	06/25/12	0.11	Determination of Total/Ortho Phosphorous	2 copies – Lab and QA
GN037	SM9215B	09/26/2012	0.7	Determination of Heterotrophic Plate Count	2 copies – Lab and QA
GN038	SM9223B	01/10/11	0.7	Determination of Total Coliform and e-coli by colilert Presence absence	2 copies – Lab and QA
GN039	SM9221B&E	09/26/2012	0.6	Determination of Total/Fecal Coliform Most Probably Number(MPN) by Multiple Tube Fermentation in Waste Water	2 copies – Lab and QA
GN041	SM 4500-Norg & NH3-B	10/05/2012	0.17	Determination of Total Kjeldahl Nitrogen.	2 copies – Lab and QA
GN049	ASTM 240D	12/20/10	0.4	Heat of Combustion – BTU	2 copies – Lab and QA
GN052	HACH 8131	12/07/11	0.8	Determination of Sulfide w/ Hach 8131 & SM4500 S2D	2 copies – Lab and QA
GN053	EPA 377.1	01/10/13	0.5	Determination of Sulfite	2 copies – Lab and QA
GN054	EPA 425.1	01/10/13	0.6	Determination of Surfactants (MBAS)	2 copies – Lab and QA
GN056	SM 2510B	01/04/13	0.10	Determination of Specific Conductance	2 copies – Lab and QA
GN057	SM18th 4500-CN G&E	04/28/09	0.7	Determination of Amenable Cyanide	2 copies – Lab and QA
GN058	SM2540B	03/23/11	0.10	Total Solids or Residue	2 copies – Lab and QA

GN059	EPA 160.5	10/29/02	0.3	Settleable Solids	2 copies – Lab and QA
GN061	SW 7.3.4.2	7/11/03	0.2	Determination of Reactivity – Sulfide	2 copies – Lab and QA
GN062	SW 9095B	10/06/05	0.2	Paint Filter Liquids	2 copies – Lab and QA
GN063	SW 7.3.3.2	07/30/03	0.2	Determination of Reactivity – Cyanide	2 copies – Lab and QA
GN088	SM 9050	09/17/2012	0.2	Preparation of Buffered water	2 copies – Lab and QA
GN089	SM 9020	09/26/2012	0.2	Preparation of Confirmatory Broths.	2 copies – Lab and QA
GN090	SM 9020	05/21/12	0.3	Quality Control for Microbiology Supplies	2 copies – Lab and QA
GN096	SW 1030	08/13/03	0.1	Ignitability of Solids	2 copies – Lab and QA
GN099	314.0	07/21/11	0.14	MADEP Perchlorate by Ion Chromatography	2 copies – Lab and QA
GN103	2540E	02/02/05	0.0	Total Volatile Solids	2 copies – Lab and QA
GN104	SW846 5050	03/23/05	0.0	Bomb Preparation of wastes	2 copies – Lab and QA
GN110	SM 9223B	06/19/09	0.2	E-coli by Quanti-Tray in Drinking Water, Groundwater and Wastewater	2 copies – Lab and QA
GN111	ASTM F2617-08	10/12/2012	0.2	Lead in Polymeric Material Using XRF.	2 copies – Lab and QA
OF001	NA	01/19/11	0.6	Sample Log-In Using Sample Master XP	2 copies – Lab and QA
GN112	SM9221C	09/21/11	0	Fecal Coliforms using Quanti-Tray 2000	2 copies – Lab and QA
GN113	SM 9230D	11/14/11	0	Enterococcus using Quanti-Tray 2000	2 copies – Lab and QA
GN114	SW 3060A / SM3500CrD	01/31/13	0	Hexavalent Chromium Prep and analysis on solid and RoHS	2 copies – Lab and QA
OF002	NA	01/19/11	0.6	Sample Receiving Procedures for all samples	2 copies – Lab and QA
OP008		04/17/08	0.1	Standard Operation Procedures for Laboratory Balances.	2 copies – Lab and QA
OP0087	EPA 608	01/12/09	0.5	Aqueous Extraction of PCB's and Pesticides by 608.	2 copies – Lab and QA
OP042	3660B	10/26/99	0.0	Sulfur Cleanup of PCP/Pest.	2 copies – Lab and QA
OP043	SW8151A	01/13/09	0.6	Herbicide Extraction soil & water.	2 copies – Lab and QA
OP044	SW 3570	08/18/11	0.9	Extraction of Solids for PCB's.	2 copies – Lab and QA
OP045	SW3510C	01/13/09	0.12	Aqueous Extraction of PCB's	2 copies – Lab and QA
OP046	SW 8100/3550	10/10/12	0.7	8015-DRO Prep by 3550, soil and liquid.	2 copies – Lab and QA
OP047	SW8270/3570	01/12/09	0.8	Extraction of BNA samples, solid and liquid.	2 copies – Lab and QA
OP048	SW8315A	01/13/09	0.9	Extraction of Formaldehyde	2 copies – Lab and QA
OP087	EPA 608	01/12/09	0.5	Extraction of Pesticide & PCB in wastewater	2 copies – Lab and QA
OP102	549.1	01/30/07	0.1	Extraction of Diquat by SPE cartridges	2 copies – Lab and QA
OP103	MADEP	07/15/09	0.2	MADEP EPH Extraction for Liquid and Soil	2 copies – Lab and QA
OP104	SW3570-3546	02/04/13	0.2	Extraction of Caulking samples for PCB	2 copies – Lab and QA

