# SOP #SRC-OGDEN-01

# Porewater Sampling from a Micro Push Point or Mini Piezometer

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## 1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide a standardized method for collection of porewater samples from micro Push Points or mini piezometers, to be used by employees of USEPA Region 8, or contractors and subcontractors supporting USEPA Region 8 projects and tasks. This SOP describes the equipment and operations used for sampling porewater in areas which will produce data that can be used to support risk evaluations. Deviations from the procedures outlined in this document must be approved by the USEPA Region 8 Remedial Project Manager, Regional Toxicologist or On-Scene Coordinator prior to initiation of the sampling activity.

## 2.0 RESPONSIBILITIES

The Field Project Leader (FPL) may be an USEPA employee or contractor who is responsible for overseeing the porewater sampling activities. The FPL is also responsible for checking all work performed and verifying that the work satisfies the specific tasks outlined by this SOP and the Project Plan. It is the responsibility of the FPL to communicate with the Field Personnel regarding specific collection objectives and anticipated situations that require any deviation from the Project Plan. It is also the responsibility of the FPL to communicate the need for any deviations from the Project Plan with the appropriate USEPA Region 8 personnel (Remedial Project Manager, Regional Toxicologist or On-Scene Coordinator).

Field personnel performing porewater sampling are responsible for adhering to the applicable tasks outlined in this procedure while collecting samples. The field personnel should have limited discretion with regard to collection procedures, but should exercise judgment regarding the exact location of sample collection, within the boundaries outlined by the FPL.

## 3. 0 EQUIPMENT

- Micro Push Point Sampers - installed as described in #SRC-OGDEN-06.
- Mini Piezometer - installed as described in #SRC-OGDEN-06.
- Syringe Assemblies - 50 ml, 100% polyethylene/polypropylene syringes configured to taigon tubing (1/4" OD x 1/8 ID) with clamps (to secure tubing to sampling port) and a stopper. The syringe assemblies are used to withdraw porewater and transfer the sample into the sample collection container.
- Syringes - used to withdraw additional porewater from sampling location. Made of 100% polyethylene/polypropylene and 50 ml in volume.
- Peristaltic Pump - used to purge groundwater through the push point sampler for sampling.
- Collection Containers - as specified in the Project Plan.

- Meter Stick - used to measure water depth, and water level.
- Decontamination Adapter - a cylindrical adapter used to backflush cleaning solution through the Push Point Samplers (PP27 and PP14) for decontamination.
- Gloves - for personal protection and to prevent cross-contamination of samples. May be plastic or latex; should be disposable and powderless.
- Field Clothing and Personal Protective Equipment - as specified in the Health and Safety Plan.
- Sampling Flags - used for identifying porewater sampling locations.
- Field Notebook - a bound book used to record progress of sampling effort and record any problems and field observations during sampling.
- Three-ring Binder Book- to store necessary forms used to record and track samples collected at the site. Binders will contain the Field Data Sheet, Site Diagram, and sample labels. Example forms are provided in the Sample Documentation SOP.
- Permanent Marking Pen - used to identify sample containers and for documentation of field logbooks and data sheets.
- Cleaning Solution - used to decontaminate the sampler after use. Obtained from the micro Push Point Sampler manufacturer, MHE Products, Inc..
- Deionized Water - used to rinse cleaning solution from the Push Point Samplers (PP27 and/or PP14) during decontamination.
- Trash Bag - used to dispose of gloves and any other non-hazardous waste generated during sampling.
- Plastic Waste Bottle - used to dispose of excess porewater collected and decontamination waste.

## 4.0 POREWATER SAMPLE COLLECTION

Collection of porewater samples occurs as two phases. First, the flux (flow of groundwater to surface water) is determined at a sampling location or stream reach according to #SRC-OGDEN-06. A porewater sample is collected ONLY if it is first determined that there is positive flux at this location or within the sampling reach (groundwater is moving towards the surface water body).

4.1. Preparation for Sample Collection

Described with the protocol for measurement of flux described in #SRC-OGDEN-06 (Figure 1).

4.2. Collection of Groundwater Flux Measurements

Described with the protocol for measurement of flux described in #SRC-OGDEN-06 (Figure 2).

