New England States' Sample Collection & Preservation Guidance Manual For Drinking Water

2009
Revision 4.2
May 1, 2009

Disclaimer

The intent of this guidance document is to provide the reader with a compilation of sampling instructions for many drinking water contaminants of concern. These instructions have been drawn from various EPA-approved methods of analysis and are presented in a consistent format for ease of use. This document itself does not impose legally binding requirements on states, authorized tribes or the regulated community and does not substitute for Safe Drinking Water Act (SDWA) requirements and EPA regulations; however, it does adhere to these requirements and regulations. It has been prepared by a workgroup including the federal, state, municipal and private sector participants listed below.

Drinking Water Sampling Guidance Manual Developers

- James Bonofiglio, City of Worcester Municipal Laboratory, Worcester, MA
- Darlene Capuano, Laboratory Director, BAL Laboratory, Cranston, RI
- Art Clark, U.S. Environmental Protection Agency, Region I, Quality Assurance Unit, North Chelmsford, MA.
- Joseph Gaydosh, Principal Chemist, Quality Assurance Section, Connecticut Department of Public Health Laboratory, Hartford, CT
- Fred Kwolek, Drinking Water Quality Program, Rhode Island Department of Health, Providence, RI
- Ellie Kwong, U.S. Environmental Protection Agency, Region I, Drinking Water Program, Boston, MA.
- Chuck Larson, New England Water Works, Holliston, MA
- Dr. Henry Leibovitz, Chief, Environmental Sciences/Certification Officer, Rhode Island Health Laboratories, Providence, RI
- Edmond Luce, Quality Assurance Officer, Vermont Department of Health Laboratory, Burlington, VT
- James Curlett, Maine Department of Health & Human Services, Health & Environmental Testing Laboratory, Augusta, ME
- Richard French, Quality Assurance Officer, Maine Department of Health & Human Services, Health & Environmental Testing Laboratory, Augusta, ME
- Ann Jefferies, U.S. Environmental Protection Agency, Region I, Quality Assurance Unit, North Chelmsford, MA.
- Robert Serabian, Quality Assurance Officer, Massachusetts Department of Environmental Protection Laboratory, Lawrence, MA

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ChapterTitle

5 Individual Sampling Standard Operating Procedures, (continued)

Inorganic Chemicals - Common Anions and Inorganic Disinfection By–Products

Analytes: Bromate, Bromide, Bromite, Chlorate, Chlorite, Fluoride, Combined Nitrate plus Nitrite, Nitrate, Nitrite, Ortho-phosphate, Sulfate

SOP: Common Anions and Inorganic Disinfection By-Products

Inorganic Chemicals - Inorganic Chemicals and Physical Tests

Analyte: Alkalinity, Chlorine, Chlorine Dioxide, Color, Conductivity, Hardness, Odor, pH, Surfactants (Foaming Agents), Turbidity

SOP: Inorganic Chemicals and Physical Tests

Inorganic Chemicals - Cyanide

Analyte: Cyanide

SOP: Cyanide

Inorganic Chemicals - Asbestos

Analyte: Asbestos

SOP: Asbestos

Inorganic Chemicals - SUVA

Analyte: SUVA

SOP: SUVA

Total Organic Carbon (TOC)

Rule: Stage 1 DDBPR, LT1

Analyte: Total Organic Carbon

SOP: Total Organic Carbon

Volatile Organics (VOC)

Rules: SDWA

Analytes: Volatile Organic Compounds (VOC) Benzene, Carbon tetrachloride, o-Dichlorobenzene, p-Dichlorobenzene, 1,2-Dichlorethane, 1,1-Dichlorethylene, cis-Dichlorethylene, trans-Dichlorethylene, Dichloromethane, 1,2-Dichloropropane, Ethylbenzene, Styrene, Tetrachloroethylene, 1,2,4-Trichlorobenzene,

Chapter	Title
5	Individual Sampling Standard Operating Procedures, (continued)

Volatile Organics (VOC) [CONTINUED]

1,1,1-Trichlorethane, 1,1,2-Trichlorethane, Trichloroethylene, Toluene, Vinyl Chloride, Xylenes

SOP: Volatile Organic Compounds (VOCs) and Trihalomethanes (THMs)

Total Trihalomethanes (TTHMs)

Rules: SDWA, Stage 1 DDBPR, LT1

Analytes: **Trihalomethanes**
Chloroform, Bromodichloromethane, Chlorodibromomethane, Bromoform

SOP: Volatile Organic Compounds (VOCs) and Trihalomethanes (THMs)

Haloacetic Acids (HAA5)

Rules: SDWA, Stage 1 DDBPR, LT1

Analytes: Monochloroacetic acid, Dichloroacetic acid, Trichloroacetic acid, Monobromoacetic acid, Dibromoacetic acid

SOP: Haloacetic Acids (HAA5)

Synthetic Organic Chemicals (SOCs)

Rules: SDWA

SOCs - Pesticides/PCB's

Analytes: Chlordane, Endrin, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lindane, Methoxychlor, PCBs (as Aroclors), Simazine, Toxaphene

SOP: Synthetic Organic Chemicals (SOCs)

SOCs - Herbicides

Analytes: 2,4-D, 2,4,5-TP (Silvex), Dinoseb

SOP: Synthetic Organic Chemicals (SOCs)

SOCs - Carbamates

Analytes: Aldicarb, Carbofuran, Oxamyl (Vydate)

SOP: Synthetic Organic Chemicals (SOCs)

SOCs - EDB/DBCP

Analyte: Ethlene Dibromide (EDB), Dibromochloropropane (DBCP)

SOP: Synthetic Organic Chemicals (SOCs)

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5 Individual Sampling Standard Operating Procedures, (continued)

SOCs - Others

Analyte: Alachlor, Atrazine, Benzo(a)pyrene (PAH), Dalapon, Di(2-ethylhexl)adipate, Di(2-ethylhexyl)phthalate, Diquat, Dioxin (2,3,7,8-TCDD), Endothall, Glyphosate

SOP: Synthetic Organic Chemicals (SOCs)

Radionuclides

Rules: Radionuclides Rule

Analyte: Beta/photon emitters, Gross Alpha, Radium 226, Radium 228, Uranium, Radioactive Cesium, Radioactive Iodine, Radioactive Strontium 89 and 90, Tritium, Gamma Emitting Radionuclides

SOP: Radionuclides

Radon

Rules Proposed Radon Rule

Analyte: Radon

SOP: Radon

For **Connecticut**, the SOP is : CTRadon in the State Specific Instructions

Chapter One - Introduction to Common Sampling Manual

1.0 Introduction

This manual was first developed in 2000 by the EPA New England (Region 1) office of the U.S. Environmental Protection Agency and the New England States' Drinking Water Programs. The intent was to address the need for consistency in public drinking water sampling protocols across these states. This document is a complete revision of that manual.

1.1 Purpose of this Manual

This document was created to assist sampling personnel in collecting public drinking water samples using standard procedures that comply with federal guidelines.

1.2 Scope of Manual

The manual summarizes national guidelines and procedures for sampling ground water and surface water supplies for monitoring drinking water quality. Federal regulations set the minimum standards and regulations for the collection of samples and the monitoring of drinking water.

State regulations must be at least as stringent as federal regulations and may go beyond the minimum federal criteria. Therefore, to make sure that samples are taken in compliance with specific state requirements in the state where the samples will be taken, please refer to Chapter 5 of this document or contact your state drinking water program before samples are taken.

1.3 How to Use This Manual

This manual is comprised of five chapters. In this, the first chapter, an overview of the many aspects of sample collection is presented, along with some general guidance to make each sampling event safe for the sampler, representative of the sampling site, and in compliance with federal and state regulations.

The second chapter is devoted to definitions needed to understand the SOP's and other information included in this manual.

The third chapter contains information on sampling containers, preservatives, and holding times that relate to the contaminants for which samples are being collected.

The fourth chapter provides state-specific information relative to the templates and sampling procedures because each state may have slightly different requirements, especially in terms of laboratory paperwork (i.e., chain of custody forms), equipment (i.e., bottle type and size), etc. It also includes a list of the laboratory certification officers for each state and their web sites for lists of their certified labs, if any.

The fifth chapter includes detailed sample collection and preservation instructions for each of the biological and chemical substances for which public water supplies must test. (The drinking water regulated analytes associated with each sampling SOP are provided in the Table of Contents.) Each standard operating procedure (SOP) is a stand-alone document that can be removed from the manual and taken to the field to provide step-by-step instructions in taking a compliant sample. They are based upon sampling guidance given in the appropriate EPA (approved) methods. EPA-approved methods for drinking water analysis are listed in Chapter 40 of the Code of Federal Regulations (CFR), Part 141.

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2.0 Water System Responsibilities

In general, the water system is responsible for the following tasks in terms of monitoring:

- performing field tests (if applicable),
- properly collecting all necessary samples in compliance with state and federal regulations,
- completing sample paperwork,
- submitting samples to certified or accredited laboratories within allowed holding times,
- collecting samples for confirmation (if necessary) and
- providing payment for analyses,
- keeping records of sampling results.

Although the water system may designate another party (such as the certified operator) to submit samples, it is ultimately the responsibility of the system owner to make sure the samples are taken properly and the results are submitted to the state program.

If samples are incorrectly taken or preserved, analyzed by uncertified (or unaccredited) laboratories, submitted beyond appropriate holding times, submitted with incomplete or inappropriate paperwork, or taken from inappropriate sampling sites, then the samples will be deemed unacceptable and rejected. Failure to submit valid test results to the state program within the required compliance period (because samples have been rejected by the laboratory and not analyzed) may result in a monitoring violation.

3.0 General Sampling Requirements

3.1 Sampler Requirements

3.1.1 In some states, only water supply program staff are authorized to collect compliance samples. Other states require that the sampler be certified. Check with your state drinking water program for its specific requirements or see Chapter 4 of this manual.

3.1.2 Before collecting any samples, all samplers should receive thorough training in proper sampling protocol. This training should include segments on proper procedures for storage and filling of sample containers, handling of preservatives, safety protocols, cleaning of sampling and field equipment, disposal of excess preservatives, and packaging and shipping requirements. Training may be offered by state drinking water programs or other sources. Contact the state laboratories at the numbers given in Chapter 4 for further information.

3.1.3 Measuring devices, such as pH or conductivity meters, used for field monitoring must be maintained and calibrated daily following the EPA-approved analytical methods and the manufacturers' instructions. The calibration standards used must be within their expiration dates and free of suspended matter. Probes must be washed with deionized water after each use and stored according to instructions. Other equipment items used to collect samples also must be rinsed with deionized water and kept clean between sampling events to prevent contamination of the samples.

