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## Environmental Safety, Health, & Quality Directorate

### Waste and Environmental Services

### Standard Operating Procedure

# for AIRNET—ENVIRONMENTAL SAMPLING OF AIRBORNE PARTICULATE RADIONUCLIDES

**Reviewer:**

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Derivative Classifier:  Classified  Unclassified

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**APPROVAL SIGNATURES:**

<b>Subject Matter Expert:</b> Shannon Allen	<b>Organization:</b> WES-EDA	<b>Signature:</b> 	<b>Date:</b> 5-24-11
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## 1.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) applies to the AIRNET ambient air monitoring network at the Los Alamos National Laboratory (LANL) only. It describes the collection of particulate samples from the air sampling stations, preparation of the samples for analysis, and submission of the samples for analysis for radionuclides.

Waste and Environmental Services division (WES) workers shall implement this procedure when collecting airborne particulate samples for radionuclides.

## 2.0 BACKGROUND AND PRECAUTIONS

### 2.1 Background

AIRNET (the WES network of air-monitoring stations) uses filter media to collect airborne particles. The filters are generally changed out on a 2-week basis and analyzed for various radionuclides. See "AIRNET – Quality Assurance Project Plan", WES-SOP-5140, for a detailed description of the project.

The AIRNET sampler operates by drawing air through the sample filter, which traps the radioactive particles. By recording the flow rate and the time the pump ran, the air volume that passed through the filter can be calculated. The sample media are analyzed for gross alpha, gross beta, and isotopic gamma activity by a contract analytical laboratory. After samples from all the 2-week periods in one calendar quarter are collected, they are analyzed as composites for various radionuclides to determine ambient air concentrations.

### 2.2 Precautions

Work to an approved AIRNET IWD and coordinate work activities with the appropriate FOD (Facility Operations Director).

## 3.0 EQUIPMENT AND TOOLS

Equipment and tools are defined in individual steps in section 4.

## 4.0 STEP-BY-STEP PROCESS DESCRIPTION

### 4.1 Preparing New Samples

Worker	1.	Preparation of sample filters is generally performed during the week preceding the change-out.
	2.	Collect the materials and tools listed below. <ul style="list-style-type: none"><li>• Precut filters / roll of polypropylene filter material</li><li>• Storage jar</li><li>• Tweezers</li><li>• Pneumatic filter cutting tool</li><li>• Filter heads (whole set of either blue or gold)</li><li>• Plastic caps for filter heads</li><li>• Spray cleaner (Fantastik® is preferred)</li><li>• Paper towels</li></ul>

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| Worker | <p>3. Prepare new filters, if needed, with the pneumatic filter cutting tool. Unwrap the roll of filter material. Cut strips about 3 inches wide from the roll. Rewrap the roll. Ensure the protective covering on the filter paper has been removed before feeding the end of a strip of filter material into the tool to cut a circular filter using the foot-controlled actuator. Keep fingers clear of cutting area. Do not handle filters with bare hands. Store excess cut filters in a sealed plastic bag.</p> <hr/> <p>4. Prepare sampler heads for new samples as follows:</p> <ul style="list-style-type: none"> <li>a. Clean filter holders and retaining rings using a paper towel dampened with Fantastik® cleaner. Wipe out dust, dirt, or lint from filter support screen, retaining ring, and filter body. Check o-rings for cracks, replacing if necessary.</li> <li>b. Place a filter into the metal filter head using tweezers. Ensure filter paper is centered in the seat of the head. Screw ring back on holder.</li> <li>c. Get a new plastic cap. Punch a vent hole in the cap and install it over the filter head. Check for clear station number markings on the head.</li> <li>d. Repeat steps a, b and c for all samples and trip blanks (stations 183, 184, 270, 271, 272, and 346).</li> <li>e. Take trip blanks with the filters during deployment; between collections store the blank filters in TA-54-1001. [At the end of the collection period 2 weeks later, ensure the blank filters are submitted with the filters just retrieved. Maintain chain-of-custody on blanks.]</li> </ul> |
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#### 4.2 Change out of samples

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|--------|---|
| Worker | <p>1. Sampler filters are generally changed every two weeks (three for some holidays), but may be changed sooner for special situations as directed by group or project managers.</p> <hr/> <p>2. Take a cellular phone or radio when collecting AIRNET samples. It is strongly preferred that two people travel together to collect AIRNET samples; however, it is acceptable for one person to collect samples as long as enhanced communications are in use.</p> <hr/> <p>3. Complete all facility-specific training requirements and follow facility-specific work rules, including access requirements. Work control in a laboratory facility is the responsibility of the Facility Manager. All work must be performed with an approved IWD and be on the Plan of the Day.</p> <hr/> <p>4. Check in with pueblo authorities and coordinate with them before doing any type of work at Jemez, San Ildefonso, and Picuris Pueblos. Work control is the responsibility of the pueblo authorities.</p> <p>Some pueblos collect their own samples and deliver them to the field team for inclusion in the current sample shipment. AIRNET personnel may occasionally collect the samples at the pueblos.</p> <hr/> <p>5. Check with the project leaders for any special requirements for private property, because each private property owner has a separate arrangement with the group.</p> <hr/> <p>6. Ensure air flow calibrators are in current calibration before using them in the field.</p> |
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Worker

7. Before leaving for sample change-out ensure the following items are in the vehicle:

- Clean replacement filter heads (all of the correct color) with plastic caps for all stations on the loop.
- Trip blank for the loop.
- Air flow calibrator
- Buck or Definer flow calibrator
- Hand-held computer
- Key for station locks
- At least one spare working pump
- At least two spare working timers.
- Cell-phone or radio.
- High visibility vests.
- Weather appropriate clothing

8. See Attachment 1 for the locations of, and directions to the AIRNET sampling locations. Travel to each sampler location and perform the following steps at each station.