4.3. Collection of Porewater Samples for Analysis

Remove the Taigon tubing used for flux measurement (Section 4.2) from the micro Push Point sample port and discard in the trash bag. Attach a syringe or peristaltic pump to the Push Point sample port. Withdraw water at a low-flow sampling rate (50-200 ml/min) (Figure 3). Once non-turbid aliquots have been withdrawn, remove the peristaltic pump or the syringe used to purge the pore water and attach a "syringe assembly" (a pre-assembled 50 ml, 100% polyethylene/polypropylene syringe clamped to Taigon tubing) to the sample port. Be sure to affix a clamp at the tubing mouth to ensure a good seal at the sample port.

Using the syringe, withdraw adequate amounts of porewater and transfer the sample (Figure 4) into the sample collection container specified in the Project Plan. Affix one sample ID label to the sample container, and one to the Field Data Sheet.

Care should be taken to avoid tracking sediment and/or silt from one area to another. As samples are taken sequentially, care should also be taken not to contaminate an area yet to be sampled with the residue of the sample that is currently being taken. In general one should move in a single direction through the sampling area. If an area is known or suspected of having a higher concentration of contaminants, all other considerations being equal, it should be sampled last to prevent cross contamination.

If sampling equipment is to be re-used, follow the decontamination procedures outlined in Section 8.0 before collecting the next sample.

## 5.0 SAMPLE CONTAINERS AND LABELING

Following the procedures outlined in Section 4.0, porewater samples are collected directly placed into sample containers, and shipped to the participating laboratory. For each porewater sample, two sample identification labels are required. One label is placed on the Field Data Sheet and the other label is affixed to the sample container.

Sample labeling will occur as prescribed below:

1) Place a pre-printed label onto the sample container (See Project Plan).
2) Place a pre-printed label onto the Field Data Sheet.
3) This procedure will be repeated for each porewater sample collected using clean sample containers and unique sample ID numbers.

Do not allow samples to freeze; place all samples directly onto wet ice (4°C). Ship samples under chain-of-custody, protected with suitable resilient packing material to reduce shock, vibration, and disturbance.

## 6.0 SITE CLEAN-UP

If any rinse water used for sample decontamination is generated in the course of sample collection, it must be disposed of as specified in the Project Plan.

All marker flags (if reused) should be decontaminated by wiping off with towels and/or baby wipes before re-use.

Disposable PPE and other non-hazardous waste generated during sampling activities will be placed in a trash bag and taken to a waste receptacle at the field office to prevent disturbance by animals and dispersion by wind. These wastes will be disposed along with trash at a municipal landfill.

Porewater and decontamination rinsate waste generated during sampling activities will be placed in DOT-compliant drums in accordance with 40 CFR 265 Part I. All non-hazardous waste will be disposed of in municipal waste bins.

## 7.0 RECORD KEEPING AND QUALITY CONTROL

Each field crew carries a three-ring binder book that contains the porewater field data sheet, site diagram, and sample labels. In addition, a field notebook is maintained by each individual or team that is collecting samples, as described in the Project Plan. Each porewater sample location is recorded on the site diagram. Each sample has an ID number affixed to the sample container, and the duplicate label must be affixed to the data sheet. Deviations from this sampling plan are noted in the field notebook, as necessary.

For each location, the notebook information must include:

a. date
b. time
c. personnel
d. weather conditions
e. sample identification numbers that were used
f. descriptions of any deviations to the Project Plan and the reason for the deviation.

Samples taken from areas with visible staining or other indications of non-homogeneous conditions should are noted. Field personnel will collect the proper type and quantity of quality control samples as prescribed in the Project Plan.

## 8.0 DECONTAMINATION

Because decontamination procedures are time consuming, having a quantity of sampling tools sufficient to require decontamination at a maximum of once per day is recommended. All sampling equipment must be decontaminated prior to reuse as prescribed in the Project Plan.

