

Cover Sheet
Standard Operating Procedure

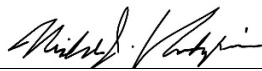
Operation Title: Protocol for Groundwater/Surface Water Interface
Sampling Using a Pore Water Sampler

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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 may be utilized by other Divisions within MEDEP, as determined by the respective Division Directors or their designees.

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 the MEDEP/DR standard operating procedure (SOP) for collecting groundwater samples using a pore water sampler. In some cases, surface water and groundwater analytical testing may yield significantly different results and a better understanding of the interface between these two media can provide insight regarding the fate and transport of site contaminants. This can be accomplished by using a pore water sampler.

Underlying this procedure is the assumption that surface waterbodies are common discharge points for groundwater, and a sample of the water beneath a stream or riverbed would be characteristic of the groundwater in the area. This SOP identifies sampling protocols to be followed when collecting samples using a pore water sampler.

3.0 Key Definitions

Pore Water Sampler: Stainless steel tube available in varying lengths with screened interval at sampler tip. Can be inserted into soil by hand to collect a soil vapor sample from a specific depth. Also referred to as a Push Point Sampler. This device is designed to collect pore water samples from the voids and spaces located between particles of sediment, soil and/or mud below the water table.

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 SOP. MEDEP/DR staff reviewing data by outside parties should ensure that this SOP (or an equivalent) is followed, depending on the specific Data Quality Objectives (DQOs) of the task.

Other MEDEP SOPs may also apply when performing this task, including, but not limited to MEDEP/DR SOP *RWM-DR-014 - Development of a Sampling and Analysis Plan* (SAP). The SAP should consider quality assurance and quality control (QA/QC) samples and measures, the specifics of which will depend on the DQOs for the task. Types of QA/QC samples are discussed in more detail in the DR Quality Assurance Plan (QAP). SAP development includes provisions for creating a Health and Safety Plan (HASP) associated with the activity, including compliance with [Dig Safe](#) notifications when disturbing soil with powered equipment or tools (i.e., not hand tools). Dig Safe notification does not include public utility clearance requests which must be completed separately (e.g., sewer and water lines). These utility marking requests typically do not extend onto marking private property (i.e., they may only mark lines in the public right of way), so hiring a private utility marking company may be necessary, depending on site specifics. Fieldwork and data collection tasks must be properly documented in accordance with applicable MEDEP SOPs and policies.

5.0 Guidelines and Procedures

5.1 Equipment

The following is a list of equipment utilized for collecting groundwater samples using the pore water sampler method.

- Peristaltic Pump
- Tubing – Two types of tubing are needed for this sampling technique:
- Low Density Polyethylene (LDPE) for running from the pore water sampler to the peristaltic pump.
- Flexible silicone tubing for connections to the pore water sampler and peristaltic pump head.
 - Note: Although pore water samplers can vary, a typical design requires LDPE tubing with an inside diameter of 0.17-inches and silicone tubing with a 3/8-inch outside diameter.
- A knife or other tool to cut tubing to desired lengths.
- Field Parameter Instruments – Devices for measuring dissolved oxygen (DO), conductivity and pH of pore water and surface water.
- Turbidity Meter – If testing for dissolved metals, turbidity must be measured to determine whether the sample must be field-filtered prior sample collection.
- Sample Filters – 0.2 to 0.45 micron (μm) in-line filters are appropriate for dissolved metals.
- Power Supply – A power supply will be necessary to operate the peristaltic pump.

- GPS Unit – To record geospatial locations of pore water samples.
- Life Preservers – When working around or near large waterbodies.
- Hip Waders – This sampling method may require the sampler to wade into a stream or river to insert the pore water sampler in a suitable location.
- Boat – Depending on the depth and size of a waterbody, a boat may be required to access sample points. Even if sample points are accessible by wading, boats and canoes can also act as equipment barges to help transport equipment between sample locations.
- Pore Water Samplers – A pore water sampler comes in two parts; a strengthening rod and the pore water sampler itself, both of which are made of stainless steel. The pore water sampler is typically a hollow tube with narrow slits extending from the last portion of the sampler to the tip, allowing groundwater to percolate through. The strengthening rod slides into the pore water sampler, and while in place, also limits water from entering. Both pieces are placed in a PVC sheath for protection during transport. Although the pore water sampler is sturdy, always exercise caution during use, as once either piece becomes bent, the equipment is ineffective. Bring at least as many pore water samplers as there are sampling locations, as on-site decontamination is difficult and not recommended. Once pore water samplers have been used, do not re-insert the strengthening rod until after the sampler has been decontaminated and cleared of sediment.
- Permanent Pore Water Samplers – A pore water sampler modified for long-term deployment. This may be necessary for silty and/or organic rich sediments where low turbidity samples are required and traditional pore water samplers will not meet the DQOs for the site.
- Sample Collection Containers – These will be provided by the lab and will vary depending on parameters to be sampled.

5.2 Sampling Procedure

Upon arriving at the site, collect field parameter measurements from the surface waterbody or bodies that are either being recharged by or recharging site groundwater. This will provide some comparative data to field parameter measurements of pore water samples.

Once an appropriate sampling location has been determined, carefully insert a pore water sampler into the riverbed or stream bed to the desired depth. Do not remove the strengthening rod until the sampler has been securely placed into the riverbed or streambed sediment. The pore water

sampler should be inserted deep enough for the slotted intervals to fully penetrate the substrate to ensure the sample collected will contain only groundwater. Typically, this depth is at least 8 inches. Once this has been accomplished, remove the strengthening rod from the pore water sampler and connect the pore water sampler to a peristaltic pump. Turn the pump on and purge for several minutes, ideally until purge water is relatively clear. Record field parameter measurements of the purge water prior to collecting the sample. If the purge water is not visually free of sediment, it should be documented in field notes.

If sampling for metals and dependent on DQOs, it is recommended that turbidity be measured. If turbidity is above 20 Nephelometric Turbidity Units (NTUs), it is recommended that a second sample be collected that has been filtered through a 0.2-0.45 μm inline particulate filter.

After the water has been sufficiently purged, decrease pumping rate if necessary (e.g., to fill 40ml VOA vials) and begin collecting the sample. The pumping rate should be low enough to ensure that surface water is not drawn into the sample. A low flow purging and sampling protocol is not required, but if desired, refer to MEDEP/DR SOP# RWM-DR-003 - Groundwater Sampling Using Low Flow Purging and Sampling for Long-term Monitoring. In general, coarse sediments (sands) are the most transmissive. With experience, samplers can actually “feel” the type of sediment as the pore water sampler is advanced into the sediment (e.g., coarse vs fine material). If the formation intercepted by the sampler screen is not transmissive enough for the collection of samples, gently advance and/or pull back the sampler to find a more transmissive zone. If the formation does not allow adequate transmission of water, it may require a change in sampling location.

Neither the tubing nor the pore water sampler should be reused at subsequent sampling locations without appropriate decontamination. Do not put the strengthening rod back into a pore water sampler after the sample has been collected, as sediment in the sampler must be flushed out first. Rather, place both pieces separately into the plastic sheath.

If pore water sampling is to be repeated, use of permanent pore water samplers should be considered. Repeatable sampling points should be marked with a grade stake or similar method of marking a location.

6.0 References

- [Sediment Pore Water Sampling using a Micro Push Point](#), (USEPA, 2003)
- [Pore Water Sampling Operation Procedure](#), (USEPA 2013)