When approaching a station, if the AIRNET station housing appears damaged in such a way that electrical wires are exposed or could be shorted to the housing or conduit, do not touch the station! Immediately report the damage and request that an electrician repair the electrical damage.

Perform the following [with the tritium sample change-out (WES-SOP-5144)]:

- a. Unlock and open the housing. Enter a comment if the station is found unlocked.
- b. Read the timer.
  - If timer and pump are operating properly, skip to Step e.
  - If the timer reading is far from the expected reading (336 hours at the end of a 2 week period) and the pump is running, record the timer reading and note in the comments field that the timer failed.

Worker

8.
  - c. If the pump is not running, attempt to restart it by resetting the Ground Fault Circuit Interrupter (GFCI) and then checking the breaker, checking the power source breaker, or taking other actions. If these actions fail or cannot be completed, contact the facility manager or the subcontractor coordinator. At pueblo sites, notify the appropriate pueblo contact.
    - If the pump starts, skip to Step e.
    - If the pump cannot be started, continue with Step d.
  - d. If both timer and pump do not operate and the timer reading is under 72 hours, consider rejecting the sample. Discuss your decision with the field supervisor or task leader. (The sample may be sent for analyses at the task leader's discretion.) The pump will have to be replaced or the problem fixed in order to start the sampling for the next period.
  - e. Press the flow calibrator against the filter head, ensuring a good seal, and read the final flow rate. Record the final flow on the palm computer, or on the chain of custody, or in the field logbook. If a flow reading cannot be obtained when the pump is running, record the final flow rate of 0. Look for a leak between the pump and the filter. Attempt to repair any leak, making a note in the comment field.
  - f. Change the sample:
    - Remove the used filter head from the quick-connect fitting.
    - Remove the plastic cap from the new filter head and place on the used head.
    - Install the new head on the quick-connect fitting.
    - Make sure the label correctly matches the location and the color of the filter head is correct for the sample period.
  - g. Press the flow calibrator against the filter head, ensuring a good seal, and read the flow rate. If needed, adjust the flow to read 4.0 cfm (between 3.8 and 4.2 cfm is acceptable) and record the new initial flow reading.
  - h. Ensure the following information is recorded electronically (or in writing, if necessary):
    - Date and time (recorded automatically by the field computer)
    - Timer reading (hours)
    - Final air flow rate (measured before old filter removed)
    - Initial air flow rate (measured after new filter installed)
    - Sample number in the following format: a sample collected the week of July 31, 2006 (always a Monday) at station 112 would be 060731.112. Label the QC trip blank samples with station numbers 183, 184, 270, 271, 272, and 346.
    - Comments on significant irregularities, "rejected" sample, estimated data, or other conditions.
  - i. Reset the digital timer by pressing the reset button (this may be done at any time after reading).
  - j. Close and lock the sample housing.
  - k. Maintain chain-of-custody of the sample.
9. If the pump is found in an inoperable condition and cannot be easily corrected, communicate this following SOP-5145, and record a comment to this effect.

Worker

10. Make a copy of written notes, after returning from field collection activities, or download the data from the field computers to the desktop computer database and print the filter chain-of-custody forms (SOP 5149).
11. Check the data on the forms for errors and then keep the forms in a safe place until the samples are shipped.

See Attachment 2 for Air Monitoring Field Data and Chain of Custody form.

#### 4.3 Station Checks

Worker

1. Compliance stations have telemetry installed and are remotely checked daily (see SOP-5152). Other significant stations may require visits during the non-collection weeks.
2. For a station visit with NO sample change-out, do the following:
  - Unlock and open the housing.
  - If the pump is not running, follow steps b and c in section 4.2 sub-section 8. Do NOT change the sample and do NOT reset the timer.
  - If the pump has failed, follow SOP-5145 for pump replacement.
  - Read the timer.
  - Read gel flow rate.
  - Attach flow calibrator to the filter head and read the filter flow rate.
  - Record the date, time, timer reading, and both flow meter readings either manually or electronically in the field computer.
  - Close and lock the housing.
  - After returning make a copy of written notes or download the data from the field computers to the database

#### 4.4 Preparation for Chemical Analysis

Worker

1. After the AIRNET samples have been changed out, they are prepared for shipping to an analytical laboratory for alpha, beta and gamma counting. The samples are initially grouped in clumps for gamma counting. Thereafter the clumps are broken up and each filter undergoes instrumental front-face proportional counting to determine gross alpha and beta count rates. The lab retains the filters for later quarterly compositing for alpha isotopic analysis.

