

U.S. ARMY CENTER FOR HEALTH
PROMOTION & PREVENTIVE MEDICINE

POTABLE FIELD WATER SAMPLING GUIDE



Readiness thru Health

Water Supply Management Program

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INTRODUCTION

This standardized document provides QC guidelines for potable water sampling to MED DET's and PVNTMED Svc personnel regarding drinking water sampling using USACHPPM sample pack kits.

Each sampling kit provides the appropriately prepared containers and preservatives to correctly collect drinking water samples. One sampling kit should be used per sample site. Users should inventory the sample pack to ensure all necessary equipment is present. An inventory of equipment is provided at Figure 1.

For assistance contact the Water Supply Management Program at:

Commander, USACHPPM
ATTN: MCHB-DC-EW
Aberdeen Proving Ground, MD 21010-5422

Phone: DSN 584-3919
COM (410) 671-3919

FAX: xxx-8104

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WWW: <http://chppm-www/dwater>

These cards were prepared by the Field Preventive Medicine Training Division (FPMTD) in coordination with the Water Supply Management Division. Questions or comments regarding field or deployment preventive medicine publications may be directed to the FPMTD at DSN 584-2488 / COM (410) 671-2488 / FAX xxx-8492



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Sample Packaging guidance on reverse of each sampling card.

ACRONYMS & ABBREVIATIONS

ALK	Alkalinity
DBCP	Dibromochloropropane
Cl	Chloride
Cond	Specific conductivity
EDB	Ethylene dibromide
F	Fluoride
FAC	Free available chlorine
FedEx	Federal Express
gal	Gallon
HCl	Hydrochloric
HNO ₃	Nitric Acid
H ₂ SO ₄	Sulfuric Acids
MBAS	Foaming agents
MED DET	Medical Detachment
mg	Milligrams
ml	Milliliter
MSDS	Material Safety Data Sheet
NO ₃	Nitrate
NO ₂	Nitrite
oz	Ounce
PVNTMED	Preventive Medicine
PVNTMED Svc	Preventive Medicine Service
QC	Quality Control
ROWPU	Reverse Osmosis Water Purification Unit
SO ₄	Sulfate
SVOC	Semi-volatile Organic Compound
T-PO ₄	Total phosphate
TDS	Total dissolved solids
THM	Trihalomethane Sampling
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
USACHPPM	U.S. Army Center for Health Promotion & Preventive Medicine
VOC	Volatile Organic Chemical



SAMPLING LOCATIONS

The three types of sampling locations are:

Source water, conducted at source (raw water) before treatment.

Treated water, collected after the water passes through a typical type of treatment such as ROWPU prior to distribution.

Distribution system, collected at representative points in the distribution system. Sampling at the dead end of a distribution line should be avoided.

SAMPLE COLLECTIONS

Take the following field measurements: pH, temperature, conductivity or TDS, turbidity, and FAC residual, if any. Record measurements on the Field Data Sheet.

Locate a utility spigot or faucet and turn on, allowing water to run at a moderate flow for 3-5 minutes to clear water standing in the plumbing system and begin a draw of water from the source or main pipe. To ensure withdrawal from the source or main pipe, monitor the temperature. Once stabilized, samples can be taken.

NOTE: All samples should be taken from the same location.

PACKAGING NOTES

Samples should be transported from the field by a major carrier such as Federal Express. The MED DET/ PVNTMED Svc personnel must make arrangements to ship cooler(s) as soon as possible to USACHPPM by whatever means possible.

The USACHPPM frequently uses Federal Express to ship samples from the field to the laboratory. The appropriate forms for shipment are included in the sample pack kit, pre-printed with USACHPPM name, address, & account number.

Federal Express will not pick up samples on Sunday. Any samples sent on Saturday will be delivered on Monday or Tuesday. If the Samples are to be sent on a Friday, the USACHPPM Water Supply Management Program must be notified to ensure that a staff member will be present to receive the samples on Saturday morning.

CONTAINER LABELING

All containers in the sample pack kit are pre-labeled. Each label will have the project number and analytical requirements for the sample written on it (see sample below, Figure 1).