Equipment decontamination will consist of the following 4 steps:

1.) Cleaning Solution
2.) Deionized water rinse
3.) Acetone rinse
4.) Deionized water rinse

Begin decontamination of the micro Push Point Sampler by thoroughly removing all sand, silt etc. from the guard rod and the exterior of the Push Point Sampler. Connect the cleaning adapter to a "garden sprayer" (with the spray nozzle removed) filled with cleaning solution. Gently insert the screened-zone of the Push Point Sampler into the cleaning adapter, making sure not to bend the screened-zone. Push approximately 300 ml of pressurized cleaning solution through the sampler into a waste receptacle. Gently push the guard rod all the way into the bore of the Push Point sampler to dislodge any bridged material. Re-rinse the Push Point sampler with cleaning solution. Follow this with a distilled water/and or methanol rinse. Rinse the guard rod with cleaning solution, followed with a distilled water rinse then and acetone rinse followed by a second distilled water rinse.

Reinsert the guard-rod into the push point sampler and the device is ready for re-use.

**Note:** before the guard-rod is reinserted into the Push Point Sampler, all small bends in both the guard-rod and in the Push Point Sampler should be removed. Use caution when straightening the screened-zone, it is somewhat delicate without the guard-rod inside it, and can be broken through repeated bending. It is sometimes helpful when straightening the screened zone to insert the guard rod or the cleaning rod to the area of the bend in the screened zone. Gently unbend the portion of the screened zone nearest the rod and carefully advance the rod to the next bend. After the rod has been fully inserted into the screened zone perform the final screened zone straightening fine-tuning until the guard rod slides freely through it.

## 9.0 GLOSSARY

Project Plan - A written document that spells out the detailed site-specific procedures to be followed by the FPL and the field personnel. In this case, the Project plan consists of the Phase 3 Sampling and Analysis Plan.

## 10.0 REFERENCES

Henry, M. 2000. "MHE Push Point Sampling Tools". Proceedings of the Ground-Water/Surface-Water Interactions Workshop. July 2000. http://www.gsiwebpage.net accessed July 2001.

MHE Products, 2001. Operators Manual and Applications Guide. MHE-PP27" and MHE-PP14". Version 1.06. February 3, 2001.

