SUMPTER COMBUSTION TURBINE FACILITY
UNITS 1 – 4

Continuous Emission Monitoring System
Quality Assurance/Quality Control Plan

Prepared for:

Wolverine Power Supply Cooperative's
Sumpter Combustion Turbine Facility
Belleville, Michigan

Prepared by:

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QA/QC Policy Statement

It is the goal of Wolverine Power Supply Cooperative that the Sumpter Combustion Turbine Facility continuous emissions monitoring systems shall provide accurate and precise data, representative of the actual stack emissions. In attaining this goal, the monitoring systems shall be operated and maintained in accordance with sound engineering practices, best management practices, and facility Owner's best interpretation of the current applicable federal, state and local regulations. The Quality Assurance/Quality Control Plan (QA/QC Plan) described in this document shall be implemented to ensure high availability, high accuracy and high precision.

I, the Chief Operator, have reviewed this QA/QC Plan and have found it to be complete and representative of the systems described herein that are in service at the Sumpter Combustion Turbine Facility.

Sumpter Combustion Turbine Facility
Continuous Emissions Monitoring Quality Assurance/Quality Control Plan

Control Copy Number: Sumpter–01

Issued: _____

Signed: _____ Date: _____
Chief Operator

Quality Assurance Quality Control Plan
Revisions History

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SECTION 1
QUALITY ASSURANCE/QUALITY CONTROL PLAN OVERVIEW

1.1 INTRODUCTION

This Quality Assurance/Quality Control Plan (QA/QC Plan) for continuous emission monitoring systems (CEMS) has been developed in accordance with the requirements set forth by the United States Environmental Protection Agency (US EPA) in Title 40 of Code of Federal Regulations (CFR) Part 75, Part 60 and in the *Part 75 Emissions Monitoring Policy Manual*. This QA/QC Plan addresses CEM operations, activities, and performance requirements implemented by Wolverine Power Supply Cooperative (Wolverine) at the Sumpter Combustion Turbine Facility.

1.2 QUALITY ASSURANCE/QUALITY CONTROL POLICY

Consistent with internal policies, Wolverine operates and maintains its facilities in strict adherence to all applicable environmental rules, regulations and policies. Wolverine is dedicated to obtaining all data necessary to demonstrate that its operations are in compliance with regulations and is committed to conducting the activities necessary to ensure that all environmental measurements are of high quality.

1.3 DEFINITION OF QUALITY ASSURANCE AND QUALITY CONTROL

The terms quality assurance (QA) and quality control (QC) are commonly distinguished as follows:

- Quality assurance is "the system of activities to provide assurance that the quality control system is performing adequately," and
- Quality control is "the system of activities to provide a quality product (e.g., environmental measurements)."

The term quality assurance is often used to denote "external" activities (i.e., activities performed on an occasional basis, such as QA audits, usually by someone not otherwise involved with routine facility operations). Quality control is often used to characterize "internal" activities (e.g., those conducted on a more frequent basis, such as periodic calibrations and routine maintenance procedures usually performed by someone whose principal responsibility includes instrument operation and maintenance). Together, quality assurance and quality control form a control loop that ensures data acceptability.

This QA/QC Plan describes both quality assurance and quality control activities. Activities that are quality assurance related are termed "QA activities." Likewise, activities that are quality control related are called "QC activities."

1.4 OBJECTIVE OF QUALITY ASSURANCE/QUALITY CONTROL PLAN

Wolverine recognizes that the reliability and acceptability of emission monitoring data depend on completion of the activities stipulated in a comprehensive QA/QC Plan. The objective of this QA/QC Plan is to delineate the activities necessary to ensure that emission monitoring data are complete, representative, precise and accurate as well as to demonstrate substantial compliance with Appendices B and D to 40 CFR Part 75. This QA/QC Plan provides that framework for implementing QA activities by addressing topics such as individual responsibilities, data integrity, documentation and corrective maintenance.

1.5 SCOPE OF QUALITY ASSURANCE/QUALITY CONTROL PLAN

This QA/QC Plan covers the operation and maintenance (O&M) of the CEMS installed at Sumpter Combustion Turbine Facility UNITS 1 – 4. It also includes descriptions of all necessary support services and support activities, such as missing data substitution procedures consistent with the US EPA regulations, data reduction and report preparation.

This QA/QC Plan identifies only the *type* and *frequency* of QA/QC activities. Additional details concerning O&M activities for each CEMS component are contained in the vendor-specific manuals (reference Appendix A of this QA/QC Plan for specific listings). The O&M manuals for each CEMS are on file at the facility and are updated periodically when required and are available for review and inspection by regulatory agencies upon request.

1.6 DOCUMENTATION CONTROL

Wolverine uses a standardized indexing format for this document, which provides for convenient replacement of pages that may be changed due to modification or refinement of the information contained herein. The indexing format includes the following information at the top of each page:

- Section Number
- Revision Number
- Date of Revision
- Page _ of _

Each QA/QC Plan is also assigned a control copy number. The Chief Operator maintains the master copy of the QA/QC Plan and an inventory listing all copies of this QA/QC Plan. Requests for revisions to the QA/QC Plan must be submitted to the Chief Operator for review and authorized prior to implementation. Figure 1-1 provides an example of the "Request for Revision" form. Once revisions to the QA/QC Plan are authorized, the Chief Operator initiates the revisions and disseminates copies of all changes to the individuals and groups that have a copy of the QA/QC Plan. The responsibilities of each group (and positions within each group) in Wolverine's current organizational structure for QA/QC activities required by this QA/QC Plan are described in Section 2 of this Plan. At a minimum, the QA/QC Plan shall be reviewed and evaluated at least once every year by the Chief Operator (or designee) to ensure that proper procedures for preventive maintenance, periodic audits and other QA/QC activities are being followed. This QA/QC Plan will be formally revised if and when Wolverine's organizational structure changes significantly with respect to the responsibilities of groups and positions described in this QA/QC Plan.

QA/QC PLAN
REQUEST FOR REVISION

Date: _____ **Reviewed By:** _____
Facility: _____ **Approved By:** _____
Initiator: _____ **Date Approved:** _____

Item to be Revised: _____
_____
_____
_____
_____
_____

Reason(s) for Revision (Procedures, Equipment, Frequencies): _____
_____
_____
_____
_____
_____

Description of Revision: _____
_____
_____
_____

Please submit request to the Chief Operator. The Chief Operator will provide final approval and instructions to implement this request.

Figure 1 - 1. QA/QC Plan Request for Revision Form.

SECTION 2
ORGANIZATIONAL STRUCTURE, RESPONSIBILITIES AND COMMUNICATIONS

2.1 INTRODUCTION

Organizational commitment is an essential element for developing and implementing a successful CEM program. In addition to considering typical management issues such as budget and personnel requirements, management at all levels must support and understand the CEM program. Management must also recognize that, even under the best circumstances, a CEMS can be expensive to install, operate and maintain. At Wolverine, management is kept apprised of all CEM program activities, from identifying the need to monitor emissions to receiving quarterly emissions reports. Commitments to CEM activities, such as those described in this QA/QC Plan, are made only after these activities are reviewed and approved by Wolverine management. Wolverine has made the necessary corporate commitments and has provided the necessary departmental staff to implement a comprehensive QA/QC program.

2.2 ORGANIZATION

Wolverine is the owner and operator of the Sumpter Combustion Turbine Facility. Figure 2-1 illustrates Wolverine's organizational structure of personnel involved in the operation of the continuous emissions monitoring system at the facility and corporate levels having the responsibility for CEMS QA/QC activities at the Sumpter Combustion Turbine Facility. While every attempt has been made to ensure the duties of each responsible party are properly delineated, occasions will arise which require the temporary reassignment of responsibilities to alternate personnel. Temporary reassignment of duties and responsibilities will not prompt updates to this QA/QC Plan.

2.2.1 Wolverine - Vice President (Designated Representative)

- Has overall responsibility for the monitoring systems
- Signs quarterly reports, petitions and Monitoring Plans
- Authorizes submittal of quarterly reports to US EPA
- Signs recertification notifications and applications, as well as US EPA test notices
- Acquires permits
- Handles enforcement activities

2.2.2 Wolverine – Director, Environmental Services (Alternate Designated Representative)

- Performs duties assigned to Designated Representative as necessary (in the absence of the Designated Representative)
- Represents the plant in regulatory matters
- Serves as regulatory liaison
- Signs quarterly reports, petitions and Monitoring Plans
- Authorizes submittal of quarterly reports to US EPA
- Signs recertification notifications and applications, as well as US EPA test notices
- Acquires permits
- Conducts periodic data review and evaluation
- Compiles and reviews electronic data reports (EDRs)
- Submits EDRs to the US EPA on behalf of the Designated Representative
- Determines when certification/recertification procedures are required for individual CEMS
- Reviews QA audits
- Responsible for data quality control
- Provides hardware troubleshooting assistance
- Provides software troubleshooting assistance
- Documents regulatory correspondence
- Interprets/advises on regulatory requirements
- Responsible for QA/QC program development/updates
- Maintains maintenance contract
- Tracks EPA allowance data
- Updates US EPA monitoring plan, as necessary

2.2.3 Sumpter – Chief Operator

- Ensures adequate resources are made available to maintain and operate the CEMS as outlined in the plant QA/QC Plan.
- Approves the QA/QC Plan
- Assures compliance with QA/QC Plan
- Maintains definitive copy of QA/QC Plan
- Responsible for plant compliance

- Responsible for coordinating plant training
- Acts as plant liaison with Director, Environmental Services
- Coordinates/observes relative accuracy test audits (RATAs) & system audits
- Provides/coordinates training

2.2.4 Plant Operators

- Assists Chief Operator with implementing QA/QC Plan
- Enters monthly natural gas gross calorific value (GCV) values into the data acquisition and handling system (DAHS)
- Assists Chief Operator with maintenance and testing associated with the QA/QC Plan
- Performs preventative, corrective and predictive maintenance
- Performs diagnostic tests, as required
- Performs quarterly linearity checks and calibration gas audits
- Facilitates and assists with RATAs
- Maintain chain of custody & cylinder certification
- Maintains calibration gas inventory
- Enters new calibration gas values into the DAHS
- Notifies Chief Operator of CEMS malfunctions that cannot be resolved by plant personnel
- Documents all routine and non-routine activities on CEMS in log book
- Responds to CEMS alarms that require maintenance
- Troubleshoots and repair all CEMS equipment
- Communicates with CEMS equipment vendor(s) to resolve non-routine malfunctions
- Maintains site documentation
- Maintains parts inventory
- Respond to alarms and take appropriate actions
- Perform and then document all routine activities in the CEMS logbook.
- Enter episode reason codes
- Minimize excess emissions
- Initiate corrective actions

Wolverine Power Supply Cooperative, Sumpter Generating Station

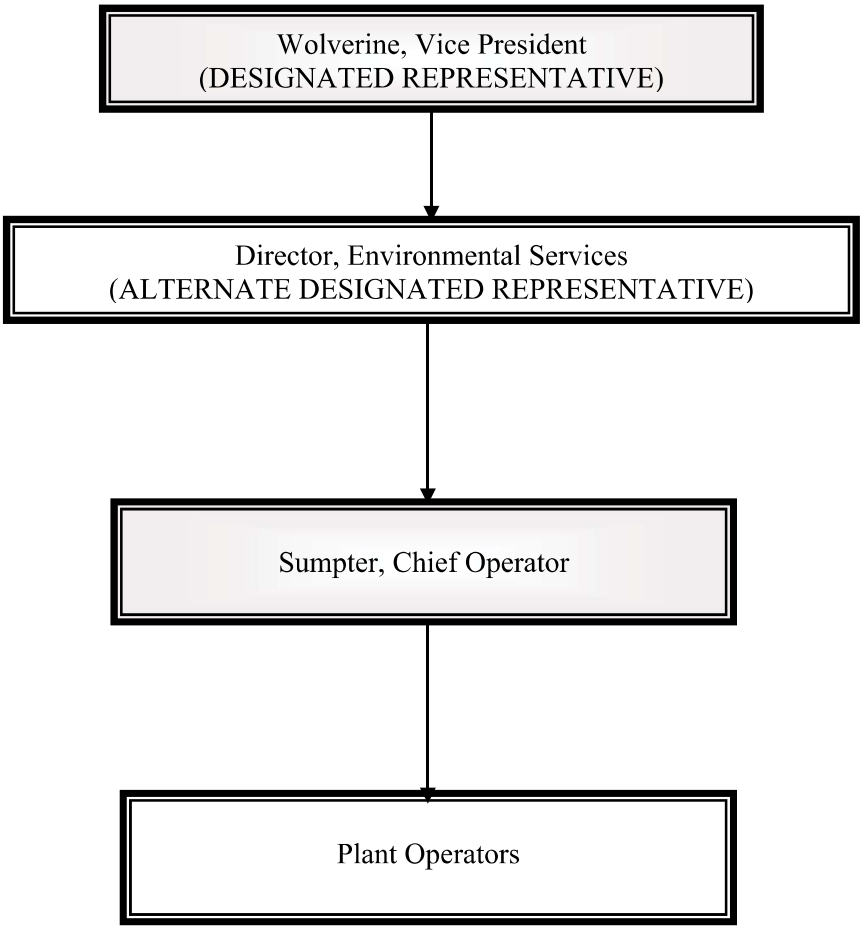

Figure 2 - 1. Wolverine Organizational Structure – CEMS Operation and Maintenance

2.3 COMMUNICATION OF INFORMATION, DATA AND REPORTS

To achieve the maximum benefit from any QA/QC Plan, provisions must be made for effective communication among all involved parties. These communications must take place both within individual groups and throughout the Organization.

Two distinct types of communication merit discussion:

1) While communication of emission data and emission reports may not appear germane, the ultimate purpose of this QA/QC Plan is to ensure high quality emission data. Therefore, the flow of routine CEM data and summary reports should be clearly delineated in the QA/QC Plan and the personnel responsible for validation and transfer of pertinent information at the various corporate levels should be designated.
2) The QA/QC Plan must provide for the communication of QA information and contain the necessary mechanisms for triggering corrective maintenance. The QA/QC Plan must also outline procedures to verify the effectiveness of the QA/QC corrective actions.

2.3.1 Emissions Data and Emissions Reports

It is the responsibility of Wolverine's Vice President to ensure that information is being communicated properly and that policies and procedures are established, implemented and maintained. The Director, Environmental Services routinely evaluates Sumpter's CEMS program to ensure compliance by reviewing and monitoring the following documents and activities:

- Regulatory Requirements
- Corporate Policies
- System Design
- Component Operations
- Manpower Requirements
- Quality Control Activities
- Preventative Maintenance Activities

Wolverine will on occasion utilize the services of a consultant to assist with data review and report generation. In this capacity the consultant is performing the duties otherwise assigned to the Director, Environmental Services. Documentation for the activities performed by the consultant is provided through maintenance logs and quarterly summary reports. Ultimate responsibility for the consultant's activities falls to the Director, Environmental Services.