3.1.4 Appropriate sample containers must be used. Generally, your laboratory will provide sample containers that have been specially prepared, depending on the end use (e.g., bacteria bottles are sterilized, metals containers are acid washed, glass vials used for VOCs are washed and oven-dried, and bottles used for SOCs are washed and triple-rinsed with organic solvents). These containers should not be opened until the actual sampling event. Sampling containers that have been compromised in any way, e.g., by being touched on the threads or the interior surfaces, must not be used. Chapter 3 provides information on containers, preservatives, and holding times.

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3.2 Laboratory Requirements

3.2.1 Only laboratories certified (accredited) by their resident state's laboratory certification (accreditation) program or state/federal laboratories certified (accredited) by EPA are allowed to perform compliance testing for microbiology, inorganic, organic, and radiochemistry parameters. Prospective clients should make sure that the laboratory, which will analyze their samples, is certified (accredited) for the specific parameters involved. Turbidity, chlorine residual, and pH monitoring are some of the exceptions to the laboratory certification (accreditation) requirements for performing analyses. These tests can be performed by any person acceptable to the state.

3.2.2 State principal laboratories or laboratories certified (accredited) by the state should supply containers, preservatives, and any trip blanks (field reagent blanks) for sampling. The containers, blanks, and preservatives used must be free of contaminants at the detection levels of each parameter of interest.

3.3 Number and Frequency of Drinking Water Samples

The number of drinking water samples to be collected is determined by each state drinking water program. In general, the state program will notify the water system in advance about the specific analyses required and the sampling time(s) and location(s). As mentioned previously, some states will have their staff take the required samples.

The federal drinking water regulations can be found in Section 40 of *The Code of Federal Regulations (CFR)*, Parts 141 and 143. Local and state regulations can be obtained from the appropriate local and state agencies.

3.4 Sampling Locations

The location for sample collection depends on:

- the water source,
- the analyses to be performed,
- the purpose for the testing and
- regulatory requirements.

Samples may be collected from the source prior to treatment, at the point of entry (before or after treatment), at the point of use (at the tap), or within the distribution system. For example, volatile organic compound (VOC) samples are usually taken at the entry point of the distribution system. (Total trihalomethane samples are taken at points within the system as determined by the Stage 2 Disinfectants and Disinfectant Byproducts Rule.) Lead and copper samples are taken at the point of use. The appropriate sampling point is determined by each state agency based on the criteria listed above. Many states assign sampling sites for each type of test. In the absence of state-approved sampling sites, samples should be taken at an appropriate entry or distribution point to the system.

3.5 Paperwork Submitted with Samples

Appropriate paperwork must accompany all samples to the laboratory. Each state requires specific information to identify the sample, the sampling time, and the sampling location. Forms for providing this information can be obtained from your state program. As a reminder, the submittal of any paperwork that is incomplete or inaccurate will result in the rejection of the sample by either the laboratory or the state program.

3.6 Analytical Methods

When samples are submitted to certified laboratories for analysis, the water system must notify the lab that the samples are for drinking water compliance purposes to ensure that appropriate methods are used and

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that the data are transmitted to the state drinking water program. (Only EPA-approved methods of analysis can be used.)

3.7 Quality Control Measures

3.7.1 *Field duplicates*. It is important for samplers to demonstrate proper sampling techniques by taking field duplicate samples on a regular basis. Field duplicates are two samples taken immediately one after the other from the same source in separate sample containers. Both will be analyzed by the laboratory, which will calculate the Relative Percent Difference between the results. This is a measure of the overall precision of analysis. Field duplicates should be collected for least 10% of all samples and more often when only small batches of samples are taken per sampling event.

3.7.2 *Extra volumes for lab QC measures.* Laboratories routinely perform quality control procedures, such as the analysis of spiked samples and the analysis of laboratory duplicates, which require extra volumes of samples. For this reason samplers are encouraged to take extra sample volumes for at least 10% of their sampling activities so that the laboratories can perform these vital QC procedures. (These extra volumes should be provided in addition to the field duplicates mentioned in the previous paragraph.)

3.8 Sampling and Safety Tips to Help Meet Requirements

3.8.1 All samples should be taken at faucets that are not threaded. In addition, faucet aerators and screens should be removed before taking samples, except for lead and copper compliance samples. Anything attached to the end of the faucet, e.g., hoses or filters, should be removed before taking samples.

3.8.2 Ice is not a packing material. Glass sample bottles should be wrapped in bubble wrap or other protective material to prevent breakage during shipping.

3.8.3 Chemical fumes from any source can potentially contaminate samples. Whenever sampling, the sampler should be conscious of his/her surroundings. For example, samples should not be taken near motor exhaust from any pump or vehicle because it will contaminate them. In addition, if sampling for volatile organic compounds (VOCs), it is not advisable to refuel vehicles either on the way to the site or while the samples are being transported to the lab.

3.8.4 Sample containers will be contaminated if the inside of the cap is touched or if the septum of a radon or VOC vial is reversed. If this should occur, the container must not be used. All containers must be kept closed until ready for use.

3.8.5 It is highly recommended that safety eye protection and gloves be worn while collecting samples. Such protective devices are readily available. **Many of the chemicals used to preserve samples are highly acidic or caustic. They can cause severe burns to eyes, skin, and clothing if they are splashed or spilled.** Sometimes these chemicals are added to the samples in the field. However, they may already be in the empty containers when they are obtained from the container provider. The gloves of choice should be phthalate-free made of nitrile. Nitrile gloves provide the best overall protection from most chemicals while still allowing dexterity. Many other types of gloves contain phthalates, which can contaminate samples for synthetic organic compounds (SOCs). Only phthalate-free gloves should be worn when collecting samples for SOCs. If such gloves are not available, the sampler must remove all gloves and wash his/her hands before collecting the samples (without gloves).

3.8.6 The sampling point(s) of each water system should be evaluated to determine the actual flushing time needed to remove the stagnant water before samples are taken. This is determined by measuring the temperature with a thermometer. Samples should not be taken until the temperature has stabilized. This is the minimum flushing time; it should be recorded for future use. Placing this information on a tag attached to the sampling faucet is suggested.

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3.8.7 A ballpoint pen or waterproof marker should be used when writing on sample tags to reduce bleeding of ink. If icing is required, samples should be placed on ice immediately after collection. When the weather is very warm, it may be advisable to pre-chill the samples in a refrigerator prior to packing on ice, this avoids depleting the ice to drop the temperature so it lasts longer. Placing filled sample containers in zip lock plastic bags prior to icing helps with sample organization, avoids wet sample tags, and results in less confusion when the samples reach the laboratory.

3.8.8 Well pits, ditches, and below-ground pumping stations, pipe raceways and vault systems are extremely dangerous sources from which to collect samples. Before entering confined spaces of any type, samplers must comply with the requirements of 29 CFR 1910.146, Permit Required Confined Space. Specially trained samplers and backup teams are required.

3.8.9 In general, preserved water samples are known environmental samples and are typically exempt from DOT and IATA (aircraft) shipping requirements. However, these regulations must be observed when shipping the preservatives or pre-preserved bottles via ground or air.

3.8.10 Sample containers that have preservatives in them should be labeled accordingly. The specific chemicals should be identified. This applies to empty containers to which preservatives are added before use as well as containers filled with sample.

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Chapter 2 - Glossary

chain-of-custody form. A physical document stating the name of the individual having physical custody of samples from a sampling site, and the duration of that custody, from sample collection until sample analysis. Alternatively, a document or paper trail showing the collection, custody, control, transfer, analysis, and disposition of physical samples.

chlorine residual. The amount of chlorine remaining in water after application at some prior time; the difference between the total chlorine added and that consumed by oxidizable matter. See "free chlorine residual".

contaminant. A contaminant is any physical, chemical, biological, or radiological substance or matter present in any media at concentrations that may pose a threat to human health or the environment.

coliform. A group of bacteria found in the intestines of warm-blooded animals (including humans) and in plants, soil, air, and water. Fecal coliforms are a specific class of bacteria, which only inhabit the intestines of warm-blooded animals. Coliforms are easily culturable and therefore are used as an indicator for possible other pathogenic organisms. The presence of coliform is an indication that the water is polluted, and may contain pathogenic organisms.

dechlorination. The deliberate removal of chlorine from water. The partial or complete reduction of residual chlorine by any chemical or physical process.

deionized water. Water that has been passed through resins that remove all ions**.**

DOC. Dissolved Organic Carbon.

DPD (diethyl phenylene diamine) colorimetric test. A test for detecting the presence of free chlorine residual in water.

field blanks. Made by transferring deionized water to a sample container at the sampling site. Field blanks test for contamination due to the introduction through the sampling procedure and sampling environment.

free chlorine residual. Chlorine that remains in water after the chlorine demand is satisfied. The presence of a residual indicates sufficient chlorine was added to disinfect the water. A residual of 0.1 to 0.2 milligrams per liter of free chlorine should be measurable at the tap from a public water system disinfected with chlorine.

holding time. The time allowed between collection of samples from water sources for analysis and the processing of those samples.

Safe Drinking Water Act [SDWA] (Public Law 93-523*)*. An amendment to the Public Health Service Act, which established primary and secondary quality standards for drinking water. The SDWA was passed in 1974 to protect public health by establishing uniform drinking water standards for the nation. In 1986, SDWA Amendments were passed that mandated the U.S. Environmental Protection Agency (EPA) to establish standards for 83 drinking water contaminants by 1992 and identify an additional 25 contaminants for regulation every 3 years thereafter.

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Surface Water Treatment Rule (SWTR). The Surface Water Treatment Rule (SWTR) was published in the Federal Register by the Environmental Protection Agency on June 29, 1989. Under the reauthorization of the Safe Drinking Water Act in 1996 the SWTR contains provisions that require disinfection and filtration for all public water systems that use surface water or a source that is ground water under the direct influence of surface water. Approved testing procedures for compliance can be found in the Standard Methods text or 40 CFR Part 141. Testing under the SWTR includes Turbidity, Heterotrophic Plate Count (Bacteria), Total Coliform and Fecal Coliform, Giardia Lamblia cysts, Legionella, and enteric viruses.

spiked samples. Samples to which a known quantity of a substance is added. The results of spiking a sample in the field or laboratory are usually expressed as percent recovery of the added material. Spiked samples provide a check of the accuracy of laboratory and analytical procedures.

SUVA. Specific Ultraviolet Absorbance

trip blanks. Test for cross-contamination during transit of samples. For each shipment of sample containers sent to the analytical laboratory, one container is filled with analyte-free water at the laboratory and is sealed. The blanks are transported to the site with the balance of the sample containers. They remain unopened. Otherwise, they are handled in the same manner as the other samples. The trip blanks are returned to the laboratory with the samples and are analyzed for the same constituents.