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- Worker            2.            To prepare filters for shipping collect the materials and tools listed below.
- Glassine envelopes (approximately 70)
  - Gloves (optional)
  - Sealable 4inch x 4inch (10cm × 10cm) plastic bags (approximately 12)
  - Sealable 8inch x 8inch (20cm x 20cm) plastic bag
  - Permanent marker (if needed)
  - Cleaning solution (Fantastik® is strongly preferred)
  - Air Monitoring Field Data and Chain-of-custody forms (Attachment 2)
  - Shipping letter with clump designations (Attachment 3). (Print from AIRNET database with correct shipping date.)
  - Tweezers
  - Scotch tape
  - Tamper evident tape
  - Sample ID and clump labels
  - Moist towelettes or paper towels
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3.            Perform the following to prepare filters for analysis:
- a. In the AIRNET database, from the main AIRNET switchboard, select the “Field Sampling” menu and open the document for ”AIRNET Field Data Management.”
  - b. Select period numbers (e.g. 080218), then select “Sample Shipping,” select period number again, then select “Filter Agreement Shipping Report.”
  - c. Print the Shipping Letter; place all chain-of-custody forms with this shipping letter.
  - d. Have a peer review the shipping letter and chain of custody forms, checking sample ID numbers, dates, and number of samples shipped. Document review on the AIRNET Shipping Checklist (Attachment 4).
  - e. Make up two sets of small stick-on labels with the sample ID (in the format yymmdd.nnn where nnn is the three digit station site ID), or use a black permanent marker to label the glassine envelopes. Lay out a moist towelette for cleaning tools.
  - f. Place filter holders on the table and place a glassine envelope labeled with the corresponding station number next to each filter holder. [Use gloves if there is reasonable expectation any of the filters were exposed to a radioactive release.]
  - g. Slowly remove the plastic cover cap from a sample holder to avoid creating a vacuum that could dislodge the filter and/or the collected dust. Discard the cap. Caps may be disposed of as regular trash.
  - h. Unscrew the ring and, using tweezers, remove the filter. Place the filter into the correct pre-labeled glassine envelope.
  - i. Fold over the top of the envelope and securely close with a small piece of clear tape. [This may be done after all the filters have been placed into envelopes.]
  - j. Wipe off tweezers on a clean piece of a paper towel dampened with cleaning solution.
  - k. Record observed irregularities that might influence the quality of the sample.
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Worker

- I. Repeat steps g through k for all filter samples.
- m. Group the glassine envelopes into “clumps” as shown on the latest version of the Shipping Letter (Attachment 3).
- n. Prepare three blank samples using clean filters. Place the blanks in pre-labeled glassine envelopes marked as stations 228, 229, and 230. [If QC spike samples are available, place them in glassine envelopes marked 231, 232, and 233.]
- o. Mark a small sealable plastic bag (with pre-printed stick-on labels or a black permanent marker) with the sample ID for each clump in the following format yymmdd.Cx where C stands for clump, and x is the letter identifier of the clump.
- p. Place each clump of filters in its corresponding labeled sealable plastic bag.
- q. Place each clump bag into large sealable plastic bag. Seal opening with tamper evident tape.

4. Prepare samples for shipping as follows:
  - a. Complete the AIRNET Sample Shipping Checklist (Attachment 4).
  - b. Make copies of the Shipping Letter and the chain of custody forms.
  - c. Send original copies of all paperwork with Sample Shipment. Retain copies of all paperwork for the validation and verification process (SOP-5149).
  - d. Put an extra set of sample ID labels with samples in shipping container.
  - e. Take packed samples to the Sample Management Office (SMO).
  - f. Enter shipping date in “Sample and Data Tracking” table of the AIRNET database.

#### 4.5 Chain-of-Custody for Samples

Worker

1. Verify that the possession and handling of samples is traceable at all times. A sample is physical evidence collected from a facility or the environment. Chain-of-custody must be documented for all samples used to demonstrate compliance. A sample is considered in custody if it is one of the following:
  - In one’s physical possession.
  - In one’s view after being in one’s physical possession.
  - In one’s physical possession and then locked up so that no one can tamper with it.
  - Kept in a secure area where access is restricted to authorized and accountable personnel only. [NOTE: A secured area is an area that is locked, such as a room, cooler, vehicle, or refrigerator. If the area cannot be secured by locking, use a custody seal to secure the area or the sample container.]
2. Complete the “relinquished by/received by” and “date” sections of the Field Data Form and Chain of Custody Record (Attachment 2) whenever samples are transferred into the custody of another person or organization. These sections of the form must provide a complete history of custody from collection to final transfer to the analytical laboratory.
3. Document any break in the chain of custody. Enter a comment in the AIRNET database and notify the task leader.

#### 4.6 Waste Management



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- Worker
1. All samples not sent for analysis and samples returned from the analytical laboratory will be handled according to an approved waste profile form when they are no longer considered archive samples and are ready for disposal. Any waste created due to an unexpected release or emergency situation will be evaluated by the waste management coordinator prior to disposal.

