The Truman Lab

Water Quality Monitoring Program

Standard Operating Procedure: General Sampling Non-Laboratory Staff

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TABLE OF CONTENTS

1.0 SCOPE AND APPLICABILITY

This Standard Operating Procedure (SOP) provides guidance for personnel when collecting water samples to be analyzed for total coliform and/or *E. coli*. This is an abbreviated version of *SOP Bacteria Sampling* and is intended for those who are non-laboratory staff. This SOP will describe the methods required for analysis of ground water (tap water) and surface water (rivers, lakes, et cetera). This method is not intended for marine water.

2.0 SUMMARY OF METHOD

The sampling method for surface water and ground water is dependent upon the target parameter being tested for; some methods may have significant changes in requirements.

2.1 GENERAL CONSIDERATIONS

- **Samples must not be taken on a Friday or the day preceding a federal holiday, as many require a 24-hour incubation time before analysis. Samples should be delivered before 4 p.m. to provide sufficient time for pre-analysis procedures.**
- The purpose of any sample is to select a portion of a population which is representative of that population. Any influence imparted by the sampling effort that affects the representative nature of the sample defeats the purpose.
- It is a rare occurrence when decisions made by the sample collector do not influence the outcome of the sample. Such variables as where to collect the sample, at what depth, grab versus composite, choice of automatic sampler, and automatic sampler collection frequency, often require on-the-spot decisions and can have considerable influences on the quality of the sample collected. It is the job of the collector to minimize these influences.
- When collecting a stream sample, always face upstream. When wading is required, be sure not to disturb the stream above the point of collection. If the stream will be disturbed by other activities such as flow measurements or biological sampling, collect the water sample first.
- When collecting a wastewater sample, do not increase the velocity of a waste flow immediately prior to sampling (by lifting flap gate, lowering discharge line, etc.). If this cannot be avoided to collect the sample, wait a period of time until any solids picked up by the increased flow are purged.
- When sampling below the confluence of two or more streams or downstream from a discharge pipe, always ensure that it is at a point where complete mixture has occurred. Straight channels exhibit laminar flow and may require long distances for lateral and vertical mixing. If sampling after complete mixing cannot be performed, two or more samples transecting the stream width or depth may be required. Depending upon the sampling objectives, the samples can then be analyzed separately as grabs or combined and submitted for analysis as one sample.
- Always use the correct sampling technique and handling procedure specified for the parameter of interest. Points to consider: container type, volume of sample needed to conduct analysis, required preservative, and holding time. Depending on the analyses

required, several collection procedures may be used to collect a single sample
- When collecting stream samples, large incidental stream materials such as leaves and sticks should be avoided.

3.0 HEALTH AND SAFETY REQUIREMENTS

Field activities that involve collection of bacterial samples from water may require working in or around various waste streams and water bodies. Field personnel should protect themselves by wearing the appropriate level of personal protective equipment, such as waders and disposable nitrile or polyvinyl chloride gloves.

All field personnel who are routinely exposed to domestic and animal waste should receive vaccinations to prevent Hepatitis A and Hepatitis B. Avoid skin-contact with sodium thiosulfate if used in the sampling process. In case of contact, wash with soap and water. Seek medical attention if any irritation develops.

Manufacturer's safety requirements for all equipment mentioned in the SOP shall be followed.

4.0 SUPPLIES AND EQUIPMENT

Below is a general list of supplies and equipment used for sample collection.

- **Chain of Custody forms**
- Map to sampling location
- Ice chest
- Ice packs
- Appropriate sampling container(s)
  - Note: Containers must be obtained from The Truman Lab
- Appropriate preservative(s)
  - Note: If a preservative is required, it will be prefilled in the sampling container
- Waterproof pen and permanent marker
- Waterproof bags for samples
- Waders (optional)
- Nitrile gloves

5.0 PROCEDURES

This section describes methods used to collect water and wastewater. Sampling techniques used for grab, composite, and modified composite samples are described below.

5.1.1 Sample Labeling

All samples must be labeled with the date, time of collection in 24-hour time, and sample order number using a permanent market. Initial the bottle cap and circle the sample order

number. The sample order number will be assigned in chronological order. For example, the first sample of the sampling day will be labeled "1". This ordering will reset every sampling day. For example, the first sample of a second sampling day (if applicable) will also be labeled "1". These two samples would be distinguished by the date and time. This information must also be listed on the Chain of Custody and other applicable forms in the correct order and location, which are dictated by this sample order number.