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Chapter 3 - Sample Collection Containers (recommended), Preservation and Holding Time for Drinking Water Quality Tests Performed for Public Water Supplies

All samples for Inorganic and Organic Tests should be preserved between 0°C to 6°C.
All Microbiological Samples should be preserved between 0°C and10°C. **Do not freeze.**
(Check program for the required number of sample aliquots to collect for each sample.)
Additional containers are required when sample aliquots are collected for Matrix Spike and Duplicates.

TEST	CONTAINER TYPE		PRESERVATIVE IN BOTTLE	HOLD TIME
Bacteria Coliform, Heterotrophic, E. coli, Enterococci, Coliphage		125 ml plastic with sterile seal Must be filled at least 100 mL	Sodium thiosulfate pellet	8 hours SWTR - Total/ Fecal Coliform, Heterotrophic 30 hours Coliform, E.coli, Enterococci, 48 hours Coliphage
Common Anions and Disinfectant By-Products Bromide, Chloride, Fluoride, Nitrate-N, Nitrite-N, 0-Phosphate -P, Sulfate		250 mL plastic or glass Chlorite must be opaque	None added	28 days Bromide, Chlorate, Fluoride, Nitrate/ Nitrite, Sulfate Chloride 14 days Chlorite 48 hours Nitrite, Nitrate O-Phosphate
Nitrate/Nitrite Combined, Bromate, Chlorate, Chlorite			For Nitrate/Nitrite Combined - 3 mL conc. Sulfuric Acid Bromate, Chlorate, Chlorite - 0.1 mL 5% EDTA per 100 mL	
Lead and Copper (Lead and Copper Rule)		1L plastic or glass 250 mL plastic or glass for school and daycare fountains	1 mL 1:1 nitric acid may be added in the field or by the lab after receipt of the sample.	14 days (6 months once preserved in field or lab). Must be acidified a minimum of 16 hours before analysis.

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TEST	CONTAINER TYPE		PRESERVATIVE IN BOTTLE	HOLD TIME
Metals and Minerals		500 mL plastic	3 mL conc. Nitric Acid (to pH < 2)	6 Months Must be acidified a minimum of 16 hours before analysis.
Inorganic Compounds and Unregulated Physical Tests Alkalinity, Asbestos, Chlorine Chlorine Dioxide, Color, Conductivity, Hardness, Odor, Oxygen, Diss., pH, Solids, Surfactants, SUVA, Turbidity	 	½ gallon plastic or 2 - 1L glass	Hardness Nitric or Sulfuric Acid to pH < 2 Others: None Added	Chlorine, Chlorine dioxide, Oxygen, dissolved and pH: ASAP Odor: 24hr Asbestos, Color, Surfactants, SUVA, Turbidity: 48hr Total Dissolved Solids: 7 days Alkalinity: 14 days Others: 28 days
Cyanide		1L plastic	2ml 10N NaOH. (Only if no chlorine) Check chlorine in field. If positive add 0.1 g ascorbic acid and shake until dissolved. Then add NaOH.	14 days

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TEST	CONTAINER TYPE		PRESERVATIVE IN BOTTLE	HOLD TIME
Volatile Organic Compounds (VOC)		3 - 40 mL glass vials with Teflon septa. Need 3 vials to do MS/MSD.	0.25 mL 1:1 HCl If chlorinated first add 25 mg ascorbic acid to the vials, then add HCl to the sample.	14 days
Ethylene dibromide (by EPA 504.1) and Pesticides (by EPA 505)		2- 40 mL glass vials with Teflon septa. Need 3 vials to do MS/MSD.	3 mg sodium thiosulfate	14 days (Heptachlor – 7 days)
Haloacetic acids (HAA5)		2-60 mL amber glass vials with Teflon septa. Need 3 vials to do MS/MSD.	6 mg ammonium chloride	Method 552.1: 28 days Method 552.2: 14days
Total Trihalomethanes (TTHM)		2 - 40 mL glass vials with Teflon septa. Need 3 vials to do MS/MSD.	3 mg sodium thiosulfate	14 days
Semi-Volatile Organics (including pesticides), and Dioxin		2-1Liter amber glass bottles Need 3 vials to do MS/MSD.	2mLs HCl, pH2 If chlorinated first add 40mg sodium sulfite to bottle, then HCl to the sample.	14 days

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TEST	CONTAINER TYPE		PRESERVATIVE IN BOTTLE	HOLD TIME
Carbamates		1- 40 mL glass vial with Teflon septa	50 mg monochloroaceticacid buffer or potassium dihydrogen citrate If chlorinated 5 mg sodium sulfate and monochloroacetic acid buffer or potassium dihydrogen citrate	14 days
Glyphosate		1- 40 mL glass vial with Teflon septa	3 mg sodium thiosulfate	14 days
Herbicides		2 – 40 mL glass vials with Teflon septa. Need 3 vials to do MS/MSD.	0.25mL HCl, pH2 If chlorinated first add 4 mg sodium sulfite to the vials, then HCl to the sample.	14 days
Total Organic Carbon		2 – 40 mL amber glass vials with Teflon septa. Need 3 vials to do MS/MSD.	0.5 mL 9N sulfuric acid (to pH<2)	28 days

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TEST	CONTAINER TYPE		PRESERVATIVE IN BOTTLE	HOLD TIME
Radionuclides Beta/photon emitters, Gross Alpha, Radium 226, Radium 228, Uranium, Radioactive Cesium, Iodine, Strontium 89 and 90, Tritium, Gamma Emitting (Barium-133, Cesium-134 & 137, Cobalt-60, and Zinc-65) Radionuclides		½ gallon plastic jug	None Added	5 days (6 months once preserved in lab)
Radon CT Radon		2 – 40 mL glass vial with Teflon septa	None Added	4 days (ASAP)

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Chapter 4 State-Specific Sampling Information

Connecticut
Department of Public Health Laboratory
10 Clinton Street
Hartford, CT. 06106
Contact Number (24 hrs.): 860-509-8500
Fax Number: 860-509-8697

May 29, 2008

General Information

The Connecticut Department of Public Health (DPH) Laboratory is open from 8 A.M. to 4 P.M, Monday thru Friday (**See special Instructions for microbiology and inorganic chemistry**). Samples are brought in through the front entrance, where the collector or courier needs to show a picture ID, sign in, and obtain an access key to the Receiving Room. Samples may be accepted on an emergency basis outside of normal working hours by contacting the appropriate department of the laboratory. Please refer to the ***New England States' Sample Collection & Preservation Guidance Manual for Drinking Water CD*** for detailed sample collection and preservation instructions for each of the biological and chemical substances for which public water supplies must test. This document summarizes national guidelines and procedures in accordance with stringent federal regulations. It is imperative that you comply with these instructions.

The Laboratory will supply sample collection containers and Temperature Control bottles and these should be used unless special arrangements have been made. Pictures of the containers supplied are on the following pages. Once collected, samples should be hand delivered or mailed to the Laboratory.

Field reagent blanks and duplicates (if included) are essential elements of our quality assurance program to insure the integrity, validity, accuracy, and precision of laboratory results. You are not charged for these samples.

Please be sure to accurately and thoroughly complete the sample requisition form containing the sample identification, date of collection, and other pertinent information. This form must have an appropriate address/account label. **Chain of Custody (CoC) samples require special handling and forms. Please contact the Laboratory, if you do not have the correct forms or the CoC Instructions.**

Connecticut State-Specific Sampling Information, cont.

Environmental Microbiology
Stacey Kinney
860-509-8562

Test: Coliform/E. coli – uses Bac Bottle – Instructions:

1. Collector must use sample container (250 ml. sterile drinking water bottle) provided by the Connecticut DPH Laboratory.
2. To ensure processing that day, drinking water, and source water samples must be submitted by 3 PM Monday through Friday.
3. Source water must be analyzed within 8 hours of collection.
4. Source water must be shipped and held below 10º C.

Microbiology

Bac Bottle →

Test: Heterotrophic Plate Count – uses Bac Bottle – Instructions:

1. Collector must use sample container (250 ml. sterile drinking water bottle) provided by the Connecticut DPH Laboratory.
2. Samples must be submitted by 3 P.M. Monday through Friday to ensure processing that day.
3. Drinking water must be analyzed within 8 hours of collection.
4. Drinking water must be shipped and held below 10º C.

Microbiology

Inorganic Chemistry
Jack Bennett
860-509-8543

To ensure processing within the holding time, drinking water samples with a holding time ≤ 48 hours must be submitted by Noon Friday and the day before a Holiday.

1L LCR Bottle⟶

Lead and Copper Rule ("First Draw") Uses a 1L LCR bottle and, for School and Daycare water fountains only, a 250 ml LCR Bottle

Instructions: Follow instructions in Chapter 5 (SOP – Lead and Copper in Drinking Water in Residential Housing) Lead and Copper (Lead and Copper Rule)

250 ml LCR Bottle ⟶

Connecticut State-Specific Sampling Information, cont.

Cyanide – Uses 1L amber glass bottle
Instructions See Chapter 5. Cyanide

← 1L amber glass Cyanide Bottle

Metals – Uses a Chem bottle
Instructions: Follow instructions in Chapter 5 (SOP – Metals and Minerals)
Except: Proceed from step 5.1.5 to 5.18. The pH will be checked at the laboratory and adjusted if necessary. Metals and Minerals

Nitrate & Nitrite - Samples **Must** be submitted by Noon Friday and the day before a Holiday. Uses Chem Bottle.
Instructions: See Chapter 5. Anions & Inorganic DBP

Chem Bottle⟶

Inorganics – Uses Chem Bottle
Instructions: See Chapter 5. Anions & Inorganic DBP

Turbidity - Samples **Must** be submitted by Noon Friday and the day before a Holiday. Uses Chem Bottle
Instructions: See Chapter 5. Inorganic Chemicals and Physical Tests

Special Chemistry
Susan Isch
860-509-8535

EPA Method 100.2, 600/4-83-043 – Uses Chem Bottle
Substance: Asbestos
Instructions: See Chapter 5. Asbestos

Chem Bottle for Asbestos and Rad ⟶

EPA Methods 900.0, 902,0, 903.0, 904.0 905.0, 906.0, 908.0
Substance: gross alpha (900.0), gross beta (900.0), iodine 131 (902.0), radium 226 & 228 (903.0 & 904.0), strontium 89 & 90 (905.0), tritium (906.0), uranium (908.0). – Uses Chem Bottle
Instructions: See Chapter 5. Radionuclides

Connecticut State-Specific Sampling Information, cont.

