STANDARD OPERATING PROCEDURE
Instructions for Cleaning Groundwater Sampling Equipment

KEY WORDS

Decontamination, native rinse, washing, cleaning

APPROVALS

Original signed by 8/11/23
MANAGEMENT: _____ DATE: _____
Joy Dias
Groundwater Protection Program, Environmental Program Manager

Original signed by 8/11/23
SENIOR SCIENTIST: _____ DATE: _____
Carissa Ganapathy
Groundwater Protection Program, Senior Env. Scientist, Supervisor

Original signed by 8/11/23
QUALITY ASSURANCE: _____ DATE: _____
Vaneet Aggarwal, Ph.D.
Environmental Monitoring Branch, Senior Env. Scientist (QA Officer)

Original signed by 8/11/23
AUTHOR/PREPARED BY: _____ DATE: _____
Nicolas Pereira
Groundwater Protection Program, Environmental Scientist

Environmental Monitoring Branch organization and personnel, such as management, senior scientist, quality assurance officer, project leader, etc., are defined and discussed in Standard Operating Procedure (SOP) ADMN002.

No previous authors.

1.0 INTRODUCTION

1.1 Purpose

This document standardizes the equipment cleaning process in the warehouse or laboratory to decontaminate groundwater sampling equipment for use by Groundwater Protection Program (GWPP) staff.

Note that gloves must be worn during all steps in this SOP. Further, to protect DPR laboratory facilities from contamination, keep sampling equipment on a clean table lined with plastic, tarps, or butcher paper.

1.2 Scope

This document provides a standard set of instructions to clean groundwater sampling equipment after field usage (see section 3.1). Variances from these general cleaning instructions are defined specifically for each piece of equipment listed (see sections 3.2-3.8). These cleaning instructions are limited to GWPP's equipment used in collection of aqueous water samples in the field. The instructions may **not** cover additional cleaning steps or equipment, such as studies requiring soil sampling, studies using standards, or sampling after pesticide applications. SOPs that include cleaning procedures will default to those outlined in the specific sampling and equipment SOPs.

1.3 Definitions

Native rinse – refers to using water from the same source as the intended sample before sampling to rinse the collection containers. This step further removes trace residues of any constituent in the containers, including drops of deionized water.

2.0 MATERIALS

2.1 Cleaning materials:

2.1.1 Liquinox®

2.1.2 Tap water

2.1.3 Deionized water (DI water)

2.1.4 Isopropyl or isopropanol alcohol

2.1.5 500 mL wash bottle (for the alcohol)

2.1.6 Disposable gloves

2.1.7 Plastic brush

2.1.8 Sealable plastic bags (small)

2.1.9 Large garbage bags

2.1.10 Buckets and dishpans (for submerging some equipment)

2.2 Equipment to be cleaned:

2.2.1 Carboys

2.2.2 Teflon tubing

2.2.3 Schrader valve adaptors and fittings

2.2.4 Garden hoses

2.2.5 Purging bucket used for parameter stabilization

2.2.6 Half-pint mason jar used for parameter stabilization

2.2.7 Sonic water level meter or cable spool reader

3.0 PROCEDURES

3.1 General cleaning sequence for sampling equipment

3.1.1 The following steps form a standardized procedure for items not listed in section 2.2 that may be used for groundwater monitoring. Follow this section for sampling equipment that is cleaned as needed, such as ice chests, six-packs, and other items used for monitoring and research.

3.1.2 First, clean the parts of the equipment that come into contact with groundwater samples using a solution containing one pump of Liquinox® mixed with tap water that creates suds, but is not difficult to rinse off.

3.1.3 Using tap water, remove any traces of the Liquinox® solution, ensuring there are no visible suds, then shake excess water from the equipment. If time allows, air dry the equipment before continuing to reduce the volume of rinsate produced during step 3.1.4.

3.1.4 Rinse the same parts of the equipment with isopropyl alcohol. All rinsate produced from this step (across all equipment) must be stored in a labeled waste container for proper disposal (see section 3.9).

3.1.5 Rinse again, this time with DI water. Repeat this step three times on all equipment.

3.1.6 If necessary, leave the equipment to dry on top of a new, clean paper towel, butcher paper, or plastic sheet to prevent contamination.

3.1.7 When the equipment is used again in the field, a native rinse will be required to remove potential trace residues before collecting any water from the sampling source.

3.1.8 Some sampling items are considered disposable if they can no longer be cleaned adequately. For example, dispose of dirty and heavily stained six-packs.

3.1.9 Any variances or omissions to the steps listed above, depending on the specific type of equipment being cleaned, will be detailed in the following sections.

3.2 Carboys (for collecting background water)

3.2.1 Remove any label and tape still on the carboys.

3.2.2 Add a small amount of Liquinox® directly inside each carboy (about ¼ Tbsp or one pump from a pump dispenser for each carboy).