# FIGURES

# Figure 1

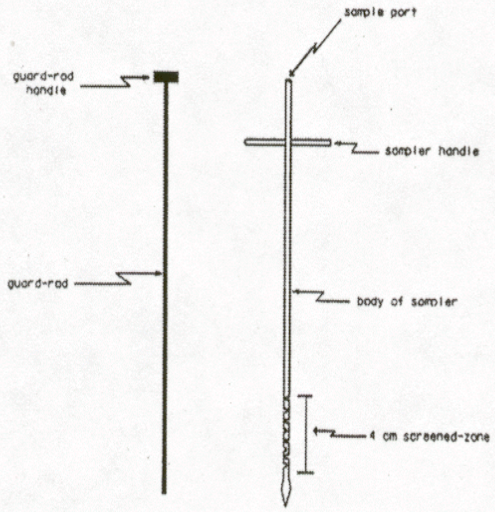



Fig. 1a
disassembled sampler



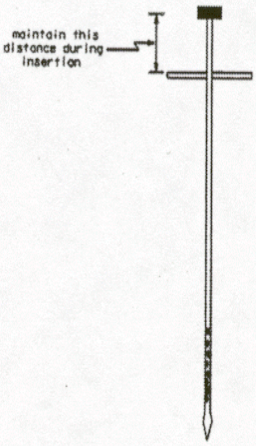




Fig. 1b
assembled sampler

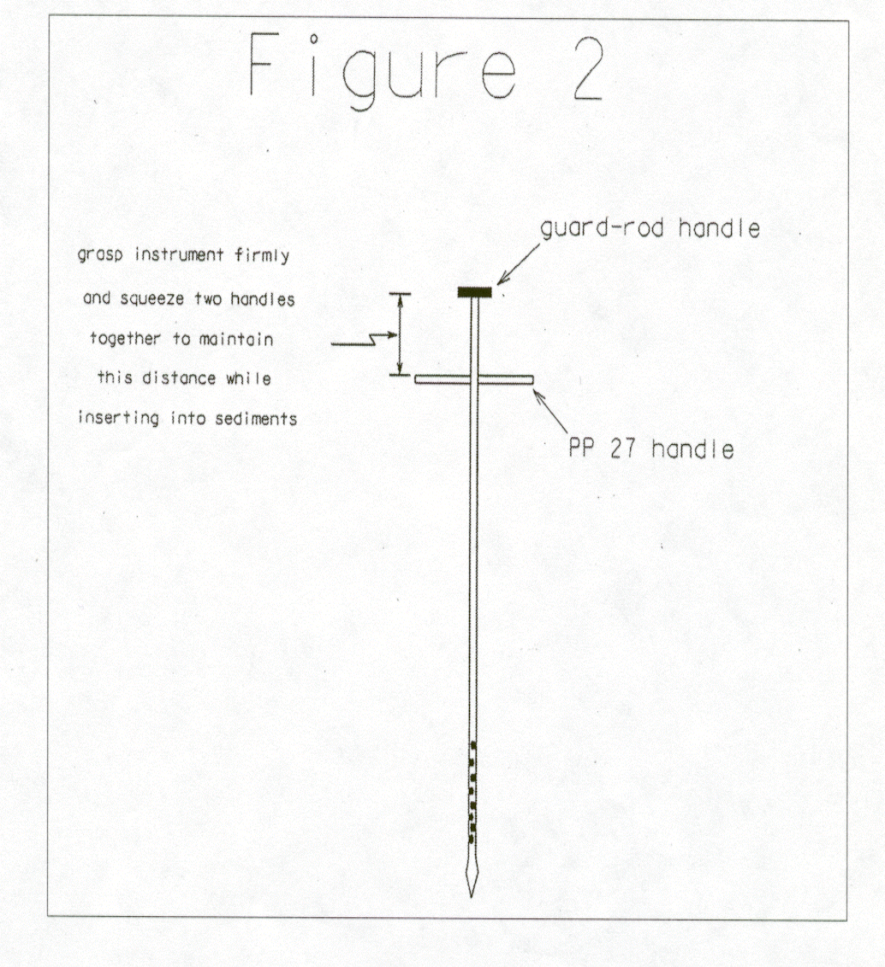


Figure 2
guard-rod handle
grasp instrument firmly
and squeeze two handles
together to maintain
this distance while
inserting into sediments
PP 27 handle