EPA Methods 78-1 & 913.0 – Uses 40 ml clear vial
Substance: Radon in water
Holding time: Maximum holding time is 4 days.
Instructions: See CT DPH Radon Program Sampling Instructions CT Radon

← 40 ml clear vial for Radon

Organic Chemistry
Mildred Carrasquillo
860-509-8547

EPA Method 505 – Uses 40 ml amber vial
Compounds: Organochlorine Pesticides, Triazines and Polychlorinated Biphenyls (PCBs)
Instructions: See Chapter 5. SOCs **Except:** Three 40 mL vials should now be submitted for each independent sample for analysis by EPA Method 505. Two field blanks should be included for each sampling site.

⟵ 40 ml amber vial

Samples for EPA Methods 549.2 - preservatives are shipped in small vials that are pre-weighed, and pre-measured.

EPA Method 549.2 - Uses 1L Brown plastic bottle
Compound: diquat
Instructions: See Chapter 5. SOCs **Except:** If chlorinated, add 100 mg/l sodium thiosulfate preservative. Samples which are biologically active must be preserved by adding sulfuric acid to a pH=2. The preservatives are in the small vials attached to the bottle.

1L Brown plastic bottle⟶

Samples for EPA Method 555 - the acid preservative is in the bottle. The sodium sulfite preservative is in the small vial that is pre-weighed, and pre-measured.

EPA Method 555 – Uses 120 mL amber bottle
Compounds: Chlorinated acid herbicides (e.g. 2.4-C, Silvex, pentachlorophenol, picloram, etc.) Instructions: See Chapter 5. SOCs **Except:** Two 120 mL bottles should now be submitted for each independent sample for analysis by EPA Method 555.If chlorinated, add the sodium sulfite preservative from the small vial.

⟵120 mL amber bottle with small vial

Connecticut State-Specific Sampling Information, cont.

EPA Method 504.1 – Uses 40 ml amber vials
Compounds: EDB, DBCP, and 1,2,3- TCP
Instructions: See Chapter 5. SOCs **Except:** Three 40 mL vials should now be submitted for each independent sample for analysis by EPA Method 504.1.
Two field blanks should be included for each sampling site.

40 ml amber vial ⟶

EPA Method 524.2 – Uses 40 ml clear vials (3 for samples, 2 for field blanks.
Compounds: Volatile Organic Compounds (VOCs - Quantity: 89)
Instructions: See Chapter 5. VOCTHM

40 ml clear vial⟶

Samples for EPA Methods 525.2, 531.1, and 547 - If samples are not chlorinated, the preservatives are in the bottle or vial. If samples are chlorinated, preservatives are shipped in small vials that are pre-weighed, and pre-measured.

Small preservative vial ⟶

EPA Method 525.2 – Uses 1L amber Bottle
Compounds: Benzo (a) pyrene, bis (2-ethylhexyl) phthalate and bis (2-ethylhexyl) adipate
Instructions: See Chapter 5. SOCs **Except:** Add 50mg sodium sulfite from the small vial to Chlorinated samples; then 1.0 mL acid (1:1 HCL/reagent water) from the second small vial.
2 of the 1Liter amber glass bottles needed. Need 3 bottles to do MS/MSD. One field blank should be included for each sampling site.
← 1L amber Bottle

Connecticut State-Specific Sampling Information, cont.

EPA Method 531.1 - Uses 60 ml I-Chem amber vial
Compounds: N-methylcarbamoyloximes, N-methyl carbamates
(e.g. aldicarb, oxamyl, carbofuran, etc.)
Instructions: See Chapter 5. SOCs **Except:** Add 48mg sodium thiosulfate from the small vial to Chlorinated samples; then 1.8mL monochloroaceticacid buffer from the second small vial. One field blank should be included for each sampling site.

60 ml I-Chem amber vial ⟶

EPA Method 547 - Uses 60 ml I-Chem amber vial
Compound: glyphosate
Instructions: See Chapter 5. SOCs **Except:** Add 6 mg sodium thiosulfate from the small vial to Chlorinated samples. One field blank should be included for each sampling site.

⟵60 ml I-Chem amber vial

Connecticut State-Specific Sampling Information, cont.
State of Connecticut Department of Public Health RADON PROGRAM

Sample Collection Protocol For Radon in Water

Sample collection containers:

Only glass containers sealed with TFE or foil-lined caps shall be used to collect samples of water for radon analysis using liquid scintillation.

Prior to sample collection:

A representative sample of the water in the distribution system or well should be collected by the homeowner or by a radon professional listed by the Connecticut Department of Public Health. Therefore, the aerator on the tap must be removed and the system should be flushed for an adequate amount of time (approximately 15 minutes).

There are two methods for collecting water samples of radon analysis using liquid scintillation. They are described below.

I. The Immersion Technique

(For laboratories that supply glass vials for water collection that do not contain a scintillation cocktail.)

After the purging period the sample is collected as follows, to minimize the loss of radon from the sample collected:

1. A length of flexible plastic tubing is attached to the spigot, tap, or other connection, and the free end of the tubing is placed at the bottom of a small container, or 300-600ml beaker. Make sure that the delivery tube does not let bubbles into the sample.

2. Fill the glass sample vial to prevent it from floating.

3. Fill the container or beaker, slowly, until the container overflows.

4. Place the delivery tubing two-thirds of the way into the glass vial, and fill the glass vial with water so that at least 50-100ml of water is displaced (i.e., water volume is displaced around two times). This will ensure that the bottle is flushed with fresh water.

5. After the bottle has been flushed, the tubing is removed from the vial, which can remain resting on the bottom of the container.

6. Carefully, place a TFE or foil-lined cap on the glass vial, *while it is still submerged*. If this is not possible, you may elect to carefully lift the vial out of the container or beaker and seal it using a TFE or foil-lined cap.

7. Once the sealed glass vial is removed from the bucket, it is inverted and checked for bubbles that would indicate headspace.

    a. If there are visible bubbles, empty the container and repeat the sampling collection.

Connecticut State-Specific Sampling Information, cont.

b. If there are no visible air bubbles, the outside of the sealed bottle is wiped dry, and the cap is sealed in place with electrical tape, wrapped clockwise.

8. After the sample bottle is sealed, a second (duplicate) sample is collected in the same fashion from the same container.

9. Record the date and time of the sample collection for each vial.

II. Syringe Technique

(For laboratories that supply radon-in-water test kits that contain the 'liquid scintillation cocktail'.)

After the purging period the sample is collected as follows, to minimize the loss of radon from the sample collected:

1. Attach a sampling funnel and tubing to the faucet.

2. Turn on the water and allow a steady flow for two minutes.

3. Slow the water flow and invert the funnel (mouth up). Adjust the flow so that the pool water in the funnel cavity is not turbulent.

4. Insert the needle of a 20 mL hypodermic syringe below the water surface, withdraw several mL of water, and discard. Repeat this rinse several times.

5. Withdraw 12-15 mL of water slowly to minimize air bubbles. Invert syringe to eject any air bubbles and retain 10 mL of water.

6. Place the syringe needle under the surface of an appropriate organic accepting liquid scintillation cocktail contained in a glass scintillation vial and slowly eject the water from the syringe into the cocktail.

7. Slowly withdraw the syringe and tightly cap the vial using a TFE or foil-lined cap.

8. After the glass vial is sealed, a second (duplicate) sample is collected in the same fashion.

9. Record the date and time of the sample collection for each vial.

Transport and analysis:

The sample(s), once received by the laboratory, should be allowed to equilibrate to room temperature before processing. Counting should begin within four days.

State of Connecticut
Department of Public Health
Radon Program
Phone: 860-509-7367
Fax: (860) 509-7378
http://www.dph.state.ct.us/BRS/Radon/radon_program.htm

Immersion technique excerpted from Standard Methods for the Examination of Water and Wastewater, 20th ed. (1998). *7500-Rn Liquid Scintillation Method*, pp. 7-39 through 7-42. CT DPH Radon Program March 8, 2005

State-Specific Sampling Information

Maine
Department of Health and Human Services
Maine Centers for Disease Control
Division of Environmental Health
Drinking Water Program

July 05, 2007

Contact number: 207-287-2070

General Instructions

All samples submitted to the Health and Environmental Testing Laboratory (HETL) for analysis must be in HETL containers unless prior arrangements have been made. The information on the sample data sheets must be as complete as possible and the sheets returned with the samples. **Be sure to indicate the date and time the sample was collected.**

Sample kits may be purchased or samples may be sent to the laboratory through the US postal mail or private carrier if sent to: HETL, 221 State St, Augusta, Maine 04333-0012. Sample kits may also be purchased and delivered to the lab in person. Laboratory hours are Monday through Friday 7:30 AM-5:00 PM.

If you plan to mail your samples, check with the post office before sampling to determine what time the mail is picked up. Take and mail the samples as close to the pick-up time as possible because the age of a water sample has direct bearing on the accuracy of the laboratory results. Samples should be shipped by mail on Monday, Tuesday, or Wednesday to avoid possible weekend delay. Samples may be brought to the laboratory at 221 State Street anytime Monday through Friday between the hours of 7:30 AM and 5:00 p.m. Samples requiring microbiological analysis should, whenever possible, be delivered before 4:00 p.m.

Water samples for microbiological analysis that arrive at the laboratory 30 hours or more after sample collection will not give a true representation of the microbiological quality of the water and will be rejected. **If your microbiological sample arrives 30 hours or more after collection, you will be required to purchase a replacement kit and take a new sample.**

Maine State-Specific Sampling Information - continued

Specific Instructions

1. Coliform Sampling

Samples must be collected at locations as specified in the water systems' "Sample Site Plan". Samples not collected from the correct site will not be accepted. Please call the Maine Drinking Water Program if you need to complete a Sample Site Plan. The Maine Drinking Water Program collects most of the coliform recheck samples and samples to remove a "Boil Water Order" (BWO), for small water systems. Please contact your compliance officer at the Drinking Water Program before collecting any follow-up (to coliform positive) samples or samples to remove a BWO.

2. Volatile Organics

Maine has a standard for MTBE. All Volatile Organic samples (VOCs) must be analyzed utilizing EPA Method 524.2. This is the only acceptable method for VOCs.

3. Herbicides, Pesticides, PCBs, and Semi-volatile organics

Do not collect any herbicide, pesticide, PCB or semi-volatile organics (SVOC) samples without first calling your compliance officer or contact the Drinking Water Program. Maine has a waiver program for these tests.

4. Lead and Copper

All lead and copper testing must be accompanied by a 141A form, even if the laboratory calculates your 90th percentiles. Please contact your lab or your compliance officer at the Drinking Water Program if you need a 141A form. Remember to indicate the time and date of collection and the last time the water was used. This helps to ensure the water was not used for the required six hours.

5. Sample collection locations.

Coliform, lead and copper, and disinfection by-products samples are collected in the water system. All other samples are collected after treatment and before distribution. Please call your compliance officer at the Drinking Water Program if you are not sure where to collect a sample.

