EVALUATION OF NONRADNET PARTICULATE MATTER DATA AND CALCULATED AIR CONCENTRATIONS

Purpose

This Meteorology and Air Quality Group (MAQ) procedure describes the steps to evaluate the NonRadNet field, laboratory, and analytical data for acceptance, qualification, or rejection, and to evaluate calculated air concentrations.

Scope

This procedure applies to the evaluation, interpretation, and reporting of the field and laboratory inorganic and particulate matter (PM-2.5, PM-10 and total) analytical results and calculations from the samples collected by the NonRadNet system.

In this procedure

This procedure addresses the following major topics:

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Hazard Control Plan

The hazard evaluation for this work is given in HCP-MAQ-Office Work.

Signatures

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Approved by: Terry Morgan, QA Officer	Date: 6/27/02
Work authorized by: Jean Dewart, MAQ Acting Group Leader	Date: 6/27/02

General information about this procedure

Attachments

This procedure has the following attachment:

Number	Attachment Title	No. of pages
1	Example of Technical Review Memo	2
2	Sample page from a TEOM data review report	1

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	7/2/02	New document.

Who requires training to this procedure?

The following personnel require training before implementing this procedure:

- technical staff member(s) assigned to evaluate NonRadNet data
- staff member(s) assigned to maintain the NonRadNet portion of MAQ's MS® Access database.

Training method

The training method for this procedure is **self-study** ("reading") and is documented in accordance with the procedure for training (MAQ-024).

General information, continued

Definitions specific to this procedure

TSP: total suspended particulate material.

PM-10: particulate matter with diameters of 10 microns or less.

PM-2.5: particulate matter with diameters of 2.5 microns or less.

Inorganics: any stable element on the periodic table of the elements

TEOM: Tapered Element Oscillating Microbalance. This instrument draws ambient air through a filter that is continuously weighed, giving real-time mass concentrations.

References

The following documents are referenced in this procedure:

- MAQ-NonRadNet, "Sampling and Analysis Plan for the Radiological Air Sampling Network (NonRadNet)"
- MAQ-024, "Personnel Training"
- MAQ-026, "Deficiency Reporting and Correcting"
- MAQ-033, "Analytical Chemistry Data Review and Archiving"
- MAQ-036, "Preparing Statements of Work for Procuring Analytical Chemistry"
- MAQ-224, "Air Sampling Using The Volumetric Air Samplers"
- MAQ-249, "Collecting Ambient VOC Samples"
- Memo ESH-17:95-384, "Statistical Analysis of Environmental Data With Negative Values," Craig Eberhart to Distribution, May 19, 1995
- DOE/EH-0173T, "Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance," January 1991
- EPA QA/G-9, "Guidance for Data Quality Assessment"

Note

Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Technical review of field and analytical lab data

Overview of NonRadNet data flow

NonRadNet field data are collected according to MAQ-249 or MAQ-224. Field data are reviewed, corrected, and uploaded into the computer system. Total suspended particulate matter (TSP) determinations are done in the MAQ laboratory at TA-54 according to MAQ-224. Following the TSP measurement, filter samples are analyzed at a commercial analytical lab (according to Statements of Work prepared according to MAQ-036), which return the data electronically. The analytical chemistry data are uploaded into the NonRadNet database and checked according to MAQ-033. Air concentrations are calculated and a report is prepared for technical review. This review of 12-day sampling data is performed according to this procedure. Any required changes are documented and sent to the NonRadNet data manager and/or the field sampling technician, who make the needed changes according to MAQ-033 and copies the complete verified and validated data set to the main database archive tables for further use.

Purpose of technical review

The technical review process determines whether data meet the data quality objectives specified in the NonRadNet Sampling and Analysis Plan (MAQ-NonRadNet). 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 in the "Comment" field for the appropriate record in the database.

Use of negative values

Use all environmental data with negative values in calculations in order 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.

Technical review of field and analytical lab data, continued

Use of data reported with value less than MDL

Reported values less than the minimum detection limit (MDL) require professional evaluation to decide how to interpret. 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 concentrations summaries are generated, the results reported in such summaries should identify the number of samples below the MDL that were included in the summary.

When data are reported as being "below minimum detectable level" (when an actual value is not presented), do not assume the concentration to be zero, but estimate the distribution using a published methodology such as suggested in "Guidance for Data Quality Assessment" (EPA QA/G-9).

Obtain data report

The **NonRadNet data manager** provides field and analytical data, calculated air concentrations, sampling and analytical completeness determinations, analytical method comparisons, and quality control checks for technical review. Use this output and other relevant information to evaluate the data and, using best professional judgement, recommend any needed modifications to the database. The following steps describe the checks to make on the data.

Review of chemistry QC data

Review the QC memo prepared by the analytical chemist and database manager supporting this program. This memo is usually delivered in the form of an MAQ Group Internal Memo. Specifically examine the cover memo and summary table for any recommendations or action items. Also monitor the LCS recoveries, blank consistencies, and data comparability between analytical methods. Review the sampling and analytical completeness determinations. If it appears that the annual requirements for these parameters will not be met, notify the appropriate project leader(s) and document this potential problem in the technical review memorandum.

Technical review of field and analytical lab data, continued

Evaluate TEOM data completeness, consistency, and usability

Using a specially developed software application, summarize 13 days of PM-2.5 and PM-10 data, centered about the day of TSP filter collection (see attachment 2). Look for missing data, negative or zero data that significantly impact the 24-hour averages, and ensure that all data V&V has been completed. Use best professional judgement to decide if any amendments to the database are necessary. Also identify any additional records that may be "qualified" or "rejected." Make a usability determination regarding these particulate matter data. PM-2.5 data should be rather uniform in concentration and within a range of 2 – 10 µg/m3. Significant deviations require careful inspection of field equipment to ensure it is properly calibrated and performing as designed.

Evaluate TSP data consistency and compare with PM-10

Examine the consistency of this period's TSP data with historical data taken in the mid 1980s in Los Alamos and White Rock. Compare each site's TSP with corresponding PM-10 taken during the same time period. PM-10 is expected to constitute 50 – 75 % of the TSP.

Review and evaluate calculated air concentrations

Review all of the calculated ambient air concentrations. Since there are no formal investigation or alert levels as have been determined for AIRNET, concentrate on values that are > 3s beyond historical data. Use best professional judgment to decide if investigations, changes to field sampling protocols and/or further amendments to the database are necessary. Plot as many elements' data as needed to visually evaluate the significance of any large concentration excursions from the norm. There are expected to be seasonal variations, and proper evaluation of these requires several years of data collection.

Review elemental ratios

Elemental ratio techniques are well known for eliminating the seasonal variations observed in TSP (and therefore net air concentrations of individual elements) and concentrating attention of relative differences in the chemistry of the particulate material samples. Print MS Access report provided for elemental ratio evaluation and examine it carefully for significant departures from observed mean values. If comparable data for local soils are available, compare those elemental ratios to those observed in this sampling period's inorganic data.

Technical review of field and analytical lab data, continued

Evaluate the field and analytical data

Evaluate whether all field and analytical data have undergone validation and verification (V&V).

- If the record is "qualified" or "rejected," perform further review using best professional judgment to decide if further amendments to the database are necessary.
- If field data are changed in any manner, these changes should be confirmed with the field personnel and explanations of the change(s) must be added to the database comment field. Also confirm changes with the chemistry coordinator since changes to field data can often affect analytical data.
- If analytical data are changed in any manner, these changes should be confirmed with chemistry data management personnel and explanations of the change(s) must be 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. Provide an explanation in the database for each amended record. List the amendments to be made for inclusion in a memo.

Complete review

Compile the changes and amendments to be made to the NonRadNet database resulting from these review actions (above) in a "Technical Review of NonRadNet Nyymmdd Inorganic Data and concurrent Particulate Matter (TSP, PM-10 and PM-2.5) Data" Internal memo (Attachment 1) to NonRadNet field personnel, chemistry data manager and other project staff. If additional investigations are necessary, consult with appropriate project leaders and identify the proposed responsible person in the memo. Print cover memo, attach all tables and plots used in this technical review, copy and distribute memo. Enter date of technical review into the Tracking_ChemData table within the AIRNET database using the appropriate button on the NonRadNet_TechReview form.

Annual evaluation of run time and completeness

Requirements for sampling completeness

There are no federal or state regulatory requirements for this program. The Meteorology and Air Quality group's goal is to achieve 90% sampling success for all stations in this program. (See "Completeness" in the NonRadNet sampling and analysis plan, MAQ-NonRadNet.) Since there are approximately 30 of the "12-Day" sampling periods per calendar year, this approximately corresponds to no more than 3 samples per station lost per year.

Requirements for analytical completeness

There are no federal or state regulatory requirements for this program. The Meteorology and Air Quality Group's goal is to achieve a minimum of 90% analytical success for all valid samples submitted to the analytical lab in this program. (See "Completeness" in the NonRadNet sampling and analysis plan, MAQ-NonRadNet.) Since there are approximately 30 of the "12-Day" sampling periods per calendar year, this approximately corresponds to no more than 3 samples per station that can fail to be chemically analyzed per year.

Determine sampling and analytical completeness

As part of the QC evaluation that is performed on each analytical EDD received from the analytical lab, evaluate whether the sampling and analytical completeness requirements continue to be met. In the event that they were not met, prepare a deficiency report according to MAQ-026 and notify the appropriate project leader(s).

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be submitted **within three weeks after generation** as records to the records coordinator:

- technical evaluation memo to field sampling personnel and/or NonRadNet data manager listing changes to be made to database

Click here to record “self-study” training to this procedure.

EXAMPLE OF TECHNICAL REVIEW MEMO

Meteorology and Air Quality Group Internal Memo

To: NonRadNet File

From: Ernie Gladney, MAQ

Date: 5 June 2002

Subject: Technical Review of NonRadNet N020414 Inorganic Data and concurrent Particulate Matter (TSP, PM-10 and PM-2.5) Data

*My professional opinion is that these inorganic and particulate matter data **meet the data quality objectives** of NonRadNet Sampling and Analysis Plan, **are under analytical control** and **appear to be representative of ambient conditions**, based upon the reviews and inspections below.*

Review performed	Status and Comments
Examine QC memo to monitor the following issues: 1. LCS recoveries 2. Blank consistency 3. Data comparability where both analytical methods were used 4. Action items identified by the chemist	Initial Data Quality Review attached. Inspection conducted. No additional issues identified. **SOW targets need to be revised in database to reflect new SOW-23-R1 values.** **Copper contamination requires further action. I recommend deleting it from our measurement program.**
Compare PM-10 and PM-2.5 for consistency and data usability in TEOM database.	Inspection report attached. **No PM-10 yet in operation at station 81.** 48 data points available for all days for all samplers, for a total of 3120 data points. **Only 1 measurement is zero and 11 are negative.** Field V&V is complete, there are 6 rejected data and all have comments. **All 24-hour averages should be usable.**
Historical consistency of TSP: 1984 – 1989 data at West Road, LA, and the WR Sewage Treatment Plant show means of 18-30 and a maximum of 150 ug/m3.	The current stations range from 14 to 83**. These are consistent with past history. However the WR site has been significantly elevated for several sampling periods now. This site may not be representative.**
Compare measured TSP to PM-10 on sampling date (expectation is that PM-10 should represent about 50 – 75% of TSP)	Report attached. Two sites have PM-10. This week's PM-10 is within expectations for LA Hospital (71% of TSP), but below expectations in WR, comprising only 22 % of the TSP.
Consistency of PM-2.5 (Should be fairly constant; similar to Bandelier which reports values of 3 – 4 ug/m3)	Data are uniform at all stations throughout period. Range is 6 – 11 ug/m3, comparable to but consistently higher than Bandelier.
Compare current elemental ratios to existing history at each site	Report attached. All are within $\pm$ 2s of historical data.

Review performed	Status and Comments
Compare TSP to net air conc for common rock forming elements (Ba, Ce, Fe, Mn, Sr)	Planned enhancement.
Trend plots	**Complete set of plots attached.** Note especially the TSP (last two plots) which clearly illustrate the impact of changing filter types in Jan. 2002.

Further actions required or recommended: **Copper contamination requires further action. I recommend deleting it from our measurement program. MDL requirements in database table need to be revised against the newly issued revision, SOW-23-R1.**

Xc: Craig, Angelique, Tim, Gary; w/attachments

SAMPLE PAGE FROM A TEOM DATA REVIEW REPORT

NonRadNet PM-10 & PM-2.5 QC

PeriodID N020414 06/05/2002

LA Hospital

TEOM-ID	Part Size	Date	24 Hr Ave from all 30 min Data	24 Hr Ave from Positive 30 min Data only	Total # data	# Positive data	# Zero data	# Negative data	Total # data with V&V	# Qualified	# Rejected
D	10	04/08/200	10.8	10.8	48	48			48		
D	10	04/09/200	13.4	13.4	48	48			48		
D	10	04/10/200	13.9	13.9	48	48			48		
D	10	04/11/200	15.0	15.0	48	48			48		
D	10	04/12/200	18.4	18.4	48	48			48		
D	10	04/13/200	11.3	11.3	48	48			48		
D	10	04/14/200	11.3	11.6	48	47	1		48		
D	10	04/15/200	21.7	21.7	48	48			48		
D	10	04/16/200	25.7	25.7	48	48			48		
D	10	04/17/200	15.5	15.5	48	48			48		
D	10	04/18/200	14.3	14.3	48	48			48		
D	10	04/19/200	22.8	22.8	48	48			48		
D	10	04/20/200	33.5	33.5	48	48			48		
H	2.5	04/08/200	8.8	9.0	48	47	1		48		
H	2.5	04/09/200	8.9	8.9	48	48			48		
H	2.5	04/10/200	6.5	6.5	48	48			48		
H	2.5	04/11/200	7.6	7.8	48	47	1		48		
H	2.5	04/12/200	8.1	8.1	48	48			48		
H	2.5	04/13/200	6.9	6.9	48	48			48		
H	2.5	04/14/200	5.5	5.7	48	47	1		48		
H	2.5	04/15/200	8.1	8.1	48	48			48		
H	2.5	04/16/200	10.0	10.0	48	48			48		
H	2.5	04/17/200	7.0	7.2	48	47	1		48		
H	2.5	04/18/200	6.7	6.9	48	47	1		48		
H	2.5	04/19/200	7.6	7.6	48	48			48		
H	2.5	04/20/200	8.9	8.9	48	48			48		

N020414.6TSP 04/14/200 15.9