#### **4.7 Records Management**

- Worker
1. The following records will be submitted to the Records Processing Facility according to EP-DIR-SOP-4004, Records Transmittal and Retrieval Process:
    - Air Monitoring Field Data Form and Chain of Custody Record (Attachment 2)
    - AIRNET Filter Shipping Letter (Attachment 3)—original with samples shipped to analytical lab.
    - Field notes

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#### **5.0 ATTACHMENTS**

Attachment 1 Directions to AIRNET Sampling Stations (4 pages)

Attachment 2 Example of Air monitoring Filed Data Form and Chain of Custody Record (1 page)

Attachment 3 Example of AIRNET Shipping Letter (3 pages)

Attachment 4 Example of AIRNET Shipping Checklist (1 page)

[If you have read and understand the preceding document, click here to receive EDS credit.](#)

## 6.0 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	—	Revision number not used.
1	01/04/91	New document, issued as ESH-8-202.
2	05/14/91	Revision to process.
3	05/09/94	Put into new format; process updated.
4	04/18/95	Update Attach. 1 indicating new and relocated samplers; remove references to tritium cartridges; add instructions for inoperable or damaged samplers.
5	12/18/95	Revise shipping instructions; remove Be request; update sampler locations.
6	05/15/96	Change filter material, add electronic recording of field data, change tracking of sample period by color of filter head, revise field form, add form for composites.
7	09/24/96	Expand steps for inoperative pumps, add eg. of electronic data recording as attachment, add actions for #90, add field safety information to prerequisites.
8	02/20/97	Update station list, add safety considerations, add new sample preparation processes and forms, add records submittal deadlines.
9	07/31/97	Update station list, add steps for critical station checks.
10	03/09/99	Add details for shipping paperwork; changed biweekly and compositing processes to reflect use of whole filters.
11	04/27/99	Revise filter handling/compositing steps for change to front face counting.
12	11/03/00	Delete lab chain-of-custody attachment, editorial changes, add shipping checklist, rewrite chapter Critical Station Checks, add "Critical Station Checks".
13	03/13/01	Move compositing to new procedure, update station list, added 3 trip blanks.
14	11/01/01	Revised to reflect use of Palm computer devices, revised some steps about sample handling, and revised handling of station 90 filters.
15	02/28/03	Updated station list, revised instructions for preparing cover memos, and other minor editorial changes.
16	12/14/04	Change criteria for flow adjustment, replaced "JCNNM" with "electrician," replace HCP with HR.
17	01/12/06	Add steps to mark back of filters with colored marks.
0	4/2/09	New document number, reformatted for WES. Formerly ENV-MAQ-202.
1	7/7/09	Quick revision to add sample loop MDA-B and directions to new stations.
2	8/2/10	Quick revision to change station numbers to master site numbers. Updated station directions.
3	6/2/11	Removed step for marking filters with colors using markers.

ATTACHMENT 1

**SOP-5143-1 Directions to AIRNET Sampling Stations**

Records Use Only



Station Number	Station Name	Directions
*—Indicates compliance stations. †—Indicates background (regional) stations.		
112	Barranca School	Travel north on Diamond Drive to San Ildefonso (past the golf course) and turn left up the hill to Barranca Road. School is on Barranca Rd (look north after passing Loma Del Escolar). The sampler is on the south side of the school.
114*	Los Alamos Airport	At the east end of Trinity Drive, turn into the Los Alamos Airport. The sampler is northwest of the airport terminal building.
116†	Espanola	On the Northern New Mexico Community College campus on the west side of Española next to the Chama highway, east of the two-story science building.
119*	Rocket Park (formerly Pinon School)	Located near Rocket Park. Find the Smith's grocery in White Rock on Sherwood and make a right turn past the small park. The sampler is located straight ahead, just where the road turns to left.
121*	Pajarito Acres (Horse Arena)	From SR 4 turn on Monte Rey North. Turn left on Piedra Loop, drive about 0.1 miles to sampler on right.
124	TA-49	Proceed on SR 4 to the entrance to TA-49 (just past mile marker 52). The sampler is at the entrance to TA-49, in the fenced area left of the main gate.
133*	Bandelier Fire Lookout (near park entrance)	From SR 4, turn into the entrance to Bandelier National Monument. Show your badge at the gate and proceed on to the fire tower lookout on the right. Proceed west on foot until you spot the sampler.
137*	Well PM-1 (E. Jemez Road)	At the end of East Jemez Road (truck route), where it ends at SR 4, turn left onto SR 4 and immediately left again onto a dirt road. Drive 200 ft to the well area. The sampler is located west and outside of the service building.
139	Pajarito Booster 2 (P-2)	Along Pajarito Road, enter turn off for TA-54. There is a large water tank and pump house to the north. The sampler is located near the south east corner of the fence.
148	TA-5 (formerly TA-52, Beta Site)	Turn down the entrance to TA-63 and proceed to the transformer station located on the east side of the road. The sampler is located on the east side of the fence.
149*	48th Street (Twin Tanks Complex)	Off 48th Street off Sandia, inside the fences of the water tanks.