State-Specific Sampling Information

Massachusetts
Department of Environmental Protection

June 21, 2007

Routine Compliance Monitoring Samples

Massachusetts-certified commercial and municipal laboratories perform the analysis of all drinking water samples collected for routine compliance monitoring purposes in the Commonwealth of Massachusetts. Massachusetts public water suppliers, and other entities requiring drinking water analysis must contract a commercial or municipal laboratory certified by the Massachusetts Department of Environmental Protection (MassDEP), Laboratory Certification Office (LCO), Division of Environmental Analysis (DEA), Senator William X. Wall Experiment Station (WES), to perform these analyses. An on-line searchable database of MassDEP-certified laboratories is available at:

http://public.dep.state.ma.us/Labcert/labcert.aspx

The information is updated daily.

The certified laboratory contracted to perform the analysis of drinking water samples will provide all the necessary sample containers, preservation reagents, and sampling instructions. The sampling instructions provided to sample collectors will be those in Chapter 5 of this Manual.

Special Compliance Monitoring and Enforcement Samples

All drinking water samples collected by Massachusetts DEP regional and program staff for special compliance monitoring purposes or enforcement actions are analyzed by the DEA/WES, Lawrence, MA. MassDEP regions and programs needing such analytical services from DEA/WES must contact via telephone or e-mail (preferred) Robert Serabian (DEA/WES Quality Assurance Officer) or Dr. Oscar Pancorbo (DEA/WES Director) to schedule the work in the MassDEP Laboratory. Once the project has been scheduled, DEA/WES will prepare the appropriate sample containers, required sample preservation reagents, sample ID tags, sample tracking/chain-of-custody form, sample cooler, any other sampling equipment needed, and sampling instructions. The sampling instructions provided will be those in Chapter 5 of this Manual. The cooler with the necessary supplies and instructions are then either picked up at DEA/WES in Lawrence, or sent by MassDEP courier or by private courier service to the MassDEP regional or Boston office in time for the sampling event. Ice and ice packs are available at the MassDEP regional and Boston offices. Once the samples are collected, the coolers with the samples are driven by MassDEP regional or program staff, sent by MassDEP courier, or sent by private overnight courier service to DEA/WES (Lawrence) for laboratory analysis.

State-Specific Sampling Information

New Hampshire
Department of Environmental Services

July 2007

Based on the New England States' Sample Collection & Preservation Guidance Manual for Drinking Water, the State of New Hampshire has prepared a separate, state-specific document called the New Hampshire Sample Collection & Preservation Manual for Drinking Water. The NH edition draws on the common manual as a template, but incorporates state-specific details such as chemical groupings and State Laboratory-specific details into the body of the document. The drinking water program has requested that the private laboratories in NH edit each of the test templates relative to their lab's specific scheduling, bottle, and preservative criteria. New Hampshire's Sampling Manual will be used at system operator training sessions given by the Drinking Water and Groundwater Bureau, while the private laboratories will distribute their laboratory-specific versions to their clients.

Copies of the New Hampshire Drinking Water Sampling Manual are available through the NH the Drinking Water and Groundwater Bureau by call 603-271-2513 or from the Department of Environmental Services Laboratory Services Unit at 603-271-3445. The manual can also be downloaded from the web at http://des.nh.gov/dwgb under Sampling Information, Sample Collection & Preservation Manual (2001).

State-Specific Sampling Information

Rhode Island Department of Health
Office of Drinking Water Quality

August 7, 2007

Rhode Island-certified laboratories perform the analysis of all drinking water samples collected for compliance monitoring purposes. Public water supplies in Rhode may utilize the Rhode Island Department Division of Laboratories or contract with a Rhode Island-certified laboratory. Since Rhode Island certifies laboratories by both analyte and method of analysis, it is important to utilize a laboratory certified for the specific analytes the system is required to monitor, that the analyses are performed using an EPA approved method, and that the laboratory has Rhode Island certification for both the analyte and method. An on-line searchable database of Rhode Island-certified laboratories, which includes a listing of analytes and methods, is available at:

http://www.health.ri.gov/labs/waterlabs-instate.php

All samples collected by Rhode Island Office of Drinking Water Quality staff for routine and special monitoring are analyzed at the Rhode Island Department of Health Division of Laboratories, 50 Orms Street, Providence, RI 02904, which is a Rhode Island certified laboratory. The Office of Drinking Water Quality is responsible for complying with monitoring schedules for all public water systems sampled by Office of Drinking Water Quality staff.

When contracting with a commercial laboratory, the public water supply must provide that laboratory with the required monitoring schedule. Monitoring schedules are available to the public water supply from the Office of Drinking Water Quality, (401) 222-6867. The certified laboratory contracted to perform the analysis of drinking water samples will provide all the necessary sample containers, preservation reagents, and sampling instructions. The sampling instructions provided to sample collectors will be those in Chapter 5 of this Manual.

Specific instructions for compliance with the Total Coliform Rule (TCR):

All results reported to the Rhode Island Office of Drinking Water Quality must be reported on Rhode Island Office of Drinking Water Quality forms. Routine coliform samples are reported as Routine Original samples (RTOR). Fecal coliform positives must be reported to the Office of Drinking Water Quality by the end of that day or the next business day and the public notice must be provided within 24 hours. Total coliform positives must be reported no later than the next business day and public notification must be provided within 14 days for systems serving food and 30 days for those that do not. Systems with fecal coliform positives, and systems with total coliform positives that serve food, are required to boil water and/or provide an alternative source of water and ice. Monitoring violations must be reported within ten (10) days.

Rhode Island State-Specific Sampling Information - continued

If a routine sample is total coliform positive, the system must analyze the culture medium to determine if fecal coliforms are present, and must collect a set of repeat samples within 24 hours of being notified of the positive result. At least one (1) repeat sample must be collected from the sampling tap where the original positive sample was taken, reported as a Repeat Original sample (RPOR), and Repeat Other samples (RPOT) must be collected upstream and downstream within five (5) service connections. Systems that routinely collect more than one coliform sample per month must collect three (3) repeat samples; systems that collect one (1) or less per month must collect four (4) repeat samples. Systems with one total coliform positive during any monitoring period must collect five (5) samples the next month of operation.

Failures to comply with all other drinking water regulations must be reported within 48 hours.

State-Specific Sampling Information

Vermont Department of Health Laboratory
195 Colchester Avenue, P. O. Box 1125, Burlington, VT 05402-1125

July 16, 2007

Contact Information: 802-863-7637 (main)
800-660-9997 (within VT only)
802-863-7632 (fax)

Web Address: http://healthvermont.gov/enviro/ph_lab/lab.aspx (for water testing information, including Water Test Order Form (ADMIN 501) and Water Test Order Form Supplement (CHEM 909), as well as the Safe Water Resource Guide)

Generally, the laboratory supplies all sample containers unless other arrangements have been made with the Program Chiefs, the Laboratory Director or assigned designees.

You may purchase test kits and send samples to the laboratory through the mail; first-class mail is recommended to ensure delivery to the laboratory within the required timeframes (found on sampling instructions contained in test kit). You are welcome to come to the laboratory in person to purchase testing kits or to drop off samples. Business hours are Monday through Friday, 7:45 a.m. to 4:30 p.m.

Completely fill out the Water Sample Collection Information Form (CHEM 202) contained in the test kit, including the date and time of sample collection as this is required for testing.

If you are sending more than one sample, each sample must have its own Water Sample Collection Information form (CHEM 202) filled out. Make sure each bottle is labeled with its sampling location or some other identifying mark ("Sample A", "Sample B", etc.). Be sure to put the same identifying information on the corresponding form in the "Submitter's Remarks" section.

1.) Instructions for coliform testing:
Samples must be received by the laboratory as soon as possible, but no more than 30 hours after collection. Samples must be received by the laboratory Monday through Friday by 4 p.m. If you wish to get next-workday results, samples must be received before 4 p.m. Monday through Thursday. Results for samples received before 4 p.m. are available after 3 p.m. the following day.

2.) Instructions for all other drinking water testing:
Samples must be received by the laboratory within the timeframes specified on the sampling instructions included with the test kits. Samples must be received before 4 p.m. Monday through Friday; except those samples for nitrite and/or odor testing, which must be received before 4 p.m. Monday through Thursday and before 12 noon on Friday.

Some drinking water testing is offered only on certain dates during the year. The laboratory will communicate those times to affected water suppliers in our Water Test Order Form Supplement (CHEM 909) or in specific mailings when kits are ordered.

SOP - MICROBIOLOGY

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

Refer to State-Specific Instructions-: CT, ME, MA, NH, RI, VT

1. **Applicable Parameters:** Total Coliforms, Fecal Coliforms, Escherichia coli, Enterococci, Heterotrophic Bacteria (HPC), Male-Specific and Somatic Coliphage (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. Avoid threaded faucets.

3. **Sampling materials:**
   3.1. Containers**:** Sterile glass or plastic bottles with a minimum capacity of 125mL.
   3.2. Preservative: Sodium thiosulfate in powder or tablet; ice
   3.3. Other: Labels, marker, safety glasses, and clean disposable gloves.

4. **Safety Concerns:**
   4.1. Before collecting samples, all samplers must receive thorough training in proper handling of chemical preservatives and safety protocols so they are aware of the associated dangers and to determine appropriate safety precautions and first aid, should it be necessary.
   4.2. Sample bottles that have preservatives in them should be labeled accordingly. The specific chemicals should be identified.

5. **General Sample Collection Procedure:**
   5.1. All microbiological parameters
      5.1.1. Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
      5.1.2. Remove aerator, screen, and all attachments from the faucet.
      5.1.3. If necessary, a lint free cloth dampened with bleach and water may be used to clean the faucet rim.
      5.1.4. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
      5.1.5. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
      5.1.6. Do NOT rinse the bottle or remove any liquid or tablets in the bottom of the container. This may be the preservative.
      5.1.7. Fill container, ensuring that at least 100mL of sample are collected, and leaving airspace of approximately one inch.
      5.1.8. Carefully replace cap on container and tighten securely. Replace dust cover if applicable.

6. **Shipping and handling:**
   6.1. Complete chain-of-custody form if requested by lab or water supply program.
   6.2. Keep sample in closed chest.
   6.3. Samples should be kept between 0 and 10^{O} C (do not freeze).
   6.4. If using wet ice to maintain temperature, it is best to contain the ice in plastic zipper locking bags so as not to contaminate the sample with the melting ice.
   6.5. Deliver samples to lab the same day if possible.
   6.6. See the following table for applicable holding time.

Parameters	Holding Time
Total Coliforms, Fecal Coliforms, Escherichia coli, Enterococci	30 hours
Male-Specific and Somatic Coliphage	48 hours
SWTR Total Coliforms, Fecal Coliforms, HPC	8 hours
Heterotrophic Bacteria (HPC)	8 hours

Lead and Copper in Drinking Water in Residential Housing (Lead and Copper Rule)

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.

