



**COVERSHEET
STANDARD OPERATING PROCEDURE**

Operation Title: WATER SAMPLE COLLECTION FROM WATER SUPPLY WELLS

Originator: Brian Beneski
Quality Assurance Manager
Division of Remediation
Bureau of Remediation and Waste Management

APPROVALS:

Division of Remediation Director:

David Wright
Print name

David Wright
Signature

12/1/2016
Date

Bureau of Remediation and Waste Management Director:

DAVID BURNS
Print name

David Burns
Signature

12/4/16
Date

QMSC Chair:

William Longfellow
Print name

W. Longfellow
Signature

12/20/16
Date

Department Commissioner:

PAUL MERCEK
Print name

Paul Mercek
Signature

1-3-2017
Date

DISTRIBUTION:

() Division of Remediation.....By: _____ Date: _____



1.0 APPLICABILITY

This Standard Operating Procedure (SOP) applies to all programs in the Maine Department of Environmental Protection's (MEDEP) Division of Remediation (DR). It is also applicable to all parties that may submit data that will be used by the DEP/DR.

This SOP is not a rule and is not intended to have the force of law, nor does it create or affect any legal rights of any individual, all of which are determined by applicable statutes and law. This SOP does not supersede statutes or rules.

2.0 PURPOSE

The purpose of this document is to describe MEDEP/DR's procedure for collecting water samples from water supply wells. Water samples are collected from water supply wells to determine extent of groundwater contamination and the impact of groundwater contamination on human health at the exposure point. This standard operating procedure (SOP) is designed to be a guideline for collecting water samples from these wells, either with or without filter systems, to assure samples are collected in a consistent, appropriate manner that will provide accurate data for making decisions and meeting the data quality objectives of the task.

3.0 DEFINITIONS

- 3.1 Treatment System - A device which removes contaminants and/or naturally occurring compounds from the water. This may include granular activated carbon (GAC) Filters, water softener, particle filter, air stripper, or reverse osmosis systems.
- 3.2 MEDEP Installed Treatment System – Any treatment system device that A MEDEP administered program has placed on a water supply to remove contamination or condition the water prior to contamination removal.
- 3.3 Sample Point - Any location from which a representative water sample may be obtained. Sample points can be located before the treatment system, between treatment system devices, or after the treatment system.

4.0 RESPONSIBILITIES

All MEDEP/DR staff must follow this procedure when performing this task. All Managers and Supervisors are responsible for ensuring that their staff are familiar with and adhere to this procedure. MEDEP/DR staff reviewing data by outside parties are responsible for assuring that the procedure (or an equivalent) was utilized appropriately.



5.0 GUIDELINES AND PROCEDURES

5.1 INTRODUCTION

Correct sampling of household water supplies is essential to the proper investigation of groundwater contamination. Each well supplying a household(s) also represents a monitoring well for local groundwater. Such information/data must be factored into the groundwater investigation program.

The three most important aspects of household water sampling are as follows: 1) develop a Sampling and Analysis Plan (SAP) that adequately and appropriately meets the sampling goal (see also SOP# RWM-DR-014 - Development of a Sampling and Analysis Plan); 2) follow established sampling procedures to ensure the integrity of the sample, and; 3) keep accurate records of sampling data (i.e. locations, bottle numbers, etc., See also SOP# RWM-DR-013 - Documentation of Field Activities and Development of A Trip Report).

5.2 PREPARATION

SAP development guidance can be found in SOP# RWM-DR-014 - Development of a Sampling and Analysis Plan. However, residential sampling does require several unique aspects, one being scheduling. It is best to inform property owners at least one week ahead of the scheduled sampling event, particularly if access treatment systems is required. Be aware of the past contamination history of the site(s) and try to plan visits so that sampling begins with the least contaminated households and ends with the most contaminated households. This method allows the least potential for cross-contamination, and should be followed whenever practical. In planning a sampling event it is recommended to allow thirty (30) minutes between each sampling appointment. If this is an initial visit to a household, bring a well data sheet (Attachment A) and get as much information about each household's well(s) as possible. Important information/data to gather when sampling household wells includes: date of installation of the well; the type of well (drilled, dug, point, or other); gallons per minute produced; depth to the screened interval (and width of screened interval if applicable), and type of piping used. Permission should be obtained to GPS the location of the well.

