SAMPLE HANDLING, STORAGE, AND SHIPPING

1.0 PURPOSE

This standard operating procedure (SOP) sets forth the methods for use field personnel engaged in handling, storing, and transporting samples.

2.0 SCOPE

This procedure applies to all samples, and sample containers handled, stored, shipped, or otherwise transported during site activities. This procedure shall serve as professional guidance for AMEC personnel. It is not intended to obviate the need for professional judgment that may arise in unforeseen circumstances. Deviations from this procedure in planning or in the execution of planned activities must be approved by the Project Manager.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

The Field Manager is responsible for ensuring that all samples are shipped according to this procedure.

The Project Manager is responsible for identifying instances of non-compliance with this procedure and ensuring that future sample transport activities are in compliance with this procedure.

The Field Manager is responsible for ensuring that sample handling, storage, and transport activities conducted during all field sampling activities are in compliance with this procedure.

5.0 PROCEDURE

5.1 HANDLING AND STORAGE

Immediately following collection, all samples will be labeled according to the procedures in SOP, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures*. The lids of the containers shall not be sealed with duct tape, but may be covered with custody seals or placed directly into self-sealing bags. The sample containers shall be placed in an insulated cooler with frozen gel packs (such as "blue ice") or ice in double, sealed self-sealing bags. Styrofoam pads shall be placed on the bottom and top (and optionally on the sides) of the inside of the cooler. All empty space between sample containers shall be filled with Styrofoam "peanuts" or other appropriate material. Prior to shipping, glass sample containers should be wrapped on the sides, tops, and bottoms with bubble wrap or other appropriate padding and/or surrounded by Styrofoam to prevent breakage during transport. Prior to shipment, the ice or cold packs in the coolers shall be replaced so that samples will be maintained as close to 4°C as possible from the time of collection through transport of the samples to the analytical laboratory. Samples shall be shipped within 24 hours or on a schedule allowing the laboratory to meet holding times for analyses. The procedures for maintaining sample temperatures at 4°C, pertains to all field samples.

5.2 SHIPPING

All appropriate U.S. Department of Transportation (DOT) regulations (e.g., 49 Code of Federal Regulations (CFR), Parts 171-179) shall be followed in shipment of air, soil, water, and other samples. Elements of these procedures are summarized below.

In Hawaii, soil sample shipments are typically brought to the courier at the airport where a United States Department of Agriculture (USDA) representative is contacted by the courier to make an inspection. Alternatively, AMEC has received approval from the USDA to ship soil samples, and has received a stamp that can be used to facilitate shipment. In this way, the USDA does not need to inspect each soil sample shipment. Water sample shipments do not need to be inspected by the USDA. Custody seals are to be placed on each container (see Section 5.1, *Handling and Storage*) to ensure proper chain-of-custody control in the event coolers are opened for inspection.

5.2.1 Hazardous Materials Shipment

Field personnel must state whether any sample is suspected to be a hazardous material. A sample should be assumed to be hazardous unless enough evidence exists to indicate it is nonhazardous. If not suspected to be hazardous, shipments may be made as described in the Section 5.2.2 for non-hazardous materials. If hazardous, the procedures summarized below must be followed.

Any substance or material that is capable of posing an unreasonable risk to life, health, or property when transported is classified as hazardous. Hazardous materials identification should be performed by checking the list of dangerous goods for that particular mode of transportation. If not on that list, materials can be classified by checking the Hazardous Materials Table (49 CFR 172.102 including Appendix A) or by determining if the material meets the definition of any hazard class or division (49 CFR Part 173).

All persons offering for shipment any hazardous material must be properly trained in the appropriate regulations, as required by HM-126F, Training for Safe Transportation of Hazardous Materials. The training covers loading, unloading, handling, storing, and transporting of hazardous materials, as well as emergency preparedness in the case of accidents. Carriers such as commercial couriers must also be trained. Modes of shipment include air, highway, rail, and water.

When shipping hazardous materials, including bulk chemicals or samples suspected of being hazardous, the proper shipping papers (49 CFR 172 Subpart C), package marking (49 CFR 172 Subpart D), labeling (49 CFR 172 Subpart E), placarding (49 CFR 172 Subpart F, generally for carriers), and packaging must be used. A copy of 49 CFR should be referred to each time a hazardous material/potentially hazardous samples are shipped.

According to Section 2.7 of the International Air Transport Association (IATA) Dangerous Goods Regulations publication, very small quantities of certain dangerous goods may be transported without certain marking and documentation requirements as described in 49 CFR Part 172. However, other labeling and packing requirements must still be followed. A "Dangerous Goods in Excepted Quantities" label (Attachment 1) must be completed and attached to the associated shipping cooler (Attachment 2). Certain dangerous goods are not allowed on certain airlines in any quantity.

As stated in item 4 of Attachment 3, the Hazardous Materials Regulations do not apply to hydrochloric acid (HCl), nitric acid (HNO_3), sulfuric acid (H_2SO_4), and sodium hydroxide (NaOH) added to water samples if their pH or percentage-by-weight criteria are met. These samples may be shipped as non-hazardous materials as discussed below.