OP106	SW3580A	01/11/11	0.1	Waste Dilution for Organic Analysis	2 copies – Lab and QA
OP107	CPSH-CH-C1001-09.3	05/10/11	0.3	Extraction of Phthalates in child care items and toys.	2 copies – Lab and QA
OP108	515.2 Mod.	04/08/09	0.1	Extraction of chlorinated herbicides in drinking water and ground water	2 copies – Lab and QA
OP109	In House	06/15/11	0.1	Extraction of PBDE and PBE for RoHS & ISO17025	2 copies – Lab and QA
OP110	SW 3546	09/28/12	0.6	Extraction of solids for SVOA using microwave ext.	2 copies – Lab and QA
OP111	MADEP	10/05/12	0.2	Extraction of MA-EPH for solids using microwave extraction	2 copies – Lab and QA
OP112	SW3456	01/23/13	0.2	Extraction of Pest/PCB in Soil using microwave Ext.	2 copies – Lab and QA
OP113	SW 3540C	10/05/12	0.1	Extraction of PCB using soxhlet extraction	2 copies – Lab and QA
OP114	SW3546	10/10/12	0.0	Extraction of TPH-DRO using microwave extraction	2 copies – Lab and QA
QC0077		07/10/00	0.0	Calibration of Pipettors and laboratory glassware.	1 copy - QA
QC0078	NA	07/18/00	0.0	Calibration of Thermometers.	1 copy - QA
QC0082	NA	3/24/04	0.1	Control of Laboratory Consumable Materials	1 copy - QA
QC0083	NA	12/29/00	0.0	Sub sampling from Submitted samples.	2 copies – Lab and QA
QC0084	NA	12/29/00	0.0	Disposal of Samples	2 copies – Lab and QA
QC0093.	NA	09/09/02	0.0	SOP on writing and revising SOP's	1 copy - QA
QC0095	NA	02/24/11	0.2	Guidelines for Manual Calculations and Manual Integration	4 copies – 3 in Labs and QA
QC098	NA	11/13/03	0.0	Washing Glassware	2 copies – Lab and QA
QC099	NA	03/18/2013	0.0	Assurance of Data Quality	1 copy - QA
Book 580	NA	03/07/08	0.0	Chemical Receipt and Preparation Log	2 copies – Lab and QA
Book 648	NA	04/01/09	NA	Pipette Calibration Book	1 copy - QA
NA	NA	NA	NA	Log of Logs	1 copy - QA
QSM001	NA	3/15/2013	0.4	Quality Systems Manual	1 copy - QA
NA	NA	05/15/05	Second edition	ISO-IEC 17025:2005 Standards	Electronic Copy – Database folder
NA	NA	06/05/03	NA	NELAC 2003 Standards	1 copy - QA
NA	NA	2005	NA	Standard Methods 21st edition	1 copy - QA
NA	NA	1992	NA	Standard Methods 18th edition	1 copy – Lab office
NA	NA	12/1997	3rd edition	SW 846 methods for analysis	Electronic Copy – Database folder
NA	NA	1979	3rd edition	EPA methods for chemical analysis of water	Electronic Copy – Database folder
NA	NA	09/22/08	NA	R101 – General Requirements: Accreditation of ISO / IEC Laboratories	Electronic Copy – Database folder
NA	NA	02/05/09	NA	R102 – Conditions for Accreditation	Electronic Copy – Database folder

NA	NA	04/2008	NA	R103 – General Requirements: Proficiency Testing for ISO / IEC 17025 Laboratories	Electronic Copy – Database folder
NA	NA	04/09/08	NA	R103a – Annex: Proficiency Testing for ISO / IEC 17025 Laboratories	Electronic Copy – Database folder
NA	NA	02/05/09	NA	P101 – Reference to A2LA Accredited Status – A2LA Advertising Policy	Electronic Copy – Database folder
NA	NA	09/22/09	NA	P102 – A2LA Policy on Measurement Traceability	Electronic Copy – Database folder
Form 001	N/A	03/07/2013	0.1	Quality Control Check Form	Electronic Copy – Database – Office
NA	NA	03/13/13	NA	EPA NLLAP Quality Requirements (LQSR) 11/05/07	Electronic Copy – Database – Office

ATTACHMENT #8

NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

29 Hazen Drive, PO Box 95, Concord, NH 03302 (603) 271-2998

PRIMARY ACCREDITATION PARAMETER LIST

ANALYTE LIST NUMBER: 100812-E

NELAP RECOGNIZED

CHEMSERVE INC
317 ELM ST
MILFORD NH 03055
(603) 673-5440
Lab ID 1008

Method Code / Analyte Code	Method Reference / Analyte Name	Revision	Revision Date: Effective Date	Revision Date: Expiration Date	Matrix Code	Category	Accr. Type
20037405	**SM 9222 D (M-FC)**			**18th ED**	**1992**		
2530	FECAL COLIFORMS		Jun 3, 2007	Jun 2, 2013	D	MIC	NE
20181800	**SM 9215 B (R2A)**			**18th ED**	**1992**		
2555	HETEROTROPHIC PLATE COUNT		Jun 3, 2007	Jun 2, 2013	D	MIC	NE
20202806	**SM 9222 B (M-ENDO)**			**18th ED**	**1992**		
2500	TOTAL COLIFORMS		Jun 3, 2007	Jun 2, 2013	D	MIC	NE
20212800	**SM 9223 B (COLILERT-18 QUANTI-TRAY)**			**18th ED**	**1992**		
2525	ESCHERICHIA COLI		Mar 25, 2011	Jun 2, 2013	D	MIC	NE
2500	TOTAL COLIFORMS		Mar 25, 2011	Jun 2, 2013	D	MIC	NE
20213803	**SM 9223 B (COLILERT-18)**			**18th ED**	**1992**		
2525	ESCHERICHIA COLI		Mar 25, 2011	Jun 2, 2013	D	MIC	NE
2500	TOTAL COLIFORMS		Mar 25, 2011	Jun 2, 2013	D	MIC	NE
10013806	**EPA 200.7**			**4.4**	**1994**		
1000	ALUMINUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1005	ANTIMONY, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1010	ARSENIC, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1015	BARIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1020	BERYLLIUM, TOTAL		Dec 9, 2010	Jun 2, 2013	D	MET	NE
1025	BORON, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1030	CADMIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1035	CALCIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1040	CHROMIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1055	COPPER, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1760	HARDNESS (CALC.)		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1070	IRON, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE

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1075	LEAD, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1085	MAGNESIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1090	MANGANESE, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1100	MOLYBDENUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1105	NICKEL, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1125	POTASSIUM, TOTAL		Dec 9, 2010	Jun 2, 2013	D	MET	NE
1150	SILVER, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1155	SODIUM, TOTAL		Nov 10, 2011	Jun 2, 2013	D	MET	NE
1185	VANADIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
1190	ZINC, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
10036609	**EPA 245.1**			**3**	**1994**		
1095	MERCURY, TOTAL		Jun 3, 2007	Jun 2, 2013	D	MET	NE
10213975	**EPA 200.5**			**4.2**	**2003**		
1005	ANTIMONY, TOTAL		May 18, 2012	Jun 2, 2013	D	MET	NE
1010	ARSENIC, TOTAL		Mar 12, 2012	Jun 2, 2013	D	MET	NE
1020	BERYLLIUM, TOTAL		May 18, 2012	Jun 2, 2013	D	MET	NE
1030	CADMIUM, TOTAL		May 18, 2012	Jun 2, 2013	D	MET	NE
1075	LEAD, TOTAL		Mar 12, 2012	Jun 2, 2013	D	MET	NE
1140	SELENIUM, TOTAL		May 18, 2012	Jun 2, 2013	D	MET	NE
10011800	**EPA 180.1**			**2**	**1993**		
2055	TURBIDITY		Sep 25, 2012	Jun 2, 2013	D	NMI	NE
10013806	**EPA 200.7**			**4.4**	**1994**		
1550	HARDNESS, CALCIUM		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
10053200	**EPA 300.0**			**2.1**	**1993**		
1540	BROMIDE		Jun 3, 2007	Jun 2, 2013	D	NMI	NE

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1575	CHLORIDE		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
1810	NITRATE AS N		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
1825	NITRATE-NITRITE, TOTAL		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
1840	NITRITE AS N		Jan 2, 2009	Jun 2, 2013	D	NMI	NE
2000	SULFATE		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
10277006	**EPA 314.0**				**1999**		
1895	PERCHLORATE		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
20020604	**SM 4500-CL G**			**18th ED**	**1992**		
1940	CHLORINE, RESIDUAL TOTAL		Jul 10, 2008	Jun 2, 2013	D	NMI	NE
20021209	**SM 4500-CN E**			**18th ED**	**1992**		
1645	CYANIDE, TOTAL		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
20022406	**SM 4500-H+B**			**18th ED**	**1992**		
1900	HYDROGEN ION (PH)		Sep 25, 2012	Jun 2, 2013	D	NMI	NE
20025803	**SM 4500-P E**			**18th ED**	**1992**		
1870	ORTHOPHOSPHATE AS P		Dec 9, 2010	Jun 2, 2013	D	NMI	NE
20044808	**SM 2320 B**			**18th ED**	**1992**		
1505	ALKALINITY		Oct 25, 2010	Jun 2, 2013	D	NMI	NE
20045801	**SM 2340 B**			**18th ED**	**1992**		
1750	HARDNESS		Jul 10, 2008	Jun 2, 2013	D	NMI	NE
20047807	**SM 2510 B**			**18th ED**	**1992**		
1610	CONDUCTIVITY		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
20049609	**SM 2540 C**			**18th ED**	**1992**		
1955	RESIDUE, FILTERABLE (TDS)		Jun 3, 2007	Jun 2, 2013	D	NMI	NE
20020808	**SM 4500-CN C**			**18th ED**	**1992**		
1412	CYANIDE, MANUAL DISTILLATION		Jun 15, 2009	Jun 2, 2013	D	PRE	NE
10088809	**EPA 524.2**			**4.1**	**1995**		
5105	1,1,1,2-TETRACHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE

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Method Code / Analyte Code	Method Reference / Analyte Name	Revision	Revision Date: Effective Date	Revision Date: Expiration Date	Matrix Code	Category	Accr. Type
5160	1,1,1-TRICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5110	1,1,2,2-TETRACHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5165	1,1,2-TRICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4630	1,1-DICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4640	1,1-DICHLOROETHENE		Jan 19, 2012	Jun 2, 2013	D	VOC	NE
4670	1,1-DICHLOROPROPENE		Mar 24, 2011	Jun 2, 2013	D	VOC	NE
5150	1,2,3-TRICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5180	1,2,3-TRICHLOROPROPANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5155	1,2,4-TRICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5210	1,2,4-TRIMETHYLBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4610	1,2-DICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4635	1,2-DICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4655	1,2-DICHLOROPROPANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5215	1,3,5-TRIMETHYLBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4615	1,3-DICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4660	1,3-DICHLOROPROPANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4620	1,4-DICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4665	2 2-DICHLOROPROPANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4540	4-CHLOROTOLUENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4910	4-ISOPROPYLTOLUENE (P-ISOPROPYLTOLUENE)		Mar 24, 2011	Jun 2, 2013	D	VOC	NE
4375	BENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4385	BROMOBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4390	BROMOCHLOROMETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4395	BROMODICHLOROMETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE

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4400	BROMOFORM		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4950	BROMOMETHANE (METHYL BROMIDE)		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4455	CARBON TETRACHLORIDE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4475	CHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4485	CHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4505	CHLOROFORM		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4960	CHLOROMETHANE (METHYL CHLORIDE)		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4645	CIS-1 2-DICHLOROETHYLENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4680	CIS-1,3-DICHLOROPROPENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4575	DIBROMOCHLOROMETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4595	DIBROMOMETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4625	DICHLORODIFLUOROMETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4975	DICHLOROMETHANE (METHYLENE CHLORIDE)		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4765	ETHYLBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4835	HEXACHLOROBUTADIENE		Mar 24, 2011	Jun 2, 2013	D	VOC	NE
4840	HEXACHLOROETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4900	ISOPROPYLBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5240	M/P-XYLENE		Jun 3, 2009	Jun 2, 2013	D	VOC	NE
5000	METHYL TERT-BUTYL ETHER (MTBE)		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5005	NAPHTHALENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4435	N-BUTYLBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5015	NITROBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5090	N-PROPYLBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5250	O-XYLENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE

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4440	SEC-BUTYLBENZENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5100	STYRENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5115	TETRACHLOROETHENE (PERCHLOROETHYLENE)		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5140	TOLUENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5205	TOTAL TRIHALOMETHANES		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4700	TRANS-1,2-DICLOROETHYLENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
4685	TRANS-1,3-DICHLOROPROPENE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5170	TRICHLOROETHENE (TRICHLOROETHYLENE)		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5175	TRICHLOROFLUOROMETHANE		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
5235	VINYL CHLORIDE		Jul 21, 2010	Jun 2, 2013	D	VOC	NE
5260	XYLENE (TOTAL)		Jun 3, 2007	Jun 2, 2013	D	VOC	NE
10307105	**SW-846 8260C SIM**						
4735	1,4-DIOXANE (1 4-DIETHYLENEOXIDE)		Mar 12, 2012	Jun 2, 2013	D	VOC	NE
20037405	**SM 9222 D (M-FC)**			**18th ED**	**1992**		
2530	FECAL COLIFORMS		Jun 3, 2007	Jun 2, 2013	N	MIC	NE
20185404	**SM 9221 B (LTB)**			**18th ED**	**1992**		
2500	TOTAL COLIFORMS		Jun 3, 2007	Jun 2, 2013	N	MIC	NE
20202806	**SM 9222 B (M-ENDO)**			**18th ED**	**1992**		
2500	TOTAL COLIFORMS		Jun 3, 2007	Jun 2, 2013	N	MIC	NE
20212800	**SM 9223 B (COLILERT-18 QUANTI-TRAY)**			**18th ED**	**1992**		
2525	ESCHERICHIA COLI		Mar 25, 2011	Jun 2, 2013	N	MIC	NE
20226408	**SM 9221 E (EC)**			**18th ED**	**1992**		
2530	FECAL COLIFORMS		Jul 10, 2008	Jun 2, 2013	N	MIC	NE
60030208	**ENTEROLERT**						
2520	ENTEROCOCCI		May 18, 2012	Jun 2, 2013	N	MIC	NE
10013806	**EPA 200.7**			**4.4**	**1994**		

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1000	ALUMINUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1005	ANTIMONY, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1010	ARSENIC, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1015	BARIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1020	BERYLLIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1025	BORON, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1030	CADMIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1035	CALCIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1040	CHROMIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1050	COBALT, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1055	COPPER, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1760	HARDNESS (CALC.)		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1070	IRON, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1075	LEAD, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1085	MAGNESIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1090	MANGANESE, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1100	MOLYBDENUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1105	NICKEL, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1125	POTASSIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1140	SELENIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1145	SILICON, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1150	SILVER, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1155	SODIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1160	STRONTIUM,TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE

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1165	THALLIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1175	TIN, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1180	TITANIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1185	VANADIUM, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
1190	ZINC, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
10036609	**EPA 245.1**			**3**	**1994**		
1095	MERCURY, TOTAL		Jun 3, 2007	Jun 2, 2013	N	MET	NE
20009001	**SM 3500-CR D**			**18th ED**	**1992**		
1045	CHROMIUM VI		Jun 3, 2007	Jun 2, 2013	N	MET	NE
10013806	**EPA 200.7**			**4.4**	**1994**		
1550	HARDNESS, CALCIUM		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
1910	PHOSPHORUS, TOTAL		Oct 2, 2012	Jun 2, 2013	N	NMI	NE
10053200	**EPA 300.0**			**2.1**	**1993**		
1575	CHLORIDE		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
1730	FLUORIDE		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
1810	NITRATE AS N		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
1825	NITRATE-NITRITE, TOTAL		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
2000	SULFATE		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
10069008	**EPA 360.1**						
1880	OXYGEN, DISSOLVED		Jan 31, 2008	Jun 2, 2013	N	NMI	NE
10079400	**EPA 420.1**				**1978**		
1905	PHENOLICS, TOTAL		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
10261606	**EPA 1664 A (SGT-HEM)**				**1999**		
1860	OIL & GREASE		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20004608	**SM 2540 B**			**18th ED**	**1992**		
1950	RESIDUE, TOTAL		Mar 23, 2011	Jun 2, 2013	N	NMI	NE

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20004802	**SM 2540 D**			**18th ED**	**1992**		
1960	RESIDUE, NON-FILTERABLE (TSS)		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20020604	**SM 4500-CL G**			**18th ED**	**1992**		
1940	CHLORINE, RESIDUAL TOTAL		Jan 27, 2009	Jun 2, 2013	N	NMI	NE
20021209	**SM 4500-CN E**			**18th ED**	**1992**		
1645	CYANIDE, TOTAL		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20022406	**SM 4500-H+B**			**18th ED**	**1992**		
1900	HYDROGEN ION (PH)		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20023603	**SM 4500-NH3 C**			**18th ED**	**1992**		
1515	AMMONIA		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
1795	KJELDAHL NITROGEN, TOTAL (TKN)		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20025803	**SM 4500-P E**			**18th ED**	**1992**		
1870	ORTHOPHOSPHATE AS P		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
1910	PHOSPHORUS, TOTAL		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20027401	**SM 5210 B**			**18th ED**	**1992**		
1530	BIOLOGICAL OXYGEN DEMAND (BOD)		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
1555	CARBONACEOUS BIOLOGICAL OXYGEN DEMAND		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20027809	**SM 5220 D**			**18th ED**	**1992**		
1565	COD		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20044808	**SM 2320 B**			**18th ED**	**1992**		
1505	ALKALINITY		Jun 3, 2007	Jun 2, 2013	N	NMI	NE
20045801	**SM 2340 B**			**18th ED**	**1992**		
1760	HARDNESS (CALC.)		Jul 10, 2008	Jun 2, 2013	N	NMI	NE
20047807	**SM 2510 B**			**18th ED**	**1992**		
1610	CONDUCTIVITY		Jun 3, 2009	Jun 2, 2013	N	NMI	NE
20049609	**SM 2540 C**			**18th ED**	**1992**		
1955	RESIDUE, FILTERABLE (TDS)		Jun 3, 2007	Jun 2, 2013	N	NMI	NE

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20020808	**SM 4500-CN C**			**18th ED**	**1992**		
1412	CYANIDE, MANUAL DISTILLATION		Jun 3, 2009	Jun 2, 2013	N	PRE	NE
20022804	**SM 4500-NH3 B**			**18th ED**	**1992**		
1464	TKN (AMMONIA) DISTILLATION		Jun 3, 2009	Jun 2, 2013	N	PRE	NE
20024800	**SM 4500-NORG B**			**18th ED**	**1992**		
1462	TKN DIGESTION & DISTILLATION		Jun 3, 2009	Jun 2, 2013	N	PRE	NE
10299806	**EPA 624**			**Appendix A**	**1982**		
5105	1,1,1,2-TETRACHLOROETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5160	1,1,1-TRICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5110	1,1,2,2-TETRACHLOROETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5165	1,1,2-TRICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4630	1,1-DICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4640	1,1-DICHLOROETHENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5180	1,2,3-TRICHLOROPROPANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4570	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4585	1,2-DIBROMOETHANE (EDB)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4610	1,2-DICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4635	1,2-DICHLOROETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4655	1,2-DICHLOROPROPANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4615	1,3-DICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4620	1,4-DICHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4410	2-BUTANONE (METHYL ETHYL KETONE MEK)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4500	2-CHLOROETHYLVINYL ETHER		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4860	2-HEXANONE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4995	4-METHYL-2-PENTANONE (MIBK)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE

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4315	ACETONE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4320	ACETONITRILE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4325	ACROLEIN (PROPENAL)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4340	ACRYLONITRILE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4375	BENZENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4395	BROMODICHLOROMETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4400	BROMOFORM		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4950	BROMOMETHANE (METHYL BROMIDE)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4450	CARBON DISULFIDE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4455	CARBON TETRACHLORIDE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4475	CHLOROBENZENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4485	CHLOROETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4505	CHLOROFORM		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4960	CHLOROMETHANE (METHYL CHLORIDE)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4645	CIS-1 2-DICHLOROETHYLENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4680	CIS-1,3-DICHLOROPROPENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4575	DIBROMOCHLOROMETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4595	DIBROMOMETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4625	DICHLORODIFLUOROMETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4975	DICHLOROMETHANE (METHYLENE CHLORIDE)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4765	ETHYLBENZENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5240	M/P-XYLENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5000	METHYL TERT-BUTYL ETHER (MTBE)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5250	O-XYLENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE

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5100	STYRENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5115	TETRACHLOROETHENE (PERCHLOROETHYLENE)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5140	TOLUENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4700	TRANS-1,2-DICLOROETHYLENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
4685	TRANS-1,3-DICHLOROPROPENE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5170	TRICHLOROETHENE (TRICHLOROETHYLENE)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5175	TRICHLOROFLUOROMETHANE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5225	VINYL ACETATE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5235	VINYL CHLORIDE		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
5260	XYLENE (TOTAL)		Jun 3, 2007	Jun 2, 2013	N	VOC	NE
10300002	**EPA 625**			**Appendix A**	**1982**		
5155	1,2,4-TRICHLOROBENZENE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
4610	1,2-DICHLOROBENZENE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
4615	1,3-DICHLOROBENZENE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
4620	1,4-DICHLOROBENZENE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
4835	HEXACHLOROBUTADIENE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
4840	HEXACHLOROETHANE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
5005	NAPHTHALENE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
5015	NITROBENZENE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
5095	PYRIDINE		Jan 27, 2009	Jun 2, 2013	N	VOC	NE
10307105	**SW-846 8260C SIM**						
4735	1,4-DIOXANE (1 4-DIETHYLENEOXIDE)		Mar 12, 2012	Jun 2, 2013	N	VOC	NE
10300002	**EPA 625**			**Appendix A**	**1982**		
5790	1-CHLORONAPHTHALENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6835	2,4,5-TRICHLOROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE

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(603) 673-5440
Lab ID 1008

Method Code / Analyte Code	Method Reference / Analyte Name	Revision	Revision Date: Effective Date	Revision Date: Expiration Date	Matrix Code	Category	Accr. Type
6840	2,4,6-TRICHLOROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6000	2,4-DICHLOROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6130	2,4-DIMETHYLPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6175	2,4-DINITROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6185	2,4-DINITROTOLUENE (2 4-DNT)		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6005	2,6-DICHLOROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6190	2,6-DINITROTOLUENE (2 6-DNT)		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5795	2-CHLORONAPHTHALENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5800	2-CHLOROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6360	2-METHYL-4,6-DINITROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6385	2-METHYLNAPHTHALENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6400	2-METHYLPHENOL (O-CRESOL)		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6460	2-NITROANILINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6490	2-NITROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5945	3,3 -DICHLOROBENZIDINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6465	3-NITROANILINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5660	4-BROMOPHENYL PHENYL ETHER		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5700	4-CHLORO-3-METHYLPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5745	4-CHLOROANILINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5825	4-CHLOROPHENYL PHENYL ETHER		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6470	4-NITROANILINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6500	4-NITROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5500	ACENAPHTHENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5505	ACENAPHTHYLENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE

This analyte list supersedes all previously issued analyte lists. Method accreditation does not imply acceptance for NHDES compliance testing. Customers may verify the laboratory's current accreditation status by calling at (603) 271-2998. Laboratory is required to use EPA approved/accepted methods where required by regulation.

NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

29 Hazen Drive, PO Box 95, Concord, NH 03302 (603) 271-2998

PRIMARY ACCREDITATION PARAMETER LIST

ANALYTE LIST NUMBER: 100812-E

NELAP RECOGNIZED

CHEMSERVE INC
317 ELM ST
MILFORD NH 03055
(603) 673-5440
Lab ID 1008

Method Code / Analyte Code	Method Reference / Analyte Name	Revision	Revision Date: Effective Date	Revision Date: Expiration Date	Matrix Code	Category	Accr. Type
5545	ANILINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5555	ANTHRACENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5595	BENZIDINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5575	BENZO(A)ANTHRACENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5580	BENZO(A)PYRENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5585	BENZO(B)FLUORANTHENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5590	BENZO(G,H,I)PERYLENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5600	BENZO(K)FLUORANTHENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5610	BENZOIC ACID		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5630	BENZYL ALCOHOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5670	BENZYL BUTYL PHTHALATE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5760	BIS(2-CHLOROETHOXY) METHANE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5765	BIS(2-CHLOROETHYL) ETHER		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5780	BIS(2-CHLOROISOPROPYL) ETHER		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6065	BIS(2-ETHYLHEXYL) PHTHALATE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5680	CARBAZOLE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5855	CHRYSENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5895	DIBENZO(A,H)ANTHRACENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5905	DIBENZOFURAN		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6070	DIETHYL PHTHALATE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6135	DIMETHYL PHTHALATE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
5925	DI-N-BUTYL PHTHALATE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6200	DI-N-OCTYL PHTHALATE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6265	FLUORANTHENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE

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NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