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Station Number	Station Name	Directions
*—Indicates compliance stations. †—Indicates background (regional) stations.		
151*	Royal Crest Trailer Court	Off East Jemez Road, turn into Royal Crest trailer court. Around the back, take the dirt road that goes around the outside (south) of the trailer court. The sampler is in the southern part of the area and is enclosed by a chain-link fence.
157*	Eastgate	On Highway 502 out of Los Alamos, proceed past the airport to the abandoned guard tower on the right, across from DeColores Restaurant. The sampler is near the base of the tower by the fence.
159	TA-54 Area G-1 (northeast corner)	Access to the station by road from Pajarito Road through the “twisp” gate, the back gate for TA-54 that is on the southeast corner of Area G.
160	TA-54 Area G-2 (back fence)	In TA-54, half way down the site along the southern fence. Inside fence, 0.4 mi. From control gate, turn right after Building 54-2, left at Y at 0.2 mi, along fence.
161	TA-54 Area G-3 (by office)	In TA-54, east of the main office building for TA-54. Inside fence, 0.4 mi from control gate on paved road, on west side of pit #38.
166*	McDonalds	South of the McDonald’s on Trinity Drive, south of storage buildings, over the south rim.
167*	White Rock Fire Station	In White Rock on Rover Blvd., across the road from the White Rock Training center, where the old White Rock Fire Station used to be.
168*	White Rock Nazarene Church	Proceed to White Rock down Pajarito Road. Continue straight at the light (intersection of SR 4). The church is on your right. The sampler is located near SR 4 on the north side of the building.
169*	TA-21 Area B	At TA-21, at end of DP Road, on the northwest corner of the gated entrance.
170	TA-54 Area G (by QA)	Enter the controlled area of TA-54. Inside fence, continue on road along north fence about 1.1 mile from control gate.
172*	Los Alamos County Landfill	On East Jemez Road at the County Disposal site, inside the northwest corner of the fence. An access gate is located on the west side of the NW corner of the fence.
173	TA-49-QA (adjacent to # 26)	Next to station #26; At the entrance to TA-49 along SR 4 near Bandelier National Monument, at the entrance to TA-49.
189	TA-54 - Area G/ Southeast Perimeter	In TA-54, in outer perimeter area southeast of the fence.
191	TA-54 - Area G/ North Perimeter	In TA-54, in outer perimeter area north of the fence.
196	Pajarito Road (TA-36)	On Pajarito Road to the east of TA-18, at the old sludge pond site (TA-36).
206*	Eastgate - Backup	Backup station for East Gate (#10); At the abandoned guard tower next to Highway 502, across from DeColores restaurant.
207	TA-54 - Area G - expansion	In TA-54, inside fence, turn right after pit #37, near power pole 2939.

Station Number	Station Name	Directions
*—Indicates compliance stations. †—Indicates background (regional) stations.		
208	TA-54 - Area G - expansion pit	In TA-54, inside fence, from entrance control gate, on paved road 0.4 mile, then dirt road 0.2 mile between domes 54-283 and 54-153, turn left after Pit #37 and Pit #38. Sampler is along the north fence of pit near power pole 2942.
210*	LA Canyon	From Diamond Drive on to West Road, turn left at the bottom of the canyon. Go east about 1 mile. The sampler is on the left side of the road.
211*	LA Hospital	Near the intersection of Trinity Drive and Diamond Drive, east of the LA Medical Center building.
212*	Crossroads Bible Church (formerly Trinity Bible Church)	At the corner of Trinity Drive and Canyon Road. Park on Canyon Rd.
213*	Monte Rey South	In White Rock, near the intersection of SR 4 and Monte Rey South.
223	Urban Park	Turn from Diamond Drive onto Sycamore St. This road meets the south end of Urban Park where sampler is located.
226 <sup>†</sup>	Santa Fe West (Buckman Booster #4)	At Buckman Booster #4 along Camino La Tierra, opposite Salva Tierra entrance, west of Bluejay Dr. intersection.
234 <sup>†</sup>	El Rancho	Travel east from Los Alamos on Highway 502 about 3 miles past Otowi Bridge, turn left into El Rancho, take next right (east) at "T", turn left on first paved road, turn right on gravel road immediately after bridge, go 0.4 miles and turn left just before cottonwood tree with two signs, follow drive to left. Station is by red well house.
248	Jemez Pueblo - Visitor's Center	Take State Road 4 west to the town of Jemez Springs. Continue on SR 4 south to the pueblo.
257*	Los Alamos Inn - South	South of Los Alamos Inn on north edge of Los Alamos Canyon.
262*	TA-3 Research Park	At the northwest corner of the exit of the Los Alamos Fire Station on W. Jemez Road
290*	Los Alamos Airport Road	At the southwest corner of fence surrounding the LA Airport.
291	DP Road - West Entrance (Knights of Columbus Hall)	From Trinity Drive head east along DP Rd. Station is directly east of the Knights of Columbus.
293	San Ildefonso Sacred Land	Enter lower Mortandad Canyon off SR-4 with San Ildefonso personnel. Follow dirt road up onto mesa top. Station is on mesa top across from domes at Area G.
294	San Ildefonso Pueblo Landfill	Use west entrance to San Ildefonso off SR 502, proceed 1 mile, turn left to transfer station. Sampler is on left. Samples are collected by Pueblo personnel.