Therefore, throughout this QA/QC Plan, duties assigned to the Director, Environmental Services include activities performed by the consultant.

Summarizing the day-to-day responsibilities in Section 2.2, the Director, Environmental Services or delegate reviews and validates the DAHS emissions and calibration data periodically to ensure regulatory compliance. The Plant Operators review the data each shift and if deficiencies are found, the Plant Operators contact plant management who coordinates corrective actions. The Plant Operators are responsible for day-to-day operation of the CEMS. The Chief Operator is responsible for ensuring that daily data is complete and accurate prior to submittal to the Director, Environmental Services. The Director, Environmental Services performs the final quality assurance review of all EDRs and submits them to the US EPA on behalf of the Designated Representative.

2.3.2 Quality Assurance/Audit Data and Reports

The Chief Operator is responsible for coordinating applicable tests required for certification or recertification. The Chief Operator also coordinates and oversees the RATAs performed by test contractors. The Plant Operators assists with QA audits. The Chief Operator reviews QA data and submits reports to the Director, Environmental Services. The Director, Environmental Services inputs the results of QA audits into the quarterly reports.

If a CEMS fails to meet any of the audit criteria, the Plant Operators will perform corrective maintenance and record this information in the maintenance log. The Chief Operator reschedules audits until successful audit results are achieved.

2.4 US EPA AND STATE AGENCY COMMUNICATIONS

The Director, Environmental Services acts as a liaison between Sumpter Combustion Turbine Facility, US EPA and the Michigan Department of Environmental Quality (MDEQ) regarding the CEM program activities. The Designated Representative is responsible for distributing reports and comments received from US EPA. The Director, Environmental Services is responsible for distributing reports and comments received from state and local agencies.

SECTION 3
SUMMARY OF AFFECTED FACILITY AND CEMS SYSTEMS

3.1 DESCRIPTION OF FACILITY AND APPLICABLE SOURCES

The Sumpter Combustion Turbine Facility (ORIS #7972) is located in Belleville, Michigan. Table 3-1 briefly describes the monitoring systems and analytical components of each unit addressed in this QA/QC Plan. Each unit uses a dedicated CEMS.

Table 3 - 1. Monitoring Systems and Analytical Components – UNITS 1 – 4

Parameter	Component Type	Sample Method	Manufacturer	Model
NO_x	NO_x Analyzer	Dry Extractive	Thermo Scientific 42i	42i-HL
O_2	O_2 Diluent Analyzer	Dry Extractive	Servomex	1440
Gas	Gas Fuel Flow Meter	Orifice Plate	Rosemount	3095MV
DAHS	Data Acquisition	–	ESC	Stackvison

The facility includes four (4) identical General Electric (GE) Model PG 7121 simple cycle combustion turbine units. Each unit combusts pipeline natural gas (PNG) only. UNITS 1 – 4 each qualify as gas-fired units and are each rated at 1,000 mmBtu/hr heat input and 83 MW electrical output, for a total generating capacity of 332 MW.

3.2 DESCRIPTION OF CEM SYSTEMS

Sumpter Combustion Turbine Facility has installed unique, dedicated dry extractive CEMS on UNITS 1 – 4 to comply with the environmental regulations (e.g., emission standards, percent monitor data availability, etc.) mandated in 40 CFR Part 75 (NO_x systems). The UNITS 1 – 4 CEMS are designed to monitor nitrogen oxides (NO_x), and oxygen (O_2) diluents. Each of the four (4) CEMS includes a Thermo Environmental Incorporated (TEI) NO_x 42C monitor, a Servomex Model 1440C O_2 monitor. Sulfur dioxide (SO_2) mass emissions and heat input are reported using US EPA's pre-approved alternative protocol specified in Appendix D to 40 CFR Part 75, and carbon dioxide (CO_2) mass emissions are reported using the procedures specified in Appendix G to 40 CFR Part 75. The CEMS data for each unit are collected and managed using an Environmental System Corporation (ESC) Stackvision data acquisition and handling system (DAHS).

3.2.1 Sampling System

The CEMS installed on each unit use stack mounted straight-extractive probes. The straight-extractive probes extract the stack effluent at a rate between 2 to 5 liters per minute, and then transport the samples through a temperature controlled umbilical to the CEMS cabinets. The sample probes are installed in a manner that ensures the collection of a representative effluent sample. The probes are also equipped with sintered stainless steel in-stack filters for particulate removal prior to sample transport.

Once in the shelter, the samples are passed through a conditioning system where moisture is removed and the samples are dried. Particulates are also removed prior to sampling. No dilution is used in the straight-extractive system. The NO_x and O_2 analyzers measure the sample directly as parts per million (ppm) dry, ppm dry and % dry, respectively.

The analyzers, cabinets and other CEMS components (e.g., the calibration gas and purge air conditioning equipment) for each unit are located at each unit's CEMS shelter. At the CEMS cabinet, the sample umbilical connects to a sample gas manifold, which is used to control sample gas, purge air and calibration gas entering the probe and analyzers. The sample manifold contains pressure regulators, tubing, pressure gauges, rotometers and solenoids needed to direct these gases appropriately. The datalogger is used to control CEMS operating modes, the manual and automatic direction of calibration gas and sample gas through the manifold and the interface between the DAHS and the sampling platform.

3.2.2 Gaseous Concentration Analyzers

The Thermo Scientific 42i analyzers operate on the principle of chemiluminescence. Chemiluminescence is the radiation of light that results from a chemical reaction. The method uses ozone to react with nitrogen oxide (NO) to form an excited molecule of nitrogen dioxide (NO_2). The excited NO_2 molecule then emits a luminescent light in the infrared region, which is measured using a photodetector. Because NO_2 does not undergo this chemical reaction, it must be converted into NO to be measured by this method. The analyzer uses a molybdenum converter to change NO_2 to NO prior to analysis. The total NO_x concentration (NO_2 and NO) is then proportional to the chemiluminescent light emitted.

The Servomex O_2 analyzer operates on the principle of paramagnetics. The analyzer measures the paramagnetic susceptibility of the O_2 in the sample gas by means of the magneto-dynamic paramagnetic O_2 transducer. The magneto-dynamic O_2 analyzer consists of a small dumbbell-shaped body made of glass and charged with gas of low magnetic susceptibility, a light source, a

photocell, a mirror, and a calibrated indicating unit. The dumbbell body is suspended in an enclosed test cell by a platinum fiber within the magnetic field of a permanent magnet and is free to rotate in the space between the poles of the magnet. Since the dumbbell body is somewhat diamagnetic - i.e., has negative magnetic susceptibility - because of its nitrogen content, the balls of the dumbbell naturally deflect slightly away from the point of maximum magnetic field strength.

When O_2 molecules enter the cell, their paramagnetism will cause them to be drawn towards the region of greatest magnetic strength. The O_2 molecules thus exert different forces that produce torque acting on the sphere arrangement, and the suspended "dumbbell," along with the mirror mounted on its suspension ribbon, will be rotated away from the equilibrium position. The mirror then will deflect an incident light beam onto the photodetector that produces an electric voltage. The electric signal is amplified and fed back to a conducting coil "dumbbell," forcing the suspended spheres back to the equilibrium position. The current required to generate the restoring torque to return the "dumbbell" to its equilibrium position is a direct measure of the O_2 concentration in the sample.

3.2.3 Orifice-plate Fuel Flow Meters

Fuel flow meters, certified and maintained in accordance with the requirements specified in Appendix D to 40 CFR Part 75, are used to measure the amount of fuel combusted by each unit. The subsections below provide a brief description of each fuel flow meter.

The flow rate of pipeline natural gas combusted by each unit is monitored using a Rosemount Model 3095MV orifice-plate flow meter. Flow measurements are recorded in units of 100 standard cubic feet per hour (100 scfh). Information regarding the placement of the orifice-plate flow meters and the equations to determine total gaseous flow rate are detailed in the Sumpter Combustion Turbine Facility Monitoring Plan. Note that standard pressure and temperature conditions, as defined by US EPA, are 68 degrees Fahrenheit (°F) and 1.0 atmosphere (atm).

The measurement principle used by the orifice-plate flow meters relies on the proper installation of an orifice-plate or primary element into a pipeline. The reduction in the cross sectional area caused by the orifice-plate results in a static pressure difference between the upstream and downstream side of the orifice-plate.

American Society of Mechanical Engineers (ASME) Standard MFC-3M-2004 as referenced in Appendix D to 40 CFR Part 75 defines the proper placement, installation and design for the

orifice-plate flow meter. Each orifice-plate flow meter is equipped with transmitters to measure the differential pressure, static pressure and temperature of the fuel stream.

3.2.4 Data Acquisition & Handling System

The DAHS used for each CEMS was manufactured by ESC utilizing the Stackvision system. The DAHS is used for data collection and storage, emissions computations, CEMS operation and report generation. The Stackvision program is also used for viewing real time data, viewing historical graphs viewing operating reports, initiating manual calibrations and performing system backups. The DAHS meets all of the reporting requirements of 40 CFR Part 75, and controls all CEMS functions for routine operation, calibration error tests, linearity checks and maintenance activities listed below:

- Provides all automatic and manual functions required by the CEMS
- Automatically initiates calibration of each gas analyzer at selected time intervals to ensure accuracy
- Automatically controls the sample selection system
- Purges the sample probe
- Provides sample conditioning system and analyzer status outputs and failure alarms

For each unit at the Sumpter Combustion Turbine Facility, the DAHS gathers NO_x and O_2 emissions data and computes one- (1) hour averages based on valid 1-minute data points. Other DAHS capabilities include performing data substitution (when necessary) and generating quarterly EDRs.

Sumpter Combustion Turbine Facility DAHS is an automated, computer-based data and information acquisition, processing, storage, and reporting system. The DAHS is programmed to fully satisfy all of the data recordkeeping and reporting requirements of this CEMS project. Comprehensive descriptions of the CEMS are contained in the applicable Monitoring Plan, as well as the vendor operation and maintenance manuals, which are maintained on file at the facility. The system operation and maintenance manuals are available in a format suitable for inspection.

SECTION 4
QUALITY CONTROL AND MAINTENANCE ACTIVITIES

4.1 INTRODUCTION

The QC activities are performed to ensure that the operation and maintenance of the CEMS are adequate and appropriate. These QC activities range from equipment installation to data handling and reporting procedures. The QC activities rely upon qualified and well-trained personnel. Appendix B of this QA/QC Plan provides a summary of the routine and preventive maintenance QC activities performed on the CEMS serving UNITS 1 – 4 at the Sumpter Combustion Turbine Facility.

4.2 INSTALLATION

The initial installation of the Sumpter Combustion Turbine Facility CEMS was conducted in accordance with applicable regulations and in strict conformance with the manufacturers' written installation instructions. These instructions include procedures for initial start-up, debugging and checkout to ensure proper initial operation of the systems. Initial certification reports and any subsequent recertification reports are maintained on file at Sumpter Combustion Turbine Facility.

4.2.1 Installation of Gaseous Concentration Monitors

The NO_x and O_2 CEMS were installed and certified in accordance with the requirements set forth in Performance Specifications 2 and 3, respectively, of Appendix B to 40 CFR Part 60, as well as those set forth in Appendix A to 40 CFR Part 75. The initial certification for the CEMS included a linearity check, 7-day calibration error test, cycle time test, RATA and bias test.

4.2.2 Installation of Data Acquisition & Handling System

Each DAHS was installed and certified in accordance with the requirements specified in 40 CFR Part 75. The initial certification included daily calibrations, missing data substitution and formula verification tests.

4.2.3 Certification of Fuel Flow Meters

The orifice-plate fuel flow meters were installed in accordance with the requirements set forth in §2.1.5 of Appendix D to 40 CFR Part 75. The initial certification for the orifice-plate fuel flow meters was conducted by the manufacturer and included using the procedures in the following standards to verify flow meter accuracy or design, as appropriate to the type of flow meter: ASME MFC-3M-2004 with September 1990 Errata, *Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi* or AGA Report No. 3. The accuracy of each fuel flow meter is within ±2% of the applicable upper range value.

4.3 QUALITY CONTROL REQUIREMENTS FOR CEMS

The QC activities for the NO_x-diluent CEMS serving UNITS 1 – 4 either conform to or exceed the requirements set forth in the specifications detailed in Appendix A to 40 CFR Part 75.

4.3.1 Calibration Gases

All calibration gases used by Sumpter Combustion Turbine Facility comply with US EPA regulations detailed in §5 of Appendix A to 40 CFR Part 75. Calibration of all gaseous emission monitors is accomplished using known concentrations of zero and span gases. To ensure that a constant supply of calibration gas is maintained, the Plant Operators removes and replaces any gas cylinders from service once the pressure reaches 200 psig (i.e., the cylinder pressure indicated by its attached regulator). The Plant Operators has first-line responsibility for maintaining an adequate supply of calibration gases. The Plant Operators will not accept a cylinder of calibration gas from stores without the accompanying certification paperwork. Copies of certification forms for all calibration gas cylinders that are in-use are attached to each of the bottles. Each cylinder of gas shall be identified with a label that contains the following information:

- Cylinder identification number
- Certified concentration of the cylinder gas, in ppm (NO_x) or percent (O_2)
- Date of the assay/certification
- Balance of gas in the mixture
- Certification expiration date
- Identification of the reference standard used
- Identification of the laboratory where the calibration gas was certified and the analyst who performed the certification
- Statement that the assay/certification was performed according to those procedures specified in §5.1.4 of Appendix A to 40 CFR Part 75

When cylinders are replaced, the Plant Operators enters the new calibration gas cylinder data (i.e., cylinder number and concentration) into a calibration gas log. He also enters the calibration gas cylinder concentration into the DAHS. A calibration check will be performed following the replacement of a calibration cylinder to verify the calibration gas concentration. The cylinder certification of analysis forms are also maintained at the plant site in a format suitable for Agency inspection for a minimum of five (5) years.

Note – For NO_x calibration gases ensure that the total NO_x concentration is entered into the DAHS as opposed to the nitric oxide (NO) value only.

4.3.2 Daily Calibration Error Test (NO_x and O_2)

The calibration of each CEMS is manually checked daily (approximately 24 hours apart to the extent practicable) while the unit is operating at normal, stable conditions, (i.e., "on-line"). Off-line calibration tests are also permitted according to the procedures outlined in 40 CFR Part 75, Appendix B, §2.1.1.2.