easy insertion into the sediments

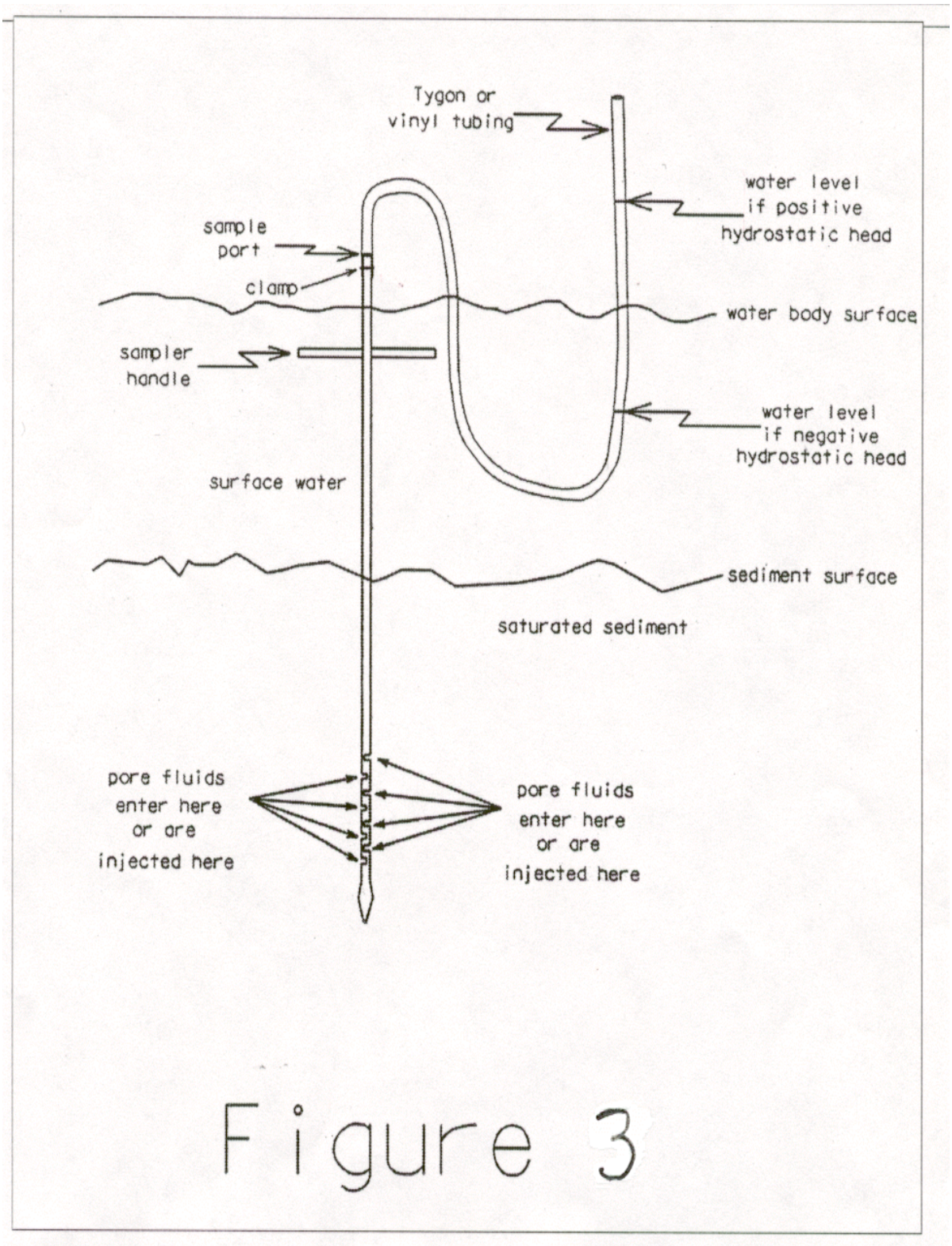

Tygon or
vinyl tubing
water level
if positive
hydrostatic head
sample
port
clamp
water body surface
sampler
handle
water level
if negative
hydrostatic head
surface water
sediment surface
saturated sediment
pore fluids
enter here
or are
injected here
pore fluids
enter here
or are
injected here