Once these forms and samples are received by laboratory staff, it is the responsibility of that staff to then assign the true unique sample number.

The purpose of the sample order number is to allow non-laboratory staff to collect samples while still being able to track and distinguish between samples. Sample order numbers are prefilled on the applicable forms, so laboratory staff must complete these forms as well as to still align with the sample order number. For example, the first sample collected must be recorded on the first row. This adds an extra layer of control so that each sample is easily distinguished by the order in which it was collected on a single sampling day.

5.2 Chain of Custody Forms

After samples are collected, the Chain of Custody form and other applicable forms must be completed. Non laboratory staff shall list the coordinates of the sample collection location if the site number is not prefilled.

5.3 Drinking Water / Ground Water

5.3.1 Drinking water samples are generally collected from frequently used indoor faucets to analyze the ground water from a well.

5.3.2 Use sterile, non-fluorescent 120mL bottles that are to be filled with 100mL of sample from frequently used indoor faucets. Bottles must be obtained from The Truman Lab. Bottles must contain sodium thiosulfate to neutralize any effects of chlorine.

5.3.3 Remove any aerators, screens, or filtration systems from the faucet. Turn on the cold water and adjust the water flow so that a steady stream of pencil-thin water flows from the faucet. Allow the water to run for 5 minutes.

5.3.4 Remove the cap of the sample container. Do not allow the inside of the bottle, cap, or the bottle threads to come in contact with hands or surfaces.

5.3.5 Holding the bottle by the base, fill the bottle to just above the 100mL line, taking care not to over or underfill the bottle. If the sample is over or under filled, carefully adjust the volume of water by pouring or filling until there is 100mL of sample. Replace the cap. Samples cannot be analyzed if there is less than 100mL of water.

5.3.6 Each sample container will be labeled with a unique sample number (or sample order number, circled), date, and time of collection in 24-hour time. Bottle caps should be initialed by the sampler. Use permanent markers. The chain of custody must also be completed to the fullest extent possible at this time. The samples must then be placed in an ice chest or refrigerator and transported back to The Truman Lab. If placed in an ice chest, place samples in a plastic bag first to avoid contact with melting water.

5.4 Grab Samples

5.4.1 A grab sample is one in which the sample collector obtains an individual discrete sample within a period of time not exceeding 15 minutes. However, exceeding the timespan is allowable in the event that continuously filling multiple sample containers (e.g. low flow sampling of groundwater) exceeds 15 minutes.

5.4.2 The most common vessels used by The Truman Lab for bacteria analysis are sterile, non-fluorescent 120mL bottles that are filled with 100mL of sample. Bottles may contain sodium thiosulfate to neutralize any effects of chlorine. Do not disturb the water upstream of the sampling location. If possible, collect samples from an area of high flow in the main channel of water. Surface water grab samples should be collected at a depth of six inches to one foot below the surface.

5.4.3 Remove the cap of the bottle. Be careful to avoid touching the inside of the bottle, cap, or threads. Hold the sterile sample container near its base and plunging it (neck down) below the surface of the water. The bottle should be turned until the neck of the bottle points *slightly* upward. If a current is present, the mouth of the bottle should be directed into the current. Because surface waters are not suspected to be chlorinated, loss of the sodium thiosulfate is of no concern if the bottles contain it.

5.4.4 Fill the bottle to just above the 100mL line, taking care not to over or underfill the bottle. If the sample is over or under filled, carefully adjust the volume of water by pouring or filling until there is 100mL of sample. Replace the cap. Samples cannot be analyzed if there is less than 100mL of water.

5.4.5 When sampling waters such as treated effluent, which have been chlorinated or are suspected to contain chlorine, pre-preserved sterile sample containers with sodium thiosulfate must be used to neutralize its effects. In these situations, it is important that care be taken when filling the containers so as not to lose the sodium thiosulfate from the container. This may be accomplished by holding the bottle by the neck (but avoiding contact with bottle threads) and gently lowering it below the surface of the water while slightly tipping the mouth into the water stream.

