

## **APPENDIX A – AMBIENT MONITORING, EMISSION TESTING, AND CONTINUOUS EMISSION AND OPACITY MONITORING**

(The effective date of Appendix A is July 14, 2006.)

### **I. AMBIENT MONITORING**

#### **CRITERIA POLLUTANTS**

##### **(A) METHODS AND EQUIPMENT**

- (1) Sulfur dioxide stations shall employ EPA's automated equivalent method. All other monitors shall be operated and maintained as described in the appropriate Sections of 40 CFR Part 50 and 40 CFR Part 58.
- (2) Sample collection lines and instrument manifolds shall be constructed of Teflon or glass. Residence time in the sampling line shall not exceed 20 seconds.
- (3) Analyzers shall be designated EPA reference or EPA designated equivalent method. Sulfur dioxide monitors shall be operated in the 0 to 1 ppm range.
- (4) A Quality Assurance (QA) manual and a station log book shall be kept for all stations. The station log book shall be used to record all ongoing activities associated with station operation. Upon approval by the NWCAA, electronic log books may be utilized.
- (5) Strip charts shall be used for all monitors unless the data acquisition system is capable of generating trend graphs from one-minute measurement averages. Paperless strip charts are acceptable if configured to store one-minute measurement averages. For sulfur dioxide stations using data acquisition based storage, one-minute data shall be reviewed for possible 5-minute violations.
- (6) All stations shall be operated on Pacific Standard Time (PST).

##### **(B) CALIBRATION**

- (1) Instruments shall be calibrated with National Institute of Standards and Technology (NIST) reference materials or NIST-traceable secondary standards, using standard reference methods and EPA-approved procedures.
- (2) Each instrument shall be calibrated at least once every six (6) months and whenever span or precision checks deviate by more than 10% of the true value or the absolute value of the zero response is equal to or greater than five times the resolution of the monitor (for sulfur dioxide monitors, 0.005 ppm)
- (3) Data precision shall be determined using single point precision checks performed at least once every two (2) weeks. Precision tests are performed by challenging the analyzer with a test gas of known concentration (between 0.080 and 0.100 ppm for sulfur dioxide). Precision data must be within  $\pm 10\%$  of the true value.

- (4) Data accuracy shall be assessed by performance audits and weekly span checks. All continuous analyzers are to be zeroed and spanned at least weekly at 70% to 90% of scale using a test gas of known concentration. Make appropriate calibration adjustments if the analyzer response deviates by more than 10% from the true value.
- (5) All standard materials used for calibrations, precision and span checks shall be recertified every 6 months, or new standard materials shall be used.
- (6) If precision and span checks are conducted at the same time, the precision test shall be conducted prior to any zero and span adjustments.
- (7) Gaseous monitors shall not be zeroed or span checked manually when pollutant levels are detected at more than 50% of any applicable 5-minute or hourly short-term standard. Monitors shall not be zeroed or spanned more than twice a day.
- (8) Written calibration and precision/span check procedures shall be included in the QA manual required under paragraph I(A)(4).

**(C) MAINTENANCE**

- (1) Preventive maintenance for the ambient analyzers and calibration systems shall be performed in accordance with procedures described in the QA manual required under paragraph I(A)(4) and the methods referenced in I(A)(1).
- (2) All scheduled and unscheduled maintenance shall be recorded in the station log book.
- (3) Written preventive maintenance procedures shall be included in the QA manual required under paragraph I(A)(4).

**(D) AUDITING**

- (1) A station audit shall be conducted by the NWCAA at least once per year. The NWCAA audit does not fulfill any requirements specified under I(B).
- (2) The NWCAA audit shall include an assessment of precision/accuracy of the instrument, a review of QA manual and other QA materials, siting parameters and operating procedures, as well as an inspection of the station log for maintenance and calibration documentation.
- (3) When a monitor does not fall within defined limits or tolerances, ambient data shall be invalidated back to the most recent point in time at which measurements are known to be accurate or an event which can be identified as the probable cause of the failure.