SAMPLE CONTAINER LABEL EXAMPLE

PROJECT NUMBER (#):	(Completed by USACHPPM)
INSTALLATION:	CAMP SWAMPY
SAMPLE NUMBER (#):	POTABLE WATER SITE 1
DATE COLLECTED:	10 OCT 95
TIME COLLECTED:	1300
SAMPLE PRESERVED:	(Completed by USACHPPM)
ANALYSIS REQUIRED:	(Completed by USACHPPM)



FIELD DATA SHEET

The MED DET / PVNTMED Svc personnel are responsible for completing the Drinking Water Supply Field Data Sheet (AEHA Form 328-R) found in the sample pack kit.

1. Project Number: Completed by USACHPPM
2. Project Name: Name of installation
3. Sampler Name: Full name and rank of sampler
4. Sampler DSN: DSN phone no.; comm'l if DSN not avail.
5. Sample No.: Give each sample point a unique number.*
6. Sample Name: e.g., bldg no., well no., WTP
7. Sample Location (coordinates): Latitude/longitude, grid coordinates, or standard military coordinates
8. Type of Sample: e.g., raw well water; TW=treated water; RS=raw surface; DS=distributed system; T=tap; FD=first draw; F=flushed; WC=water coolers
9. Date: Date sample taken (mo/da/yr)
10. Time: Time sample taken (24-hour format - 0800)
11. Temp: Temperature of the water; C=celsius; F=fahrenheit
12. pH: pH level of the water
13. FAC: Free available chlorine; note mg/L
14. Turbidity: Turbidity of the sample (if analyzed)
15. Conductivity: Conductivity of the sample (if analyzed)
16. Remarks: Note anything of interest

*All samples collected at a given point should have the same sample number.

Inventory of Equipment in Potable Water Sampling Pack

Containers*	
1 liter amber glass flint	2 ea
Pesticides, herbicides, and SVOC	
40 ml vials	3 ea
VOC and THM	2
EDB/DBCP	2 ea
Endothal, glyphosate, and carbamates	1
1 liter amber/brown plastic bottle for diquat	1
1 gal plastic cube for radiochemicals	1
1 liter plastic/cube bottle	1
Metals and calcium hardness	1
Nitrite/nitrate and total phosphate	1
Cyanide	1 ea
16 oz glass flint for TOC and mercury	1 ea
16 oz plastic bottle	1 ea
ALK, MBAS, color, tritium and TDS	1 ea
8 oz plastic bottle for chloride and sulfate; and tritium	1
4 oz plastic bottle for fluoride	
Blanks*	
VOCs and THMs	3 ea
SVOC, EDB/DBCP, endothal, glyphosate, & carbamates	2 ea
Preservatives*	
Sulfuric acid, 10 ml ampule	1 ea
Nitrite/nitrate and total phosphate, diquat, and TOC	
Nitric acid, 10 ml ampule	1 ea
Metals and calcium, hardness, and mercury	2
Radiochemicals	1
1:1 Hydrochloric, vial or	2
10 ml ampules	
Miscellaneous:	
Cooler, packing	1
Tape and bubble wrap, packing	1
Pipet and bulb apparatus, 1 ml clear glass	1
Waterproof pen	3
Drinking Water Supply Field Data Sheets	2
Plastic bags	1
FedEx Shipment Forms and MSDS	

* Will vary, depending on what analyses are being collected Fig1



VOC SAMPLING

LOCATE:

- Three 40ml vials labeled for **VOC sampling**
- Vial of **1:1 HCL**
- Three QC **VOC blanks**, already filled with water (DO NOT OPEN)

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Collect samples carefully, avoiding the presence of air bubbles
- Adjust the faucet/spigot to slow the flow rate to fill the container without splashing; using a low flow rate assures a minimum amount of aeration (presence of bubbles)
- Pour sufficient sample into vial to form a reverse meniscus (rounded surface) at the top of the vial
- With the eyedropper, add two drops of the 1:1 HCl solution to the VOC sample vial
- Carefully screw the cap on with the teflon side toward the water
- Invert the sample vial a few times to mix
- Turn the capped vial upside down and tap at the side lightly to force any bubbles to rise
- If bubbles are present, remove the cap, but **do not empty the vial**; add just enough water to remove the headspace at the top of the vial, forming a rounded surface, and carefully screw the cap on with the teflon side toward the water
- As part of the QC, 3 blanks (40ml vials already filled with water) must be returned with each sample kit. Keep the blanks with the sample vials at all times, in storage and in the field. **DO NOT OPEN THEM.**