Figure 3

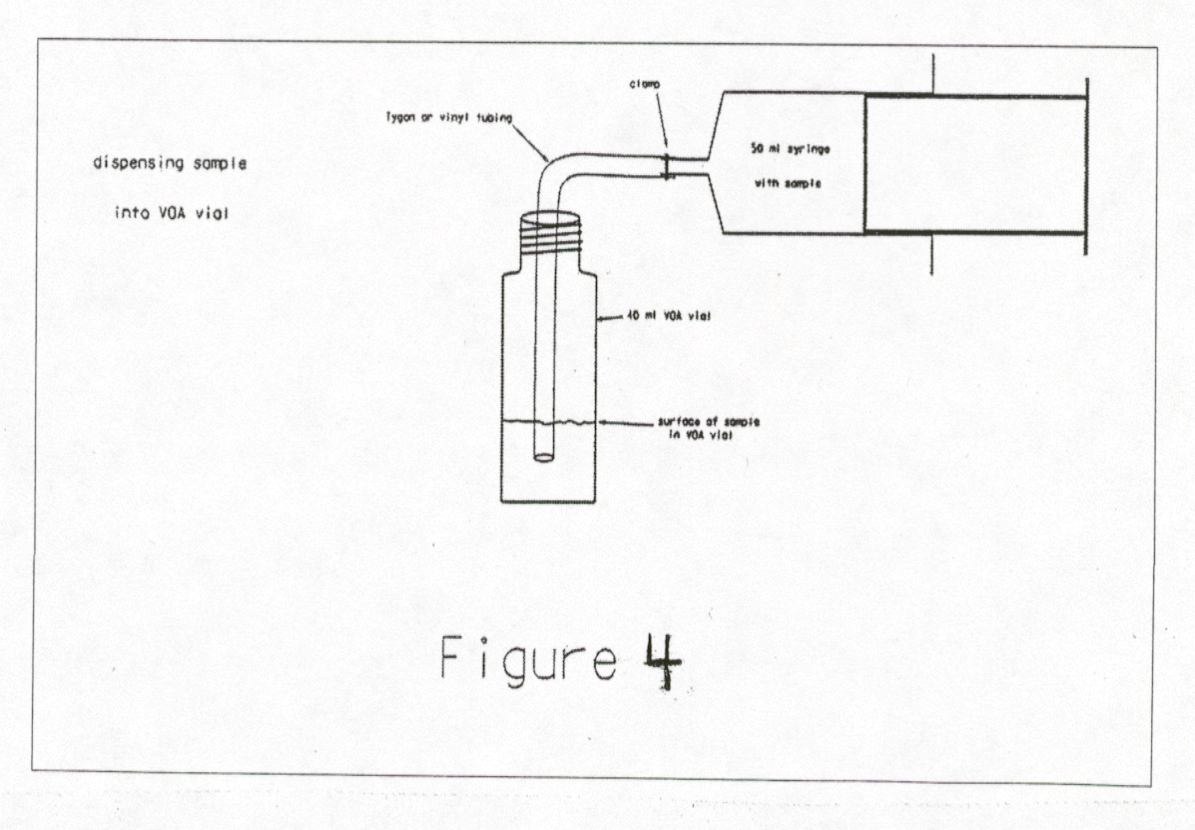
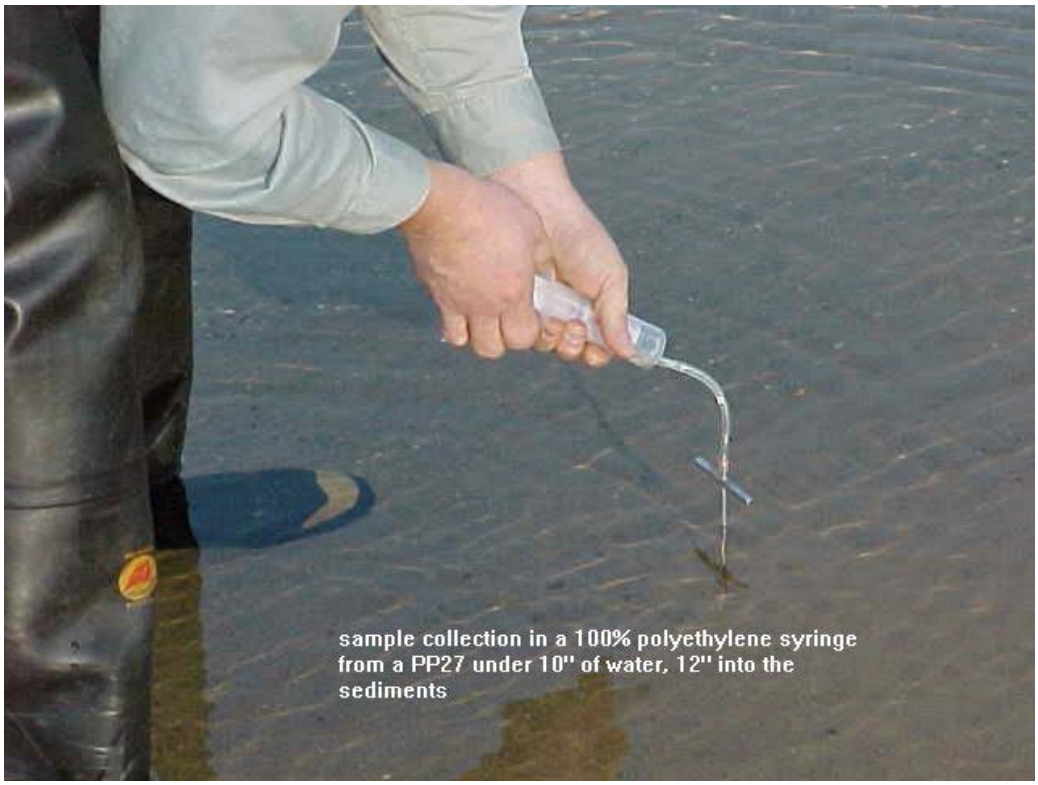

dispensing sample
into VOA vial
clamp
Tygon or vinyl tubing
50 ml syringe
with sample
40 ml VOA vial
surface of sample
in VOA vial