5.3 EQUIPMENT

Below is a list of recommended equipment to have when household sampling:

- Bucket (to collect excess water when sampling treatment systems),
- Disposable nitrile gloves (to prevent exposure and/or cross-contamination),
- Flashlight (to enter dark basements/cellars),
- Field Notebook (to record pertinent information),
- Chain of Custody Forms (to document chain-of-custody),
- Label Tags (to label sample points at households with filters),



- Container of clean water (for rinsing),
- Container of Soapy Water (for washing),
- Sample Containers from laboratory
- Short section of hose to attach to spigot

5.4 HEALTH AND SAFETY

Part of completing a successful household sampling assignment is completing it in a safe and healthful manner. Whenever sampling water from any point, at a minimum wear disposable nitrile gloves and safety glasses. Hand and eye protection decrease the chance of dermal exposure and also reduce the chance of cross-contamination of samples.

Also be aware of physical hazards; treatment systems are usually located in the basement, so make sure to take a flashlight. Watch for overhead hazards such as low ceilings and/or hanging objects. Be especially careful of electrical hazards such as outlets near the sampling area and/or bare wires. Lastly, try not to splash the water when sampling; splashing contaminated water in the eyes or on exposed skin could be harmful if the water is significantly contaminated. If water supplies are known or suspected to be contaminated, care should be taken to avoid cross-contamination with other water samples being collected as part of the same sampling event.

5.5 SAMPLING

5.5.1 Sampling Water Supplies Without DEP Installed Treatment System

When sampling a water supply well without any treatment system, samples may be obtained from an indoor faucet (kitchen, bathroom, other), or an outside faucet (spigot). If MEDEP has sampled the well previously and conditions have not changed (house renovations, family size, etc.) samples should be obtained from the same location as previously sampled. If MEDEP has not sampled the well before, or if conditions have changed, samplers should inspect the plumbing and select a sample location closest to the pressure tank or pump. Samplers should make sure that the sample point is clean (i.e., no grease, lead soldering, or other possible contaminants) and that no possible sources of cross-contamination (gas cans, solvents, etc.) are nearby. If a water treatment system (such as radon, sediment filters, or water softeners) is present, the sample should be collected prior to these systems. If sampling from a faucet, remove the aerator; if sampling from an outside spigot, remove existing hoses from the spigot.

Run the water on cold at full flow for least ten(10) minutes prior to collecting a sample. Running the water will accomplish two goals. First, it will purge the pipes of any stagnant water; second, it will drain the pressure tank and cause the pump to turn on and start pumping water from the well. This should allow the collection of a representative sample from the well.

Record any observations and/or comments about matters pertinent to the sample location or to the site.



After the water has run for approximately 10 minutes, reduce the flow to facilitate sample collection with minimal aeration and begin filling the laboratory containers. See Section 6.4.3 below for special procedures when sampling for EPH or VPH.

5.5.2 Sampling Households With Treatment System

For households with a MEDEP installed treatment system, samplers should collect samples after the treatment system first (post-treatment), between treatment devices second, and before the treatment system (pre-treatment) last to reduce likelihood of cross-contamination. The pre-treatment samples should be collected before any filter, softener, or other device that the landowner or MEDEP has installed.

The plumbing system, including the any treatment devices should be purged by turning on a faucet located on the downstream end of the devices. This may be a kitchen or bathroom faucet. If sampling from a faucet, remove the aerator prior to purging and sampling. Sufficient water should be purged to flush the treatment devices as completely as possible (10-20 minutes depending on the number of devices present). In most situations, purging can continue while samples are being collected at the designated sample points. The sample before the filter system is taken last due to its highest probability of being contaminated. If multiple treatment systems are present, sampling should proceed from point of use to point of entry, in order to reduce potential for cross-contamination. Care should be taken to accurately label the sample containers with the correct sample location designation (pre-, mid-, and post-filter). Each sample port location should be purged for 10 to twenty seconds to remove stagnant water prior to sample collection. When sampling, it may be appropriate to attach polyethylene tubing to the sampling port and collect purge water in a bucket. Properly preserved laboratory containers should be filled using a flow rate that is appropriate for the type of analysis and container type.

If multiple treatment devices are present, it may be necessary to take more samples. Samplers should take care to accurately identify and label sample locations and associated laboratory containers. Filtration devices can often be bypassed with bypass valves included in the plumbing. When sampling any of these devices, trace the route of the plumbing (pipes) to make sure the sample is being taken from the correct sampling port. Be sure to include contingencies for such devices in the sampling plan.

Once all the samples have been collected at a water supply, remove gloves, and return all plumbing to its original position (aerator back on faucet, all sample ports closed, etc.). Record water meter readings if the residence is equipped with a meter. Be sure to note if the meter reading is in cubic feet or gallons. The water meter reading will give (in conjunction with the previous reading) the amount of water being used, which is useful in predicting/explaining the breakthrough in GAC filters. Place the samples in a cooler on ice for transport to the laboratory.