Daily calibration error tests are controlled by the DAHS. Per §6.3.1 of Appendix A to 40 CFR Part 75, the analyzers are to be challenged at two calibration levels as required by US EPA specifications. The two levels are: (1) zero-level (0.0 to 20.0% of span) and (2) high-level (80.0 to 100.0% of span). Alternatively, a mid-level calibration gas (50.0 to 60.0% of span) may be used in lieu of the high-level gas if it more closely approximates the actual effluent concentration. No zero-level adjustments are to be made before the high-level checks are completed (or vice-versa). Following a "passing" calibration error test, data are prospectively considered valid for 26 clock hours (i.e., 24 hours plus a 2-hour grace period) unless another assessment (i.e., calibration error test, quarterly linearity check or RATA) is failed during that period. For units using dual-span monitors, the daily calibration error test shall be performed on each scale/span that has been used since the previous calibration error test.

In accordance with §2.1.3 of Appendix B to 40 CFR Part 75, an additional calibration error test is required whenever:

- A calibration error test is failed,
- A monitor is returned to service following repair or corrective maintenance, or
- After making routine or non-routine calibration adjustments.

A routine adjustment is a manual analyzer adjustment to bring the readings as close as practicable to the known calibration gas tag value(s). Routine adjustments are permitted after any successful calibration error test. A non-routine adjustment is a manual adjustment to bring the readings away from the calibration gas tag value. Consistent with Question 10.35 of the *Part 75 Emissions Monitoring Policy Manual*, non-routine adjustments may be necessary since calibration gas concentration are only guaranteed accurate to within 2% of the tag value.

Non-routine adjustments are only permitted prior to (but not during) linearity checks and RATAs and at other times, provided sufficient technical justification is provided in the QA/QC Plan. An additional calibration error test must be conducted after each routine or non-routine adjustment.

After a routine adjustment, the calibration error must be less than or equal to twice the applicable performance specification (i.e., 5.0 % of span for NO_x; 1.0 % absolute difference for O_2). After a non-routine adjustment, the calibration error must be less than or equal to the applicable performance specification (i.e., 2.5 % of span for NO_x; 0.5 % absolute difference for O_2).

In addition, a NO_x monitor for which the calibration error exceeds 5.0% of the span value shall not be considered out-of-control if the absolute difference between the reference value of the calibration gas and the monitoring system response is less than or equal to 5.0 ppm for span values less than or equal to 50 ppm. For span values of greater than 50 ppm but less than or equal to 200 ppm, the NO_x monitor shall not be considered out-of-control if the absolute difference between the reference value of the calibration gas and the monitoring system response is less than or equal to 10.0 ppm.

A start-up grace period of up to eight (8) clock hours is allowed for an affected unit before an on-line calibration error test must be performed, provided that the following requirements are met:

- Unit is in a start-up condition and a start-up event must have begun, as evidenced in US EPA EDR Hourly Operating Data by a change in the unit operating time from zero in one clock hour to a positive operating time in the next clock hour.
- The last on-line calibration error test must have been completed and passed within 26 clock hours before the hour in which the unit last operated.
- The monitoring system is not “out-of-control” with respect to other required quality assurance tests.

During the start-up grace period, data collected by the CEMS are considered valid. Whenever one or more clock hours within the 8-hour grace period overlaps with clock hours that are within

a 26-hour period associated with a previous on-line calibration error test, CEM data validation is governed by whichever time period expires last.

Off-line calibrations may be used to validate data during unit start-up if the following three conditions are met:

- An off-line calibration demonstration must have been completed and passed according to the procedures of §2.1.1.2 of Appendix B to 40 CFR Part 75.
- An on-line calibration error test must have been completed and passed within the previous 26 unit operating hours, and
- An off-line calibration error test must have been completed and passed within the previous 26 clock hours.

Equation 4-1 is found in §7.2.1 of Appendix A to 40 CFR Part 75 and is used to determine the calibration error:

$$CE = \frac{|R - A|}{S} \times 100 \qquad \text{<Equation 4-1>}$$

Where:

CE	=	Percentage calibration error based upon instrument span
R	=	Reference value of zero- or upscale-level calibration gas introduced into the CEMS
A	=	Actual monitoring system response to the calibration gas
S	=	Span of the instrument

The typical calibration gas concentrations used for daily calibration error tests are listed in Table 4-1.

Table 4 - 1. Calibration Gas Ranges Units 1 – 4

		Calibration Gas Values (% of span)[1]		
Calibration Gas	**Instrument Span**	**Zero-Level (0.0-20.0%)**	**Mid-Level (50.0–60.0%)**	**High-Level (80.0–100.0%)**
NO_x	0–100 ppm (high)	0.0–20.0 ppm	50.0-60.0 ppm	80.0-100.0 ppm
	0–20 ppm (low)	0.0–4.0 ppm	10.0-12.0 ppm	16.0-20.0 ppm
O_2	0–25.0%	0.0 – 5.0%	12.5-15.0%	20.0 – 25.0%

[1]A zero-level AND EITHER a high-level OR mid-level gas must be used.

At a minimum, the analyzers are considered out-of-control and should be recalibrated whenever the daily error at either the zero- or high-level checkpoint exceeds the out-of-control limits listed below in Table 4-2. Recalibration whenever the daily error exceed the established "maintenance limit" is optional based upon operator experience with the instrument or knowledge of other details

such as changing barometric pressure, etc. The NO_x CEMS is considered out-of-control whenever either the NO_x or O_2 monitor component exceeds the applicable out-of-control limits.

Table 4 - 2. Gaseous Analyzer Out-of-Control Limits

	Out-of-Control Limits	
Analyzer	**Primary Criteria**	**Alternative Criteria**
NO_x (≤ 50 ppm span)	≤ 5.0% CE	≤ 5.0 ppm (R–A)
NO_x (span > 50 ppm, but ≤ 200 ppm)	≤ 5.0% CE	≤ 10.0 ppm (R–A)
O_2	≤ 1.0% (R–A)	None

4.3.2.1 Daily calibration error test data validation procedures. Whenever a daily calibration error test is failed, data from the applicable monitor are considered invalid beginning with the hour of a failed test until the hour in which a subsequent calibration error test is passed. For dual-range analyzers, whenever a calibration error test is failed at one range, a successful calibration error test must be completed at both ranges before the data are considered valid.

A passed calibration error test may be used to prospectively validate data for the hour in which it is performed only if, after completion of the test, the minimum data collection requirements are met for the clock hour (i.e., following the calibration error test, at least one valid data point is obtained in each of two (or more) 15-minute quadrants of the hour).

Analyzer outputs during the daily calibration error test are processed by the DAHS, which computes and records drift values and automatically flags a calibration failure alarm. Low-level and high-level drift values are printed out as part of the daily preventive maintenance report. Calibrations are reviewed regularly by the Plant Operators to determine if the calibration error out-of-control limits listed above are exceeded.

Corrective maintenance is performed by the Plant Operators anytime a calibration error out-of-control limit is exceeded. Corrective maintenance is conducted in accordance with the relevant CEMS component manufacturer's standard operation and maintenance/troubleshooting procedures or the site's relevant standard operating procedures. Results of the corrective maintenance procedures are documented in the maintenance log. The calibration error test procedure is then repeated to demonstrate that the corrective maintenance procedures were successful.

4.3.4 Daily QC Activities

Quality control checks may be defined as all those checks performed on a routine basis such as system inspection, periodic calibrations, and routine preventative maintenance. A suggested schedule for performing quality control checks can be found in Appendix B to this QA/QC Plan.

4.4 QUALITY CONTROL ACTIVITIES FOR FUEL FLOW METERS

The orifice-plate meters installed at Sumpter Combustion Turbine Facility do not require any specific daily QC activities. However, there are fuel sampling requirements for pipeline natural gas.

4.4.1 Monthly Gas Samples

The Sumpter Combustion Turbine Facility will determine the GCV of the pipeline natural gas at least once each calendar month. The procedures used to determine the GCV of pipeline natural gas are maintained in the CEM files. The GCV of the pipeline natural gas shall be determined using one of the approved methods identified in §2.3.4 of Appendix D to 40 CFR Part 75. The procedures used to determine the GCV of pipeline natural gas are maintained in the CEM files. In short, the GCV is normally obtained from the supplier. The GCV is recorded daily by the supplier and the average monthly value is utilized by Sumpter Combustion Turbine Facility for the calendar month. The GCV will be entered into the DAHS and the data will be updated appropriately. For months where a unit operates for greater than or equal to 48 hours, the GCV value from the most recent monthly sample shall be used to calculate heat input. For calendar months where a unit operates less than 48 hours, heat input is calculated from the highest GCV value from either:

- The most recent monthly sample,
- The highest value specified in the pipeline tariff or contract (unless the most recent monthly sample is higher), or
- The highest GCV value from the previous year (unless the most recent monthly sample is higher).

If a unit operates less than 48 hours during a calendar month, then the sampling and analysis requirement for determining the GCV is waived for that calendar month. This waiver is limited by the condition that at least one analysis for GCV must be conducted each quarter that the unit operates for any amount of time.

The SO_2 emission rate is calculated using the default emission rate of 0.0006 lb/mmBtu and procedures specified in Appendix D to 40 CFR Part 75.

4.4.2 Annual Gas Samples

The sulfur content of the pipeline natural gas must be determined annually in order to comply with 40 CFR 72.2 definition of pipeline natural gas through annual testing or valid tariff or contract sheet.

SECTION 5
QUALITY ASSURANCE ACTIVITIES

5.1 INTRODUCTION

QA activities for the CEMS include audits performed by the Plant Operators or independent contractors (e.g., linearity checks, RATAs), and periodic checks and reviews performed by the Director, Environmental Services. Table 5-1 presents a list of all QA activities for the CEMS.

The Chief Operator initiates all vendor QA activities, and with the assistance of the Plant Operators, oversees QA activities performed by contractors. The Plant Operators performs corrective maintenance when necessary based on the results of the QA activities. The Director, Environmental Services incorporates the applicable data resulting from the QA activities in the DAHS.

Table 5 - 1. CEMS Quality Assurance Activities

Audit	Frequency
Linearity	Quarterly
RATA	Semiannually or Annually
Span Evaluation	Annually
Primary Element Inspection	12 Calendar Quarters
Transmitter Accuracy Test	Every 4 Fuel Flow Meter QA Operating Quarters
System Appraisal	Periodically

5.2 QUALITY ASSURANCE ACTIVITIES FOR CEMS

The QA activities for the gaseous concentration CEMS either meet or exceed the requirements set forth in Appendices A & B to 40 CFR Part 75 and Appendices B. These QA activities consist of linearity checks, RATAs and system appraisals.

Table 5-2 provides a QA audit summary for the effluent CEMS and Table 5-3 provides an equivalent QA audit summary for the fuel flow meters.

Table 5 - 2. CEMS QA Audit Summary

Quality Assurance Audits	Frequency	NO_X	O_2
Linearity Check	Quarterly[1,2]	≤ 5.0% or ± 5 ppm	≤ 5.0% or ± 0.5% O_2
RATA	Semiannual	≤ 10.0%	NA[3]
RATA	Annual[4]	≤ 7.5%	NA[3]
Span Evaluation	Annual	✓	✓
System Appraisal	Periodically	✓	✓
Quality Control Audits			
Calibration Error Test	Daily	≤ 2.5%[5]	≤ 0.5%[5]

[1] Every unit QA Operating Quarter which is defined as any quarter in which a unit operates for ≥ 168 cumulative operating hours.
[2] In accordance with §6.2 of Appendix A to 40 CFR Part 75, since the span value for the low range of the NO_x analyzer is ≤ 30 ppm, the low range of NO_x analyzer is exempt from the linearity requirements.
[3] O_2 (diluent) is part of NO_x CEMS.
[4] Conduct RATA annually (i.e., four QA Operating Quarters) if the previous relative accuracy (RA) for NO_x CEMS was ≤ 7.5%.
[5] Whenever the calibration error or calibration drift exceeds twice the applicable audit limit, the monitor is considered out of control pending corrective maintenance and successful recalibration.

Table 5 - 3. Fuel Flow Meter QA Audit Summary

Quality Assurance Audits	Frequency	Audit Limits
Transmitter Accuracy Test	Every 4 Fuel Flow Meter QA Operating Quarters[1,2]	≤ 1.0% of full-scale
Primary Element Inspection (and/or Replacement)	12 Calendar Quarters	N/A

[1] Every unit operating quarter which the unit combusts fuel measured by the fuel flow meter for at least 168 cumulative operating hours.
[2] Notwithstanding these requirements, no more than 20 successive calendar quarters shall elapse after the quarter in which a fuel flow meter was last tested for accuracy with a subsequent flow meter accuracy test having been conducted.

5.2.1 Linearity Check (NO_x and O_2)

A 3-point linearity check is performed once each unit QA operating quarter by the Plant Operators (or contractor) for each analyzer of the gaseous CEMS. A QA unit operating quarter is defined as any quarter in which a unit operates for greater than or equal to 168 cumulative operating hours; where a unit operating hour is any hour or partial hour that a unit combusts fuel.

A linearity check is not required for a calendar quarter in which an affected unit operates for less than 168 cumulative operating hours. However, no more than four calendar quarters shall elapse since the last linearity check was performed.

If a linearity check has not been performed by the end of the fourth calendar quarter since the last linearity check, then the linearity check must be completed within 168 consecutive unit operating hours after the end of the calendar quarter. Refer to Section 5.2.1.1 of this QA/QC Plan for information concerning the linearity check grace period and associated data validation procedures.

Notwithstanding these requirements, in accordance with §6.2 of Appendix A to 40 CFR Part 75, since the span value for the low range of the NO_x analyzer is less than or equal to 30 ppm, the low range of the NO_x analyzer is exempt from (any) linearity requirements.

The linearity check is conducted in accordance with the requirements specified in §2.2.1 of Appendix B to 40 CFR Part 75. Linearity checks are performed no less than 30 days apart, to the extent practicable. Additionally, linearity checks may be required as a diagnostic test to verify proper CEMS operation following corrective action. Reference Section 5.6 of this QA/QC Plan for information concerning US EPA diagnostic test requirements.

Before initiating a linearity check, routine and non-routine calibration adjustments can be made to the analyzers. Consistent with Question 10.35 of the *Part 75 Emissions Monitoring Policy Manual*, non-routine calibration adjustments may be required due to the fact that calibration gas values are only guaranteed to be within 2% of the tag value.

A routine adjustment is a manual analyzer adjustment to bring the readings as close as possible to calibration gas tag value. A non-routine adjustment is a manual adjustment to bring the readings away from the calibration gas tag value. An additional calibration error test must be conducted after each routine or non-routine adjustment.
After a routine adjustment, the calibration error must be less than twice the applicable performance specification (e.g., 5.0% of span for NO_x; 1.0% absolute difference for O_2). After a non-routine adjustment, the calibration error must be less than or equal to the applicable performance specification (e.g., 2.5% of span for NO_x; 0.5% absolute difference for O_2).