Station Number	Station Name	Directions
*—Indicates compliance stations. †—Indicates background (regional) stations.		
297	TA-50, MDA-C	Turn off Pajarito Rd. onto the road to Mortandad canyon. Take the first dirt road on the left behind the first trailers on the left. Go down dirt road about 500 ft. Take a left onto a well pad. Station is located outside the south MDA-C fence.
299 <sup>†</sup>	Santa Fe School for the Deaf	In Santa Fe at the corner of St. Francis Drive and Cerrillos Road. Enter school from Cerrillos Road entrance. Sampler is behind school buildings near fence on northeast side of property, toward St. Francis Drive.
300	Picuris Pueblo	Travel N on SR 68 to SR 75, turn right and travel through community of Dixon. Follow signs to Picuris Pueblo (left turn before Penasco). Follow road to administration building and check in; ask for environmental personnel.
302	TA-3	Turn east off Diamond Drive into steam plant parking area. The sampler is located outside the fence.
307*	TA-16 Near S-Site Cafeteria	From East Jemez Road, enter S-Site (TA-16) toward cafeteria. Station is located to the northeast of the cafeteria.
311	LA Airport Runway	From SR 502 enter Airport Rd. Follow toward terminal building. At vehicle gate enter password, pass through heading east beyond hangars to the end of the runway. Do not approach runway at any time, keep far north of the runway.
317*	A15 - West End	From Trinity Drive head east along DP Rd. Station is at end of commercial area on north side of road.
318	East Road Fire Station	Along SR 502(East Rd), about a quarter mile west of Airport Rd on south side of road. Park off SR 502.
319	New Beginnings Church	At corner of SR 502 (East Rd) and Sombrillo Court, on north side of road. Do not park along SR 502.
320	HedgeRow East Rd.	Along SR 502(East Rd), about an eighth mile west of Airport Rd on north side of road. Approach station from service road running parallel to SR 502 on the north. Do not park along SR 502.
326*	DP - Fire Station	From Trinity Drive head east along DP Rd. Station is opposite fire station. Do not stop along DP Road.
327*	DP - Ace	From Trinity Drive head east along DP Rd. Station is opposite Ace Hardware. Do not stop along DP Road.
328*	DP - Monitor	From Trinity Drive head east along DP Rd. Station is opposite L A Monitor. Do not stop along DP Road.
329*	A15 - West Center	From Trinity Drive head east along DP Rd. Station is 100m beyond end of commercial area on the north side of the road.
330*	A15 - East Center	From Trinity Drive head east along DP Rd. Station is 200m beyond end of commercial area on the north side of the road.
331*	A15 - East End	From Trinity Drive head east along DP Rd. Station is 300m beyond end of commercial area on the north side of the road.

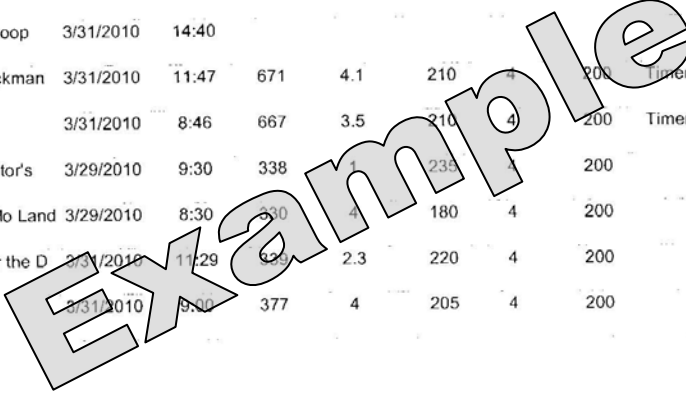
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Station Number	Station Name	Directions
*—Indicates compliance stations. †—Indicates background (regional) stations.		
344	Hilltop House	Station is located east of the Hilltop House Hotel near the intersection of Trinity Dr. and Central, in the grassy area in front of the hotel.
345	Canyon School	Near the intersection of SR-502 and Central, east of the Canyon Complex on the fence line of the south parking lot.
347	Airport Hangers	Just east of the eastern most hanger at the Los Alamos Airport.
348	State Road 502/Mid-Runway	On the north side of state Road 502 about Mid way down the LA Airport Runway.