29 Hazen Drive, PO Box 95, Concord, NH 03302 (603) 271-2998

PRIMARY ACCREDITATION PARAMETER LIST

ANALYTE LIST NUMBER: 100812-E

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CHEMSERVE INC
317 ELM ST
MILFORD NH 03055
(603) 673-5440
Lab ID 1008

Method Code / Analyte Code	Method Reference / Analyte Name	Revision	Revision Date: Effective Date	Revision Date: Expiration Date	Matrix Code	Category	Accr. Type
6270	FLUORENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6315	INDENO(1,2,3-CD)PYRENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6320	ISOPHORONE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6530	N-NITROSODIMETHYLAMINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6545	N-NITROSODI-N-PROPYLAMINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6535	N-NITROSODIPHENYLAMINE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6605	PENTACHLOROPHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6615	PHENANTHRENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6625	PHENOL		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
6665	PYRENE		Jan 27, 2009	Jun 2, 2013	N	SBN	NE
10296205	**EPA 608**			**Appendix A**	**1982**		
8880	AROCLOR-1016 (PCB-1016)		Jun 3, 2007	Jun 2, 2013	N	SPC	NE
8885	AROCLOR-1221 (PCB-1221)		Jun 3, 2007	Jun 2, 2013	N	SPC	NE
8890	AROCLOR-1232 (PCB-1232)		Jun 3, 2007	Jun 2, 2013	N	SPC	NE
8895	AROCLOR-1242 (PCB-1242)		Jan 19, 2011	Jun 2, 2013	N	SPC	NE
8900	AROCLOR-1248 (PCB-1248)		Jun 3, 2007	Jun 2, 2013	N	SPC	NE
8905	AROCLOR-1254 (PCB-1254)		Jun 3, 2007	Jun 2, 2013	N	SPC	NE
8910	AROCLOR-1260 (PCB-1260)		Jun 3, 2007	Jun 2, 2013	N	SPC	NE
7355	4,4-DDD		Jan 27, 2009	Jun 2, 2013	N	SPE	NE
7360	4,4-DDE		Jan 27, 2009	Jun 2, 2013	N	SPE	NE
7365	4,4-DDT		Jan 27, 2009	Jun 2, 2013	N	SPE	NE
7025	ALDRIN		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7110	ALPHA-BHC (ALPHA-HEXACHLOROCYCLOHEXANE)		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7115	BETA-BHC (BETA-HEXACHLOROCYCLOHEXANE)		Jun 3, 2007	Jun 2, 2013	N	SPE	NE

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NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

29 Hazen Drive, PO Box 95, Concord, NH 03302 (603) 271-2998

PRIMARY ACCREDITATION PARAMETER LIST

ANALYTE LIST NUMBER: 100812-E

NELAP RECOGNIZED

CHEMSERVE INC
317 ELM ST
MILFORD NH 03055
(603) 673-5440
Lab ID 1008

Method Code / Analyte Code	Method Reference / Analyte Name	Revision	Revision Date: Effective Date	Revision Date: Expiration Date	Matrix Code	Category	Accr. Type
7250	CHLORDANE (TECH.)		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7105	DELTA-BHC		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7470	DIELDRIN		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7510	ENDOSULFAN I		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7515	ENDOSULFAN II		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7520	ENDOSULFAN SULFATE		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7540	ENDRIN		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7530	ENDRIN ALDEHYDE		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7535	ENDRIN KETONE		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7120	GAMMA-BHC (LINDANE)		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7685	HEPTACHLOR		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7690	HEPTACHLOR EPOXIDE		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
7810	METHOXYCHLOR		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
8250	TOXAPHENE (CHLORINATED CAMPHENE)		Jun 3, 2007	Jun 2, 2013	N	SPE	NE
10300002	**EPA 625**			**Appendix A**	**1982**		
6275	HEXACHLOROBENZENE		Jan 27, 2009	Jun 2, 2013	N	SPE	NE
6285	HEXACHLOROCYCLOPENTADIENE		Jan 27, 2009	Jun 2, 2013	N	SPE	NE
10179007	**SW-846 8082**			**0**	**1996**		
8880	AROCLOR-1016 (PCB-1016)		Sep 30, 2009	Jun 2, 2013	SC	SPC	NE
8885	AROCLOR-1221 (PCB-1221)		Sep 30, 2009	Jun 2, 2013	SC	SPC	NE
8890	AROCLOR-1232 (PCB-1232)		Sep 30, 2009	Jun 2, 2013	SC	SPC	NE
8895	AROCLOR-1242 (PCB-1242)		Sep 30, 2009	Jun 2, 2013	SC	SPC	NE
8900	AROCLOR-1248 (PCB-1248)		Sep 30, 2009	Jun 2, 2013	SC	SPC	NE
8905	AROCLOR-1254 (PCB-1254)		Sep 30, 2009	Jun 2, 2013	SC	SPC	NE
8910	AROCLOR-1260 (PCB-1260)		Sep 30, 2009	Jun 2, 2013	SC	SPC	NE

This analyte list supersedes all previously issued analyte lists. Method accreditation does not imply acceptance for NHDES compliance testing. Customers may verify the laboratory's current accreditation status by calling at (603) 271-2998. Laboratory is required to use EPA approved/accepted methods where required by regulation.

NEW HAMPSHIRE ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

29 Hazen Drive, PO Box 95, Concord, NH 03302 (603) 271-2998

PRIMARY ACCREDITATION PARAMETER LIST

ANALYTE LIST NUMBER: 100812-E

NELAP RECOGNIZED

CHEMSERVE INC
317 ELM ST
MILFORD NH 03055
(603) 673-5440
Lab ID 1008

Method Code / Analyte Code	Method Reference / Analyte Name	Revision	Revision Date: Effective Date	Revision Date: Expiration Date	Matrix Code	Category	Accr. Type

1008 / Dec 19, 2012

Bill Hall
NH ELAP Program Manager
Issue Date: December 19, 2012

Matrix Legend: D=Drinking Water; N=Non-Potable Water; SC=Solid and Chemical Materials

Category Legend: MIC=Microbiology; MET=Metals; NMI=Non-Metal Inorganics; PRE=Preparation; VOC=Volatile Organic Compounds; SBN=SVOC-BNA; SHE=SVOC-Herbicides; SNO=SVOC-NOS; SPC=SVOC-PCB; SPE=SVOC-Pesticides; RAD=Radiochemistry; WET=Wet