Before initiating a linearity check, trial gas injections may also be performed for the purpose of optimizing the performance of the CEMS. The results of the trial injections do not affect the status of the conditionally valid data if the specifications listed below are met:

1) For gas injections, the stable, ending monitor response is within ±5 percent or within 5 ppm of the tag value of the reference gas.
2) No adjustments to the calibration of the CEMS are made following the trial injection other than routine or non-routine adjustments permitted under §2.1.3 of Appendix B to 40 CFR Part 75.
3) No repairs, reprogramming or re-linearizations are performed following the trial gas injections

If these specifications are not met, then the trial gas injection must be treated as a failed linearity check and the results reported in the quarterly EDR. Data from the monitor(s) are invalid until a probationary calibration error test is conducted following corrective action. The probationary calibration error initiates a conditionally valid data period.

Linearity checks that are aborted or invalidated due to problems with the reference calibration gases or operational problems with the affected unit do not affect the validation status of the emissions data and need not be reported. A record of the linearity checks, including trial injections and partial tests (whether reported or not), must be maintained on-site in a format suitable for Agency inspection.

For the linearity check, the audit gases are introduced at a connection on the probe. Each CEMS is challenged three times at each of the three calibration levels (low, mid, and high) while the unit is combusting fuel at conditions of typical stack temperature and pressure; it is not necessary for the unit to be generating electricity. Reference gases at a particular level are never used twice in succession. The three calibration gas levels are defined by 40 CFR Part 75 as:

1) Low-level concentration equals 20.0 to 30.0% of span,
2) Mid-level concentration equals 50.0 to 60.0% of span, and
3) High-level concentration equals 80.0 to 100.0% of span.

Only certified US EPA Protocol gases will be used to perform linearity checks. The calibration gases must also meet the requirements specified in Section 4.3.1 of this QA/QC Plan. The nominal concentrations of audit gases for the linearity check are provided in Table 5-4.

Table 5 - 4. Nominal Concentrations of Audit Gases for Linearity Checks – Units 1-4

		Calibration Gas Values (% of span)		
Analyzer	**Span**	**Low-Level (20.0-30.0%)**	**Mid-Level (50.0–60.0%)**	**High-Level (80.0–100.0%)**
NO_x[1]	0–100 ppm	20.0–30.0 ppm	50.0–60.0 ppm	80.0–100.0 ppm
O_2	0–25%	5.0–7.5%	12.5–15.0%	20.0–25.0%

[1] In accordance with §6.2 of Appendix A to 40 CFR Part 75, since the span value for the low range of the NO_x analyzer is ≤ 30 ppm, the low range of NO_x analyzer is exempt from the linearity requirements.

Once a linearity check has been commenced, the test shall be done hands off. That is, no adjustments of the monitor are permitted during the linearity test period, other than the routine calibration adjustments following daily calibration error tests.

Results of the linearity checks are unacceptable if, at any of the three gas concentration levels, the NO_x analyzer reading differs from the audit gas concentration by more than 5.0% of the audit gas concentration, or if the absolute value of the difference between the average of the monitor responses and the average of the audit gas concentrations exceeds 5 ppm NO_x, whichever is least restrictive. For O_2, the linearity checks are unacceptable if, at any of the three gas concentration levels, the deviation of the monitor reading is more than 5.0% of the audit gas concentration, or if the absolute value of the difference between the average of the monitor response and the average of the audit gas concentrations exceeds 0.5% O_2, whichever is least restrictive.

Table 5-5 lists the performance specifications for linearity checks.

Table 5 - 5. Linearity Check Performance Specifications

Analyzer	Performance Specifications
NO_x	≤ 5.0% LE or ≤ 5 ppm (R–A)
O_2	≤ 5.0% LE or ≤ 0.5% (R–A)

An analyzer is considered out-of-control from the time that an unacceptable linearity check is completed until the time that an acceptable linearity check is completed, following corrective maintenance. The NO_x CEMS is considered out-of-control whenever either monitor component (NO_x or O_2) exceeds the applicable linearity error limits. Data remain out-of-control until the successful completion of a subsequent linearity check, unless the data validation procedures specified in 40 CFR Part 75, §75.20(b)(3)(ii) are followed.

When necessary, corrective maintenance is conducted and documented by the Plant Operators in accordance with established corrective action procedures detailed in the operation and maintenance plans. Upon completion of corrective action, a probationary calibration test is performed to initiate a conditionally valid data period before conducting a subsequent linearity check.

The equation used to determine the results of the linearity check is as follows:

$$LE = \frac{|R - A|}{R} \times 100 \qquad \text{<Equation 5-1>}$$

Where:

LE	=	Percentage linearity error based upon the reference value of the audit calibration gas
R	=	Reference value of low-, mid-, or high-level calibration gas introduced into the CEMS
A	=	Average of the monitoring system responses

5.2.1.1 Linearity check grace period. When a linearity check has not been completed by the end of the unit QA operating quarter in which it is due, or if due to infrequent unit operating four successive calendar quarters have elapsed since the previous linearity check without conducting a subsequent linearity check, Sumpter Combustion Turbine Facility has a 168 consecutive unit operating hour grace period to perform the required test. The grace period begins with the first unit operating hour following the calendar quarter in which the linearity check was due. If, at the end of the 168-unit operating hour grace period the linearity check has not been completed, data is invalid beginning with the hour following the expiration of the grace period. Data from the monitoring system remains invalid until the hour of completion of a successful hands-off linearity check.

When a linearity check is conducted within a grace period for the purposes of satisfying the requirement of a previous unit QA operating quarter, the results of that linearity check may only be used to meet the requirements of the previous quarter and not the quarter in which the missed linearity check is completed.

A "1" code must be reported in the grace period indicator element of the linearity check data record whenever a grace period is used to meet the linearity check requirement.

Refer to Figure C-1 of Appendix C to the QA/QC Plan for an illustration of data validation procedures associated with linearity grace periods.

5.2.1.2 Linearity check data validation procedures. If a calibration error test is failed before completing the linearity, the linearity must be repeated. Data from the monitor system is invalidated prospectively from the hour of the failed calibration error test until the hour of successfully completing a subsequent calibration error test.

If a linearity check is failed or aborted due to problems with the CEMS, data from the monitoring system is invalidated prospectively from the hour of the failed or aborted linearity check until the completion of a probationary calibration error test which initiates a conditionally valid data period.

If a subsequent linearity test is successfully completed, the conditionally valid data collected beginning with the hour of completing the probationary calibration error test until the hour of completing the linearity check is considered to be quality-assured data.

If a probationary calibration error test is not performed, data is invalid from the hour of the failed or aborted linearity check until the hour of completing a successful linearity check.

Refer to Figure C-2 of Appendix C to this QA/QC Plan for an illustration of data validation procedures associated with test period expiration and probationary calibration error test.

5.2.3 Relative Accuracy Test Audit (NO_x–diluent CEMS)

A RATA is performed semiannually (i.e., once every two successive QA operating quarters) or annually (i.e., once every four successive QA operating quarters) based on the previous RATA results for each NO_x-diluent CEMS. RATAs are conducted in accordance with the requirements specified in Appendices A and B to 40 CFR Part 75. A RATA is conducted on an annual basis only if the previous RATA results meet the requirements specified in §2.3.1 of Appendix B to 40 CFR Part 75. Specifically, a RATA is performed on an annual basis if:

- The previous relative accuracy (RA) for a gaseous monitor or monitoring system was 7.5% or less; or
- For units with low NO_x emission rates (average NO_x emission rate measured by the reference method during the RATA ≤ 0.200 lb/mmBtu), when a NO_x-diluent continuous emission monitoring system fails to achieve a relative accuracy of ≤

7.5%, but the monitoring system mean value from the RATA, calculated using Equation A-7 in Appendix A to 40 CFR Part 75, is within ± 0.015 lb/mmBtu of the reference method mean value. *Each of the four- (4) units addressed in this QA/QC Plan have typical operating levels of less than 0.200 lb/mmBtu NO_x. Hence, the alternative criteria (lb/mmBtu mean difference) will apply during any RATA test program.*

If the RA was greater than 7.5% (and less than or equal to 10%), and fails to qualify and meet the alternate low NO_x emission rate specifications, then the RATA is conducted semiannually. A RATA must be performed within eight successive calendar quarters since the last RATA. Table 5-7 summarizes the standard and alternative criteria for performing annual or semi-annual RATAs.

Table 5 - 6. 40 CFR Part 75, Appendices A and B RATA Requirements

	Relative Accuracy (RA)			
	Standard Criteria		Alternative Criteria	
Analyzer	***Semi-Annual***	***Annual***	***Semi-Annual***	***Annual***
NO_x CEMS	7.5% < RA ≤ 10.0%	RA ≤ 7.5%	±0.020 lb/mmBtu	±0.015 lb/mmBtu

Each single load RATA must be completed within a period of 168 consecutive unit operating hours, while the unit combusts its normal fuel. There is no limit to the number of RATAs that can be conducted in an effort to achieve the results required to qualify for the annual test frequency. Consistent with §2.3.2(h) of Appendix B to 40 CFR Part 75, an attempted RATA can be annulled depending on the nature of the problem encountered during the RATA. If the reason for discontinuing a RATA is unrelated to the performance of the CEMS being tested (e.g., problems with the reference method or with the affected unit(s)), any valid test runs that were completed prior to the occurrence of the problem may either be used as part of the official RATA or the runs may be disregarded and the RATA re-started. However, if a RATA is aborted due to a problem with the CEMS, the test is considered invalid and must be repeated. In such cases, none of the runs in the aborted test may be used as part of the official RATA. The aborted test may not be disregarded (since it affects data validation), and must be reported in the quarterly EDR. No adjustments, corrective actions, repairs, or replacements will be made to the CEMS during a RATA other than the routine calibration adjustments following daily calibration error tests.

Each RATA may be done:

1) "Cold" (i.e., with no corrective maintenance, repair, calibration adjustments, re-linearization or reprogramming of the monitoring system prior to testing, or
2) After performing routine and non-routine calibration adjustments, or
3) After repair, maintenance, re-linearization or reprogramming of the monitoring system.

Consistent with Question 10.35 of the *Part 75 Emissions Monitoring Policy Manual*, non-routine calibration adjustments may be required due to the fact that calibration gas values are only guaranteed to be within 2% of the tag value.

A routine adjustment is a manual analyzer adjustment to bring the readings as close as possible to calibration gas tag value. A non-routine adjustment is a manual adjustment to bring the readings away from the calibration gas tag value. An additional calibration error test must be conducted after each routine or non-routine adjustment.

After a routine adjustment, the calibration error must be less than twice the applicable performance specification (e.g., 5.0% of span for NO_x; 1.0% absolute difference for O_2). After a non-routine adjustment, the calibration error must be less than or equal to the applicable performance specification (e.g., 2.5% of span for NO_x; 0.5% absolute difference for O_2).

Before initiating a RATA, trial RATA runs may be performed as a means to check the accuracy of the CEMS. The results of the trial runs do not affect the status of the quality-assured or conditionally valid data if the specifications listed below are met.

1) For trial RATA runs, the average reference method reading and the average CEMS differ by no more than ±10% of the average reference value or ±15 ppm or ±0.02 lb/mmBtu.
2) No adjustments can be made to the calibration (other than those specified in §2.1.3 of Appendix B to 40 CFR Part 75) of the CEMS following the trial runs, and
3) No repairs, reprogramming or re-linearizations are performed following the trial runs.

If these limitations are exceeded then the trial runs must be treated as a failed RATA and the results reported in the quarterly EDR.

If the RATA is performed after repair, corrective maintenance, relinearization or reprogramming of the monitoring system, the monitoring system shall be considered out-of-control from the hour

in which the repair, corrective maintenance, relinearization of reprogramming is commenced until the RATA has been passed unless a probationary calibration has been passed initiating a conditionally valid data period.

The Chief Operator makes all arrangements for a test contractor to perform the RATAs. The Director, Environmental Services enters the test results into the DAHS. The Chief Operator maintains the RATA results on file at the plant. RATA checks which are aborted or invalidated due to problems with the reference method or operational problems with the affected unit do not affect the validation status of the emissions data and need not be reported. A record of all RATA runs, including trial RATA runs, (whether reported or not) must be maintained on-site in a format suitable for Agency inspection. All RATA test results from the test contractor are verified by the Chief Operator.

The audit is performed at normal operating load while the unit combusts its normal fuel. A minimum of nine 21-minute test runs are performed per audit. Additional runs may be performed but only a maximum of three tests may be rejected and the total number of test results used to determine the relative accuracy or bias must be greater than or equal to nine. Additional data, including the rejected runs, are reported in the quarterly EDR.

Table 5-8 provides a summary of the RATA test run calculation and reporting requirements as outlined in 40 CFR Part 75, Appendix A, §6.5.9 and Appendix B, §2.3.1.4.

Table 5 - 7. 40 CFR Part 75 RATA Test Run Calculation and Reporting Requirements

Number of RATA Test Runs (N) –			
Performed	**Used In Calculations**	**Excluded From Calculations**	**Reported**
9 *(minimum)*	9	0	9
10	9	1	10
11	9	2	11
12	9	3 *(maximum)*	12
N ≥ 13	N–3	3 *(maximum)*	N

The RATA results are acceptable if the relative accuracy is less than or equal to 10.0% for NO_x and O_2 analyzers. A monitor or monitoring system is considered out-of-control beginning at the time of a failed RATA and ending at the time of a successful RATA, following corrective maintenance, unless the data validation procedures specified in 40 CFR Part 75, §75.20(b)(3)(ii) through (ix) are followed.

When necessary, corrective maintenance is performed and documented by the Plant Operators in accordance with established corrective maintenance procedures specified in CEMS vendor O&M manuals. Following corrective action, another RATA is conducted. Data remain out-of-control until the successful completion of a subsequent RATA, unless a probationary calibration is performed following the corrective maintenance that initiates a conditionally valid data period.

5.2.2.1 Bias test. At the conclusion of each RATA, a bias test is conducted using the data sets collected for the RATA. If the monitor fails to meet the bias requirements, then a bias adjustment factor is applied to the subsequent monitor data values starting with the first clock hour following the hour in which the RATA was completed.

5.2.2.2 RATA grace period. §2.3.3 of Appendix B to 40 CFR Part 75 provides the owner or operator with a grace period of 720 consecutive unit operating hours to complete a required RATA whenever (1) a required RATA was not performed in the unit QA operating quarter that it was required; or (2) eight successive calendar quarters have elapsed since the quarter in which the last RATA was passed. The grace period begins with the first unit operating hour after the quarter in which the RATA was required.

Data validation during a RATA grace period shall be done in accordance with the applicable provisions in §2.2.3 of Appendix A to 40 CFR Part 75. If, at the end of the 720-unit operating hour grace period, the required RATA has not been completed, data from the monitoring system shall be invalid, beginning with the hour following the expiration of the grace period. Data from the monitoring system remain invalid until the hour of completion of a subsequent successful hands-off RATA.