SAMPLE PACKAGING

Potable water samples being sent to USACHPPM labs for analyses should be packaged in packing material provided in the sample pack kit to prevent breakage of the samples.

- Locate the roll of bubble wrap and two large plastic bags.
 - Cut the bubble wrap to the appropriate size for each glass container and individually wrap each container
 - Double the plastic bags (one inside the other) and line the inside of the cooler
- Place each sample container inside the plastic bag; avoid having any glass sample containers touching other glass containers by positioning the glass container and surrounding it with plastic containers when possible
- Tie the inner bag closed and place the ice, prefrozen gel blocks, or other means of refrigeration in the second bag to ensure the samples remain cold -- **DO NOT USE DRY ICE**
- Wrap a copy of the Field Data Sheet to keep it dry and place it inside the cooler
- Seal the cooler securing with tape provided in the sample pack kit
- Place a return address (the installation where the sampling took place) on the top left-hand corner of the cooler
- Send the properly packaged cooler to:

USACHPPM
ATTN: MCHB-DC-LLI, Bldg E-2100 (G. Miles)
Aberdeen Proving Ground, MD 21010-5422



THM SAMPLING

LOCATE:

- Three 40ml vials labeled for **THM sampling**
- Vial of **1:1 HCl**
- Three QC **THM blanks**, already filled with water (DO NOT OPEN)

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Collect samples carefully, avoiding presence of air bubbles
- Adjust the faucet/spigot to slow the flow rate to fill the container without splashing; using a low flow rate assures a minimum amount of aeration (presence of bubbles)
- Pour sufficient sample into vial to form a reverse meniscus (rounded surface) at the top of the vial
- With the eyedropper, add two drops of the 1:1 HCl solution to the THM sample vial
- Carefully screw the cap on with the teflon side toward the water
- Invert the sample vial a few times to mix
- Turn the capped vial upside down and tap at the side lightly to force any bubbles to rise
- If bubbles are present, remove the cap, but **do not empty the vial**; add just enough water to remove the headspace at the top of the vial, forming a rounded surface, and carefully screw the cap on with the teflon side toward the water
- As part of the QC, 3 blanks (40ml vials already filled with water) must be returned with each sample kit. Keep the blanks with the sample vials at all times, in storage and in the field. **DO NOT OPEN THEM.**



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SVOC SAMPLING

LOCATE:

- Two 1-liter amber glass flint jars labeled **semi-volatile analysis**
- Vial or one ampule of **1:1 HCl**
- One QC **SVOC blank**, (two 1-liter amber glass flint jars) already filled with water (DO NOT OPEN)

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Adjust the flow rate to a point that the container can be filled without splashing; fill container to the neck of the jar
- Carefully break the head off the HCl ampule; turn upside down; tap the bottom to force out the acid solution; add half of the acid solution (or 5ml from the vial) to each SVOC container
- Replace the caps on the containers and shake to effect mixing
- As part of the QC, 1 blank (two 1-liter amber glass flint jars already filled with water) must be returned with each sample kit. Keep the blanks with the sample vials at all times, in storage and in the field. **DO NOT OPEN THEM.**



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PESTICIDES/HERBICIDES SAMPLING

LOCATE:

- Two 1-liter amber glass flint jars labeled **pesticide analysis**
- Two 1-liter amber glass flint jars labeled **herbicide analysis**

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Adjust the flow rate to a point that the container can be filled without splashing; fill the containers to the neck of the jar
- Replace caps on the containers and shake to effect mixing



SAMPLE PACKAGING

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Aberdeen Proving Ground, MD 21010-5422



CARBAMATES SAMPLING

LOCATE:

- Two 40ml vials labeled for **carbamates sampling**
- Two QC **carbamate blanks**, already filled with water
· (DO NOT OPEN)

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Collect samples carefully, avoiding the presence of air bubbles
- Adjust the faucet/spigot to slow the flow rate to the point the container can be filled without splashing; using a low flow rate assures a minimum amount of aeration (presence of bubbles)
- Pour sufficient sample into vial to form a reverse meniscus (rounded surface) at the top of the vial
- Carefully screw the cap on with the teflon side toward the water
- Invert the sample vial a few times to mix
- Turn the capped vial upside down and tap at the side lightly to force any bubbles to rise
- If bubbles are present, remove the cap, but **do not empty the vial**; add just enough water to remove the headspace at the top of the vial, forming a rounded surface, and carefully screw the cap on with the teflon side toward the water
- As part of the QC, 2 blanks (40ml vials already filled with water) must be returned with each sample kit. Keep the blanks with the sample vials at all times, in storage and in the field. **DO NOT OPEN THEM.**



SAMPLE PACKAGING

Potable water samples being sent to USACHPPM labs for analyses should be packaged in packing material provided in the sample pack kit to prevent breakage of the samples.

- Locate the roll of bubble wrap and two large plastic bags.
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- Place each sample container inside the plastic bag; avoid having any glass sample containers touching other glass containers by positioning the glass container and surrounding it with plastic containers when possible
- Tie the inner bag closed and place the ice, prefrozen gel blocks, or other means of refrigeration in the second bag to ensure the samples remain cold -- **DO NOT USE DRY ICE**
- Wrap a copy of the Field Data Sheet to keep it dry and place it inside the cooler
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EDB/DBCP SAMPLING

LOCATE:

- Two 40ml vials labeled for **EDB/DBCP sampling**
- Vial of **1:1 HCl**
- Two QC **EDB/DBCP blanks**, already filled with water (DO NOT OPEN)

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Collect samples carefully, avoiding the presence of air bubbles
- Adjust the faucet/spigot to slow the flow rate to fill the container without splashing; using a low flow rate assures a minimum amount of aeration (presence of bubbles)
- Pour sufficient sample into vial to form a reverse meniscus (rounded surface) at the top of the vial
- With the eyedropper, add two drops of the 1:1 HCl solution to the EDB/DBCP sample vial
- Screw the cap on with the teflon side toward the water
- Invert the sample vial a few times to mix
- Turn the capped vial upside down and tap at the side lightly to force any bubbles to rise
- If bubbles are present, remove the cap, but **do not empty the vial**; add just enough water to remove the headspace at the top of the vial, forming a rounded surface, and carefully screw the cap on with the teflon side toward the water
- As part of the QC, 2 blanks (40ml vials already filled with water) must be returned with each sample kit. Keep the blanks with the sample vials at all times, in storage and in the field. **DO NOT OPEN THEM.**



SAMPLE PACKAGING

Potable water samples being sent to USACHPPM labs for analyses should be packaged in packing material provided in the sample pack kit to prevent breakage of the samples.

- Locate the roll of bubble wrap and two large plastic bags.
 - Cut the bubble wrap to the appropriate size for each glass container and individually wrap each container
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ENDOTHAL SAMPLING

LOCATE:

- Two 40ml vials labeled for **endothal sampling**
- Two QC **endothal blanks**, already filled with water (DO NOT OPEN)

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Collect samples carefully, avoiding the presence of air bubbles
- Adjust the faucet/spigot to slow the flow rate to fill the container without splashing; using a low flow rate assures a minimum amount of aeration (presence of bubbles)
- Pour sufficient sample into vial to form a reverse meniscus (rounded surface) at the top of the vial
- Carefully screw the cap on with the teflon side toward the water
- Invert the sample vial a few times to mix
- Turn the capped vial upside down and tap at the side lightly to force any bubbles to rise
- If bubbles are present, remove the cap, but **do not empty the vial**; add just enough water to remove the headspace at the top of the vial, forming a rounded surface, and carefully screw the cap on with the teflon side toward the water
- As part of the QC, 2 blanks (40ml vials already filled with water) must be returned with each sample kit. Keep the blanks with the sample vials at all times, in storage and in the field. **DO NOT OPEN THEM.**