Figure 4


sample collection in a 100% polyethylene syringe
from a PP27 under 10" of water, 12" into the
sediments

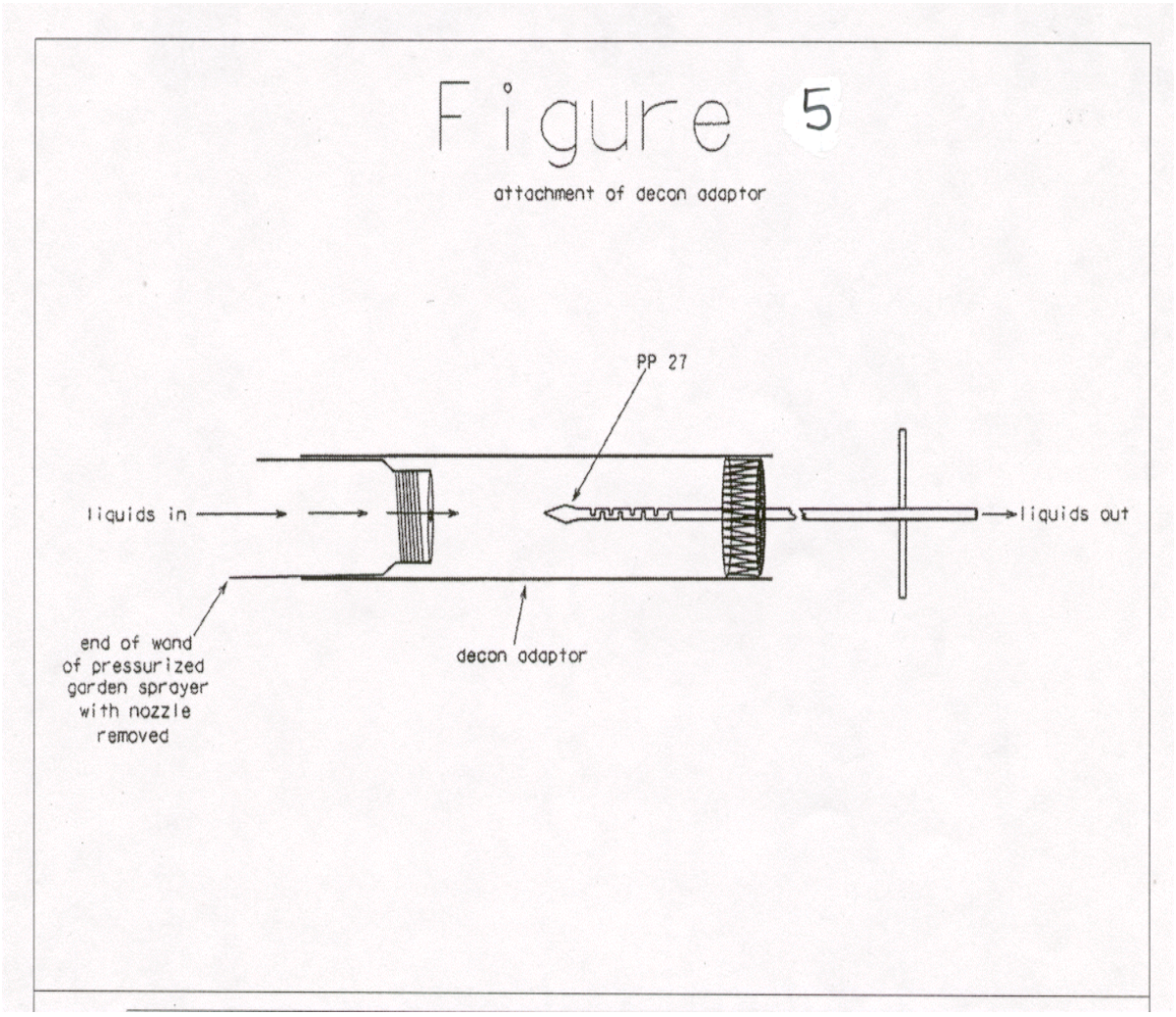


Figure 5
attachment of decon adaptor
PP 27
liquids in
liquids out
end of wand of pressurized garden sprayer with nozzle removed
decon adaptor