5.4.6 Each sample container will be labeled with a unique sample number (or sample order number, circled), date, and time of collection in 24-hour time. Bottle caps should be initialed by the sampler. Use permanent markers. The chain of custody must also be completed to the fullest extent possible at this time. The samples must then be placed in an

ice chest or refrigerator and transported back to The Truman Lab within 5 hours from the time of collection. If placed in an ice chest, place samples in a plastic bag first to avoid contact with melting water.

5.4.7 Special precautions to consider when collecting grab samples.

- When submerging a sample container, avoid contaminating the sample with your hands. Clean protective gloves should be worn when collecting a sample. It is best to hold the container well below the opening and move it away from you (upstream) as it fills.
- When collecting stream samples, try to select a point in the main flow. Avoid backwater areas and the shoreline when possible. It is often better to select a site either above or below a riffle to assure the main flow is being sampled.
- When possible, collect lake samples by boat, avoiding the shoreline (unless the purpose of the sample is to characterize the shore areas). Most lakes stratify, which results in significantly different water qualities above and below the thermocline. If the whole water column is to be characterized, several depths must be sampled.

5.5 Pole Samples

5.5.1 Pole (swing) samples are used to collect samples when traditional grab samples are not feasible. This may include using a pole sampler to collect a sample from off the side of a bridge or to collect a sample closer to the center of a water body when it is not safe to approach the center by foot. Pole samples are considered less reliable because it is more difficult to control collection factors, such as depth and direction.

5.5.2 Attach the correct sample container onto the pole sampler. Position it so that the mouth of the bottle will be pointing into the current, facing upstream. The bottle should be turned until the neck of the bottle points *slightly* upward. Use the pole sampler to place the bottle into the water body and collect the sample. Samples should be collected at a depth of six inches to one foot below the surface. The bottle should be filled just above the 100 mL mark or the appropriate sample fill marker if using a different size container. Follow the same precautions as with a normal grab sample.

5.5.3 Each sample container will be labeled with a unique sample number (or sample order number, circled), date, and time of collection in 24-hour time. Bottle caps should be initialed by the sampler. Use permanent markers. The chain of custody must also be completed to the fullest extent possible at this time. The samples must then be placed in an ice chest or refrigerator and transported back to The Truman Lab within 5 hours from the time of collection. If placed in an ice chest, place samples in a plastic bag first to avoid contact with melting water.

The Truman Lab

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Chain of Custody

Client Name:	Client Phone:	Client Email:	Client Address:

Sampler Name:	Hand-Delivered?	Matrix Code: Surface Water = SW, Drinking Water = DW, Waste Water = WW, Soil = SO, Other = O	Sample Type (ST): Grab = GS, Composite = CS, Modified = MS, Other = O	Container Type (CT): Plastic = P, Glass = G, Other = O	LAB USE ONLY
Sampler Signature:	Mailed?				Sample Batch Number:

Sample Order #	Collection Date	Collection Time	Collection Location / Site Number	Matrix Code	Analysis Requested	Unique Sample Number	Preservative	ST / CT
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

1. Relinquished By:	1. Received By:	Date:	Time:	Comments:	Approved By:
2. Relinquished By:	2. Received By:	Date:	Time:		

Instructions

1) The patterned boxes shall be completed by laboratory staff. Non-patterned boxes shall be completed by the sampler. When samples change custody, the ***Relinquished By*** and ***Received By*** sections must be completed by both parties exchanging the samples. If two samples are ***Duplicates*** of each other, circle the ***Sample Order #*** of both samples on this form.

2) If the ***Collection Location*** is different from the provided ***Client Address*** and a ***Site Number*** is not prefilled, list the ***Coordinates*** of the sampling location (if available).

3) Using a permanent marker, label each sample container with the ***Sample Order #*** (if a ***Unique Sample Number*** is not prefilled), ***Date***, and ***Time*** of collection. Circle the ***Sample Order #*** on the container. Initial the bottle cap. For example, the first sample collected will be labeled "1", circled, and this sample information will correspond with the other sections on this form for ***Sample Order #1***. The sample will be labeled by laboratory staff with the ***Unique Sample Number*** upon receival at the laboratory.