Accreditation Legend: NE=NELAP; NH=NH State Certification; CE=State Certification; IN=Interim (NELAP); WI=Withdrawn; AP=Applied; RE=Revoked; SU=Suspended

This analyte list supersedes all previously issued analyte lists. Method accreditation does not imply acceptance for NHDES compliance testing. Customers may verify the laboratory's current accreditation status by calling at (603) 271-2998. Laboratory is required to use EPA approved/accepted methods where required by regulation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

CHEMSERVE ENVIRONMENTAL ANALYSIS
317 Elm Street
Milford, NH 03055
Heather Marmorstein Phone: 603 673 5440
heatherm@chemservelab.com

CHEMICAL

Valid To: August 31, 2013 Certificate Number: 2891.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on consumer and children's products:

Test Technology	Test Methods
Lead in Paint by ICP	CPSC-CH-E1003-09; EPA 200.7, EPA 6010C
Lead in Children's Metal Products by ICP (including jewelry)	CPSC-CH-E1001-08.1; EPA 200.7, EPA 6010C
Total Lead in Non-Metal Children's Products by ICP	CPSC-CH-E1002-08.1; EPA 200.7, EPA 6010C
Extractable Cadmium in Children's Metal Products by ICP	CPSC-CH-E1004-01; EPA 200.7, EPA 6010C
Phthalates in Children's Products by GC/MS	CPSC-CH-C1001-09.3; SW-846 8270D
Standard Consumer Safety Specification for Toy Safety - Metals in Toys by ICP (As, Ba, Cd, Cr, Hg, Sb, Se)	ASTM F963-08 Sections 4.3.5.2, 8.3; EPA 200.7, EPA 6010C
Elements in Paint, Metal Products and Non-Metal Products by ICP (As, Ba, Cd, Cr, Cu, Hg, Ni, Sb, Se, Zn)	SW-846 3052, SW-846 6010C
Extractable Lead and Cadmium from Glazed Ceramic Surfaces	ASTM C738-94 (extraction); EPA 200.7, EPA 6010C
Elements in Polymeric Materials by XRF (Br, Cd, Cr, Hg, Pb)	ASTM F2617-08; CPSC-CH-E1002-08.1
PBB/PBDE in Non-Metal Products by GC/MS	SW-846 3546, SW-846 8270D

5301 Buckeystown Pike, Suite 350 | Frederick, Maryland 21704-8373 | Phone: 301 644 3248 | Fax: 301 662 2974 | www.A2LA.org

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

CHEMSERVE ENVIRONMENTAL ANALYSIS

Milford, NH

for technical competence in the field of

Chemical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 29th day of December 2011.

President & CEO
For the Accreditation Council
Certificate Number 2891.01
Valid to August 31, 2013

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Chemical Scope of Accreditation.

The Commonwealth of Massachusetts

Department of Environmental Protection

Division of Environmental Analysis
Senator William X. Wall Experiment Station

certifies

M-NH023

CHEMSERVE
317 ELM ST
MILFORD, NH 03055-0000

Laboratory Director: **JAY W. CHRYSTAL**

for the analysis of

POTABLE WATER (CHEMISTRY)
POTABLE WATER (MICROBIOLOGY)
NON POTABLE WATER (MICROBIOLOGY)
NON POTABLE WATER (CHEMISTRY)

pursuant to 310 CMR 42.00

This certificate supersedes all previous Massachusetts certificates issued to this laboratory. The laboratory is regulated by and shall be responsible for being in compliance with Massachusetts regulations at 310 CMR 42.00.

This certificate is valid only when accompanied by the latest dated Certified Parameter List as issued by the Massachusetts D.E.P. Contact the Division of Environmental Analysis to verify the current certification status of the laboratory.

Certification is no guarantee of the validity of the data. This certification is subject to unannounced laboratory inspections.

Oscar C. Jacobs

Director, Division of Environmental Analysis

Issued: **01 JUL 2012**

Expires: **30 JUN 2013**

State of New Hampshire
Environmental Laboratory Accreditation Program

Awards
PRIMARY ACCREDITATION
to

CHEMSERVE INC

of

MILFORD, NH

For the analytes listed on the attached page(s) in accordance with the provisions on the NELAC Standards and Env-C 300.

Certificate Number: 100812
Effective Date: June 3, 2012
Expiration Date: June 2, 2013
Laboratory ID: 1008

NELAP RECOGNIZED

Bill Hall
NH ELAP Program Manager

Method accreditation does not imply acceptance for NHDES compliance testing. Laboratory is required to use EPA-approved methods where required by regulation. Continuing accreditation status is dependent on successful ongoing participation in the program. Customers may verify the lab's current accreditation status by calling (603) 271-2998.

105

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 1, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JAY W. CHRYSTAL
CHEMSERVE
317 ELM STREET
MILFORD, NH 03055

NY Lab Id No: 10657

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Bacteriology

Coliform, Total / E. coli (Qualitative)	SM 18-21 9222B(97)/40CFR141.21(F)6i.
	SM 18-21 9223B (97) (Colilert)
E. coli (Enumeration)	SM 18-21 9223B (97) (Colilert)
Standard Plate Count	SM 18-21 9215B

Serial No.: 46121

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 1, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JAY W. CHRYSTAL
CHEMSERVE
317 ELM STREET
MILFORD, NH 03055

NY Lab Id No: 10657

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB-1016	EPA 8082
PCB-1221	EPA 8082
PCB-1232	EPA 8082
PCB-1242	EPA 8082
PCB-1248	EPA 8082
PCB-1254	EPA 8082
PCB-1260	EPA 8082

Serial No.: 46122

Laboratory Scope of Accreditation

Attachment to Certificate of Accreditation 004, expiration date July 31, 2013. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

State Laboratory ID: 68-03619 **EPA Lab Code:** NH00023 (603) 673-5440

Chemserve
317 Elm Street
Milford, NH 03055

Program Drinking Water

Method	Analyte	Accreditation Type	Primary	Effective Date
SM 9215 B	Heterotrophic bacteria (Enumeration)	NELAP	NH	7/19/2010
SM 9223 Colilert	Total coliform & E. coli	NELAP	NH	2/8/2011
SM 9223 Colilert	Total coliform (Enumeration)	NELAP	NH	7/19/2010

State of Rhode Island and Providence Plantations
DEPARTMENT OF HEALTH
Certifies

LAO00313

CHEMSERVE
317 ELM STREET
MILFORD NH 03055
Laboratory Director: JAY CHRYSTAL

for the analysis of: **Non-potable Water Organic Chemistry - Non-potable Water Inorganic Chemistry -**

This certificate is issued, pursuant to Rhode Island General Laws 23-16.2 and supersedes all previous Rhode Island certificates issued to this laboratory. Certification is no guarantee of the validity of the laboratory results.