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GLYPHOSATE SAMPLING

LOCATE:

- Two 40ml vials labeled for **glyphosate sampling**
- Vial of **1:1 HCl**
- Three QC **glyphosate blanks**, already filled with water (DO NOT OPEN)

FOR EACH VIAL:

- Fill out the information required on the sample container label
- Collect samples carefully, avoiding presence of air bubbles
- Adjust the faucet/spigot to slow the flow rate to fill the container without splashing; using a low flow rate assures a minimum amount of aeration (presence of bubbles)
- Pour sufficient sample into vial to form a reverse meniscus (rounded surface) at the top of the vial
- With the eyedropper, add two drops of the 1:1 HCl solution to the glyphosate sample vial
- Carefully screw the cap on with the teflon side toward the water
- Invert the sample vial a few times to mix
- Turn the capped vial upside down and tap at the side lightly to force any bubbles to rise
- If bubbles are present, remove the cap, but **do not empty the vial**; add just enough water to remove the headspace at the top of the vial, forming a rounded surface, and carefully screw the cap on with the teflon side toward the water
- As part of the QC, 2 blanks (40ml vials already filled with water) must be returned with each sample kit. Keep the blanks with the sample vials at all times, in storage and in the field. **DO NOT OPEN THEM.**



SAMPLE PACKAGING

Potable water samples being sent to USACHPPM labs for analyses should be packaged in packing material provided in the sample pack kit to prevent breakage of the samples.

- Locate the roll of bubble wrap and two large plastic bags.
 - Cut the bubble wrap to the appropriate size for each glass container and individually wrap each container
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- Place each sample container inside the plastic bag; avoid having any glass sample containers touching other glass containers by positioning the glass container and surrounding it with plastic containers when possible
- Tie the inner bag closed and place the ice, prefrozen gel blocks, or other means of refrigeration in the second bag to ensure the samples remain cold -- **DO NOT USE DRY ICE**
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DIQUAT SAMPLING

LOCATE:

- One 1-liter brown plastic bottle labeled for **diquat analysis**
- Ampule of **sulfuric acid (H_2SO_4)**
- Fill out the information required on the sample container label
- Adjust the flow rate to the point the container can be filled without splashing; fill to the neck of the plastic bottle
- With caution, break the H_2SO_4 ampule and add the acid solution to the diquat container
 - After breaking the head off the ampule, turn it upside down and tap the bottom to force out the acid solution
- Replace the cap on the container and shake to effect mixing



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METALS, MERCURY, AND CALCIUM HARDNESS SAMPLING

LOCATE:

- One 1-liter plastic cube labeled for metals and calcium hardness analysis
- One 16-oz glass flint jar labeled for mercury analysis
- Two ampules of nitric acid (HNO₃)

FOR EACH CONTAINER:

- Fill out the information required on the sample container label
- Adjust the flow rate to the point the container can be filled without splashing; fill to the neck of the plastic cube and bottle
- With caution, break the HNO₃ ampule; add one ampule of acid solution to each container
 - After breaking the head off the ampule, turn it upside down and tap the bottom to force out the acid solution
- Replace the cap on the container and shake to effect mixing



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RADIOCHEMICALS & TRITIUM SAMPLING

LOCATE:

- One 1-gal plastic cube labeled for **radiochemicals analysis**
- One 16-oz plastic bottle labeled for **tritium analysis**
- Two ampules of **nitric acid (HNO₃)**

FOR EACH CONTAINER:

- Fill out the information required on the sample container label
- Adjust the flow rate to the point the container can be filled without splashing; fill each container to the neck
- With caution, break the HNO₃ ampule; add one ampule to each container
 - After breaking the head off the ampule, turn it upside down and tap the bottom to force out the acid solution
- Replace the cap on the container and shake to effect mixing




SAMPLE PACKAGING

Potable water samples being sent to USACHPPM labs for analyses should be packaged in packing material provided in the sample pack kit to prevent breakage of the samples.