Refer to State-Specific Instructions-: CT, ME, MA, NH, RI, VT

1. **Applicable Parameters:** Lead and Copper

2. **Sample Location: All lead and copper tap samples should be first draw samples.** The water in the plumbing system should have remained motionless for at least six hours before collecting the first-draw sample. Sample should be taken from a kitchen or bathroom sink cold water tap.

3. **Sampling Materials:**
   3.1 Containers: Acid-washed plastic or glass **1 liter bottles** with plastic or teflon cap liners.
   3.2 Preservative: 1 mL 1:1 nitric acid per liter.
   3.3 Other: Labels, marker.

4. **Safety Concerns:** None.

5. **General Sample Collection Procedure**:
   5.1 Prior arrangements will be made with the customer to coordinate the sample collection event. Dates will be set for sample kit delivery and pick-up by water department staff.
   5.2 There must be a minimum of six hours during which there is no water used from the tap the sample is taken from and any taps adjacent or close to that tap. The water department recommends that either early mornings or evenings upon returning home are the best sampling times to ensure that the necessary stagnant water conditions exist.
   5.3 A kitchen or bathroom cold water faucet is to be used for sampling. If water softeners or other treatment devices are used on kitchen taps, the sample should be collected from a bathroom tap that is not attached to a water softener or other treatment device if possible. **Aerators should not be removed prior to sampling.** The opened sampling container should be placed below the faucet and the cold water tap gently opened. The container should be filled to the line marked "1000 mL" or "one liter", and the water turned off.
   5.4 The sampling container should be tightly capped and placed in the sampling kit provided. The sample kit label should be reviewed at this time to ensure that all information on the label is correct.
   5.5 If any plumbing repairs or replacements have been done in this home since the previous sampling event, this information should be noted on the label in the space provided. In addition, if the sample was collected from a tap with a water softener or other treatment device, this should be noted as well.

6. Shipping and Handling:

6.1 If sample is to be picked up by the local water department personnel, pre-arrange same-day pick up. The sample kit should be placed outside the residence in the location agreed upon so that the water department staff may pick it up.

6.2 If homeowner is delivering the sample to the lab, deliver sample to the lab the same day.

6.3 States may provide the results of this monitoring effort to participating customers when reports are generated for the State. Some states provide notification within 10 working days from the time of sample collection when excessive lead and/or copper levels are found. Homeowners should check with their state to learn about the reporting policy in their State.

6.4 The following table lists the maximum holding time for the applicable parameters above.

Parameters	Holding Time
Lead & Copper	6 months (14 days is the maximum time allowed before adding the preservative. Must be acidified a minimum of 16 hours before analysis.)

SOP - COMMON ANIONS & INORGANIC DISINFECTION BY- PRODUCTS

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Bromate, Chlorite, Chloride, Fluoride, Nitrate-N, Nitrite-N, Combined Nitrate-plus-Nitrite-N, ortho-Phosphate-P, Sulfate (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location, which is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   3.1. Container: Pre-cleaned 250 mL plastic or glass bottles (opaque for chlorite).
   3.2. Preservatives: The anion of interest that requires the most preservation treatment and the shortest holding time will determine the preservation treatment.
      3.2.1. Use sulfuric acid (H_2SO_4 to pH < 2) for combined analysis of Nitrate-plus-Nitrite.
      3.2.2. Use 0.1 mL of 5% EDA solution per 100 ml for bromate (not required for EPA Method 300.0) and chlorite. In general, cool samples to <6^{o}C on ice.
   3.3. Other: Labels, marker, pH test strip paper, safety glasses, and clean disposable gloves.

4. **Safety Concerns**:
   4.1. Before collecting samples, all samplers must receive thorough training in proper handling of chemical preservatives and safety protocols so they are aware of the associated dangers and to determine appropriate safety precautions and first aid, should it be necessary.
   4.2. "Empty" containers for "nitrate-plus-nitrite" may contain sulfuric acid, which is a very strong acid that causes burns.
   4.3. Sample bottles that have preservatives in them should be labeled accordingly. The specific chemicals should be identified.

5. **General Sample Collection Procedure**:
   5.1. All Common Anions and Inorganic Disinfection By-Products
      5.1.1. Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
      5.1.2. Remove aerator, screen, and all attachments from the faucet.
      5.1.3. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
      5.1.4. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
      5.1.5. Follow specific instructions provided in sections 5.2, 5.3, or 5.4 to collect the parameters of interest.

5.2. **Bromide, Chloride, Fluoride, Nitrate-N, Nitrite-N, ortho-Phosphate-P, Sulfate**

5.2.1. No preservation is added.
5.2.2. Fill bottle to shoulder.
5.2.3. Screw cap on securely.

5.3. **Combined Nitrate-plus-Nitrite**

5.3.1. Fill bottle to shoulder.
5.3.2. Add 3 mL sulfuric acid to sample.
5.3.3. Screw cap on securely and shake sample.
5.3.4. Remove cap and pour a few drops of sample from bottle into it.
5.3.5. Pour a drop of sample from cap on a pH test strip. If a red color appears, the pH is ≤ 2 and screw cap on securely.
5.3.6. If a red color does not appear, repeat the steps of adding sulfuric acid, shaking and testing the sample by pouring it from the cap on a pH test strip until the pH ≤2.
5.3.7. Do not dip pH paper into sample.
5.3.8. Do not let pH paper touch the inside of the sample container or the cap.
5.3.9. Screw the cap on securely after the pH of the sample has been adjusted to pH ≤ 2.

5.4 **Bromate, Chlorate, Chlorite**

5.4.1 Fill bottle to shoulder, leaving room for preservatives and mixing. Do not rinse bottle if preservatives have been added to the bottle prior to collecting the sample.
5.4.2 Add 0.1 mL of 5% EDA solution per 100 mL sample.
5.4.3 If the sample is collected from a treatment plant employing chlorine dioxide, the sample must be sparged with an inert gas (helium, argon, nitrogen) prior to addition of the EDA preservative at time of sample collection.
5.4.4 Screw cap on securely.

6. **Shipping and Handling:**

6.1. Complete chain-of-custody form if requested by lab or water supply program.
6.2. Keep samples stored at temperatures above 0 ºC and less than 6 ºC.
6.3. Deliver samples to lab the same day if possible.
6.4. The following table lists the maximum holding time for the applicable parameters above.

Parameters	Holding Time
Bromate, Bromide, Chloride, Fluoride, Sulfate, Combined Nitrate-plus-Nitrite-N	28 days
Chlorite, Nitrate-N (chlorinated)	14 days
Nitrate-N (non-chlorinated), Nitrite-N, ortho-Phosphate-P	48 hours

SOP - METALS AND MINERALS

Do not use for "first draw" lead and copper sampling.

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Metals and Minerals (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location, which is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   - 3.1. Containers: Pre-cleaned acid-washed plastic or glass 125 mL to 1-liter bottles with plastic or Teflon cap liners.
   - 3.2. Preservative**:** Approximately 3 mL 1:1 nitric acid per liter. Preservative may already be in bottle. Preservation may be done by lab after receipt of sample.
   - 3.3. Other: Labels, marker, pH test strip paper, safety glasses, and clean nitrile gloves.

4. **Safety Concerns:**
   - 4.1. Before collecting samples, all samplers must receive thorough training in proper handling of chemical preservatives and safety protocols so they are aware of the associated dangers and to determine appropriate safety precautions and first aid, should it be necessary.
   - 4.2. Nitric acid is a strong acid, and will cause burns.
   - 4.3. "Empty" sample containers may contain acid. Open them slowly and carefully.
   - 4.4. Sample bottles that have preservatives in them should be labeled accordingly. The specific chemicals should be identified.

5. **General Sample Collection Procedure**:
   - 5.1. All metals and minerals
     - 5.1.1. Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
     - 5.1.2. Remove aerator, screen, and all attachments from the faucet.
     - 5.1.3. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter. **Do not rinse bottle;** it may have a preservative in it.
     - 5.1.4. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
     - 5.1.5. Fill bottle to the shoulder.
     - 5.1.6. If acid was added to container by bottle supplier, proceed to step 5.1.8.
     - 5.1.7. Add 3 mL 1:1 nitric acid to sample.

5.1.8. Screw cap on securely and shake sample. Then remove cap. Pour a few drops of sample from bottle to cap, and then pour a drop of sample from cap on a pH test strip. If a red color appears, the pH is ≤ 2. If a red color does not appear, repeat steps 5.1.7 and 5.1.8. Do not dip pH paper into sample. Do not let pH paper touch the inside of the sample container or the cap.

5.1.9. Screw cap on securely.

6. Shipping and Handling:

6.1. Complete chain-of-custody form if requested by lab or water supply program.

6.2. Keep samples in closed chest. Refrigeration is not required.

6.3. Deliver samples to lab the same day if possible.

Maximum Holding Time for Metals	
Analyte	**Holding Time**
Metals (except Mercury)	6 Months
Mercury	28 Days

SOP - INORGANIC CHEMICALS AND PHYSICAL TESTS

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Alkalinity, Chlorine (total and free), Chlorine Dioxide, Color, Conductivity, Hardness, Odor, Oxygen (dissolved), pH, Total Dissolved Solids, Surfactants, Turbidity. (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location, which is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   - 3.1. Container: Pre-cleaned plastic or glass bottle as noted in the table in Chapter 3.
   - 3.2. Preservatives: Ice or refrigeration; For Hardness add approximately 3 mL 1:1 nitric acid or sulfuric acid.
   - 3.3. Other: Labels, marker, pH test strip paper, safety glasses, and clean nitrile gloves.

4. **Safety Concerns:**
   - 4.1. Before collecting samples, all samplers must receive thorough training in proper handling of chemical preservatives and safety protocols so they are aware of the associated dangers and to determine appropriate safety precautions and first aid, should it be necessary.
   - 4.2. "Empty" containers for "hardness" may contain nitric acid or sulfuric acid, which are very strong acid that causes burns.
   - 4.3. Sample bottles that have preservatives in them should be labeled accordingly. The specific chemicals should be identified.

5. **General Sample Collection Procedure:**
   - 5.1. All Inorganic chemistry and physical parameters.
     - 5.1.1. Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
     - 5.1.2. Remove aerator, screen, and all attachments from the faucet.
     - 5.1.3. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object. **Do not rinse bottle**; it may have a preservative in it (See Hardness 5.2)
     - 5.1.4. Fill bottle to shoulder.
     - 5.1.5. Screw cap on securely

5.2 Hardness:

5.2.1 If acid was added to container by bottle supplier, proceed to step 5.2.3

5.2.2 Add 3 mL 1:1 nitric acid or sulfuric acid to sample.

5.2.3 Screw cap on securely and shake sample. Then remove cap. Pour a few drops of sample from bottle to cap, and then pour a drop of sample from cap on a pH test strip. If a red color appears, the pH is 2. If a red color does not appear, repeat steps 5.2.2 - 5.2.4. Do not dip pH paper into sample. Do not let pH paper touch the inside of the sample container or the cap.