When a RATA is conducted within a grace period for the purpose of satisfying the RATA requirement from a previous QA operating quarter, the schedule for the subsequent RATA is determined from the quarter in which the RATA was originally due. If, however, a RATA deadline determined in this manner is less than two QA operating quarters from the quarter in which the missed RATA is completed, the RATA deadline is reset at two QA operating quarters from the quarter in which the missed RATA is completed.

A “1” code must be reported in the grace period indicator element of the RATA data record whenever a grace period is used to meet the RATA requirement.

Refer to Figure C-3 of Appendix C to this QA/QC Plan for illustrations of data validation procedures associated with RATA grace periods.

5.2.2.3 Data validation. If a calibration error test is failed before completing the RATA, the RATA must be repeated. Data from the monitor system is invalidated prospectively from the hour of the failed calibration error test until the hour of successfully completing a subsequent calibration error test.

For a RATA performed "cold" or after performing only routine or non-routine calibration adjustments, if a RATA is failed or aborted due to problems with the CEMS, data from the monitoring system is invalidated prospectively from the hour of the failed or aborted RATA until the completion of a probationary calibration error test which initiates a conditionally valid data period. The data remains valid provided all required QA/QC tests are passed. If a probationary calibration error test is not performed, data are invalid from the hour of the failed or aborted RATA until the hour of completing a successful RATA.

For a RATA performed after repair, corrective maintenance, re-linearization or reprogramming, if a RATA is failed or aborted due to problems with the CEMS, all conditionally valid emission data recorded by the CEMS are invalidated, from the hour of commencement of the test period (i.e., hour in which the probationary calibration was performed) until the completion of a new probationary calibration test which initiates a new conditionally valid data period. The data recorded following the new probationary calibration test remains valid provided all required QA/QC tests are passed. If a new probationary calibration error test is not performed, data are invalid from the hour of the failed or aborted RATA until the hour of completing a successful RATA.

Refer to Figure C-4 of Appendix C to this QA/QC Plan for an illustration of data validation procedures associated with test period expiration and probationary calibration error test.

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5.3 QUALITY ASSURANCE ACTIVITIES FOR FUEL FLOW METERS

The QA activities for the Sumpter Combustion Turbine Facility fuel flow meters meet the requirements set forth in Appendix B and D to 40 CFR Part 75. The QA activities conducted on the fuel flow meters include, as applicable, a periodic primary element inspection, transmitter accuracy tests and a system appraisal. Table 5-9 indicates the frequency for each audit.

Table 5 - 8. Fuel Flow Meter Quality Assurance Activities

Audit	Frequency
Primary Element Inspection	12 Calendar Quarters
Transmitter Accuracy Test	Every 4 Fuel Flow Meter QA Operating Quarters

5.3.1 Transmitter Accuracy Test

A transmitter accuracy test shall be performed on each orifice-plate fuel flow meter once every four successive fuel flow meter QA operating quarters. A fuel flow meter QA operating quarter is defined as a calendar quarter in which the unit combusts the fuel measured by the fuel flow meter for at least 168 cumulative operating hours, where a unit operating hour means any hour (or fraction of an hour) during which a unit combusts the fuel measured by the fuel flow meter.

No more than twenty successive calendar quarters shall elapse since the quarter in which a fuel flow meter was last tested without performing a subsequent transmitter accuracy test.

A transmitter accuracy test may also be required as a recertification/diagnostic test following a fuel flow meter repair (reference Section 5.6 of this QA/QC Plan). Appendix B of this QA/QC Plan provides a copy of the transmitter accuracy test form.

The fuel flow meter differential pressure, temperature and static pressure transmitters are calibrated using test equipment that has a current certificate of traceability to NIST standards. The calibration of each transmitter is performed by comparing its readings to that of the NIST traceable equipment at least once at each of three levels.

The three levels are defined as: (1) zero-level and two other levels (e.g., “mid” and “high”) such that the full range of the transmitter readings corresponding to normal unit operation is represented. For temperature transmitters, the zero and upscale levels may correspond to fixed reference points, such as the freezing point or boiling point of water.
The accuracy of each transmitter or transducer at each level tested is calculated using Equation 5-2.

$$ACC = \frac{|R - T|}{FS} \times 100 \qquad \text{<Equation 5-2>}$$

Where:

ACC	=	Accuracy of the transmitter or transducer as a percentage of full scale
R	=	Reading of the NIST traceable reference value (in mA, in. H_2O, psi, or degrees)
T	=	Reading of the transmitter or transducer being tested (in mA, in. H_2O, psi, or degrees)
FS	=	Full scale range of the transmitter or transducer being tested (in mA, in. H_2O, psi, or degrees)

The specified fuel flow meter accuracy of 2.0 percent of full scale is considered to be met at all levels, if each transmitter meets an accuracy of 1.0 percent of its full scale range at each of the loads tested. If one or more of the transmitters does not meet the accuracy of 1.0 percent of full scale range at a particular level, Sumpter Combustion Turbine Facility may demonstrate that the fuel flow meter meets the total flow meter accuracy specification of 2.0 percent at that level by using one or more of the alternate methods listed below.

1) If, at a particular level, the sum of the individual accuracies of the three transmitters is ≤ 4.0 percent, then the flow meter accuracy specification is considered to be met at that level.
2) If, at a particular level, the total flow meter accuracy is 2.0 percent or less, when calculated in accordance with Part 1 of American Gas Association (AGA) Report No. 3, General Equations and Uncertainties Guidelines, the fuel flow meter accuracy is considered to be met.

A record of the orifice-plate fuel flow meter accuracy or its individual transmitters or transducers shall be kept in a file suitable for Agency inspection.

Results of the transmitter accuracy test shall be included by reporting a TEST SUMMARY DATA record and a TRANSMITTER TRANSDUCER DATA record in the QA EDR. Refer to the US EPA *ECMPS Reporting Instructions Quality Assurance and Certification* for specific reporting instructions.

Note: Records of transmitter accuracy tests should include a copy of the NIST certification for the reference equipment used to conduct the test.

5.3.2 Primary Element Inspection

A visual inspection of the primary element for orifice-plate fuel flow meters shall be conducted at least once every twelve (12) successive calendar quarters. This inspection may be performed utilizing a boroscope.

If a visual inspection is failed (i.e., if the primary element is corroded or damaged), then Sumpter Combustion Turbine Facility shall perform one of the three corrective action procedures specified in Appendix D to 40 CFR Part 75, as listed below.

1) Replace the primary element with another element meeting the requirements of AGA Report No. 3 or ASME MFC-3M-2004 (Note: if the primary element size changes, also calibrate the transmitters or transducers, consistent with the new primary element size); or
2) Replace the primary element and demonstrate that it meets the 2.0 percent accuracy specification in accordance with the procedures specified in §2.1.5.2 of Appendix D to 40 CFR Part 75; or
3) Restore the corroded or damaged element to "as new" condition and determine the overall accuracy of the flow meter using the requirements specified in AGA Report No. 3 or ASME MFC-3M-2004. The transmitters will also be retested prior to collecting quality-assured data from the flow meter. If the primary element size is changed, the transmitters will be calibrated with the new primary element size.

Results of the primary element inspections are reported by submitting TEST SUMMARY DATA and TRANSMITTER TRANSDUCER DATA records in the QA EDR. Refer to the US EPA *ECMPS Reporting Instructions Quality Assurance and Certification document* for specific reporting instructions.

Note: In some instances a QA CERTIFICATION EVENT DATA record must be included in the quarterly EDR whenever a fuel flow meter primary element is replaced. Refer to the US EPA ECMPS Reporting Instructions Quality Assurance and Certification document for QA CERTIFICATION EVENT DATA reporting guidelines.

5.3.3 Data Validation for Failed Fuel Flow Transmitter Accuracy Test

If, during a transmitter accuracy test, the flow meter accuracy specification of 2.0 percent is not met at <u>any</u> of the levels tested, repair or replace the transmitter(s) as necessary until the flow meter accuracy specification has been achieved at all levels. (Note that only transmitters that are repaired or replaced need to be re-tested; however, the re-testing is required at all three measurement levels, to ensure that the flow meter accuracy specification is met at each level).

The fuel flow meter is "out-of-control" and data from the flow meter are considered invalid, beginning with the date and hour of the failed transmitter accuracy test and continuing until the date and hour of completion of a successful transmitter accuracy test at all levels. In addition, if, during normal operation of the fuel flow meter, one or more transmitters malfunction, data from the fuel flow meter shall be considered invalid from the hour of the transmitter failure until the hour of completion of a successful 3-level transmitter accuracy test.

During each period of invalid orifice-plate fuel flow meter data described herein, data will be provided either from another fuel flow meter that meets the requirements of 40 CFR Part 75 or substituted for fuel flow rate using missing data procedures in §2.4.2 of Appendix D to 40 CFR Part 75.

5.3.3 Data Validation for Failed Primary Element Inspection

Data from the fuel flow meter are considered invalid, beginning with the date and hour of a failed visual inspection and continuing until the date and hour when:

1) The damaged or corroded primary element is replaced with another primary element meeting the requirements of AGA Report No. 3 or ASME MFC-3M0 2004, and if applicable, the transmitters have been successfully recalibrated; or
2) The damaged or corroded primary element is replaced, and the overall accuracy of the flow meter is demonstrated to meet the 2.0 percent accuracy specification in accordance with the procedures specified in §2.1.5.2 of Appendix D to 40 CFR Part 75; or
3) The restored primary element is installed to meet the requirements of AGA Report No. 3 or ASME MFC-3M-2004 and its transmitters are tested to meet the fuel flow meter transmitter accuracy test specifications (See Section 5.3.1 of this QA/QC Plan).

5.4 SYSTEM APPRAISAL

As an additional internal audit procedure, Wolverine periodically conducts a system appraisal to evaluate the effectiveness of the QA/QC activities outlined in this QA/QC Plan. This audit is designed to provide a redundant evaluation of Sumpter Combustion Turbine Facility performance of the procedures specified in this QA/QC Plan. Sumpter checks such details as the completeness of the recordkeeping procedures, effectiveness of the maintenance procedures, and availability of data. If audit results indicate a need to modify existing QA/QC procedures, then pertinent Wolverine personnel meet to discuss these changes. If changes are made to the QA/QC Plan, the Director, Environmental Services is responsible for revising the QA/QC Plan and distributing the revisions to the applicable personnel.

5.5 ANNUAL SPAN EVALUATION

A periodic evaluation of the maximum potential concentration (MPC), the maximum expected concentration (MEC), span and range is conducted for each CEMS analyzer, as applicable, by the Director, Environmental Services annually, at a minimum. An analysis of historical CEMS data will be conducted to ensure that a majority (>50%) of the data are between 20.0 and 80.0% of full-scale, to the extent practicable. The evaluation will include, at a minimum, data collected during the previous four calendar quarters. In accordance with §2.1 of Appendix A to 40 CFR Part 75, the data collected during the unit operating conditions listed below can be eliminated from the annual evaluation.

Data collected during short-term, non-representative unit operating conditions (e.g., trial burn of different fuel).

Changes in the manner of operation of the unit, or

Installation or removal of emission controls.

If the evaluation results indicate a need to change the span or range of an analyzer, this change must be made no later than 45 days after the end of the calendar quarter in which the need to adjust the span was identified. However, if the change in span renders the current calibration gases unsuitable for conducting daily calibration error tests and quarterly linearity checks, then up to 90 days after the end of the calendar quarter may be taken to make the required adjustment.

Whenever an analyzer span adjustment is made, the Plant Operators conducts a calibration error test. Whenever a span adjustment requires an accompanying change to calibration gas concentrations, then the Plant Operators conducts a probationary calibration error test and a linearity check. The Director, Environmental Services is responsible for updating the hardcopy Monitoring Plan.

Additionally, in accordance with Question 12.30 of the *Part 75 Emissions Monitoring Policy Manual*, whenever a Monitoring Plan is updated, submittal of the electronic and hardcopy information shall made to the appropriate US EPA Regional office and the applicable State and local agencies by the Director, Environmental Services. Results of the annual span and range evaluation must be maintained on-site in a form suitable for inspection.

Reference Figure C-5 in Appendix C to this QA/QC Plan for data validation procedures following an analyzer span change. Additionally, reference Question 13.33 of the *Acid Rain Program Policy Manual* for US EPA policy concerning annual span evaluation.

Note: A QA Certification Event Data record must be reported in the EDR whenever a span change is made that requires a linearity check as a diagnostic test.

5.6 DIAGNOSTIC TEST REQUIREMENTS

§75.20(b) of 40 CFR Part 75 now distinguishes between "recertification tests" and "diagnostic tests." Diagnostic tests are those tests required to verify that a CEMS is operating accurately following certain preventive or corrective maintenance procedures. Upon completion of any maintenance activity that may affect the system accuracy, a calibration error test is required, at a minimum. Routine or corrective maintenance, repair or replacement of minor analyzer and CEMS components generally does not require additional QA activities.

Correspondingly, maintenance activities on major analyzer or CEMS components require the completion of additional QA activities.

Consistent with the guidance provided in Question 12.10 of the *Part 75 Emissions Monitoring Policy Manual*, the Owner conducted a detailed evaluation of the CEMS components to distinguish between "major" and "minor" system components. Tables 5-10, 5-11 and 5-12 identify the diagnostic test requirements associated with major component maintenance activities for CEMS, fuel flow meters and DAHS, respectively. Appendix D of this QA/QC Plan provides a list of minor system components. Replacement or repair of minor components requires only a calibration error test as a diagnostic test.

Note: The diagnostic test requirements are not applicable to the Part 60 CO analyzers.

Table 5 - 9. Diagnostic Test Requirements (NO_x-diluent CEMS)

Repair, Replacement, or Modification	Reference	Probationary Calibration Error	Linearity	RATA & BAF	Cycle Time Test
Like-kind analyzer replacement (≤ 720 hrs./yr. Per source)[1]	75.20(d)	X	X		
Like-kind analyzer replacement (including probe, sample interface)	75.20(d)	X	X	X	X
Replace umbilical	12.10[2]	X		X	X[4]
Change probe length and/or location	12.10[2]	X		X	X[4]
Replace or repair any of the following components (as applicable):					
Photomultiplier	12.10[2]	X	X[3]		
Lamp		X	X[3]		
Internal analyzer particulate filter		X	X[3]		X[4]
Analyzer vacuum pump		X	X[3]		X[4]
Capillary tube		X	X[3]		X[4]
Ozone generator		X	X[3]		
Reaction chamber		X	X[3]		
NO_x converter		X	X[3]		
Ozonator dryer		X	X[3]		
Sample cell		X	X[3]		
Optical filters		X	X[3]		
Repair or replace analyzer processor board	12.10[2]	X	X[3]		
Analyzer span change[5]	App. A, 2.1.1.5	X	X		

[1] Like-kind analyzer replacement that uses the same probe and sample interface as primary CEMS. Apply applicable BAF to new analyzer data. If new analyzer is used on a particular affected unit for more than 720 hours in a calendar year, then the new analyzer must be redesignated as a regular non-redundant CEMS and a RATA must be passed. See Appendix B of this QA/QC Plan.

[2] *Part 75 Emissions Monitoring Policy Manual*, Question 12.10.

[3] An abbreviated linearity check may be conducted in lieu of standard linearity check. Refer to Section 5.6.1 of this QA/QC Plan.

[4] An alternative system reponse test may be conducted in lieu of standard cycle time test. Refer to Section 5.6.1 of this QA/QC Plan.

[5] Whenever changes are made to the analyzer span, the Monitoring Plan information must be updated in the corresponding quarterly EDR. The calibration gas concentrations for the required diagnostic tests and routine QA/QC tests must be selected based on the new analyzer span value. Data from the analyzer is considered invalid beginning with the hour of adjustment until all required diagnostic tests are successfully completed.

Table 5 - 10. Diagnostic Test Requirements (DAHS)

Repair, Replacement or Modification	Reference	Probationary Calibration Error	Linearity	RATA & BAF	Formula Verification	Missing Data Verification
Replace entire DAHS (i.e., different vendor)	12.10[1]	X[2]			X	X
DAHS EDR upgrade	12.10[1]				X	X
DAHS – Change or insert new mathematical algorithm	12.10[1]	X	X[3]	X[4]		
DAHS – Change missing data algorithm	12.10[1]				X	

[1] *Part 75 Emissions Monitoring Policy Manual, Question 12.10.*
[2] Perform probationary calibration error tests on all affected CEMS analyzers.
[3] Linearity checks must be completed within 168 cumulative operating hours from the probationary calibration error test.
[4] RATA must be completed within 720 cumulative operating hours from the probationary calibration error test.

5.6.1 Optional Abbreviated Diagnostic Test Procedures

For certain diagnostic test events, USEPA allows an abbreviated linearity check and/or cycle time test to be conducted in lieu of the standard requirements for these QA tests. Reference Table 5 – 10 in Section 5.6 of this QA/QC Plan. The subsections below provide the procedures for conducting abbreviated linearity checks and cycle time tests. Refer to Section 5.7.2 of this QA/QC Plan for the associated data validation procedures.

5.6.1.1 Abbreviated linearity check procedures. First, a "hands-off" calibration error test shall be successfully completed. Routine and non-routine calibration adjustments may be conducted prior to initiating the abbreviated linearity check (Reference Section 4.3.1 of this QA/QC Plan). The calibration error test must meet the applicable performance specifications (i.e., ≤ 2.5% or alternatively 5 ppm NO_x analyzers; and ≤ 0.5% for O_2 analyzers) as opposed to the daily calibration error test limits.

After successfully completing the calibration error test, a single set of linearity injections (i.e., one injection at low-, mid- and high-levels) shall be conducted. Refer to Section 5.2.1 of this QA/QC Plan for general procedures for conducting linearity checks. The abbreviated linearity check results are acceptable if the linearity error is ≤ 5.0% for NO_x analyzers (or /R-A/ ≤ 5.0 ppm); and ≤ 5.0% for O_2 analyzers (or /R-A/ ≤ 0.5%).

If the abbreviated linearity check is passed, the test results are maintained in the CEMS files. The test results are not reported in the EDR. If the abbreviated linearity check is failed, it must

be considered an aborted linearity check and reported in the EDR. After a failed abbreviated linearity check, a full linearity check must be successfully completed in order for the CEMS to be considered in control. In this case, the test results must be reported in the EDR by including TEST SUMMARY DATA, LINEARITY SUMMARY DATA and LINEARITY INJECTION DATA records as required..

5.6.1.2 Alternative system reponse test. To conduct an alternative system reponse test, initiate a calibration error test. Ensure that the analyzer achieves a stable reading of the zero-level calibration gas. Start a timer (e.g., stop watch) when the injection of the high-level calibration gas begins. Stop the timer when the analyzer reading is within 5% of the high-level calibration gas tag value.

The results of the alternative system reponse test are acceptable if the response time is ≤ 15 minutes. If the alternative system reponse test is passed, the test results are maintained in the CEMS files and are not required to be reported in the EDR. If the alternative system reponse test is failed, it must be considered an aborted cycle time test and reported in the EDR. After a failed alternative system reponse test, a full cycle time test must be successfully completed in order for the CEMS to be considered in control. Reference Section 5.7.1.5 of this QA/QC Plan for the procedures for conducting a standard cycle time test. In this case, the test results must be reported by including TEST SUMMARY DATA, CYCLE TIME SUMMARY DATA and CYCLE TIME INJECTION DATA records in the EDR.

5.6.2 Diagnostic Test Data Validation Procedures (NO_x-diluent CEMS and DAHS)

§75.20(b)(3) includes detailed data validation procedures for diagnostic test events associated with the NO_x-diluent CEMS and the DAHS. After completing all required corrective maintenance, a successful probationary calibration error test must be performed before commencing any required diagnostic tests.

In the period between the hour of replacement, modification or corrective maintenance made to the CEMS that triggered the need to perform diagnostic testing and the hour of successful completion of a probationary calibration error test, Sumpter Combustion Turbine Facility must report emission data using the applicable missing data procedures or data collected using a reference method or other certified monitoring system.

The completion of a probationary calibration error test initiates a diagnostic test period in which data collected by the CEMS are considered to be conditionally valid. The status of the conditionally valid data is contingent upon the results of subsequent required diagnostic tests. If

all required diagnostic tests are successfully completed within the specified time period, then all the conditionally valid data collected by the CEMS is considered to be quality-assured data.

Following the probationary calibration error test, the diagnostic tests must be completed within the time periods listed below.

168 consecutive unit operating hours for linearity checks and/or cycle time tests,
720 consecutive unit operating hours for RATAs, and
21 consecutive unit operating days for a 7-day calibration error test.

If a diagnostic test is failed or aborted due to a problem with the CEMS, then all the conditionally valid data recorded by the CEMS is invalidated from the hour of completing the probationary calibration error test until the hour in which a subsequent probationary calibration error test is passed after performing corrective action.

A daily calibration error test shall be performed during the diagnostic test period. If a routine daily calibration error test is failed (i.e., calibration exceeds twice the applicable performance standard) during the diagnostic test period, then the applicable CEMS (e.g., NO_x or O_2 analyzer) is out-of-control. The conditionally valid data are prospectively invalidated from the hour of the failed calibration error test until the hour in which a calibration error test is passed, thereby resuming the conditionally valid status. If a daily calibration error test is failed or missed during a diagnostic test period, then no further diagnostic test can be conducted until a subsequent calibration error test is performed. The subsequent calibration error test re-establishes the conditionally valid data status. If a calibration error test is failed during the performance of a linearity check or RATA, these tests must be restarted.

Following are the data validation requirements for diagnostic tests that are not completed within the specified time period.

1) If a late linearity test, cycle time test, or RATA is successfully completed on the first attempt, then the data collected during the allotted time period (e.g., 168 hours for cycle time test and linearity test, 720 hours for RATA and 21 days for 7-day drift) are considered "quality-assured." The data collected starting with the first hour after the expiration of the diagnostic test period are invalidated from the hour of expiration of the diagnostic test period until the hour of completion of the late test.
2) If a late linearity test, cycle time test, or RATA is failed on the first attempt, then the CEMS data are invalidated from the hour of the original probationary calibration

error test. Under these circumstances, the CEMS data remains invalid until the successful completion of any late diagnostic test(s).

The results of each diagnostic test shall be maintained on-site in a format suitable for inspection.

Note: Diagnostic test events where an abbreviated linearity check and/or cycle time test was successfully completed are not required to be reported in the EDR.

5.6.3 Diagnostic Procedures for Fuel Flow Meters

Sumpter performs diagnostic testing on its fuel flow meters in accordance with the requirements set forth in Appendix D to 40 CFR Part 75, when applicable.

Table 5-12 provides a list of preventive and corrective maintenance procedures specifically identified by either 40 CFR Part 75 or the *Part 75 Emissions Monitoring Policy Manual* that trigger a requirement to perform diagnostic tests on mass fuel flow meters.

Table 5 - 11. Diagnostic Test Requirements (Fuel Flow Meters)

Repair, Replacement or Modification	Reference	Flow Meter Calibration	Transmitter Calibration	Primary Element Inspection	Re-determine Flow Coefficients
Fuel flow meter transmitter/transducer repair/replacement	App. D 2.1.6.3		X		
Replace primary element of a fuel flow meter that was certified by actual calibration	12.10[1]	X			
Replace primary element of fuel flow meter that was certified by design with an element of the same dimension	12.10[1]			X[2]	
Replace primary element of fuel flow meter that was certified by design with an element of the different dimension	12.10[1]			X	X

[1] *Part 75 Policy Manual, Question 12.10.*

[2] Replace the primary element with another element meeting the requirements of AGA Report No. 3 or ASME MFC-3M-2004; or replace the primary element and demonstrate that it meets the 2.0 percent accuracy specification in accordance with the procedures specified in §2.1.5.2 of 40 CFR Part 75, Appendix D; or restore the corroded or damaged element to "as new" condition and determine the overall accuracy of the flow meter using the requirements specified in AGA Report No. 3 or ASME MFC-3M-2004. The transmitters will also be retested prior to collecting quality-assured data from the flow meter. If the primary element size is changed, the transmitters will be calibrated with the new primary element size.

Beginning with the hour of the failed QA test and continuing until the hour that a certified mass fuel flow meter is in place, the fuel flow meter is out-of-control and data from the flow meter are considered invalid. During the fuel flow meter out-of-control periods, data will either be provided from another fuel flow meter the meets the requirements of §75.20(d) and §2.1.5 of Appendix D to 40 CFR Part 75 or substituted for fuel flow rate using the missing data procedures in §2.4.2 of Appendix D to 40 CFR Part 75.

Note: Fuel flow meter diagnostic events must be reported by including TEST SUMMARY DATA, FUEL FLOWMETER ACCURACY DATA,and/or TRANSMITTER TRANSDUCER DATA in the EDR.

5.7 RECERTIFICATION PROCEDURES FOR CEMS

Consistent with the requirements set forth in §75.20 of 40 CFR Part 75, Wolverine will recertify the CEMS or any system component installed at the Sumpter Combustion Turbine Facility, when necessary. Recertification is required whenever a replacement, modification, or change is made to the CEMS or system component that significantly affects the system's ability to measure or record NO_x emission rate or O_2 concentration emissions. Moreover, Wolverine will recertify the CEMS if a replacement, modification, or change is made to the facility flue gas handling system that significantly affects the ability of the CEMS or system component to measure or record NO_x or O_2 emissions. On the other hand, changes resulting from routine or normal corrective maintenance or QA activities do not require recertification. Similarly, software modifications in the automated DAHS are not considered recertification events. Table 5 - 13 provides recertification procedures currently specified by US EPA.

Based on the extent of the equipment failure and replacement, Sumpter will notify US EPA and MDEQ no later than the second business day after the need for recertification has been determined. Wolverine's Designated Representative will submit a notice of the recertification testing dates to the US EPA at least 21 days prior to the testing dates for full recertifications, and at least 7 days prior to the testing dates for partial recertifications. If adjustments are made to the reported test schedule, the Designated Representative will notify US EPA of the changes by telephone at least seven days prior to the first scheduled day of testing. However, under emergency conditions when testing is required following an uncontrollable equipment failure that results in lost data, notification is sufficient if provided within two business days following the date when testing is scheduled. Whenever a CEMS or system component fails the certification or recertification test, the test may be repeated immediately without advance notification.

Table 5 - 12. Summary of Recertification Requirements

TYPE OF CHANGE TO MONITORING SYSTEM[1]	Probationary Calibration Error	7-day Calibration Error	Linearity	RATA & BAF	Cycle Time Test
Permanently replace NO_x or O_2 analyzer with like-kind analyzer	X	X	X	X	X
Permanently replace NO_x O_2 analyzer with analyzer that does not qualify as a like-kind analyzer	X	X	X	X	X
Change from extractive to dilution or in-situ CEMS	X	X	X	X	X
Change probe length and/or location	X			X	X[2]
Fuel Flow Meter	Fuel Flow Meter Accuracy Test				
Change flue gas handling system or unit operation that significantly affects flow or concentration profile	Consult with US EPA				
Other modifications	Consult with US EPA				

[1] All recertification events require the submittal of a QA Cert Event Record in the unit's electronic quarterly report submitted to USEPA.
[2] Either recalibrate the flow meter until the flow meter accuracy is within the performance specification or replace the flow meter with another one that is demonstrated to meet the performance specification. Perform transmitter calibration, primary element inspections and re-determine flow coefficients as applicable.

Consistent with Question 12.30 of the *Acid Rain Policy Program Policy Manual*, within 45 days of completing recertification tests, the Designated Representative, or alternate, will submit a recertification application to US EPA and MDEQ. The application will be electronically formatted and will include the following information:

- Any changes to the previous Monitoring Plan for the applicable unit (Consistent with the requirements of 40 CFR Part 75).
- Recertification test results, including the type of tests performed, test dates and test results (including failed tests).
- Test results for verifying the accuracy of emission calculations conducted by the DAHS.
- A summary of the equations used for converting component data to standard units and for calculating missing data.

The CEMS or system component is deemed provisionally certified by US EPA for 120 days beginning with the completion date of the recertification audits. During this time, US EPA

reviews the application and notifies the utility if the application is rejected. If the recertification application is disapproved by the Administrator, the data are invalidated from the hour in which the probationary calibration error test was completed until a subsequent probationary calibration error test is passed, thereby initiating a new recertification period. All recertification test and other requirements specified in the notice of disapproval must be completed no later than 30 unit operating days after the disapproval issuance date. The Designated Representative is required to provide notification of the new recertification test dates and to submit a new recertification application.

5.7.1 Recertification Procedures for Gaseous Monitors (NO_x and O_2)

This section specifies the tests required for a complete recertification of a gaseous CEMS. The recertification tests are: (1) 7-day calibration error test, (2) linearity check, (3) RATA, (4) bias test and (5) cycle time test. However, under certain circumstances not all of these tests may be required by US EPA to recertify a system or system component.

Following the probationary calibration error test, the recertification tests must be completed within the time periods listed below.

- 168 consecutive unit operating hours for linearity tests and/or cycle time tests,
- 720 consecutive unit operating hours for RATAs, and
- 21 consecutive unit operating days for a 7-day calibration error test.

5.7.1.1 7-Day calibration error test. A 7-day calibration error test will be performed in accordance with the recertification procedures specified by 40 CFR Part 75.

Note, NO_x monitor measurement ranges with a span of 50 ppm or less are exempt from the 7-day calibration error test.

This test measures the instrument's daily calibration error during seven consecutive unit operating days. The coordination of the test will be conducted in the same manner as the linearity check with regard to group responsibilities, communication and data flow.
The test will be performed once per day at 24-hour intervals for seven consecutive days (i.e., seven unit operating days rather than calendar days) while the unit is combusting fuel (but not necessarily generating electricity). The test will challenge the CEMS once at each of the following calibration levels while the monitor is operating in its normal sampling mode: (1) zero-level (0.0-20.0% of span); and (2) high-level (80.0-100.0% of span). Alternatively, a mid-

level calibration gas (50.0 to 60.0% of span) may be used in lieu of the high-level gas if it more closely approximates the actual effluent concentration. The calibration gases used must be US EPA Protocol and certified by the vendor to be within 2.0% of the tagged value. The calibration gas must also meet the specifications detailed in Section 4.3.1 of this QA/QC Plan. No manual adjustments will be made to the instrument during the test period. If automatic adjustments are made by the monitor, the test will be performed in a manner that will determine and record the extent of adjustment. The calibration gas will be injected at the probe injection port so that the entire CEMS is challenged by the gas.

The 7-day calibration error test results are acceptable for the NO_x monitor, if none of the test results (i.e., of any day) differs from the reference value of the calibration gas by more than 2.5% based on the instrument's span. Alternatively, when the span value of the NO_x analyzer is less than 200 ppm, the results are acceptable if no single test (i.e., of any day) deviates from the reference value of the calibration gas by more than 5 ppm (note that the Part 75 rule states 5 ppm and not 5.0 ppm). For O_2 monitors, the results are acceptable if no single test result (i.e., of any day) deviates from the reference value of the calibration gas by more than 0.5%. The equation used to determine the calibration error results is found in Section 4.3.2 of this QA/QC Plan.

Results of the 7-day calibration error test shall be included in TEST SUMMARY DATA and CALIBRATION INJECTION DATA in the EDR.

The performance specifications for 7-day calibration error tests are illustrated in Table 5-14.

Table 5 - 13. 7-Day Calibration Error Performance Specifications

	Out-of-Control Limits	
Analyzer	**Primary Criteria**	**Alternative Criteria**
NO_x (≤ 50 ppm span)	7-day CE test not required	7-day CE test not required
NO_x (span > 50 ppm, but < 200 ppm)	≤ 2.5% CE	≤ 5.0 ppm (R–A)
O_2	≤ 0.5% (R–A)	None

5.7.1.2 Linearity check. A linearity check will be performed in accordance with the requirements specified in 40 CFR Part 75. Refer to Section 5.2.1 of this QA/QC Plan.

5.7.1.3 Relative accuracy test audit. A RATA shall be conducted in accordance with the specifications mandated in 40 CFR Part 75. Refer to Section 5.2.2 of this QA/QC Plan.

5.7.1.4 Bias test. A bias test shall be performed on the data sets for the RATA as specified in Appendix A to 40 CFR Part 75. Refer to Section 5.2.2.1 of this QA/QC Plan.

5.7.1.5 Cycle time test. During CEMS recertification, Sumpter Combustion Turbine Facility will also conduct a cycle time test according to the procedures detailed in §6.4 of Appendix A to 40 CFR Part 75. As with the 7-day calibration error test procedures, the calibration gases used for the cycle time test will meet the specifications described in Section 4.3.1 of this QA/QC Plan.

5.7.1.6 To determine the upscale cycle time, identify the effluent stack emission level recorded by the DAHS. Next, inject a high-level calibration gas through the entire CEMS until a stable response is reached. The upscale cycle time is the length of time it takes the CEMS to go from the stable effluent reading to a 95% step change of the high level calibration gas concentration (A stable value is defined as a change in the reading of less than 2.0% of the span value over two minutes, or a reading with a change less than 6.0% from the measured average concentration over six minutes.). To determine the downscale cycle time, once again, identify the effluent stack emission level recorded by the DAHS. Next, inject a zero-level calibration gas through the entire CEMS until a stable response was reached. The downscale time is the length of time it takes the CEMS to go from the stable effluent emissions to the zero-level response to a 95% step change of the zero-level calibration gas concentration.

For monitors or monitoring system that perform a series of operations (such as purge, sample and analyze), time the injections of the calibration gases so they will produce the longest possible cycle time. Report the slower of the two elapsed times (upscale or downscale) as the cycle time for the analyzer.

Prior to January 1, 2009, the cycle time for the NO_x CEMS is the longest upscale or downscale interval measured for either the NO_x or O_2 analyzer (i.e., the longest/slowest of the four (4) total times). On or after January 1, 2009, record the cycle time for each component analyzer separately. For NO_x analyzers with dual ranges, the test results from the range giving the longer cycle time will be reported. The cycle time test results are acceptable if none of the response times exceed 15 minutes.

Figures 5-1 and 5-2 contain illustrative examples of the upscale and downscale cycle time test procedures, respectively.

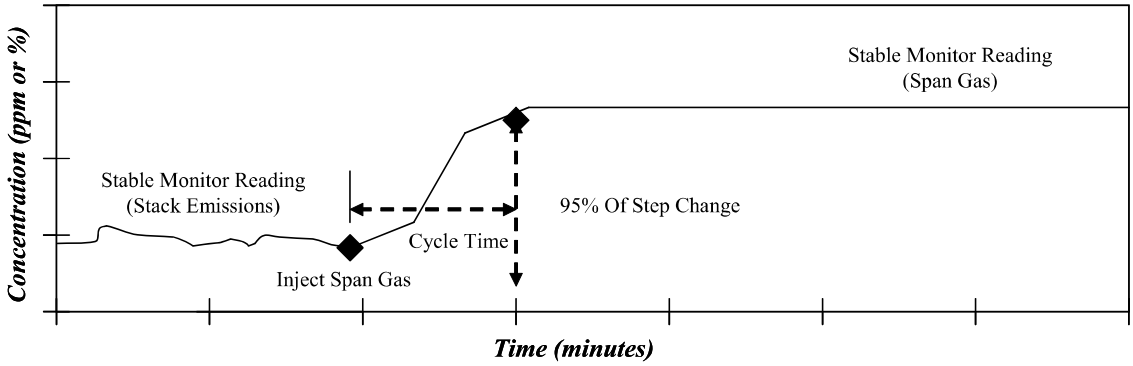

Figure 5 - 1. Upscale Cycle Time Test

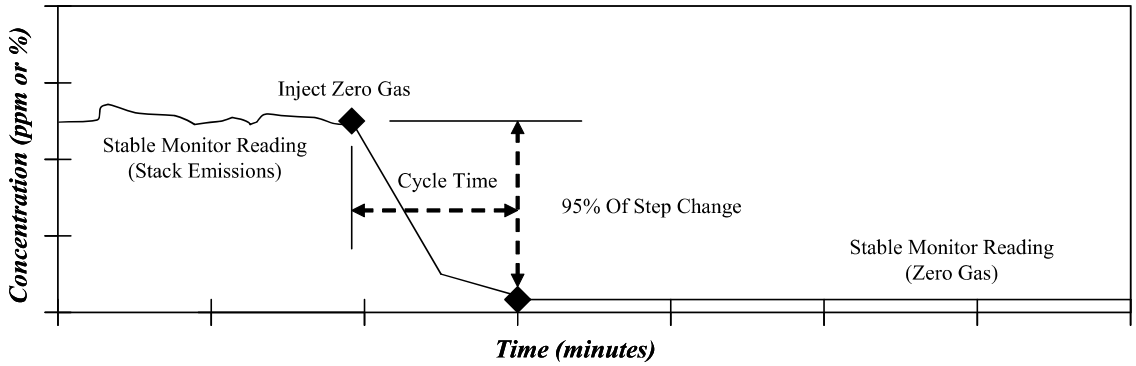

Figure 5 - 2. Downscale Cycle Time Test

5.7.2 Recertification Data Validation Procedures

§75.20(b)(3) of 40 CFR Part 75 includes detailed data validation procedures for recertification events. After completing all required repairs, replacements, etc., a successful probationary calibration error test must be performed before commencing any required recertification tests.

In the period between the hour of replacement, modification or change to the CEMS that triggered the need to recertify and the hour of successful completion of a probationary calibration error test, Sumpter must report emission data using the applicable missing data procedures or data collected using a reference method or other certified monitoring system.

The completion of a probationary calibration error test initiates a recertification test period in which data collected by the CEMS are considered to be conditionally valid. The status of the conditionally valid data are contingent upon the results of subsequent required recertification

tests. If all required recertification tests are successfully completed within the specified time period, then all the conditionally valid data collected by the CEMS is considered to be quality-assured data.

If a recertification test (with the exception of a 7-Day Calibration Error Test) is failed or aborted due to a problem with the CEMS, then all the conditionally valid data recorded by the CEMS is invalidated from the hour of completing the probationary calibration error test until the hour in which a subsequent probationary calibration error test is passed after performing corrective action. The failure of a 7-Day Calibration Error Test during a recertification test period does not invalid conditionally valid data unless the test results exceed twice the applicable performance specification.

A daily calibration error test shall be performed during the recertification test period. If a routine daily calibration error test is failed (i.e., calibration exceeds twice the applicable performance standard) during the recertification test period, then the applicable CEMS (e.g., NO_x or O_2 analyzer) is out-of-control. The conditionally valid data are prospectively invalidated from the hour of the failed calibration error test until the hour in which a calibration error test is passed, thereby resuming the conditionally valid status. If a daily calibration error test is failed or missed during a recertification period, then no further recertification test can be conducted until a subsequent calibration error test is performed. The subsequent calibration error test re-establishes the conditionally valid data status. If a calibration error test is failed during the performance of a linearity check or RATA, these tests must be restarted.

Following are the data validation requirements for recertification tests that are not completed within the specified time period:

1) If a late linearity test, cycle time test, or RATA is successfully completed on the first attempt then the data collected during the allotted time period (e.g., 168 hours for cycle time test and linearity test, 720 hours for RATA and 21 days for 7-day drift) are considered “quality-assured”. The data collected starting with the first hour after the expiration of the recertification test period are invalidated from the hour of expiration of the recertification test period until the hour of completion of the late test.
2) For a late 7-day calibration error test, the CEMS data are invalidated from the hour of expiration of the recertification period until the hour of completion of the late test, regardless if it is passed on the first attempt or not.
3) If a late linearity test, cycle time test, or RATA is failed on the first attempt, then the CEMS data are invalidated from the hour of the original probationary calibration

error test. Under these circumstances, the CEMS data remains invalid until the successful completion of any late recertification test(s).

Reference Figure C-6 to Appendix C to this QA/QC Plan for data validation procedures associated with recertification events.

Note: A QA Cert Event record is required to report recertification events in the EDR.

5.7.4 Recertification Procedures for Fuel Flow Meters

Sumpter Combustion Turbine Facility recertifies its fuel flow meters in accordance with the requirements set forth in Appendix D to 40 CFR Part 75, when applicable. Specifically, Sumpter will verify that the orifice-plate, location of the primary element, and pressure taps meet the guidelines set forth in ASME-MFC-3M-2004 and perform a flow transmitter accuracy test when recertifying a fuel flow meter. Table 5-15 provides a list of corrective maintenance procedures specifically identified by 40 CFR Part 75 that trigger a requirement to perform recertification tests.

Table 5 - 14. Summary of Recertification Test Requirements for Fuel Flow Meters

Repair, Replacement or Modification	Reference	Fuel Flow Meter Accuracy Test	Fuel Flow Meter Transmitter Accuracy Test	Primary Element Inspection
Fuel Flow Meter Replacement	App. D, 2.1.5.3	X		
Fuel Flow Meter Transmitter/Transducer Repair/Replacement	App. D, 2.1.6.3		X	
Fuel Flow Meter Primary Element Replacement	App. D, 2.1.6.4		X[1]	X[1]

[1] Replace the primary element with another element meeting the requirements of AGA Report No. 3 or ASME MFC-3M-2004; or replace the primary element and demonstrate that it meets the 2.0 percent accuracy specification in accordance with the procedures specified in §2.1.5.2 of Appendix D to 40 CFR Part 75; or restore the corroded or damaged element to "as new" condition and determine the overall accuracy of the flow meter using the requirements specified in AGA Report No. 3 or ASME MFC-3M-2004. The transmitters will also be retested prior to collecting quality-assured data from the flow meter. If the primary element size is changed, the transmitters will be calibrated with the new primary element size.

Note: A QA Cert Event Record must be included in the quarterly EDR whenever recertification of a gas concentration analyzer or mass fuel flow meter occurs.

5.8 REPLACEMENT USING LIKE-KIND ANALYZERS

For the NO_x or O_2 instruments replaced with like-kind analyzers, from the hour a probationary calibration error check is passed the data from the analyzer is conditionally valid for a period of 168 cumulative operating hours. The data becomes valid provided that within the 168 cumulative operating hours window, the analyzer passes a linearity test. If the analyzer fails the linearity test then the data is invalid until the completion of a successful linearity test.

In accordance with 40 CFR Part 75.20 (d)(v), a like-kind replacement analyzer can monitor a parameter for up to 720 cumulative operating hours per unit in any calendar year. The use of a like-kind replacement analyzer is required to pass a minimum nine-run RATA for collecting valid data over 720 cumulative operating hours in any calendar year. The 720 unit operating limit is on a per unit basis, therefore a like-kind replacement may be used in each of the applicable units at the Sumpter Combustion Turbine Facility for up to 720 cumulative operating hours without having to perform a minimum nine-run RATA to collect valid data. Any time a like-kind replacement analyzer is in service, the data shall reflect the bias adjustment factor determined during the most recent RATA for the CEMS component in question.

When using a like-kind replacement analyzer to report valid data, the analyzer will be assigned a separate component ID for the EDR records. In addition, the EDR shall reflect the proper method of determination code of "17" for periods where valid data is being measured using a like-kind replacement analyzer. Refer to Figures C-7 and C-8 of Appendix C to this QA/QC Plan for illustrations of data validation procedures associated with replacement using like-kind analyzers.

Note: A QA Cert Event record must be included in the quarterly EDR whenever a like-kind analyzer is utilized.

SECTION 6
PREVENTIVE MAINTENANCE, CORRECTIVE MAINTENANCE AND MISSING DATA SUBSTITUTION PROCEDURES

Preventive and corrective maintenance are important QC activities in Sumpter Combustion Turbine Facility CEM program. Preventive maintenance is based on the CEMS manufacturers' recommended procedures, as well as Sumpter Combustion Turbine Facility operating experience, and is the responsibility of the Plant Operators. Step-by-step preventive maintenance procedures and schedules for the CEMS and DAHS are provided in the applicable O&M manuals. Corrective maintenance is also performed by the Plant Operators based on the step-by-step procedures for CEMS presented in the applicable vendor O&M manuals.