5.5.3 Special Situations

There are certain situations that require unique sampling methods. For example, when sampling for petroleum hydrocarbons by either the VPH or EPH methods, it may be necessary to collect samples from spigots at high flow rates. Under these circumstances, a section of hose fitted with a “Y”-control valve may be required to assure that grease associated with the moving parts of the fixture or spigot is not introduced into the sample by opening or closing the fixture just prior to sampling. Another example of a unique situation is when tritium is used to investigate the relative age of the groundwater. Samplers need to remove their watches before collecting samples that will be analyzed for tritium (if the watch is a tritium-illuminated type). Special circumstances should be outlined in the sampling plan.

6.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

In order to insure that the samples are representative of the water at a given sampling point, the sampler must pay close attention to QA/QC procedures. At each household the sampler must be aware of four (4) areas which may be sources of cross-contamination of the samples: **1)** samplers hands--wear a new pair of gloves at every residence sampled and at each sample point; **2)** sampling order--sample at the least contaminated households first, the most contaminated last; and at the least contaminated point in any filtration system first (post-filter) and the most contaminated point last (pre-filter) **3)** self-contamination--make sure the sampling area is free of any possible sources of contamination (grease on the tap, solvent bottles near the sample port, etc.), and; **4)** piping--look at the plumbing and pipe materials and note the presence of lead soldering or improper lubrication (i.e. WD-40, oil, etc.) on the pipes. Also, ask the resident if any work had recently been done on the well, plumbing, or any other components of the water system.

A trip blank should be preserved with the same preservative as the actual samples, stored and transported with the other samples collected during the sampling event, and then analyzed (along with the other samples) for the appropriate suspected contaminants by the lab. If a sampling event is completed and the trip blank contains contaminants, this indicates that the containers may not have been clean or other QA/QC procedures have failed. In this case, it may be necessary to re-sample.

Samplers should avoid fueling a vehicle until after the samples have been delivered to the laboratory or after securing them in a cooler. Avoid the use of colognes, perfumes and bug sprays on sampling days. In addition, sampling personnel should avoid any contact with inside surfaces of sample containers and covers or caps.

If sample results indicate that contamination is present at unanticipated levels or between filters re-sampling may be warranted. All sample data should be reviewed for possible sources of error before re-sampling the water supply. Re-check all field documentation from the trip to insure the sample numbers were recorded correctly in both the field notebook and on the laboratory analysis request sheet and/or chain of custody. If the documentation check fails, go back to the site and re-sample. When re-sampling, be sure to check the plumbing to make sure all valves are properly opened and closed. An open bypass valve would bypass the filters and supply unfiltered raw water to the house.



7.0 DOCUMENTATION

All sampling activities must be documented as outlined in MEDEP/DR SOP# RWM-DR-013 - Documentation of Field Activities and Development of A Trip Report. Sample custody must be followed as outlined in MEDEP/DR SOP# RWM-DR-012 – Chain of Custody Protocol.

8.0 REFERENCES

- U.S. Environmental Protection Agency, "A Compendium of Superfund Field Operations Methods," EPA-540/P-87/001, December 1987.
- U.S. Environmental Protection Agency, "Sampling of Hazardous Materials," EPA, April 1990.



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ATTACHMENT A
Well Questionnaire



MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Well Questionnaire

A. CURRENT OWNER

PREVIOUS OWNERS (if any)

Name: _____ Name: _____
Address: _____ Address: _____
Telephone: _____ Telephone: _____

B. WELL LOCATION

Tax Map _____ Lot Number _____ Street Location _____

C. DESCRIPTION OF WELL

1. Date Installed: _____

2. Who installed the well?

____ Contractor Name: _____
____ Owner/Occupant Address: _____
____ Unknown _____
____ Other (_____) _____

3. Type of Well:

____ Dug Well _____ Drilled Well _____ Other (gravel or sand packed)
____ Spring _____ Well Point _____

4. Well Specifications:

Depth of Well _____ Type of Pump _____
Casing Length _____ Pump Depth _____
Casing Material _____ Piping Material _____

5. Is the top of the well above ground? Yes ___ No ___

6. Well Covering: Concrete Roof Board Other

7. Depth to Bedrock or Ledge: _____

Water Bearing Material:

Sand/Gravel Sand Till _____ Silt/Clay Bedrock

8. Estimated Yield (gal/min or gal/day) _____ Date _____

Estimated Consumption (gal/day) _____ Date _____

9. Is the water currently being treated?

Chlorinator Softener Other ___
Iron Removal _____ pH control _____

10. Have you experienced any problems with water quality or quantity?

11. Has the water quality ever been tested? By whom?

Today's Date: _____

Mail to: ME DEP; BRWM/DR
17 State House Stn.
Augusta ME 04333-0017