5.2.4 Screw cap on securely.

6. Shipping and Handling:

6.1. Complete chain-of-custody form if requested by lab or water supply program.

6.2. Keep sample in closed chest.

6.3. Samples must be kept on ice between 0 and 6^{O} C (except for chlorine, chlorine dioxide, dissolved oxygen and pH.) Chlorine, chlorine dioxide, dissolved oxygen and pH samples may be kept on ice without harm to the samples.

6.4. Deliver sample to lab the same day if possible.

6.5. The following table lists the maximum holding time for the applicable parameters.

Parameter	Maximum Holding Time	Parameter	Maximum Holding Time
Alkalinity	14 days	Odor	24 hours
Chlorine (Total & Free)	Analyze within 15 minutes	Oxygen, Dissolved	Analyze within 15 minutes
Chlorine Dioxide	Analyze within 15 minutes	pH	Analyze within 15 minutes
Color	48 hours	Total Dissolved Solids	7 days
Conductivity	28 days	Surfactants	48 hours
Hardness	6 Months	Turbidity	48 hours

SOP - Cyanide

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Cyanide (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   - 3.1. Container
     - 3.1.1. Pre-cleaned 1L plastic or brown glass bottle.
   - 3.2. Preservatives: Non-chlorinated samples may be collected in pre-preserved bottles. Chlorinated samples must be preserved in the field with ascorbic acid followed by the addition of sodium hydroxide.
     - 3.2.1. Chlorinated samples use ascorbic acid crystals followed by sodium hydroxide (NaOH to pH ≥12)
     - 3.2.2. Non-chlorinated samples use sodium hydroxide only
     - 3.2.3. Ice.
     - 3.2.4. (If sulfide is suspected, contact lab before sampling.)
   - 3.3. Other: Labels, marker, safety glasses, and phthalate-free gloves.

4. **Safety Concerns:**
   - 4.1. Before collecting samples, all samplers must receive thorough training in proper handling of chemical preservatives and safety protocols so they are aware of the associated dangers and to determine appropriate safety precautions and first aid, should it be necessary.
   - 4.2. Sample bottles that have preservatives in them should be labeled accordingly. The specific chemicals should be identified.
   - 4.3. Cyanide Caution! Sodium Hydroxide is a strong alkali and will cause burns. "Empty" sample containers may contain alkali. Open them slowly and carefully.

5. **General Sample Collection Procedure: Note: Chlorine and pH checked in Field**
   - 5.1. Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
     - 5.1.1. Remove aerator, screen, and all attachments from the faucet.
   - 5.2. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter. **Do not rinse bottle.**
   - 5.3. Remove bottle cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.

5.4. Fill bottle to shoulder, leaving room for preservatives and mixing.

5.5. If you are certain that no chlorine is present, collect sample in pre-preserved bottle or add sodium hydroxide to pH ≥ 12 (see sections 5.8 – 5.9), Screw cap on securely, shake sample, and follow section 6, Shipping and Handling.
5.6. Check a small portion of the sample with field test kit to determine if chlorine is present. If chlorine is present, add 0.1 gram ascorbic acid.
5.7. Stir or shake sample until ascorbic acid is dissolved. Repeat step 5.6 and 5.7 if necessary to neutralize all chlorine.
5.8. After all chlorine has been neutralized, add enough sodium hydroxide (liquid or pellets one at a time to raise sample pH to 12 or greater.
5.9. Remove container cap and check sample pH by pouring a small amount of sample into the container cap, and then pouring a drop from the cap on a pH test strip. If the new color of the test strip does not indicate a pH of at least 12, repeat steps 5.8 and 5.9.
5.10. Screw cap on securely.

6. Shipping and Handling:

6.1. Complete chain-of-custody form if requested by lab or water supply program.
6.2. Keep samples stored at temperatures above 0 ºC and less than 6 ºC.
6.3. Deliver samples to lab the same day if possible.
6.4. The following table lists the maximum holding time for the applicable parameters.

Parameter	Holding Time
Cyanide	14 days

SOP - ASBESTOS

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters**: Asbestos in water (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location, which is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   3.1 Container:
      3.1.1 Two Pre-cleaned 1-liter polyethylene or glass bottles.
      3.2 Preservatives**:** Keep samples stored at temperatures above 0 ºC and less than 6 ºC
   3.3 Other: Labels, marker, pH test strip paper, safety glasses, and gloves.

4. **Safety Concerns**:
Before collecting samples, all samplers must receive thorough training in proper handling of chemical preservatives and safety protocols so they are aware of the associated dangers and to determine appropriate safety precautions and first aid, should it be necessary.
"Empty" containers for chemistry parameters may contain corrosive or caustic preservatives that cause burns.
Sample bottles that have preservatives in them should be labeled accordingly. The specific chemicals should be identified.

5. **Sample Collection Procedure:**
   5.1 Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the project number and location, and date and time of collection must be submitted.
   5.2 Remove the aerator and screen from faucet.
   5.3 Turn on the cold water tap and run the water for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
   5.4 Remove first bottle cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
   5.5 Fill both bottles to approximately to the shoulder.
   5.6 Replace container cap securely.

6. Shipping and Handling:

6.1 Complete chain-of-custody form if requested by lab or water supply program.

6.2 Keep samples stored at temperatures above 0 ºC and less than 6 ºC to avoid excessive bacterial or algal growth.

6.3 Deliver samples to lab the same day if possible.

6.4 The following table lists the maximum holding time for the applicable parameters.

Parameter	Holding Time
Asbestos	48 hours

SOP - Specific Ultraviolet Absorbance (SUVA)

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. Applicable Parameters: UV254 and Dissolved Organic Carbon (DOC) (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. Sample Location: A state-approved location. The UV254 and DOC samples used to determine an SUVA value must be taken at the same time and at the same location. SUVA must be determined on water prior to the addition of disinfectants/oxidants.

3. Sample Containers: Four (4) 1 L amber glass bottles (two (2) for each analysis) with teflon lined septa. (Use screw caps with thick silicone rubber-backed TFE septa with open ring to produce a positive seal for DOC samples).

4. Sample preservation: Ice or refrigerate samples above 0 ºC and less than 6 ºC from time of collection to analysis, and protect samples from light. SUVA samples require no further preservation, however, your lab will need to filter the sample for analysis within 48 hours. DOC samples require no preservation at the time of collection; however, your lab must filter and preserve the samples with sulfuric acid or phosphoric acid to a pH <2 within 48 hours.

5. Sample Collection Procedure:

5.1 Remove aerator & screen.
5.2 Turn on cold water tap and allow system to flush until water temperature has stabilized (2-3 minutes). Reduce flow (to thickness of a pencil).
5.3 Remove cap and rinse bottle with sample. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
5.3 Fill the sample bottle, and replace the cap.
5.4 Immediately fill three more bottles with sample using the same procedure.

6. Shipping and Handling:

6.1 Complete chain-of-custody form if requested by lab or water supply program.
6.2 Keep samples stored at temperatures above 0 ºC and less than 6 ºC to avoid excessive bacterial or algal growth.
6.5 Deliver samples to lab the same day if possible.
6.6 The following table lists the maximum holding time for the applicable parameters.

SUVA Parameter	Holding Time
UV254	48 hours
DOC	48 hours

SOP - Total Organic Carbon (TOC)

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Total Organic Carbon (TOC) and Dissolved Organic Carbon (DOC). (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location, which is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   - 3.1. Container**:** Two pre-cleaned 40 ml amber glass septum vials with Teflon septa for each sampling site
   - 3.2. Preservatives**:** 0.5 ml of 9N sulfuric acid added to bottles before shipment to the field; ice or refrigeration
   - 3.3. Other**:** Labels, marker, safety glasses, and phthalate-free gloves.

4. **Safety Concerns**: Caution! "Empty sample containers contain sulfuric acid which is a strong acid and will cause burns. Open them slowly and carefully.

5. **Sample Collection Procedure**:
   - 5.1. Remove aerator, screen, and all attachments, such as hoses, from the tap.
   - 5.2. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
   - 5.3. Remove bottle cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
   - 5.4. Fill vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial). Gently tap the vial to dislodge any air bubbles.
   - 5.5. Carefully hook cap over the top of the vial. The Teflon side of the septum must be facing the sample (Teflon side is smooth and shiny).
   - 5.6. Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, add more water. (NOTE: Samples with bubbles cannot be analyzed)
   - 5.7. Shake sample for one minute.

5.8. Complete sample tag and sample collection form, using waterproof ink. Proper identification, including project number and location, and the date and time of collection, must be submitted.
5.9. Complete chain-of-custody form if requested by lab or water supply program.

6. **Shipping and Handling:**
6.1. Complete chain-of-custody form if requested by lab or water supply program.
6.2 Keep samples in closed chest at temperatures above 0°C and less than 6°C and away from direct light and solvent vapors.
6.3 Deliver the samples to lab the same day, if possible.
6.4 The following table lists the maximum holding time for the applicable parameters.

Parameter	Holding Time
TOC	28 Days

SOP - VOLATILE ORGANIC COMPOUNDS (VOCs) and TRIHALOMETHANES (THMs)

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Volatile organic compounds, including Trihalomethanes (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   - 3.1 Containers: Three pre-cleaned 40-mL glass vials with Teflon septa per sampling location.
   - 3.2 Preservatives: 1:1 hydrochloric acid, ascorbic acid, ice or refrigeration. 3 mg sodium thiosulfate for THMs.
   - 3.3 Field reagent blanks: The laboratory must provide a pair of field reagent blanks, to accompany collectors, on each compliance monitoring sampling event. Do not open trip blanks.
   - 3.4 Other: Labels, marker, pH test strip paper, and DPD chlorine field test kit (if water has been chlorinated),

4. **Safety Concerns:** Caution! Hydrochloric acid is a strong acid, and will cause burns. Caution! "Empty" sample vials may contain acid. Open them slowly and carefully.

5. **Sample Collection Procedure:**
   - 5.1 All samples – Fill three vials as follows
     - 5.1.1 Complete sample tag and sample collection form, using waterproof ink Proper identification, including the date and time of collection must be submitted.
     - 5.1.2 Remove aerator, screen, and all attachments from the faucet.
     - 5.1.3 Turn on the cold water tap and run it for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
     - 5.1.4 Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
     - 5.1.5 Follow specific instructions provided in sections 5.2 or 5.3 to collect the parameters of interest.

