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Environmental Programs Directorate

Standard Operating Procedure

for **AIRNET—QUARTERLY COMPOSITING SAMPLES**

APPROVAL SIGNATURES:

| Subject Matter Expert: | Organization | Signature | Date |
|---------------------------|--------------|-------------------|----------|
| Karen Schultz Paige | WES-EDA | Signature on File | 4/6/2009 |
| Responsible Line Manager: | Organization | Signature | Date |
| Craig Eberhart | WES-EDA | Signature on File | 4/6/2009 |

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1.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) states the responsibilities and describes the preparation of composites of biweekly AIRNET samples for the purpose of determining alpha-emitting nuclides and selected inorganics on a quarterly basis for the Los Alamos National Laboratory (LANL) Waste and Environmental Services Division (WES).

All WES workers shall implement this procedure when preparing and submitting of composited samples of filter papers used to collect airborne particulates as part of the AIRNET monitoring program.

The analytical laboratory workers will follow the appropriate text for physical compositing.

2.0 BACKGROUND AND PRECAUTIONS

2.1 Background

A quarterly analysis of filters supplies information more specific than gross alpha and gross beta measurements. The isotopic analysis provides sensitive measurement of the concentrations of plutonium-238 and 239, of americium-241 and of uranium-234, 235 and 238 over the entire quarter. Filters are also analyzed for a suite of inorganic elements. At times the suite of analytes is varied.

AIRNET filter samples are collected every two weeks. The uncut biweekly samples are shipped to the analytical laboratory for analysis. Every quarter, the filters from the past calendar quarter are cut then composited into one sample per AIRNET site for analysis for the additional analysis. The compositing is done at the analytical laboratory. The paperwork outlining how the compositing is to be done is determined by a WES worker.

2.2 Precautions

None

3.0 EQUIPMENT AND TOOLS

- Gloves (powderless)
- Scissors
- Metal sample cans
- Kimwipes®
- 1 set of labels (e.g., 04Q1.nn)
- Copy of Microsoft Access reports or forms for “Quarterly Composites”
- Tweezers
- Bench paper
- Permanent marker
- Scotch tape
- Cleaning solution

4.0 STEP-BY-STEP PROCESS DESCRIPTION

4.1 Preparation for Quarterly Sample Compositing

Compositing of the quarterly samples is performed at the analytical laboratory at the end of the quarter after the final set of instrumental analyses is completed. Perform the following steps to prepare needed paperwork for compositing.

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| Worker | 1. | In the Microsoft Access AIRNET database AIRNET_PeriodID table, there is a quarterly composite field, “QuartComp,” that indicates which biweekly period IDs will be included in each specific composite. This field is populated during each calendar year’s start-up activities. NOTE: Samples deployed before Christmas and collected in early January of the following year will be included in the first quarterly composite of the new year. |
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2. Ensure that the field data verification and validation (V&V) for filters and the biweekly analyses are complete. NOTE: We elect to take the risk that a few samples may be reclassified upon health physics review, and will NOT use the gross beta as an indicator for compositing decisions and may composite prior to completion of that review.

3. Using the Microsoft Access AIRNET database (see the AIRNET Database User's Guide), produce the composite reports to ensure that no sample that has been rejected for field data reasons is included in a composite.

Start on the AIRNET Database Form "MAIN Switchboard" and selecting the "Quarterly Composite" button. The subsequent forms walk through the process of producing a complete checklist for assembling the composite, printing labels, editing the cover letter, producing a chain-of-custody document for returning samples, etc.

Send a copy of all documents produced via this database form to the analytical laboratory.

4. Prepare pre-printed labels for the composited samples:
 - Use the button for that purpose on the AIRNET Database "Quarterly Composite" Form.
 - Send these to the compositing site.

5. Prepare a letter to the analytical laboratory requesting the analyses on the quarterly composite samples. The chemistry data coordinator maintains current analysis information and it is also documented in the Sites_MasterLocation table within the AIRNET database.