This certificate is valid only when accompanied by the certificate and list of analytes and methods for which certification has been granted based upon the following out of state certification(s):

Certifying Authority	*Certification Number*	*Expiration Date*
NH	*100811*	*06/02/2012*

CHEMSERVE is responsible for maintaining each of the certifications listed above. Failure to notify the Laboratory Certification Officer of any change in the status of these certifications may result in the suspension or revocation of certification. Contact the Laboratory Certification Officer to verify the current certification status of this laboratory.

Michael Fine, MD
Director of Health

Expires: 12/30/2012

THIS CERTIFICATE IS TO BE CONSPICUOUSLY DISPLAYED AT THE LABORATORY IN A LOCATION VISABLE TO THE PUBLIC

ATTACHMENT #9

Demonstration of Capability
Precision and Accuracy
Certification Statement

Analyst:
Matrix:
Method:
Data Location:

We, the undersigned, certify that:

1. The analyst identified above, using the cited method which is in use at this facility for the analysis of samples under the National Environmental Laboratory Accreditation Program, have met the demonstration of capability.
2. The test method was performed by the analyst identified on this certificate.
3. A copy of the test method and the laboratory specific SOP is available for all personnel on site.
4. The data associated with the demonstration capability are true, accurate, complete and self-explanatory.
5. All raw data (including a copy of this certification form) necessary to reconstruct and validate these analyses have been retained at the facility, and that the associated information is well organized and available for review by authorized assessors.

Paul Fyfe		
Manager Name and Title	Signature	Date
Heather Marmorstein		
QA Manager Name	Signature	Date

ChemServe Environmental
317 Elm Street
Milford, NH 03055

Appendix D
Training Program Outline

Sample Training Program

1. Facility Sampling Plan
    a. Where do operators currently take their samples
    b. Where do they need to take them for the project samples
2. Samples
    a. Grab
    b. Composite
    c. Type of samples used for project
    d. Sample days
3. Proper Sampling Techniques
    a. Ensuring representative samples
    b. Cleaning sampling equipment
4. Sample Containers & Labeling
    a. Proper sampling container
    b. Proper labeling
        i. Time
        ii. Operator taking samples
        iii. Date
        iv. Location
5. Splitting Samples
    a. What is a split sample
    b. What samples will be split and why
6. Sample Preservation/Storage
    a. Need for preservation
    b. Keeping samples at 4^{o} C
    c. Need for other preservatives
7. Chain of Custody Forms
    a. Purpose of COC forms
    b. How to fill them out
    c. Who signs them
    d. Who keeps them
8. Shipping Samples
    a. Packaging them for transport to Chemserve
    b. When to transport

Appendix E
Sample Log Sheet

NEIWPCC Low Cost Nitrogen Removal Retrofit Study

Sample Collection Log

Name of Facility: _____

Sample Description	Sample Number	Collection Date	Collection Time	Person Collecting Sample	Type (Grab or Composite)	Flow (Instantaneous for Grab; Avg Daily for Comp)	Preservation Used	Notes

NEIWPCC
New England Interstate Water Pollution Control Commission

This Project was funded by an agreement (L196144501) awarded by the Environmental Protection Agency to the New England Interstate Water Pollution Control Commission.

Appendix F
Chemserve Chain of Custody Form

Chain of Custody No.

Multiple COC's Yes No

_____ _____ _____

ChemServe ENVIRONMENTAL ANALYSTS

CHAIN OF CUSTODY

317 Elm Street Milford, NH 03055
(603) 673-5440/ Fax (603) 673-0366

Ⓐ CUSTOMER INFORMATION

CUSTOMER: _____

ADDRESS: _____

CITY/STATE/ZIP _____

TELEPHONE: _____

REPORT TO: _____

P.O. NUMBER: _____

Ⓑ PROJECT INFORMATION

JOB NAME: _____

JOB NUMBER: _____

LOCATION: _____

TELEPHONE: _____

CONTACT: _____

QUOTE NUMBER: _____

Ⓒ SAMPLE INFORMATION

TURNAROUND TIME: (CIRCLE ONE:)

STANDARD RUSH

RUSH T.A.T. _____ (CHECK w/LAB)

MCP ☐ YES ☐ NO ☐ GWI ☐ GW2 ☐ GW3

STATION # Ⓓ	SAMPLE IDENTIFICATION & LOCATION Ⓔ	COLLECTED Ⓕ DATE	COLLECTED Ⓖ TIME	SAMPLE TYPE Ⓗ GRAB	SAMPLE TYPE Ⓗ COMP	Ⓘ MATRIX (SOLID (S) LIQUID (L) COMBINED (C) HAZARD (H))	Ⓙ # OF CONTAINERS	Ⓚ CONTAINER AND PRESERVATIVE	Ⓛ ANALYSIS
		DATE	TIME						
		DATE	TIME						
		DATE	TIME						
		DATE	TIME						
		DATE	TIME						
		DATE	TIME						
		DATE	TIME						
		DATE	TIME						

Ⓜ CUSTODY SAMPLER: _____ (print name)

SIGNATURE:

	DATE	MILITARY TIME
RELINQUISHED:	DATE	TIME
RECEIVED:	DATE	TIME
RELINQUISHED:	DATE	TIME
RECEIVED FOR LAB:	DATE	TIME

SAMPLE CHECK LIST:

RECEIVED WITHIN HOLD TIME YES OR NO

RECEIVED IN GOOD CONDITION YES OR NO

TEMP BLANK _____ °C

SHIPPED OR HAND DELIVERED

SAMPLES WERE PROPERLY PRESERVED YES NO N/A

SAMPLES WERE FILTERED IN FIELD LAB N/A

IF NO EXPLAIN:

GROUP #

FIELD READING(S) & COMMENTS: