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Next Review Date: 4/17/2014

## Environmental Programs Directorate

### Standard Operating Procedure

for **AIRNET—TECHNICAL EVALUATION OF DATA AND  
CALCULATED AIR CONCENTRATIONS**

**APPROVAL SIGNATURES:**

<b>Subject Matter Expert:</b>	<b>Organization</b>	<b>Signature</b>	<b>Date</b>
Andrew Green	WES-EDA	Signature on File	4/6/2009
<b>Responsible Line Manager:</b>	<b>Organization</b>	<b>Signature</b>	<b>Date</b>
Craig Eberhart	WES-EDA	Signature on File	4/6/2009

## 1.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) states the responsibilities and describes the evaluation of AIRNET field data, laboratory analytical data, and calculated air concentration data for acceptance, qualification, or rejection for the Los Alamos National Laboratory (LANL) Waste and Environmental Services Division (WES)

All WES participants shall implement this procedure when evaluating AIRNET data.

## 2.0 BACKGROUND AND PRECAUTIONS

### 2.1 Background

Data calculated from field data and analytical results gives measurements of air concentrations of isotopes or elements of interest. The reviewer following this procedure places the values in operational context. High values in places where background values are expected are noted and at times investigated. The reviewer may reject or qualify data. The review produced by this procedure is a professional best judgment of the significance of the derived concentrations.

### 2.2 Precautions

None

## 3.0 EQUIPMENT AND TOOLS

None

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## 4.0 STEP-BY-STEP PROCESS DESCRIPTION

### 4.1 Technical Review of Field and Analytical Lab Data

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1. Overview of AIRNET data flow:
    - AIRNET field data are collected according to WES SOP 5143, AIRNET – Environmental Sampling of Airborne Radionuclides, and WES SOP 5144, AIRNET – Sampling of Ambient Airborne Tritium..
    - Field data are reviewed, corrected, and uploaded into the computer system according to WES SOP 5149, AIRNET – Management of Field Data.
    - Samples are analyzed at the analytical labs which return the data electronically.
    - The analytical chemistry data are uploaded into the AIRNET database and checked according to WES SOP 5141, AIRNET – Analytical Chemistry Data Management and Review.
    - Air concentrations are calculated and a report is prepared for technical review.
    - This technical review of data is performed according to this procedure.
    - Any required changes are documented and sent to the AIRNET data manager who makes the needed changes according to WES SOP 5141 and copies the complete verified and validated data set to the main database archive tables for further use.
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2. Purpose of technical review:

- The technical review process provides concurrence with the decisions already made by the field personnel and the analytical chemistry coordinator about whether data meet the data quality objectives specified in the AIRNET Sampling and Analysis Plan (WES SOP 5140).
- When the data are ready for this technical review, all data will have been evaluated for one of three outcomes: accept, qualify, or reject.
- This technical review will confirm or modify these data qualifiers.
- For qualified and rejected data, an explanation must be included for the appropriate record in the database.
- This technical review also evaluates abnormally high/low results, data reasonableness, and consistency.
- As needed, investigations are done to resolve or explain such results.

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3. Using negative values:

- Use all environmental data with negative values in calculations to obtain the best estimate of the true value (DOE/EH-0173T). For a full explanation of this statistical principle, see memo ESH-17:95-384.

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4. Using data reported with values less than MDL:

- Analytical values should be reported even if the result is below the published laboratory detection limit (MDL), since the background count is usually some positive value. Reported values that are less than the detection limit require professional evaluation to decide their interpretation. Statistically, these results have a low level of confidence associated with them and actions and decisions based on such data may not be warranted. When concentration summaries are generated, the results that are reported in such summaries should identify the number of samples below the MDL or the minimum detectable activity [MDA]) that were included in the summary.
- When data are reported as “less than” or “below minimum detectable level/activity,” that is, when an actual value is not presented, do not assume the concentration is zero. Estimate the distribution using a published methodology such as that suggested in “Guidance for Data Quality Assessment” (EPA QA/G 9R, EPA QA/G 9S).

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5. Obtain data report:

- The AIRNET data manager will provide a review package of field and analytical data, calculated air concentrations, runtime and completeness calculations, and quality control checks for technical review. If possible, use the electronic copy of the technical review sheet (shown in Attachment 1) that is accessed from the QC\_HP Review Memo form within the AIRNET database. Consult the AIRNET Database On-Line Help or the AIRNET Database Users Guide for details.
  - An acceptable alternative is to write a memorandum documenting your review. (Memoranda were used to document technical reviews through most of 2002.) Use the data review package and other relevant information to evaluate the data and, using best professional judgment, recommend any needed modifications to the database.
  - The following steps describe the technical review process and assume that the technical review sheet is used. Review sheet entries should be typed.
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6. Evaluate concentrations that exceed action levels:
  - At the top of the technical review sheet, type in the sample period in the standard numbering format used for AIRNET. Also enter the data type (e.g., biweekly alpha/beta, tritium, gamma, quarterly isotopic). Abbreviations (e.g., A/B, H-3, B/W, Qtrly Comp) may be used. Using Part 1, determine which air concentrations exceed action levels given in WES SOP 5142. A summary of these results normally will be printed on an attachment to the review package. If the summary is not attached, scan the report for the flagged values. Evaluate all concentrations that exceed action levels to determine whether they are consistent with historical measurements, contemporaneous measurements, or known releases. Type your findings in the "Discussion" part of the section or attach them to the technical review sheet. If you include attachments of your own, refer to the attachments in the "Discussion."
  - In some cases, the reviewer may decide that a formal memorandum describing the investigation is appropriate. If so, also reference that memo on the review sheet. If the investigations are not complete or causes cannot be identified before the technical review is finished, the Environmental Air Monitoring Project Leader may assign a person to lead additional investigations.
  - In all parts of the form, make some kind of entry. Enter "None" if there is no discussion.

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7. Review calculated air concentrations:
  - Using Part 2 of the review sheet, review all of the calculated ambient air concentrations. A summary of these results may be attached to the review package. If the summary is not attached, scan the report for the values. If any values that do not exceed high or low action levels still appear to be unexpectedly low, high, or inconsistent, use best professional judgment to decide if investigations and/or further amendments to the database are necessary. Document your review in the "Discussion" part of the section.
  - Note that, for gamma analyses, this section looks at abnormally high, low, or inconsistent MDAs, since any value exceeding MDA would already be flagged in the previous review section. Furthermore, gamma results below MDA are reported as a "less than" instead of the actual "measured" value.
  - In all parts of the form, make some kind of entry. Enter "None" if there is no discussion.

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8. Using beta activity as an indicator of sampler operation:
  - Wherever included in the data set, beta activity may indicate whether samplers are operating properly. The beta concentration should be consistent from site to site during a given sampling period and can be used to assess proper sampler operation. For example, if the end flow value is assumed to be zero due to a pump failure and the beta activity appears too elevated for that flow, it may be appropriate to assume that the sampler operated at a constant or normal flow until failure. Any beta inconsistencies should also be discussed under Part 2 of the review sheet.

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9. Evaluate the field and analytical data:
  - Each data element has a nominal value with a range of acceptable values. If the element is outside its range of normal values, or if other abnormal conditions are identified, the record is identified as "qualified" or "rejected" during the data evaluation steps of WES SOP 5149 or WES SOP 5141. "Rejected" data are those that are considered unusable for some reason. A summary of these qualified and rejected results normally will be attached to the review package. If not, scan the report for the flagged values.
  - Using Part 3 of the review sheet, review the qualified and rejected data. Also review the entire data package for other results that may need to be qualified or rejected. For example, abnormally high or low tritium collection or recovery efficiencies may indicate the need to qualify that data. In some cases, the review package may contain a special data report (such as the tritium collection/ recovery efficiencies) to assist in your review.

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- 9.
- Use best professional judgment to decide if any new or amended qualified/rejected changes in the database are necessary. For example, if a timer reading is missing, the correct timer reading could be determined by calculating the hours between the sample collection times, provided the station was otherwise operating properly. If field data are changed in any manner, these changes should be confirmed with the field personnel and explanations of the change(s) added to the database comment field. Qualified records will maintain their qualified status unless they are rejected. Rejected records may only be changed to qualified records.
  - Document your findings and recommendations in the “Discussion” area of Part 3. If you include additional attachments, refer to them in the “Discussion.” Provide an explanation for entry in the database for each amended record.
  - In all parts of the form, make some kind of entry. Enter “None” if there is no discussion.
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10. Cross check quarterly volume for composite results:

If you are evaluating quarterly composite data, review the air volume summary provided with the quarterly concentration and resolve qualified values. Cross check the internal and external chain-of-custody documentation to determine the number of filters composited (since there are usually 25 samples in a year, there will be three quarters with 6 filters, and one quarter during the year with 7 filters). In case the number of filters deviates from the quarter’s norm, ensure that the correct set of volumes was used in the summary. Using Part 3, specify if qualified values are valid and acceptable, or should be rejected, based on this volume review. Document the justification for any rejections.

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11. Evaluation of gamma data:

The gamma data are measured on “clumps” of filters, which are filters grouped together from similar locations such as the AIRNET sampling sites at TA-21. This clumping improves the detection limits and allows for individual filter measurements if unexpectedly high concentrations are present. Review the gamma data and investigate any air concentrations where:

- The calculated “less than” concentration is above the 0.5 mrem concentration or
- The naturally occurring gamma emitters (Be-7 and Pb-210) are inconsistent from clump to clump.

Document findings and recommendations under “Discussion” in Part 3.

This special gamma criteria review does not apply to experimental or temporary AIRNET samplers that are not part of the routine filter clumping and analysis process.

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12. Verification & validation of absolute humidity data during tritium review:

Weekly mean values for absolute humidity for the sampling period are sent from the WES Meteorology team to the AIRNET data manager via email, and are then manually entered into the AIRNET database. Original emails will be attached to each tritium QC memo and the database contents will appear on the bottom of the Tritium Collection and Water Recovery report. Verify that the emailed value and manually entered records in the database agree and that the mean value has been correctly calculated.

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13. Other observations:

- If, during your review of the entire data package, you observe any other items that may affect the quality of the data, document those items under Part 4, “Other technical reviewer observations.”
- In all parts of the form, make some kind of entry. Enter “None” if there is no discussion.

14. Reporting questionable data:

Consult with the responsible project leaders and group management regarding the use or qualification of any data with excessive qualifiers, large uncertainties, or numerous estimated values.

15. Specify actions to be taken:

- On the review sheet (or an attachment or other equivalent document such as a memo), compile your findings, changes, and amendments to be made in the AIRNET database. Enter any actions to be taken in Part 5 of the review sheet. If additional investigations are necessary, consult with appropriate project leaders and identify the proposed responsible person in Part 5.
- In all parts of the form, make some kind of entry. Enter “None” if there is no discussion.

Save the edited review document file.

16. Complete review:

- Print a copy of the electronic form. Sign, print your name, and date the reviewer’s line in Part 6. Return the entire data package to the AIRNET Data Manager. The AIRNET Data Manager will make any needed changes in the database as specified in Part 5, sign off in Part 6 of the sheet, and forward the data package to the Records Coordinator.

## 4.2 Evaluation of Sampler Run Time and Data Completeness

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1. Requirements for run time:

- The FFCA stations must meet 95% run time per calendar year. The WES goal is to achieve 90% run time for all other stations. (See “Completeness” in the AIRNET sampling and analysis plan, WES SOP 5140.)

2. Requirements for completeness:

- FFCA data must meet 80% annual completeness requirements (see “Completeness” in the AIRNET sampling and analysis plan, WES SOP 5140). The WES goal is to achieve 80% sample completeness for all samplers. For biweekly results, 80% sample completeness corresponds to no more than 5 individual samples lost, rejected, or not analyzed during a calendar year at any individual AIRNET station.

3. Periodically evaluate run time and completeness:

- Periodically during the year, review the run-time and completeness calculations. If it appears that the annual requirements for run time and completeness will not be met, notify the appropriate project leader(s) and document this potential problem on one of the review sheets for the sample period.

4. Determine run time and completeness:

- As part of the evaluation of the last biweekly sample period for a calendar year, evaluate whether the run-time and completeness requirements were met. If they were not met, notify the appropriate project leader. This information may be entered in Part 4 of the review sheet or issued as a separate memo.

### 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.

### 5.0 DEFINITIONS

N/A

### 6.0 PROCESS FLOW CHART

N/A

### 7.0 ATTACHMENTS

Attachment 1 Technical Review of AIRNET Data (1 page)

### 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	1/3/96	New document.
1	11/4/99	Major changes to mesh with ESH-17-216; data evaluation steps modified; title and scope narrowed to biweekly data.
2	7/31/97	Major changes to reflect new data management steps and responsibilities; sections moved to chemistry data management procedures and to ESH-17-216.
3	3/20/03	Eliminated procedure 223 for review of quarterly composites and integrated requirements with this procedure. Added review sheet to replace memos. Changed procedure steps to describe use of review sheet and clarify and update review steps. Added V&V of absolute humidity data.
0	4/7/2009	New document number and reformatted for WES division. Formerly RRES-MAQ-251.

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

**ATTACHMENT 1: TECHNICAL REVIEW OF AIRNET DATA**

**SOP - 5148 - 1**

**TECHNICAL REVIEW OF AIRNET DATA**

Records Use only



**Sample period:**

**Data type:**

**Part 1: Evaluate concentrations exceeding action levels**

Discussion:

**Part 2: Review abnormally high/low/inconsistent results within action levels**

Discussion:

**Part 3: Evaluate field and analytical data**

Discussion:

**Part 4: Other technical reviewer observations**

Discussion:

**Part 5: Actions to be taken**

Discussion:

**Part 6: Signatures**

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Reviewer signature (Review complete)

\_\_\_\_\_  
Name (print)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Data Manager signature (Actions taken)

\_\_\_\_\_  
Name (print)

\_\_\_\_\_  
Date

Example