HANDLING AND SHIPPING OF SAMPLES 5.5

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Samples should be packaged and shipped to the laboratory for analysis as soon as possible. Generally, the shorter the time between sample collection/processing and sample analysis, the more reliable the analytical results will be. Before shipping samples to the laboratory:

- Check that sample bottles are labeled correctly.
- Complete an Analytical Services Request (ASR) form.
- Pack samples carefully in the shipping container to prevent bottle breakage, shipping container leakage, and sample degradation. Check that the bottle caps are securely fastened.

Protocols for labeling, documenting, and packaging samples established by the receiving laboratory must be followed. **Obtain authorization from the laboratory before shipping highly contaminated or potentially hazardous samples for analysis.** A summary of procedures for shipping samples to the NWQL is outlined below. Office of Water Quality Technical Memorandum 92.06 and National Water Quality Laboratory Technical Memorandum 95.04 give detailed instructions on shipping procedures.

LABELING SAMPLE BOTTLES 5.5.1

Each sample bottle must be correctly labeled with the station identification number, date, time, and sample designation. Sample designation is established by the laboratory. Laboratory codes that are added or deleted from the analytical schedule requested should be recorded on the ASR forms that accompany the samples—**not on the sample bottles.**

1. Label each bottle with a permanent, waterproof marker, or use preprinted labels that will remain securely attached to the bottles, even if they become wet.

2. Write legibly and include as a minimum the following information:
   - Station identification number.
   - Date and time of sample collection.
   - Sample designation code (Appendixes A5-A through A5-C).

A bottle with an unreadable label or no label is a wasted sample.

5.5.2 FILLING OUT AN ANALYTICAL SERVICES REQUEST FORM

Each set of samples must include an Analytical Services Request (ASR) form. To ensure correct processing of samples, the information recorded on the ASR form must correspond to each sample in the shipment.

- **Never send a sample to the NWQL without an ASR form** (forms are available through DENSUPPL).
- **Information recorded on ASR forms must be legible** and completed in permanent ink or by computer.

Fill out the ASR form as follows, including as much information about the sample(s) as possible:

1. Record mandatory information:
   - Station identification number and (or) unique number
   - Telephone number at which field personnel who collected the samples can be reached
   - Name of study chief and (or) field personnel
   - State and District user codes
   - Project account number
   - Date and time at beginning of field trip
   - Schedules and laboratory codes of the analytical work requested for submitted samples

2. Record the Sample Medium, Analysis Status, Analysis Source, Hydrologic Condition, Sample Type, and Hydrologic Event information. This information is mandatory if the analytical results are to be stored in the USGS National Water Information System (NWIS) data base.
3. Record the field-measurement values of specific electrical conductance (conductivity), pH, and field alkalinity (or acid neutralizing capacity).
4. In the comments section of the form, add information that needs to be brought to the laboratory's attention. **Be sure to note if the samples are potentially hazardous or highly contaminated so that proper precautions can be taken by laboratory personnel.**
5. At the bottom of the ASR form, list the total number of sample bottles for each sample-designation code.
6. To prevent water damage to paperwork accompanying samples to the laboratory (such as the ASR form and the temperature-check postcard), place all paperwork inside two sealable plastic bags. In coolers, tape the bags containing the paperwork to the underside of the lid.
7. Keep a copy of the completed ASR forms in the study files.

Add a bold cautionary note to the ASR form if samples could contain hazardous concentrations of contaminants.

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5.5.3 PACKAGING SAMPLES

When packaging samples for shipment to the laboratory, remember that all bottles must be protected from breaking (especially glass bottles) and (or) leaking. The laboratory usually will return with the cooler reusable packing materials such as mesh bags, foam sleeves, and bubble wrap. Plastic bags and cardboard boxes will not be returned. **Do not use foam peanuts or vermiculite.**

When packaging samples:

1. Make sure bottle labels are waterproof and that information is legible.
2. Tighten all bottle caps to prevent leakage.
3. Line all shipping containers, including those without ice, with doubled heavy-duty plastic bags.
4. Use adequate packing material to prevent bottle breakage.
   - Ship all glass bottles in foam sleeves or wrap them with bubble wrap.
   - Enclose each sleeved FAM and RAM bottle in two sealable plastic bags.
   - Pack bottles so that they do not touch each other.

Sample integrity must be maintained. Ship samples with enough ice to keep chilled at 4°C or below without freezing until the sample is logged in at the laboratory.

5. Pack samples designated for chilling in coolers.
   a. Use insulated ice chests (coolers) (1- to 5-gallon sizes are recommended). Larger volumes of chilled samples can be sent in coolers as long as the carrier's maximum weight and size restrictions are not exceeded. **Do not use broken or leaky coolers.**
   b. Pack samples designated for chilling with ice.
      - The volume of ice should be equal to or greater than the volume occupied by samples (twice the volume of ice to samples is recommended during warm temperatures).
      - The amount of ice necessary will vary depending on the length of time in transit and ambient air temperature. Chilling the cooler and samples prior to shipment is recommended in hot weather.
      - **Do not use blue ice or other types of commercial refreezing containers that have freezing points below 0°C.** This can cause bottles to freeze and result in ruined samples or broken bottles.
      - Enclose ice and samples in doubled plastic bags. **Do not mix ice with water-absorbent packing materials.**
   c. Seal cooler spouts or drains, preferably with silicone or epoxy.
6. Samples not requiring chilling can be shipped in heavy-duty cardboard boxes but may also be shipped in coolers.

DO NOT USE

— foam peanuts or vermiculite as packing material.

— dry ice to keep samples chilled.

7. When shipping multiple sets of samples in the same container, label each set of sample bottles with a different letter of the alphabet (A, B, C) so that bottles of each sample set will have the same letter.
   - Print the letter in the upper right-hand corner of the ASR form for that particular sample set.
   - Place all bottles from a sample set into a separate bag (such as plastic or mesh) or bind with a rubber band to keep them together.

8. All bottles for a particular schedule should be sent in the same shipping container, with some exceptions. Samples that do not need to be chilled can be packed and shipped in the cooler with chilled samples, provided the following exceptions do not apply. The ASR form must list only those samples that are being shipped with that form. On the ASR form, delete laboratory codes of any sample bottles not included in the same shipping container.
   - **Exception: Do not ship nutrient samples with samples that were treated with HNO_3.**
   - **Exception:** Do not ship FAM and RAM samples in the same container as FA or RA samples when requesting sample analysis for potassium and (or) chromium concentrations.
9. After samples and ice (if required) are placed in doubled plastic bags, close each bag separately with a knot.
10. Inside coolers:
   - Include a return address shipping label with the ASR form. This label must include a street address (not a post office box number), an account number, and the USGS District User Code (to bill return-shipping charges).
   - Label the inside of each cooler and cooler lid with a current return address and telephone number, using a permanent waterproof marker.
11. Include the ASR form for each sample set shipped in each cooler or box.
   - Remember to place the ASR form and temperature-check postcard into two sealable plastic bags to prevent water damage.
   - Tape the plastic bag containing the ASR form(s) and temperature-check card to the underside of the cooler lid, or place the sealed paperwork on top of samples packed in a cardboard box.

SHIPPING SAMPLES 5.5.4

Whenever possible, ship samples to the laboratory on the day of collection. Check laboratory hours of operation—keep in mind that the laboratory might not receive samples on Saturdays, Sundays, or holidays. The integrity of chilled samples sent late on a Thursday or on a Friday could be compromised if not received by the laboratory in time to be unpacked and refrigerated. Check planned arrival time before selecting the carrier service.

- No carrier service will accept or deliver leaky boxes or coolers. Securely tape the outside of shipping containers to prevent leaking and to maintain container integrity.
- Do not exceed maximum weight and size restrictions set by the carrier service.
- When shipping a single set of samples in multiple containers, mark the outside shipping label with the number of containers being shipped (such as 1 of 2, 2 of 2).
- Comply with the carrier service's requirements for meeting U.S. Department of Transportation regulations for transporting hazardous substances.
- **Identify samples that require special shipping procedures:**
  - Send chilled samples to the laboratory by the fastest means possible.
  - Some samples require special handling and shipping (such as radon and CFC samples). Contact the laboratory for specific instructions.
  - Obtain authorization from the laboratory before sending any highly contaminated or potentially hazardous samples to the laboratory for analysis.

Document date of sample shipment on the copy of each ASR form. Keep a copy in study files.