5.2.2 Non-hazardous Materials Shipment

If the samples are suspected to be nonhazardous, based on previous site sample results, field screening results, or visual observations, if applicable, then samples may be shipped as nonhazardous.

When a cooler is ready for shipment to the laboratory, two copies of the chain-of-custody form shall be placed inside a self-sealing bag and taped to the inside of an insulated cooler. The coolers will then be sealed with waterproof tape. Chain-of-custody seals will be placed on the coolers as discussed in SOP, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures*.

Upon receipt of sample coolers at the laboratory, the sample custodian shall inspect the sample containers as discussed in SOP, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures*. The samples shall then be either immediately extracted and/or analyzed, or stored in a refrigerated storage area until they are removed for extraction and/or analysis. Whenever the samples are not being extracted or analyzed, they shall be returned to refrigerated storage.

6.0 RECORDS

Records shall be maintained as required by implementing these procedures.

7.0 HEALTH AND SAFETY

1. Avoid lifting heavy coolers with back muscles; instead, use leg muscles or dollies.

2. Wear proper gloves, such as blue nitrile, latex, etc., as defined in the site-specific project Health and Safety Plan, when handling sample containers to avoid contacting any materials that may have spilled out of the sample containers.

8.0 REFERENCES

SOP, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures*

9.0 ATTACHMENTS

1. Label for Dangerous Goods in Excepted Quantities
2. Sample Cooler Marking Figure
3. SW-846 Preservative Exception

Attachment 1

LABEL FOR DANGEROUS GOODS IN EXCEPTED QUANTITIES

DANGEROUS GOODS IN EXCEPTED QUANTITIES

This package contains dangerous goods in excepted small quantities and is in all respects in compliance with the applicable international and national government regulations and the IATA Dangerous Goods Regulations.

_____
Signature of Shipper

_____ _____
Title Date

_____

_____
Name and address of Shipper

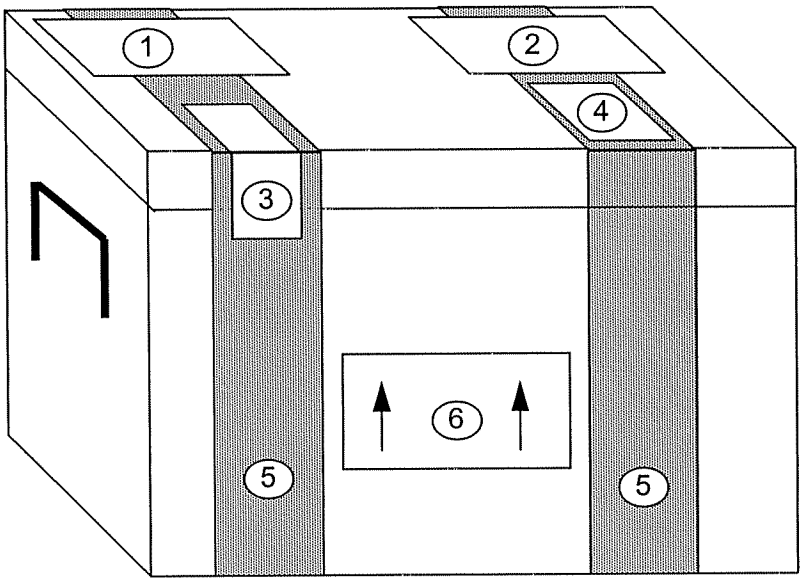
This package contains substance(s) in Class(es)
(check applicable box(es))

Class: 2 ▶ 3 ▶ 4 ▶ 5 ▶ 6 ▶ 8 ▶ 9 ▶

and the applicable UN Numbers are:

Attachment 2

NON-HAZARDOUS MATERIAL COOLER MARKING FIGURE FOR SHIPMENT FROM OUTSIDE THE CONTINENTAL UNITED STATES



(1) AIR BILL/COMMERCIAL INVOICE
(2) USDA PERMIT (Letter to Laboratory from USDA)
(3) CUSTODY SEAL
(4) USDA 2" X 2" SOIL IMPORT PERMIT
(5) WATERPROOF STRAPPING TAPE
(6) DIRECTION ARROWS STICKER - TWO REQUIRED

Attachment 3

PRESERVATIVE EXCEPTION

Measurement	Vol. Req. (mL)	Container[2]	Preservative [3,4]	Holding Time[5]
MBAS	250	P,G	Cool, 4°C	48 Hours
NTA	50	P,G	Cool, 4°C	24 Hours

1. More specific instructions for preservation and sampling are found with each procedure as detailed in this manual. A general discussion on sampling water and industrial wastewater may be found in ASTM, Part 31, p. 72-82 (1976) Method D-3370.

2. Plastic (P) or Glass (G). For metals, polyethylene with a polypropylene cap (no liner) is preferred.

3. Sample preservation should be performed immediately upon sample collection. For composite samples each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

4. When any sample is to be shipped by common carrier or sent through the United States Mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. for the preservation requirements of Table 1, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentration of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or grater); Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

5. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of sample under study are stable for the longer time, and has received a variance from the Regional Administrator. Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show this is necessary to maintain sample stability.

6. Should only be used in the presence of residual chlorine.