- Locate the roll of bubble wrap and two large plastic bags.
 - Cut the bubble wrap to the appropriate size for each glass container and individually wrap each container
 - Double the plastic bags (one inside the other) and line the inside of the cooler
- Place each sample container inside the plastic bag; avoid having any glass sample containers touching other glass containers by positioning the glass container and surrounding it with plastic containers when possible
- Tie the inner bag closed and place the ice, prefrozen gel blocks, or other means of refrigeration in the second bag to ensure the samples remain cold -- **DO NOT USE DRY ICE**
- Wrap a copy of the Field Data Sheet to keep it dry and place it inside the cooler
- Seal the cooler securing with tape provided in the sample pack kit
- Place a return address (the installation where the sampling took place) on the top left-hand corner of the cooler
- Send the properly packaged cooler to:

USACHPPM
ATTN: MCHB-DC-LLI, Bldg E-2100 (G. Miles)
Aberdeen Proving Ground, MD 21010-5422



NITRITE/NITRATE (NO_2/NO_3), TOTAL PHOSPHATE (T- PO_4), TOC SAMPLING

LOCATE:

- One 1-liter plastic cube labeled for NO_2/NO_3 and T- PO_4 analysis
- One 16-oz glass flint jar labeled for TOC analysis
- Two ampules of sulfuric acid (H_2SO_4)

FOR EACH CONTAINER:

- Fill out the information required on the sample container label
- Adjust the flow rate to the point the container can be filled without splashing; fill to the neck of the plastic bottle
- With caution, break the H_2SO_4 ampule; add one ampule of the acid solution to each container
 - After breaking the head off the ampule, turn it upside down and tap the bottom to force out the acid solution
- Replace the cap on the container and shake to effect mixing



SAMPLE PACKAGING

Potable water samples being sent to USACHPPM labs for analyses should be packaged in packing material provided in the sample pack kit to prevent breakage of the samples.

- Locate the roll of bubble wrap and two large plastic bags.
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- Place a return address (the installation where the sampling took place) on the top left-hand corner of the cooler
- Send the properly packaged cooler to:

USACHPPM
ATTN: MCHB-DC-LLI, Bldg E-2100 (G. Miles)
Aberdeen Proving Ground, MD 21010-5422



CYANIDE SAMPLING

LOCATE:

- One 1-liter plastic bottle/cube labeled for **cyanide analysis**
- Fill out the information required on the sample container label
- Adjust the flow rate to the point the container can be filled without splashing; fill to the neck of the plastic bottle
- Replace the cap on the container and shake to effect mixing

ALL REMAINING SAMPLES: Alkalinity, chloride, specific conductivity, sulfate, pH, fluoride, color, foaming agents, and total dissolved solids

GATHER:

- All remaining containers
- Fill out the information required on the sample container label
- Adjust the flow rate to the point the container can be filled without splashing; fill to the neck of the plastic bottle/cube
- Replace the cap on the container



SAMPLE PACKAGING

Potable water samples being sent to USACHPPM labs for analyses should be packaged in packing material provided in the sample pack kit to prevent breakage of the samples.

- Locate the roll of bubble wrap and two large plastic bags.
 - Cut the bubble wrap to the appropriate size for each glass container and individually wrap each container
 - Double the plastic bags (one inside the other) and line the inside of the cooler
- Place each sample container inside the plastic bag; avoid having any glass sample containers touching other glass containers by positioning the glass container and surrounding it with plastic containers when possible
- Tie the inner bag closed and place the ice, prefrozen gel blocks, or other means of refrigeration in the second bag to ensure the samples remain cold -- **DO NOT USE DRY ICE**
- Wrap a copy of the Field Data Sheet to keep it dry and place it inside the cooler
- Seal the cooler securing with tape provided in the sample pack kit
- Place a return address (the installation where the sampling took place) on the top left-hand corner of the cooler
- Send the properly packaged cooler to:

USACHPPM
ATTN: MCHB-DC-LLI, Bldg E-2100 (G. Miles)
Aberdeen Proving Ground, MD 21010-5422