

Packaging and Shipping Environmental Samples

SSFL SOP 11
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1.0 Objective

The objective of this technical standard operating procedure (SOP) is to outline the requirements for the packaging and shipment of environmental samples for the Santa Susana Field Laboratory (SSFL) site. Additionally, Sections 2.0 and 3.0 outline requirements for the packaging and shipping of regulated environmental samples under the Department of Transportation (DOT) Hazardous Materials Regulations, the International Air Transportation Association (IATA), and International Civil Aviation Organization (ICAO) Dangerous Goods Regulations for shipment by air and apply only to domestic shipments. This SOP does not cover the requirements for packaging and shipment of equipment (including data or bulk chemicals) that are regulated under the DOT, IATA, and ICAO. However, packaging and shipment of hazardous material and radioactive samples is not expected.

1.1 Packaging and Shipping of All Samples

This SOP applies to the packaging and shipping of all environmental samples. Samples displaying radioactivity above background concentrations will not be collected or shipped.

Note: This SOP does not address shipment of hazardous or radioactive materials. Do not ship a hazardous or radioactive material unless you have received training that meets the requirements of the Department of Energy (DOE), The Boeing Company (Boeing), CDM Smith, and the DOT.

2.0 Background**2.1 Definitions**

Environmental Sample - An aliquot of sample representative of the site. This definition applies only to environmental samples that contain less than reportable quantities for any foreseeable hazardous constituents according to DOT regulations promulgated in 49 CFR - Part 172.101 Appendix A.

Custody Seal - A custody seal is a narrow adhesive-backed seal that is applied to individual sample containers and/or the container (i.e., cooler) before offsite shipment. Custody seals are used to demonstrate that sample integrity has not been compromised during transportation from the field to the analytical laboratory.

Inside Container - The container, normally made of glass or plastic, that actually contacts the shipped material. Its purpose is to keep the sample from mixing with the ambient environment.

Outside Container - The container, normally made of metal or plastic, that the transporter contacts. Its purpose is to protect the inside containers.

Secondary Containment - The outside container provides secondary containment if the inside container breaks (i.e., plastic over packaging if liquid sample is collected in glass).

Excepted Quantity - Excepted quantities are limits to the mass or volume of a hazardous material below which DOT, IATA, ICAO regulations do not apply. The excepted quantity limits are very low. Most regulated shipments will be made under limited quantity.

Limited Quantity - Limited quantity is the amount of a hazardous material exempted from DOT labeling or packaging requirements in 49 CFR. Authorized exemptions are noted under column 8A in the Hazardous Materials Table in 49 CFR 172.101.

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Qualified Shipper - A qualified shipper is a person who has been adequately trained to perform the functions of shipping hazardous materials.

2.2 Associated Procedures

- SSFL SOP 10, *Sample Custody*

2.3 Discussion

Proper packaging and shipping is necessary to ensure the protection of the integrity of environmental samples shipped for analysis. These shipments are potentially subject to regulations published by DOT. Failure to abide by these rules places both CDM Smith and the individual employee at risk of serious fines. The analytical holding times for the samples must not be exceeded. If necessary, the samples shall be packed in time to be shipped for overnight delivery or for pick-up by the laboratory courier. Make arrangements with the laboratory before sending samples for weekend delivery.

3.0 General Responsibilities

Field Team Leader—The field team leader (FTL) is responsible for:

- Ensuring that field personnel package and ship samples in accordance with this SOP.
- Ensuring samples are shipped such that holding times can be met by the laboratory.
- Ensuring normal samples collected and QC samples are documented on the Chain of Custody (CoC).

Site Health and Safety Technician—The person who will use field screening instruments to monitor all field activities for VOCs and radiological contaminants and pre-shipment sample coolers. This person is a trained radiological technician who works under the guidance of Science Application International Corporation's (SAIC's) Certified Health Physicist (CHP).

4.0 Required Equipment

The following equipment will be needed in the field trailer to conduct sample packing and shipping:

- Site-specific plans (e.g., Field Sampling Plan [FSP] Addendum, health and safety plan)
- Insulated coolers
- Heavy-duty plastic bags
- Plastic zip-top bags, small and large
- Clear tape
- Duct tape
- Nylon reinforced strapping tape
- Rubber bands (optional)
- Bubble wrap (optional)
- Ice in bags
- Custody seals
- Chain-of-custody record
- This End Up and directional arrow labels
- Overnight courier airbills

5.0 Procedures

5.1 Packaging Environmental Samples

Preservatives in samples are not anticipated to meet threshold criteria to be classified as hazardous materials for shipping purposes. The following steps must be followed when packing sample bottles and jars for shipment:

1. Verify the samples undergoing shipment meet the definition of "environmental sample" and are not a hazardous material as defined by DOT. Professional judgment and/or consultation with qualified persons such as the appropriate health and safety coordinator or the health and safety manager shall be observed.
2. Select a sturdy cooler in good repair. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler. Line the cooler with a large heavy-duty plastic bag.
3. Be sure the caps on all bottles are tight (will not leak); check to see that labels and chain-of-custody records are completed properly (SSFL SOP 10).

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4. Place all bottles in separate and appropriately sized plastic zip-top bags and close the bags. Up to three VOA vials may be packed in one bag. Binding the vials together with a rubber band on the outside of the bag, or separating them so that they do not contact each other, will reduce the risk of breakage. Bottles may be wrapped in bubble wrap or placed into foam bottle holders.
Note: Trip blanks must be included in coolers containing VOA samples.
5. Place bubble wrap in the bottom of an empty cooler followed by a large plastic bag, and place the sample containers in the bag with sufficient space to allow for the addition of packing material between any glass containers. It is preferable to place glass sample bottles and jars into the cooler vertically. Glass containers are less likely to break when packed vertically rather than horizontally. The containers may alternatively be placed into foam or cardboard holders that fit within the coolers.
6. While placing sample containers into the cooler, conduct an inventory of the contents of the shipping cooler against the chain-of-custody record.
7. Put ice in large plastic zip-top bags (double bagging the zip-tops is preferred) and properly seal. Place the ice bags on top of and/or between the samples. Several bags of ice are required (dependant on outdoor temperature, staging time, etc.) to maintain the cooler temperature at approximately 4° Celsius (C) \pm 2° C . Fill all remaining space between the bottles or cans with packing material. Securely fasten the top of the large plastic bag with fiber or duct tape or a zip tie.
8. Print copies of the electronic CoC form. Place one copy of the completed CoC record for the laboratory into a plastic zip-top bag, seal the bag, and tape the bag to the inner side of the cooler lid. Retain a second copy of the CoC for sample management records. Close the cooler lid.
9. The cooler lid shall be secured with nylon reinforced strapping tape by wrapping each end of the cooler a minimum of two times. Attach a completed chain-of-custody seal across the opening of the cooler on opposite sides. The custody seals shall be affixed to the cooler with half of the seal on the strapping tape so that the cooler cannot be opened without breaking the seal. Complete two more wraps around with fiber tape and place clear tape over the custody seals.
10. The shipping container lid must be marked "**THIS END UP**" and arrow labels that indicate the proper upward position of the container shall be affixed to the cooler. Labels used in the shipment of hazardous materials (such as Cargo Only Air Craft, Flammable Solids, etc.) are not permitted on the outside of containers used to transport environmental samples and shall not be used. The name and address of the laboratory is included on the shipping label (i.e., overnight delivery service label).
11. Screen the cooler with the radiation meter before shipment and document that a background level (at most) exists. The cooler will be surveyed by the RAD Technician to ensure that Radiation flux on exterior surfaces does not exceed 0.5 mrem/hr on all sides. This survey will be documented and the results reviewed by the qualified shipper, as needed.

5.2 Packaging of Limited-Quantity Radioactive Samples

Samples containing radioactivity above background will be handled in accordance with DOT shipment regulations and the requirements of the analytical laboratory receiving the samples. Per DOT shipment regulations, packages cannot exceed 200 millirem per hour and/or 2,200 disintegrations per minute as measured at any point on the package surface. Samples with exceedence of radiological screening levels (per the health and safety plan or SSFL SOP 7) will be set aside and the DOE, California Department of Toxic Substance Control (DTSC), and Boeing will be contacted. Screening limits are 30 millirem per hour and 200 disintegrations per minute.

6.0 Restrictions/Limitations

This SOP addresses the packing and shipping of environmental samples exhibiting typical radioactivity for SSFL (less than 30 millirem per hour for gamma emitters and 200 disintegrations per minute for alpha/beta emitters). Being a site that has a history of radioactive occurrences, the sample locations, samples, and coolers will be screened for radioactivity. However, CDM Smith will not handle, package, or ship samples with radioactivity that exceeds DOT regulations or the requirements of

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the receiving laboratory. If radioactivity above these levels is detected, packing and shipping work will be temporarily suspended and DOE, DTSC, and Boeing will be contacted for further direction. The cooler or samples will be set aside, and work with those samples will not resume until approved for shipment by DOE. Any effort beyond stop work will require modified SOPs.

7.0 References

U. S. Environmental Protection Agency. (EPA). 2007 or current revision. *Sampler's Guide, Contract Laboratory Program, Guidance for Field Samplers*, EPA-540-R-07-06.

Title 49 Code of Federal Regulations, Department of Transportation. 2005 or current revision. *Hazardous Materials Table, Special Provisions, Hazardous, Materials Communications, Emergency Response Information, and Training Requirements*, 49 CFR 172.

Title 49 Code of Federal Regulations, Department of Transportation. 2005 or current revision. *Shippers General Requirements for Shipments and Packaging*, 49 CFR 173.