<b>ATTACHMENT 2</b>	
<b>SOP-5143-2 Example of Air Monitoring Field Data Form and Chain of Custody Record</b>	<b>Records Use Only</b>  

Meteorology and Air Quality Group  
**Air Monitoring Field Data Form and Chain-of-Custody Record**  
**AIRNET Sample Collection**

Sample collection loop: <b>Valley</b>		Sample matrix: <b>Filters</b>								See cover letter for analyses requested.
Field Sample ID number	Station name	Date Collected	Time Collected	Timer reading	End Filter Flow	End Gel Flow	Start Filter Flow*	Start Gel Flow*	Comments	
100329.116	Espanola	3/31/2010	12:36	674	2.9	230	4	200	Timer not reset	
100329.183	Trip Blank - Valley Loop	3/31/2010	14:40							
100329.226	Santa Fe West (Buckman Bo	3/31/2010	11:47	671	4.1	210	4	200	Timer not reset	
100329.234	El Rancho	3/31/2010	8:46	667	3.5	210	4	200	Timer not reset	
100329.248	Jemez Pueblo - Visitor's	3/29/2010	9:30	338	1	235	4	200		
100329.294	San Ildefonso Pueblo Land	3/29/2010	8:30	330	4	180	4	200		
100329.299	Santa Fe School for the D	3/31/2010	11:29	625	2.3	220	4	200		
100329.300	Picuris Pueblo	3/31/2010	9:00	377	4	205	4	200		



Relinquished by (print and sign)	Date Time	Relinquished by (print and sign)	Date Time	Relinquished by (print and sign)	Date Time	Relinquished by (print and sign)	Date Time
Received by (print and sign)		Received by (print and sign)		Received by (print and sign)		Received by (print and sign)	

Sampers (print names and initial): \_\_\_\_\_

\* Start flows recorded at this date and time apply to the next sample, not current sample.



**ATTACHMENT 3**

**SOP - 5143 - 3 Example of AIRNET Shipping Letter** Records Use Only



Date: Wednesday, April 07, 2010

Period ID: 100412

**Los Alamos  
NATIONAL LABORATORY**

ATTN: Julie Ellingson  
Paragon Analytics, Inc.  
225 Commerce  
Fort Collins, CO 80524

Please analyze the enclosed samples as indicated:

These samples are on:

Ship Date: 04/07/2010  
Turn Around Time: 30 days  
RAD Screening: Not Required


Project Cost Code: WEPR 1312 0300

LANL Contact Signature:

**Clumps, Samples and Screening Data for BiWeekly AIRNET Filter Samples**

Page 1 of 3

Sample #	Included in shipment	Maximum 2005 Activity			Collection Date	Time
		Alpha	Beta	Total Units		
<b>ClumpSampleID: 100412.C20</b>						
100412.183		0.0054	0.0062	0.012	nCi/sample	
100412.184		0.0031	0.0046	0.008	nCi/sample	
100412.228		0.0028	0.0052	0.001	nCi/sample	
100412.229		0.0063	0.0086	0.001	nCi/sample	
100412.230		0.00108	0.0012	0.002	nCi/sample	
100412.270		0.0016	0.002	0.004	nCi/sample	
100412.271		0.00046	0.00098	0.001	nCi/sample	
100412.272		0.0029	0.0016	0.005	nCi/sample	
<b>ClumpSampleID: 100412.CC</b>						
100412.119		0.0027	0.049	0.052	nCi/sample	
100412.121		0.0028	0.088	0.091	nCi/sample	
100412.133		0.0025	0.092	0.094	nCi/sample	
100412.167		0.0038	0.092	0.096	nCi/sample	
100412.168		0.0025	0.096	0.098	nCi/sample	
100412.213		0.0025	0.086	0.089	nCi/sample	
<b>ClumpSampleID: 100412.CD</b>						
100412.114		0.0052	0.044	0.049	nCi/sample	
100412.157		0.0029	0.046	0.049	nCi/sample	
100412.206		0.0056	0.1	0.106	nCi/sample	
100412.311		0.0042	0.048	0.052	nCi/sample	
100412.347		0.0022	0.088	0.090	nCi/sample	
100412.348		0.0052	0.088	0.093	nCi/sample	

ATTACHMENT 3	
<b>SOP-5143-3 Example of AIRNET Shipping Letter</b>	Records Use Only 