3.2.3 Add tap water, close the lid, and shake vigorously, ensuring the solution reaches any small nooks or crannies within the carboys.

3.2.4 Dump the Liquinox® solution in the vehicle cleaning sump outside the laboratory facilities. Rinse the carboys thoroughly with tap water. Repeat this as needed to remove any excess suds still in the carboys.

3.2.5 Move the carboys into the laboratory. Use a clean benchtop liner or butcher paper if transporting them on a cart. Keep the carboy lids fastened while transporting them.

3.2.6 Skip alcohol rinsing for carboys to remove the risk of any potential leftover rinsate residue.

3.2.7 Add about 250 mL of DI water into each carboy, ensuring the spigot doesn't touch the inside or outside of the carboy neck. Close the lid and shake vigorously to ensure the water reaches any nooks and crannies. The water can be dumped into the sink. Repeat this step three times.

3.2.8 Once clean, relabel the carboys. They can be stored with any clean carboys. Ensure they are stored with the lid secured until they are used to collect background water.

3.2.9 When collecting background water in the field (SOP QAQC010), conduct a native rinse by adding about ¼ gallon of the source water you intend to sample. Close the lid and shake vigorously before dumping the rinse water and collecting the sample.

3.3 Teflon tubing

3.3.1 Fill a plastic dishpan (deep enough to completely submerge all tubing) with a solution of Liquinox® and hot tap water (See Figure 1).

3.3.2 Submerge the tubing in the dishpan and shake to ensure the solution distributes evenly.

3.3.3 Remove tubing from solution and rinse with tap water to remove any leftover suds. This solution can be disposed down the sink.

3.3.4 Using a wash bottle, rinse the inside of the tubing with isopropyl alcohol, about a volume's worth of tubing repeated three times across all tubing (28.928 mL x 3 for a total of 86.784 mL for each tube). Use the dishpan to collect this alcohol rinsate as it must be stored in a waste container for proper disposal (see section 3.9).

3.3.5 Run DI water through the entire length of the tubing (using the same volumes as in step 3.3.4). Repeat this step three times and dump the DI water down the drain.

3.3.6 Allow the tubing to dry on a clean piece of benchtop liner or butcher paper. Once dried, store each piece of tubing in its own small, sealable bag until you intend to sample.

3.3.7 When the tubing is used in the field, conduct a native rinse by allowing the water you plan to collect to run through the tubing for 20 seconds before starting to sample.

3.4 Schrader valve adaptors

3.4.1 Repeat the steps as shown in section 3.3.

3.4.2 Remember to store the alcohol rinsate in a waste container for proper disposal.

3.4.3 Store the dried adaptors in clean plastic bags before placing them back in the toolbox.

Figure 1: Example of the dishpan used to submerge equipment in a detergent solution. Pictured from left to right are DI water, isopropyl alcohol, and Liquinox® wash bottles. A 90-degree Schrader adaptor and a piece of sample collection tubing are displayed to the right of the wash bottles.

3.5 Garden hoses

3.5.1 The steps in this section should be performed outside the warehouse as routine cleaning after each sampling trip.

3.5.2 Fill a bucket or other container (deep enough to completely submerge the hose) with a solution of Liquinox® and tap water.

3.5.3 Submerge the hose in the container and shake to ensure solution distributes evenly. If the hose is particularly dirty, it can be left to soak for a few minutes.

3.5.4 Use the solution to scrub the outer lining of the hose with a plastic brush.

3.5.5 Remove the hose from the Liquinox® solution and rinse any leftover suds off with tap water. This solution can be poured into the vehicle cleaning sump outside of the laboratory facilities.

3.5.6 Skip alcohol rinsing for the garden hose since it is not used as sample collection equipment.

3.5.7 Run DI water through the entire length of the hose, about a volume's worth relative to the hose, repeated three times (~965.278 mL x 3 or 2.895 L).

3.5.8 Hang the hose outside to dry. Once dry, store in a clean, large garbage bag until it is needed in the field.

3.6 Purging bucket

3.6.1 The first three steps can be done outside with water from a hose. Add ¼ Tbsp or one pump of Liquinox® into the bucket and mix with tap water.

3.6.2 Use a plastic brush to scrub the inside and outside of the bucket with the Liquinox® solution.

3.6.3 Pour the solution into the vehicle cleaning sump and rinse the bucket with water to remove any suds.

3.6.4 Skip alcohol rinsing for the stabilization bucket since it is not used as sample collection equipment.

3.6.5 Working in the lab, add 300 mL of DI water into the bucket and swirl it around the inner walls. Pour out the DI water and repeat for a total of three times.