   - 5.2 Chlorinated Water Supplies
     - 5.2.1 Use vials that have 25 mg of powdered ascorbic acid added to vial by the bottle supplier.
     - 5.2.2 Fill vial carefully until water is above the vial rim. (This will prevent the formation of an air pocket in the vial). Gently tap the vial to dislodge any air bubbles.

5.2.3 Carefully add 2 drops of 1:1 hydrochloric acid to center of the water surface (i.e., to the meniscus). The acid will sink to bottom of vial, displacing 2 drops of sample.

5.2.4 Carefully hook cap over the top of the vial. The Teflon side of the septum must be down (facing the sample). (Teflon surface is shiny.)

5.2.5 Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the vial. If bubbles are present, remove the cap and repeat step 5.2.2. If any sample in the vial is spilled, resample with a fresh vial. (Note: Samples with bubbles cannot be analyzed.)

5.2.6 Shake sample for one minute.

5.3 Unchlorinated Water Supplies

5.3.1 Use vials that have 1:1 hydrochloric acid added to the vial by the bottle supplier.

5.3.2 Fill vial carefully until water is above the vial rim. (This will prevent the formation of an air pocket in the vial). Gently tap the vial to dislodge any air bubbles.

5.3.3 Carefully hook cap over the top of the vial. The Teflon side of the septum must be down (facing the sample). (Teflon surface is shiny.)

5.3.4 Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the vial. If bubbles are present, remove the cap and repeat step 5.3.2. If any sample in the vial is spilled, resample with a fresh vial. (Note: Samples with bubbles cannot be analyzed.)

5.3.5 Shake sample for one minute.

6. **Shipping and Handling:**

6.1 Complete chain-of-custody form if requested by lab or water supply program.

6.2 Keep samples in closed chest at temperatures above 0°C and less than 6°C and away from direct light and solvent vapors.

6.3 Deliver the samples to lab the same day, if possible.

6.4 The following table lists the maximum holding time for the applicable parameters.

Parameters	Holding Time
Volatile organic compounds, including trihalomethanes	14 days

SOP - HALOACETIC ACIDS (HAA5)

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Haloacetic acids (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   3.1. Containers:
      3.1.1. For 552.1, one pre-cleaned 250-mL amber glass bottle with Teflon-lined cap.
      3.1.2. For 552.2, two pre-cleaned 60-mL amber glass septum vials with Teflon septa.
   3.2. Preservatives: Granular ammonium chloride added to bottles before shipment to the field, ice.
   3.3. Other: Labels, marker, safety glasses, and phthalate-free gloves.

4. **Safety Concerns**:
   4.1. Caution! "Empty" sample bottles will contain special preservatives. (They should be labeled accordingly.) Open them slowly and carefully.
   4.2. Before collecting samples, all samplers must receive thorough training in proper handling of chemical preservatives and safety protocols so they are aware of the associated dangers and to determine appropriate safety precautions and first aid, should it be necessary.

5. **Sample Collection Procedure:**
   5.1. Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
   5.2. Remove aerator, screen, and all attachments from the faucet.
   5.3. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
   5.4. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
   5.5. Fill each bottle or vial carefully until water is actually above the rim. (This will prevent the formation of an air pocket inside the container.) Gently tap the container to dislodge any air bubbles.

5.6. For vials, carefully hook cap over the top of the vial. The Teflon side of the septum must be facing the sample. (Teflon side is smooth and shiny).
5.7. Screw cap on securely. Check for air bubbles by inverting the container and gently tapping the cap. If bubbles are present, add more water. (Note: Samples with bubbles cannot be analyzed.)
5.8. Shake sample for one minute.

6. Shipping and Handling:

6.1. Complete chain-of-custody form if requested by lab or water supply program.
6.2. Keep samples in closed chest at above 0°C and less than 6°C. Keep them away from direct light and solvent vapors.
6.3. Deliver samples to lab the same day if possible.
6.4. The following table lists the maximum holding time for the applicable parameters.

Parameters	Holding Times
Haloacetic Acids Monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, dibromoacetic acid	28 days for 552.1 14 days for 552.2

SOP - SYNTHETIC ORGANIC CHEMICALS (SOCs)

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS, WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Ethylene dibromide, dibromochloropropane, semi-volatile organic compounds, pesticides, carbamates, glyphosate, herbicides (chlorinated acids) Other - Alachlor, Atrazine, Dioxin, Diquat, Endothall (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location**: A state-approved location. If one has not been designated, select an appropriate location, which is representative of the distribution system.

3. **Sampling Materials:**
   - 3.1. **Containers:** A total of 9 containers including: 3 pre-cleaned one-liter amber glass bottles with Teflon-lined caps and 6 pre-cleaned 40mL vials with Teflon-lined caps for each sampling site.
   - 3.2. **Preservatives:** Keep samples stored at temperatures above 0 ºC and less than 6 ºC; granular sodium thiosulfate, sodium sulfite, and/or potassium tartrate or potassium dihydrogen citrate; hydrochloric acid added to appropriate bottles.
   - 3.3. **For specific preservatives, refer to Chapter 3, page 16 of this Manual.**
   - 3.4. **Other**: pH test strip paper, markers, labels, and field reagent blanks.

4. **Safety Concerns**: Caution! "Empty" sample bottles contain special preservatives. Open them slowly and carefully. Caution! Hydrochloric acid is a strong acid and can cause burns.

5. **General Sample collection procedure:** Refer to the sample container matrix **(Chapter 3)** for this method to correctly associate bottles and preservatives for either a chlorinated or a non-chlorinated system.
   - 5.1 Turn on cold water tap and run water for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
   - 5.2 For each one liter bottle labeled Pest-525: Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object. **Do not rinse bottle.** Fill bottle to shoulder. If chlorine is not present in the system, proceed to step 5.4.
   - 5.3 If chlorine is present in the system, collect sample in the container that has sodium sulfite added to the bottle then carefully add 2mLs of the 6N hydrochloric acid provided and check that the pH is 1-2.
   - 5.4 Screw cap on securely.
   - 5.5 Complete sample tag.

5.6 For each of the 40mL vials: Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of vial or bottle threads to be touched by any object. Do not rinse vial. Fill vial carefully to just overflowing, but do not flush out the preservative**.** If chlorine is not present in the system, proceed to step 5.7. If chlorine is present in the system, check to make sure the container is pre-preserved with the correct preservative or add the preservative as specified in the Sample Container and Preservation Table of this manual.

5.7 Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, add additional sample.

5.8 Field blanks- are treated same as sample.

5.9 Complete sample tag and sample collection form, using waterproof ink. Proper identification, including project number and location, and the date and time of collection, must be submitted.

6.0 Shipping and Handling:

6.1 Keep samples in closed chest at 0 ºC and less than 6 ºC away from direct light and solvent vapors.

6.2 Ice is not a packing material. To prevent breakage, wrap glass bottles in bubble wrap or other protective material.

6.3 If possible, deliver sample to lab the same day.

6.4 The following table lists the maximum holding time for the applicable parameters.

Synthetic Organic Chemical Parameters	Holding time
EDB / DBCP, Semi-Volatile Organics, Pesticides, Carbamates, Glyphosate, Herbicides (Chlorinated Acids) Other - Alachlor, Atrazine, Dioxin, Diquat, Endothall	14 Days

SOP - RADIONUCLIDES
(Except for Radon)

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES OF ALL INSTRUCTIONS ARE NOT FOLLOWED. CONFIRM SCHEDULING AND INSTRUCTIONS BEFORE SAMPLING. WASH HANDS. WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)

1. **Applicable Parameters:** Gross alpha, gross beta, iodine, radium 226, radium 228, strontium, gamma emitters, tritium and uranium, cesium, iodine (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   - 3.1 Containers: One pre-cleaned one-1/2-gallon plastic bottle or two pre-cleaned 2-liter plastic bottles.
   - 3.2 Preservatives: None.
   - 3.3 Other: Labels, marker, safety glasses, and phthalate-free gloves.

4. **Safety Concerns:** None.

5. **Sample Collection Procedure:**
   - 5.1 Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
   - 5.2 Remove aerator, screen, and all attachments from the faucet.
   - 5.3 Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
   - 5.4 Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
   - 5.5 Fill bottle to the shoulder.
   - 5.6 Screw cap on securely.

6. **Shipping and Handling:**
   - 6.1 Complete chain-of-custody form if requested by lab or water supply program.
   - 6.2 Deliver sample to lab the same day, if possible. Samples must be received at the lab within 5 days.
   - 6.3 The following table lists the maximum holding time for the applicable parameters.

Parameters	Holding time
Gross Alpha Activity; Gross Beta Activity; Iodine-131; Radium 226 & 228; Strontium 89 & 90; Tritium; Uranium; and Gamma Emitters (Barium-133, Cesium-134 & 137, Cobalt-60, and Zinc-65)	6 months

SOP - RADON

READ INSTRUCTIONS CAREFULLY. LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED! CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS. WEAR SAFETY GLASSES, AND CLEAN NITRILE GLOVES.

(For State-Specific Instructions: CT, ME, MA, NH, RI, VT)
For **Connecticut**, the SOP is : CTRadon in the State Specific Instructions

1. **Applicable Parameters:** Radon (See 40 CFR Part 141 for the most up to date list of approved methods.)

2. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location, which is representative of the distribution system. Avoid threaded faucets.

3. **Sampling Materials:**
   - 3.1 Containers: Two or more pre-cleaned 40-mL glass septum vials with Teflon-lined septum.
   - 3.2 Preservative: Closed, insulated chest without ice.
   - 3.3 Other: Labels, marker, safety glasses, and phthalate-free gloves.

4. **Safety Concerns:** None.

5. **Sample Collection Procedure:**
   - 5.1 Complete sample tag and sample collection form, using waterproof ink. Proper identification, including the date and time of collection must be submitted.
   - 5.2 Remove aerator, screen, and all attachments from the faucet.
   - 5.3 Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
   - 5.4 Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
   - 5.5 Fill vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial.) Gently tap the vial to dislodge any air bubbles.)
   - 5.6 Carefully hook cap over the top of the vial, trying to match the threads. The Teflon side of the septum must be facing the sample. (Teflon side is smooth and shiny).
   - 5.7 Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, empty the vial and repeat sampling procedure, beginning with step 5.5. (Note: Samples with bubbles cannot be analyzed.)
   - 5.8 Repeat steps 5.4 through 5.7 for each subsequent vial. At least two vials must be collected at each location.

6. **Shipping and Handling:**
   - 6.1 Complete chain-of-custody form if requested by lab or water supply program.
   - 6.2 Keep samples in closed chest at room temperature and away from direct light and solvent vapors.
   - 6.3 Deliver sample to lab the same day.
   - 6.4 The following table lists the maximum holding time for the applicable parameters.

Parameter	Holding Time
Radon	4 days