**Clumps, Samples and Screening Data for BiWeekly AIRNET Filter Samples**

Sample #	Included in shipment	Maximum 2005 Activity			Units	Collection Date	Time
		Alpha	Beta	Total			
<b>ClumpSampleID: 100412.CE</b>							
100412.112		0	0	0.000	nCi/sample		
100412.149		0.0048	0.084	0.089	nCi/sample		
100412.166		0.0048	0.048	0.053	nCi/sample		
100412.172		0.0026	0.096	0.099	nCi/sample		
100412.210		0.0056	0.084	0.090	nCi/sample		
100412.211		0.0052	0.088	0.093	nCi/sample		
100412.223		0	0	0.000	nCi/sample		
100412.257		0.0026	0.094	0.097	nCi/sample		
100412.262		0.0026	0.094	0.097	nCi/sample		
100412.302		0	0	0.000	nCi/sample		
<b>ClumpSampleID: 100412.CG</b>							
100412.159		0.0006	0.106	0.112	nCi/sample		
100412.160		0.0007	0.092	0.099	nCi/sample		
100412.161		0.0056	0.092	0.098	nCi/sample		
100412.170		0.0058	0.1	0.106	nCi/sample		
100412.189		0.0052	0.082	0.087	nCi/sample		
100412.191		0.0054	0.096	0.101	nCi/sample		
100412.196		0.0022	0.047	0.049	nCi/sample		
100412.207		0.0029	0.048	0.051	nCi/sample		
100412.208		0.0054	0.096	0.101	nCi/sample		
<b>ClumpSampleID: 100412.CH</b>							
100412.124		0.0042	0.094	0.098	nCi/sample		
100412.137		0.0035	0.043	0.047	nCi/sample		
100412.139		0.0054	0.096	0.101	nCi/sample		
100412.148		0.0044	0.09	0.094	nCi/sample		
100412.151		0.0028	0.048	0.051	nCi/sample		
100412.173		0.004	0.043	0.047	nCi/sample		
100412.297		0.0042	0.084	0.088	nCi/sample		
100412.307		0.0025	0.088	0.090	nCi/sample		
<b>ClumpSampleID: 100412.CK</b>							
100412.116		0.0052	0.047	0.052	nCi/sample		
100412.226		0.0046	0.084	0.089	nCi/sample		
100412.234		0.004	0.076	0.080	nCi/sample		
100412.248		0.0052	0.086	0.091	nCi/sample		
100412.294		0.0028	0.128	0.131	nCi/sample		
100412.299		0.005	0.098	0.103	nCi/sample		
100412.300		0.005	0.086	0.091	nCi/sample		

**ATTACHMENT 3: EXAMPLE OF AIRNET SHIPPING LETTER**

**SOP-5143-3 Example of AIRNET Shipping Letter**

Records Use Only



**Clumps, Samples and Screening Data for BiWeekly AIRNET Filter Samples**


Page 3 of 3

Sample #	Included in shipment	Maximum 2005 Activity			Units	Collection	
		Alpha	Beta	Total		Date	Time
<b>ClumpSampleID: 100412.CT</b>							
100412.169		0.0029	0.04	<b>0.043</b>	nCi/sample		
100412.317		0.0027	0.046	<b>0.049</b>	nCi/sample		
100412.326		0.0026	0.04	<b>0.043</b>	nCi/sample		
100412.327		0.0022	0.052	<b>0.054</b>	nCi/sample		
100412.328		0.0027	0.05	<b>0.053</b>	nCi/sample		
100412.329		0.0018	0.054	<b>0.056</b>	nCi/sample		
100412.330		0.0022	0.052	<b>0.054</b>	nCi/sample		
100412.331		0.0029	0.05	<b>0.053</b>	nCi/sample		
100412.346		0.0000	0.0001	<b>0.000</b>	nCi/sample		
<b>ClumpSampleID: 100412.CW</b>							
100412.212		0.0029	0.1	<b>0.103</b>	nCi/sample		
100412.290		0.0029	0.047	<b>0.050</b>	nCi/sample		
100412.291		0.0029	0.106	<b>0.109</b>	nCi/sample		
100412.318		0.0029	0.092	<b>0.095</b>	nCi/sample		
100412.319		0.0066	0.053	<b>0.060</b>	nCi/sample		
100412.320		0.0027	0.098	<b>0.101</b>	nCi/sample		
100412.344		0.0066	0.098	<b>0.105</b>	nCi/sample		
100412.345		0.0052	0.088	<b>0.093</b>	nCi/sample		
<b>5 EXTRA Blanks for lab use:</b>				<b>Total # Samples sent for Chemical Analysis: 71</b>			

Note: Activity Per Gram shipped = (Sum[MaxTotal Activity])/((SumOfSampleWeights))

$$= 5 / ( 71 ) = 0.07 \text{ nCi/g}$$

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ATTACHMENT 4	
<b>SOP-5143-1 Example of AIRNET Shipping Checklist</b>	Records Use Only 

AIRNET Shipping Checklist	This form is from SOP-5143
Sample ID:	Initials
Check shipment date on cover letter (2 locations)	
Check that the number of actual samples match the number indicated on the agreement	
Check that the number of actual samples match the number indicated on the letter	
Check that the sample set on chain-of-custody matches the sample set on the letter	
Check that all the samples marked with an "X" are on the chain-of-custody form or denoted "No Sample"	
Check that the number of samples on the chain-of-custody equals the number of actual samples	
Count the sample boxes of samples to be shipped. Be sure they equal the number indicated on the agreement. Sign the Agreement if it looks good.	
For the filter set, ensure the actual clumps to be shipped are listed on pp. 3 and 4 of the letter. For the silica gel shipment, ensure the data file was created and submitted to the analytical laboratory.	
Check that sample IDs match chain-of-custody field ID sample numbers	
Look over chain-of-custody forms and make any necessary changes (initial all changes)	
Check for all signatures on the Chain-of-Custody forms, note shipping prep shipping completed	
Make two copies of chain-of-custody forms; ensure any changes or corrections are on both copies	
For filters, include an extra set of sample ID labels	
Note tracking of shipment in Microsoft Access database	

After completion, file this checklist in the local files for 1 year. This checklist is not a permanent record.