**(E) DATA RECORDING, VALIDATION AND REPORTING**

- (1) For each station visit, the following information shall be recorded in the station log book:
  - (a) Date, time, and personnel identification
  - (b) Room temperature minimum/maximum and current value
  - (c) Reason for visit
  - (d) Actions taken

- (e) Time period for which the analyzer was offline
- (2) All quality assurance procedures shall be described in detail in the QA manual, including but not limited to:
- (a) General description of the monitor installation, including model and serial numbers
  - (b) General operating procedures
  - (c) Calibration, precision, span check procedures, and associated control limits
  - (d) Preventive maintenance procedures
  - (e) Corrective maintenance procedures
  - (f) Data recording, processing, and validation procedures
  - (g) Spare parts list
  - (h) Evidence of operator training
  - (i) Vendor contact information
  - (j) List of current station operators
- (3) For reporting purposes, ambient air quality data are to be averaged for each clock hour. Strip chart recorder time shall not differ from the time of the data acquisition system by more than 10 minutes.
- (4) Data shall be collected on strip chart recorders (except as noted under I(A)(5)), as well as a digital data acquisition system. Strip charts shall be reviewed, and checked against the appropriate data logger values. The strip charts shall be initialed by the station operator during each station visit.
- (5) All questionable data such as significant sudden spikes, excessively noisy signals, or other unusual data patterns should be investigated, and, if appropriate, voided. For an hour/day to be considered valid, a minimum of 45 minutes/18 hours of valid data shall be collected, respectively. Data collected during span/precision checks, calibrations or maintenance shall be considered invalid. Data collected during periods of exceedance of the acceptable temperature range are invalid and shall be flagged; validation shall be subject to review by the Control Officer.
- (6) Monthly diskettes containing the validated pollutant concentration data in SAROAD format shall be submitted to the NWCAA no later than thirty (30) days after the end of the reporting month. Other file formats, as well as data submittal via e-mail may be approved by the Control Officer.
- (7) Whenever the ambient SO<sub>2</sub> concentration is measured to be equal to or greater than 0.800 ppm for five (5) or more consecutive minutes, a supplemental written report shall be submitted with the monthly monitoring data, indicating the time, actual concentrations, and possible reason(s) (if known) for each period of excess SO<sub>2</sub>.
- (8) Whenever monitoring equipment required by an Order of Approval to Construct, an air operating permit, or enforcement action, for any reason, fails to provide data for a continuous period of twenty-four (24) hours or longer, or if more than two (2) consecutive days with less than eighteen (18) hours of valid data occur, the NWCAA shall be notified. Notification shall be made within seventy-two (72) hours after the first invalid day occurs.

- (9) For each monitoring station, the operator shall provide a supplemental report when monthly data capture falls below 90%. This report shall list the reasons for the low data capture.
- (10) All data strip charts and site logs shall be kept for at least five years.

## **NON – CRITERIA POLLUTANTS**

### **(F) METHODS AND EQUIPMENT**

- (1) Ambient measurements of pollutants not listed as criteria pollutants in the FCAA may be required by the NWCAA. Guidelines for methods, equipment, associated operations, data recording and reporting shall be approved by the NWCAA on a case by case basis.

## **METEOROLOGICAL DATA**

### **(G) METHODS AND EQUIPMENT**

- (1) The meteorological system shall accurately measure wind speed and wind direction and be approved by the Control Officer. The data accuracy shall fall within the following control limits:
  - (a) wind speed:  $\pm 2$  mph
  - (b) wind direction:  $\pm 10$  degrees
  - (c) temperature:  $\pm 2$  degrees F
- (2) Instruments measuring wind direction shall be oriented to true north.
- (3) A log book shall be kept for each meteorological system. Dates and description of initial installation, results of calibrations, preventive maintenance and operational checks, and operator initials shall be recorded in the log book. Upon approval by the NWCAA electronic log books may be utilized.
- (4) All station installations shall meet EPA siting criteria (*Quality Assurance Handbook for Air Pollution Measurement Systems - Volume IV – Meteorological Measurements*) (EPA-600/4-82-060, revised 1989).

### **(H) AUDITING**

- (1) A performance audit shall be conducted once every two years (22-24 months from the last performance audit) by an independent auditor. A performance audit shall also be performed if the siting parameters or location changes or new equipment is installed. The audit shall be conducted within 90 days, if new equipment is installed or a change in siting parameters occurs, and shall evaluate the following:
  - (a) As-found orientation
  - (b) Wind speed threshold check
  - (c) Wind direction threshold check
  - (d) Wind speed accuracy check
  - (e) Wind direction accuracy check

- (2) A system audit may be conducted periodically by the NWCAA. This audit shall include an examination of all site logs, instrument siting and installation, daily operating procedures, preventive maintenance, and calibration data and methods.

**(I) DATA RECORDING AND REPORTING**

- (1) All meteorological data shall be reported as hourly averages. When wind speed is less than two (2) miles per hour and there is no predominant wind direction, the direction may be reported as 000 degrees. If there is a predominant wind direction, an average shall be reported.
- (2) Meteorological data calibration reports and results from independent performance audits shall be submitted to the NWCAA no later than thirty (30) days after the end of the month in which they were conducted.
- (3) Monthly diskettes containing the validated meteorological data in SAROAD format shall be submitted no later than thirty (30) days after the end of the reporting month. Other file formats, as well as data submittal via e-mail may be approved by the Control Officer.

**II. EMISSION TESTING**

**(A) GENERAL**

- (1) Unless specified in an applicable subpart, the test length for an emission test shall, whenever possible, equal or exceed the time period of the standard with which the test is to demonstrate compliance.
- (2) Emission tests shall, whenever possible, employ methods with established detection limits (DL) lower than the applicable standard. Minor modifications to the test methods, designed to increase method precision, may be approved by the Control Officer, provided that such modifications do not represent a major modification to the test method, or a less stringent interpretation of applicable regulations.
- (3) Where measured concentrations or emissions of pollutants are below the method detection limit, the value of the detection limit shall be used to calculate average emissions, and the results shall be reported as "less than DL" if all runs were below the DL, and "less than" the average of the runs if one or more runs were above the DL. The detection limit shall be in units of the standard and actual DLs, whether standard or calculated, must be reported. Reagent blanks below the DL shall use a value of zero. In Method 23, DLs shall be treated as written in the method. DLs for similar pollutants cannot be added or averaged.
- (4) Gas dilution systems used for instrument calibration shall comply with EPA Method 205.

**(B) TEST PLANS AND TEST DATES**

- (1) A source test plan shall be submitted for approval by the NWCAA for all compliance source tests at least thirty (30) days prior to the scheduled date, unless otherwise specified in an

applicable subpart. A summary of the test shall accompany the test plan and be submitted on a template provided by the NWCAA. CGA and RATAs are not considered source tests.

- (2) Once a test plan has been approved by the NWCAA, any changes in test dates or methodology shall require NWCAA approval, provided such changes do not conflict with other requirements or extend the test date beyond the date specified in a subpart.

**(C) OPERATING CONDITIONS**

- (1) Unless otherwise specified in an applicable subpart or a permit condition, the facility shall operate at normal conditions. Normal operation shall exclude periods of startup, shutdown, or unit malfunction. Soot blowing is considered part of normal operations.
- (2) If maximum capacity does not represent the condition which results in the highest emissions, the facility may be required to repeat the test at different load conditions and/or during use of a different fuel.
- (3) All operating parameters, listed and approved under II(B) shall be recorded during the test.

**(D) TEST STOPPAGES**

- (1) Once initiated, a compliance test shall be completed, except as noted in II(D)(2). Failure to complete a test shall be a violation of the requirement to test, and, in cases where the initial data indicate non-compliance with the applicable emission standard, the results may be considered a violation of that standard.
- (2) A stack test may be stopped due to severe weather, tester equipment failure, unit failure, safety considerations, or other conditions beyond the control of the facility. The NWCAA observer may void a test or individual run on-site if procedures are determined to be employed incorrectly.
- (3) Data generated during aborted tests shall be appended to the report of the valid repeat test. Documentation of the reasons for test stoppage shall be included in the test report. Test stoppages under II(D)(2) do not provide an extension of any test deadline.

**(E) POSTPONEMENT**

- (1) Compliance tests shall be completed prior to the required test deadline as listed in the applicable subpart or a permit condition. Failure to conduct a timely compliance test constitutes a violation of the requirement to test.

**(F) TEST REPORT**

- (1) A test report shall be submitted to the NWCAA no later than 60 (sixty) days after the completion of the test, unless otherwise specified by an applicable subpart.
- (2) A summary of the test shall accompany the test report and submitted on a template provided by the NWCAA.

- (3) All field data, operational data listed in the test plan, quality assurance information, sample calculations, and other supporting information, such as certificates for gas standards, or meter box and calibrations, shall be included in the test report.

**(G) REQUIREMENTS FOR RE-TESTING**

- (1) A facility shall be required to repeat a test, and may be required to conduct source tests more frequently, if one or more of the following conditions are encountered:
  - (a) The facility exceeded the applicable standard.
  - (b) If the test was stopped for any reason.
  - (c) If operating conditions or testing methodology deviated significantly from those described in the original test plan.
  - (d) If the test was voided by the NWCAA.

**III. CONTINUOUS EMISSION AND OPACITY MONITORING**

**(A) GENERAL**

- (1) Unless subject to acid rain regulations (40 CFR Part 75), all continuous emission monitoring (CEM) systems shall be capable of meeting the appropriate EPA performance specification using procedures outlined in 40 CFR 60, Appendix B. CEMs subject to acid rain regulations shall be capable of meeting the specifications outlined in the appropriate Section of 40 CFR Part 75.
- (2) All CEMs shall be operated in accordance with the appropriate Section of 40 CFR 60, Appendix F.
- (3) A Quality Assurance (QA) and a station log book shall be kept for all stations. The station log book shall be used to record all ongoing activities associated with station operation.
- (4) The operator shall assess the operation of each CEM daily. The date, time, operator and location shall be written on the strip chart and log book each time the monitor is checked manually. Recorder charts shall be documented with explanations for unusual traces, maintenance, invalid data, calibrations, etc. On a case-by-case basis the NWCAA may approve the use of electronic log books.
- (5) For gaseous CEMs, “continuous” shall be defined as a minimum of one measurement every 15 minutes, i.e., four equally spaced data points comprising an hourly average.
- (6) For continuous opacity monitors (COMs), “continuous” shall be defined as a minimum of one measurement every 15 seconds.
- (7) Continuous emission rate monitors shall comply with 40 CFR Part 60, Appendix B, Specification 6. The flow portion of the system shall be checked periodically against EPA Method 2.

**(B) CALIBRATION**

- (1) CEM calibration drift (precision) checks shall be conducted daily in accordance with 40 CFR Part 60, Appendix F and the written operational procedures.
- (2) The instrument shall be adjusted in accordance with the requirements of the applicable performance specification of 40 CFR Part 60, Appendix B.
- (3) Temperature monitors shall be accurate to within 5 degrees F, unless otherwise specified in a subpart.
- (4) A section on calibration check and adjustment procedures shall be included in the CEM QA document.
- (5) Continuous opacity monitors shall be calibrated as outlined in 40 CFR Part 60, Appendix B, Specification 1 and the manufacturer's procedures.

**(C) MAINTENANCE**

- (1) Continuous opacity monitors shall be maintained according to "*Recommended Quality Assurance Procedures for Opacity Continuous Emission Monitoring Systems*" (EPA 340/1-86-10) and the manufacturer's procedures.
- (2) All gaseous CEMs shall be maintained using QA criteria of 40 CFR Part 60, Appendix F and the manufacturer's procedures.
- (3) Temperature monitors shall be maintained according to manufacturer's recommendations.
- (4) A section on preventive maintenance procedures shall be included in the CEM QA document.

**(D) AUDITING - CONTINUOUS OPACITY MONITORS (COMS)**

- (1) Accuracy checks shall be performed according to EPA "*Recommended Quality Assurance Procedures for Opacity Continuous Emission Monitoring Systems*" (EPA 340/1-86-10). Testing in addition to otherwise applicable requirements shall be implemented as follows:
  - (a) On-stack performance audit: A calibration error check shall be conducted if accuracy or linearity of data does not comply with applicable specifications.
  - (b) An off-stack (clear path) zero alignment shall be conducted if the percentage difference between the simulated zero check response and the true value is greater than suggested manufacturer's limits or standards.
- (2) System audits may be conducted by the NWCAA. The audit may include an on-site inspection of the opacity monitor and a review of operating procedures, site log, documentation of data collection activity, and location criteria.
- (3) Multi-performance audits may be conducted by the NWCAA to assess data accuracy and to determine if the opacity monitor meets the applicable performance specification.

**(E) AUDITING - GASEOUS MONITORS**

- (1) Data accuracy assessments shall be performed at least once every calendar quarter and at periodic intervals determined by monitor performance and data accuracy.

Data accuracy assessments shall be conducted in accordance with procedures outlined in 40 CFR Part 60, Appendix F. The following testing methods shall be used as described in Part 60:

- (a) Relative Accuracy Test Audit (RATA)
- (b) Relative Accuracy Audit (RAA)
- (c) Cylinder Gas Audit (CGA)

The Relative Accuracy Test Audit shall be conducted at least once every four (4) calendar quarters as described in the applicable performance specification outlined in 40 CFR Part 60, Appendix B.

- (2) All RATAs shall assess accuracy in units of the applicable standard with which compliance is being determined and shall test the entire system. Accuracy calculations shall be based on the output of the CEM's data acquisition system.
- (3) Data accuracy assessments which require the CEM to be off-line shall not be performed during periods in which the CEM is measuring greater than 75% of the applicable standard without prior approval by the NWCAA.
- (4) System audits may be conducted by the NWCAA. The audit may include an on-site inspection of the CEM and a review of operating procedures, site log, documentation of data collection activity, and location criteria.
- (5) Multi-performance audits may be conducted by the NWCAA to assess data accuracy and to determine if the CEM meets the applicable performance specification.

**(F) DATA RECORDING, VALIDATION AND REPORTING**

- (1) Strip charts shall be used for all monitors unless the data acquisition system is capable of generating trend graphs from one-minute averages. Paperless strip charts are acceptable if configured to store one-minute averages (15-second or better averages for opacity monitors). Strip chart times shall not deviate from the time of the data acquisition system by more than 10 minutes.
- (2) All gaseous CEMs shall be able to digitally capture and store data in at least 5-minute averages, unless the data acquisition system is used to replace strip charts in which case one-minute storage shall be required. Opacity monitoring systems shall be capable of storing 15-second averages.
- (3) All data shall be retained for a period of at least five (5) years and be available to the NWCAA upon request.
- (4) Each CEM shall have a log book or file on site. Any work performed on any portion of CEM system shall be recorded, including the following information:

- (a) Date, time, and personnel identification
  - (b) Reason for station visit
  - (c) Action(s) taken
  - (d) Time period for which the analyzer was offline
- (5) Each CEM shall have a QA manual on site which address all quality control requirements outlined in 40 CFR Part 60, Appendix F, Section 3. All QA procedures should be described in sufficient detail to assure that all operators carry out procedures in the same manner. At a minimum, the following shall be included:
- (a) Instrument installation description including model and serial numbers
  - (b) Operating procedures including daily check procedures and pertinent instrument settings
  - (c) Procedures for calibration and calibration drift assessment
  - (d) Quality control limits and instrument adjustments procedures
  - (e) Preventive maintenance procedures
  - (f) Data recording, validation, backup, and reporting procedures
  - (g) Accuracy assessment procedures for CGAs and RATAs
  - (h) Corrective action plan for malfunctioning CEM, including reporting requirements
  - (i) List of current station operators
  - (j) Vendor names and addresses
  - (k) Spare parts inventory
  - (l) Evidence of operator training
- (6) Data from strip chart recorders or recording devices approved under III(F)(1), shall be reviewed and, if applicable, compared to corresponding data logger values, and then signed by the station operator. At a minimum, the following information shall be checked and appropriately labeled:
- (a) Zero and span/precision checks
  - (b) Preventive maintenance operations
  - (c) QA activities
  - (d) Unusual chart traces
  - (e) Time, date, and personnel identification
- (7) Pre-adjustment values for automatically adjusting monitors shall be documented (40 CFR Part 60, Appendix F, Section 4.2).
- (8) All unusual or questionable data shall be investigated and, if appropriate, be voided. For gaseous monitors, a minimum of 45 minutes of valid data in a 1-hour period is required for the hour to be considered valid. A minimum of 18 hours of valid data in a 24 hour period is required for the day to be considered valid.
- (9) CEM data shall be considered invalid, and flagged for reporting purposes, if:
- (a) The monitor is not operated and maintained in accordance with the applicable performance specifications of 40 CFR Part 60, Appendix B.
  - (b) Quality assurance procedures are not in accordance with 40 CFR Part 60, Appendix F.
  - (c) The CEM or is not operative or off line.
  - (d) The monitor is being zeroed or spanned.

(e) The CEM is “out-of-control” as defined in 40 CFR Part 60, Appendix F.

- (10) Data generated during QA audits (e.g., CGAs), calibration, and calibration drift checks shall be excluded for purposes of compliance determination.
- (11) For reporting purposes, averaging periods for CEMs are one (1) clock hour for gaseous monitors, six (6) minutes for opacity monitors, and fifteen (15) minutes for temperature monitors, unless otherwise specified by applicable limits.
- (12) Missing data substitution: Missing or invalid data shall be substituted using the following procedures:
- (a) Missing data from CEMs that are turned off during periods of excess emissions shall be reported as exceedances of all applicable emission standards.
  - (b) Parametric, engineering, or source test data may be utilized for data substitution during periods of normal operation as demonstrated by operating data.
  - (c) Data substitution is not required if invalid data are the result of CEMs drift checks, calibrations, audits, or preventative maintenance.
  - (d) If neither (a) nor (b) above apply, the following substitution scheme is to be used:

Previous 30 day data availability	Up to 24 hours of missing data:	Greater than 24 hours of missing data
≥ 95%	Average of last and first valid hour bracketing the missing data period.	The average of first and last valid hour or the 90 <sup>th</sup> percentile value during the last 720 hours, whichever is greater
Previous 30 day data availability	Up to 8 hours of missing data:	Greater than 8 hours of missing data
≥ 90% and < 95%	Average of last and first valid hour bracketing the missing data period	The average of first and last valid hour or the 95 <sup>th</sup> percentile value during the last 720 hours, whichever is greater
< 90%	Maximum hourly average over the last 30 days	Maximum hourly average over the last 30 days

- (13) Data availability (in percent) shall be defined as the [(number of valid (excluding substituted) hours of CEM data in a reporting month) minus (hours of calibration/CD/QA checks)] divided by [total hours of operation of the corresponding unit in that month] times 100.
- (14) CEMs are required to maintain greater than 90% data availability on a monthly basis. A supplemental report shall be submitted if during any calendar month a CEM system fails to produce 90% data availability, stating the reason(s) for the low data availability.
- (15) The following data shall be submitted to the NWCAA on a monthly basis or according to the applicable standard:
- (a) Time, date, magnitude, and cause of all emissions or temperatures which exceed the applicable standard(s).
  - (b) The cause and time periods of any bypass of the air pollution control equipment.

- (c) The cause and time periods of CEM downtime not associated with routine QA or maintenance operations.
  - (d) Data availability for each CEM, listed by unit and parameter.
  - (e) Supplemental report for system with  $\leq 90\%$  monthly data availability.
  - (f) Other data or information as required by the Control Officer.
- (16) Monthly reports shall be postmarked no later than thirty (30) days after the end of the reporting month.
- (17) A Data Assessment Report as defined in 40 CFR Part 60 Appendix F, Section 7 shall be submitted to the NWCAA on a quarterly basis and other time interval as specified by the NWCAA.

PASSED: July 14, 2005