3.6.6 Allow the bucket to dry on top of clean butcher paper or benchtop liner before storing. Once dry, store in a clean, large garbage bag away from sample collection equipment until it is needed in the field.

3.6.7 Perform a quick native rinse in the field before using the bucket for parameter stabilization.

3.7 Half-pint mason jar

3.7.1 Repeat the steps in section 3.5 but adjust the measurements used to just a tiny pinch of Liquinox® and only 20 mL of DI water per rinse.

3.7.2 Store the jar in small plastic bag inside the well sampling toolbox.

3.8 Sonic water level meter and cable spool reader

3.8.1 The steps in this section should be performed before each sampling trip. Note that this water level meter is not waterproof; therefore, **only** clean the metal probe.

3.8.2 Using a plastic brush, scrub the metal probe (the rod inserted into the well casing to read water levels) with a solution of Liquinox® and water.

3.8.3 Rinse the solution off with tap water. The solution can be poured into the sink.

3.8.4 Rinse the probe with DI water. Repeat this step a total of three times.

3.8.5 Immediately dry the probe with a clean paper towel. Once dry, store it in the carrying case until needed in the field.

3.8.6 For the cable spool reader, rinse the cable and spool with well water as a native rinse at the well site. If dirt is present, clean with Liquinox® and water upon return from the field, otherwise clean the steel probe before a sampling trip similar to 3.8.1 through 3.8.5.

Figure 2: The fume hood used to store alcohol waste rinsate. The waste bottle will be in the solvent storage cabinet (bottom right).

3.9 Disposal of isopropyl alcohol

3.9.1 Alcohol is a hazardous waste; therefore, proper steps must be taken in the storage and subsequent disposal of the waste rinsate.

3.9.2 In any earlier rinse steps outlined in this SOP, ensure as much rinse water is shaken out and drained as thoroughly as possible **before** cleaning with isopropyl alcohol. This will reduce the amount of alcohol rinsate that must be stored until proper disposal.

3.9.3 Rinse the equipment with alcohol as outlined in previous sections, using only as much alcohol as necessary. Some of this alcohol will evaporate, especially if little rinse water remains (as described above).

3.9.4 Pour the resulting alcohol rinsate into a two-gallon waste jug. An empty alcohol container can be used for this waste. This container will be in the solvent storage cabinet of the fume hood located within the laboratory facilities (see Figures 2 and 3).

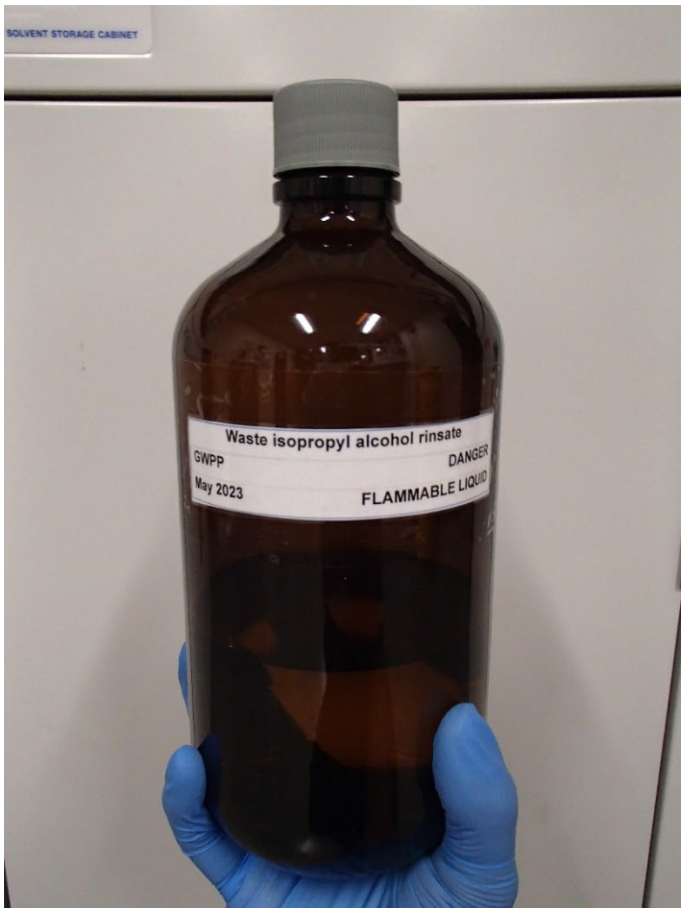

Figure 3: An example of an alcohol rinsate waste bottle, with the appropriate label.

3.9.5 Mark the container with a label as follows:

Waste Isopropyl Alcohol Rinsate	
GWPP	**DANGER**
Month/Year	**FLAMMABLE LIQUID**

3.9.6 Once two waste containers are full, inform GWPP management to request proper disposal.