4.2 Compositing Samples at the Analytical Laboratory

After the filters have been collected, shipped, and analyzed for one quarter, they are ready to be "composited" for the analyses of various radionuclides by radiochemical alpha spectroscopy. This process is performed at the analytical laboratory. Follow all safety and radiation protection requirements of the laboratory. The analytical laboratory will ensure all required training is current.

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| Analytical laboratory worker | 1. The analytical lab staff assembles all filters (in individual containers) for the calendar quarter to be composited. |
| | 2. For each sample station, label one sample container with the station I.D., in the format yyQn.ss, where yy is the year, n is the quarter number, and ss is the station number, using the preprinted labels generated from the AIRNET database. These labels will be supplied by the participating WES staff member. |
| | 3. Put all sample containers (each containing an individual filter) from each station in an individual stack. |
| | 4. Refer to the Compositing Checklist generated above and remove all samples marked with an "R." Rejected samples will no longer be analyzed individually, beginning with the 04Q1 composites. Return these rejected samples to LANL for disposition. |
| | 5. Refer to the Compositing Checklist to ensure the stack contains all the period IDs listed on the checklist. For each sample that goes in a composite, mark on the Compositing Checklist that the samples are present and were included in this composite. |

- Analytical laboratory worker
6. Cover the bench with bench paper and place a Kimwipe® over the immediate work area. Put on the gloves. Select one stack (representing a single station).

 7. Place a labeled sample composite container open, face-up in the covered work area. Remove samples one at a time from their original counting containers, and holding each over the composite container with the tweezers, cut it in half, letting the loose half drop gently into the composite container. Place the remaining half (held in the tweezers) gently back into its original counting container. Note that as a result of changes to the biweekly analysis requirements, that some of the stations will have only one-half filter remaining for use in the composite. In these cases, simply combine all the remaining half filters WITHOUT any further cutting.

 8. If there is remaining loose particulate material in any of the vacated individual sample containers, manually apportion it uniformly between the new composite containers.

 9. Discard any vacated individual sample containers. Repeat Steps 7 and 8 for the remaining filters in this quarter for this site. Close the completed composite sample container and set aside for resubmission to the Sample Management organization at the analytical laboratory. If the filters have never left their custody, all chain-of-custody documentation is handled internal to the analytical laboratory.

 10. Put a new Kimwipe® on the work area. Wash both scissors and tweezers. Select the next stack (representing a single station). Repeat Steps 7 through 9..

 11. After the last composite is prepared, the analytical laboratory staff must sign and date the Compositing Checklist. Make a copy, and leave one copy at the analytical laboratory. Ensure the original Quarterly Composite Checklist is returned and becomes part of the records retained at WES.

 12. Package all remaining sample half-filters for shipment back to the WES. Initiate the chain-of-custody form prepared from the database and receive custody of the sample remains from the analytical laboratory for return to WES. Upon arrival at the WES, relinquish custody to the field team at TA-54 site for sample archiving.

4.3 Records Management

- Worker
1. Maintain and submit records and/or documents generated to the Records Processing Facility according to EP-DIR-SOP-4004, Records Transmittal and Retrieval Process and to AIRNET Project files.

5.0 DEFINITIONS

None

6.0 PROCESS FLOW CHART

None

7.0 ATTACHMENTS

None

8.0 REVISION HISTORY

| Revision No. <i>[Enter current revision number, beginning with Rev.0]</i> | Effective Date <i>[DCC inserts effective date for revision]</i> | Description of Changes <i>[List specific changes made since the previous revision]</i> |
|------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 | 3/13/01 | New document created from a chapter of ESH-17-202, R12. |
| 1 | 7/2/02 | Updated details about station 90 handling, cutting filters, and changes to requested analytes. |
| 2 | 4/15/04 | Updated requirements for disposition and storage of analyzed filters. Discontinued the analysis of rejected biweekly filters not included in normal composite sample. |
| 3 | 4/04/05 | Quick-change revision to replace HCP with HR for annual review. |
| 0 | 4/8/2009 | New document number and reformatted for WES division. Formerly ENV-MAQ-242. |