During unit operating hours when the monitors are out-of-control or unavailable, Sumpter Combustion Turbine Facility will implement the missing data substitution procedures specified in 40 CFR Part 75. These procedures are discussed below in Section 6.4 of this QA/QC Plan. Note that special maintenance procedures (e.g., testing the megawatt meter or load indicator while the unit is off line) may generate false signals to the DAHS. The Director, Environmental Services will screen data and edit per US EPA's established guidance.

6.1 OVERVIEW OF CEMS PREVENTIVE MAINTENANCE

Preventive maintenance for the CEMS consists of regularly scheduled maintenance checks. Results of these checks are recorded in the maintenance log and/or forms. The maintenance log and/or forms are maintained on file by the Plant Operators. Appendix B to this QA/QC Plan provides examples of CEM program maintenance forms.

6.2 OVERVIEW OF CEMS CORRECTIVE MAINTENANCE

Corrective maintenance of CEMS is performed by the Plant Operators, whenever necessary, based on results of QC checks, QA audits, or failure of a monitoring system. In the event of a monitoring system failure, the Plant Operators assesses the nature of the failure and initiates corrective action. If the Plant Operators is unable to diagnose the problem or repair the component, a manufacturer's service representative is contacted to resolve the problem.

6.3 SPARE PARTS

Sumpter Combustion Turbine Facility maintains an inventory of CEMS spare parts that is adequate to meet the normal operating requirements. Enough spare parts are maintained on-site to accommodate the time required for ordering and receiving replacements. The Plant Operators

is responsible for ordering and maintaining the spare CEM parts. The CEMS spare parts inventory is periodically updated based on usage experience, as necessary.

6.4 MISSING DATA SUBSTITUTION PROCEDURES

In the event of CEMS failure, missing data or an out-of-control situation on a CEMS, the DAHS will use the data substitution procedures mandated, as applicable, in 40 CFR Part 75, Subpart D as well as Appendix D. The specified missing data procedures shall be implemented whenever a valid hour of emission rate data is not measured or recorded by the CEMS. Reason codes for missing data periods are assigned by the Plant Operators.

6.4.1 Missing Gas or Oil Sample Data

In accordance with the missing data procedures specified in §2.4.1 of Appendix D to 40 CFR Part 75, the missing data values in Table 6-1 shall be reported whenever the results of a required sample of sulfur content, GCV is missing or invalid. The substitute data value(s) shall be used until the next valid sample for the missing parameter is obtained.

Table 6 - 1. Missing Data Substitution Procedures for Sulfur, and GCV Data

Parameter	Missing Data Substitution – Maximum Potential Value
Gas Total Sulfur Content	0.002 lb/mmBtu for pipeline natural gas *(annual samples)*
Gas GCV	110,000 Btu/100 scf for pipeline natural gas

6.4.2 Missing Fuel Flow Meter Data

In accordance with the missing data procedures specified in §2.4.2.1 of Appendix D to 40 CFR Part 75, in the event of fuel flow meter failure or out-of-control situation, and no fuel flow data is available, the maximum potential fuel flow rate will be substituted for each hour of missing data. The maximum potential fuel flow rate is the lesser of (1) the maximum fuel flow rate that the applicable unit is capable of combusting, or (2) the maximum fuel flow rate that the flow meter can measure (i.e., upper range value).

If quality assured historical fuel flow data is available, then Wolverine will substitute the arithmetic average of the hourly fuel flow rate measured and recorded by the certified fuel flow meter system at the corresponding operating unit load range during the previous 720 operating hours. If no fuel flow rate data are available at the corresponding load range, then data from the next higher load range, if such data are available. If no quality assured data are available from

either the corresponding load range or a higher load range, then Wolverine will substitute the maximum potential fuel flow rate for each hour of the missing data period.

SECTION 7
DOCUMENTATION AND REPORTS

7.1 INTRODUCTION

Methods for documenting QA and QC data and information are an integral part of this QA/QC Plan. This section describes reports and other records that document QA and QC activities conducted on the Sumpter Combustion Turbine Facility CEMS. The Plant Operators utilizes two means of documentation: (1) the DAHS and (2) manually prepared QA and QC forms, logs and reports. The following subsections describe the DAHS and its uses in QA/QC documentation. Further information on report generation is included in the DAHS Instruction Manual.

The DAHS not only documents QA/QC data and information, but also serves as the primary CEM data acquisition and processing system. Therefore, the system plays an integral role in generating data summaries and other information included in quarterly reports. Emissions data per se are not QA/QC information; rather, their collection is subject to various QA/QC measures to ensure that data are of known and acceptable accuracy and precision. Nonetheless, this section describes both QA/QC documentation, which the DAHS provides, as well as the DAHS-generated emission summaries.

7.2 DATA ACQUISITION AND HANDLING SYSTEM OVERVIEW

The DAHS is an automated, computer-based data and information acquisition, processing, storage and reporting system. The DAHS was specifically designed to fully satisfy all of the data recordkeeping and reporting requirements contained in the regulatory permit for the Sumpter Combustion Turbine Facility. The DAHS consists of ESC StackVision software which summarizes 1-minute emissions data and calibration data into hourly day files. The StackVision program is also used for viewing real time data, viewing historical graphs, viewing operating reports, initiating manual calibrations and performing system backups. StackVision evaluates the data, compiles and summarizes 1-hour data, performs missing data substitution, allows for generation of quality assurance files and EDRs. Additional information concerning the DAHS (e.g., software items, installation dates and list of formulas) is detailed in the facility's US EPA Monitoring Plan. The DAHS receives analog and digital signals directly from emission monitoring system components. The DAHS uses these inputs to prepare reports summarizing data and information derived from the input signals. The DAHS datalogger performs engineering unit conversion (i.e., converts analog signals into engineering units such as percent, lb/hr, etc.), performs calculations and stores data.

The DAHS software provides the following functions:

- Polling Data
- Generation of standard and user configurable reports
- Alarming – Polled data are compared against specified set-points, an alarm is triggered if one or more set-points have been exceeded. Also, CEMS alarms are identified and flagged by the DAHS
- Alarm Acknowledgement – All alarms can be acknowledged on the DAHS using applicable flags
- Menu Security – Unauthorized personnel are prevented from changing data
- Data Flagging – Data process codes and monitoring codes are assigned to data after the data are polled and validated and after an alarm is acknowledged
- Data Editing – Authorized personnel can edit digital data and data flags. A log entry must be made for all edited data
- Event Logging – Critical system messages, alarms, exceptions and informational messages are logged chronologically and stored for historical reference
- Hourly Recordkeeping – Hourly averages of all data inputs are stored for historical reference
- Data Archiving – The DAHS archives data and reports. The backup process functions automatically

7.2.1 DAHS Generated Quarterly Reports

The Director, Environmental Services shall review, annotate, approve the emissions data and generate the quarterly reports (as specified by 40 CFR Part 75). Under the authority of the Designated Representative/ADR a Quarterly EDR will be submitted to US EPA in an ACSII Flat file format specified by US EPA. The report will be submitted to US EPA by the 30th day of the month following the end of each calendar quarter.

Note: Monitoring Plan changes, QA tests results and quarterly emissions EDRs are submitted as three separate submittals. Any Monitoring Plan changes must be reported first followed by the quarterly QA tests and then the emissions EDRs

7.3 MANUAL DOCUMENTATION AND REPORTING

There are two distinct types of manually prepared QA/QC documentation. They are:

- Maintenance Logs

- Audit Reports

The following subsections describe these types of documentation.

7.3.1 Maintenance Log

The Plant Operators and Plant Operators maintain a maintenance log for each unit in the CEM shelter. Consistent with Appendix B to 40 CFR Part 75, the Plant Operators will maintain a record of all testing, maintenance or repair activities performed on any monitoring system or component in a location and format suitable for inspection. The maintenance log must include entries for:

- Any testing, adjustment, repair, replacement, or preventive maintenance action performed on any monitoring system
- Corrective actions associated with a monitor's outage period
- Any adjustment that recharacterizes a system's ability to recorded and report emissions data must be recorded (e.g., changing of temperature and pressure coefficients and dilution ratio settings)
- The procedures used to make the adjustment(s)

Additionally, individual entries must include the:

- Date,
- Time, and
- Description of corrective and preventive maintenance procedures performed on the CEMS.

7.3.2 Audit Reports

A detailed description of audit activities and reporting requirements, such as the calibration error test, linearity checks, RATAs and bias test, 7-day drift test and cycle time test is included in Sections 4 and 5 of this QA/QC Plan. The results of audit activities are included in the appropriate quarterly report. Supporting data and audit reports shall be maintained at Sumpter Combustion Turbine Facility in the monitoring system file.

The Plant Operators utilizes various site-specific activity checklists and audit logs to document QA/QC activities performed at the Sumpter Combustion Turbine Facility. Examples of these QA/QC activity checklists and test logs can be found in Appendix B of this QA/QC Plan.

7.4 RECORDKEEPING

As specified in 40 CFR Parts 75.53, 75.57 and 75.59, the following items shall be maintained in an appropriate manner in the CEMS files:

- A current Monitoring Plan
- A current QA/QC Plan
- Operating parameter records
- NO_x emissions records
- O_2 concentration records
- Fuel analysis records
- Fuel flow meter calibration records
- Preventive maintenance logs

To ensure all appropriate documentation is available for review in a format suitable for inspection, it is the policy of Sumpter Combustion Turbine Facility to maintain all CEMS recorded and supportive data available for review for a period of five (5) years.

7.5 MONITORING PLAN SUBMITTALS

Prior to January 1, 2009, the electronic Monitoring Plan (i.e., the 500-level records) was included in each EDR. Beginning January 1, 2009, the electronic Monitoring Plan is not included in each XML EDR. The Monitoring Plans for each unit have been converted to the new XML format and were submitted to CAMD in the first quarter 2009 EDR submittal. Changes to the XML electronic Monitoring Plan records should be made when necessary and submitted to CAMD prior to (or concurrent with) the next EDR submittal. The Director, Environmental Services is responsible for ensuring that the Monitoring Plan is updated appropriately when necessary and for submitting the Monitoring Plan to CAMD. Monitoring Plan revisions are submitted to CAMD using the ECMPS Client Tool.

APPENDIX A

MAINTENANCE MANUAL LIST

MAINTENANCE MANUAL LIST

PARAMETER	REFERENCE
NO_x	Thermo Scientific 42i Model 42i High Level Instruction Manual
O_2	Model 1440 Quick Start Guide, Servomex
Sample Conditioning System	Various Operation and Maintenance Manuals
DAHS	Environmental System Corporation, CEMS StackVision User Guide

APPENDIX B

QA/QC MAINTENANCE LOG SHEETS

(FOR REFERENCE ONLY)

(THE ACTUAL FORMAT OF THE FORMS USED MAY VARY FROM THOSE REFERENCED IN THIS APPENDIX)

QC CHECKS OVERVIEW: SYSTEM CHECKS
QC CHECKS OVERVIEW: ANALYZERS/FUEL FLOWMETERS/AIR SYSTEMS
MAINTENANCE WORKSHEET
LINEARITY CHECK DATA FORM
TABLE OF TRANSMITTER OR TRANSDUCER ACCURACY RESULTS

SUMPTER COMBUSTION TURBINE FACILITY
CONTINUOUS EMISSIONS MONITORING
QC Checks Overview: System Checks

Activity: QC Checks	Daily	Weekly	Monthly	Quarterly	Semiannual	Annual
SYSTEM CHECKS						
Verify Zero Value	X					
Verify Span Value	X					
Routine Data Observation	X					
Check Cal Gas Pressure	X					
Check status of sample conditioning system	X					
Check Gas Pressure and Flow to analyzer(s)	X					
Check alarm log	X					
Check Shelter Temperature and Thermostat	X	X				
AC Filter Cleaned		Check	X			
Clean Interior of Enclosure Analyzer Screens		X				
Verify that calibration gas cylinders have > 200 psig	X					
Check for sample pump performance using sample vacuum as a guide			X			
Inspect probe filter and sample conditioner filter. Replace or clean as necessary.				X		X
Perform all quarterly analyzer maintenance routines				X		
Inspect filter element and probe gaskets of sample probe, including stack hardware mountings		X				
Inspect sample lines for condensation or particulate buildup			X			
Remove probe end cap and inspect pipe extending into stack.			X			
Clean inside cabinets			X			
Inspect instrument air coalescing filter bowls for water condensation		X				
Inspection of particulate filter on NO_x, O_2 analyzers			X			
Leak check NO_x, O_2 analyzers					X	
Clean inside cabinets			X			
Backup DAHS	As Required					

SUMPTER COMBUSTION TURBINE FACILITY
CONTINUOUS EMISSIONS MONITORING
QC Checks Overview: Analyzers/Flowmeters/Air Systems

Activity: QC Checks	Daily	Weekly	Monthly	Quarterly	Semiannual	Annual
NO_X ANALYZER						
Perform Functionality Check	X					
Verify Zero & Span Values	X					
Preventative Maintenance				X	X	
O_2 ANALYZER						
Perform Functionality Check	X					
Verify Zero & Span Values	X					
Preventative Maintenance				X	X	
FLOWMETERS						
Perform Transmitter Calibration (NIST)					X[1]	
Check for Abnormal Noise & ΔP					X	
Check for flow rates outside of specifications				X		
Visual Inspection of Fuel Flowmeter	As Required[2]					
AIR SYSTEM						
Air Hose Check					X	
Check Air System	X	X			X	
Check Pruafil and desiccant and replace as required	X					
AUDIT						
RATA					X[3]	X[3]
Linearity Check				X[4]		
Calibration Gas Audit				X[5]		

1. See Section 5.1.1.8 for Fuel Flowmeter calibration frequency.
2. See Section 5.1.1.8 for Fuel Flowmeter visual inspection frequency.
3. See Section 5.3. for RATA frequency.
4. See Section XXX for Linearity frequency.
5. See Section XXX for Calibration Gas Audit frequency.

MAINTENANCE WORKSHEET

TECHNICIAN PERFORMING CHECK(S): _____

UNIT NO: _____

ACTIVITY TO BE PERFORMED:_____

_____

_____

_____

REASON FOR ACTIVITY:_____

_____

_____

_____

DESCRIPTION OF PERFORMED WORK:_____

_____

_____

_____

Sumpter Combustion Turbine Facility
Unit _____

LINEARITY CHECK DATA FORM

Date:		Time Started:			Time Ended:		
Analyzer		NO_x (ppm)			O_2 (%)		
Calibration Gas Range		Low	Mid	High	Low	Mid	High
Reference Calibration Gas Value (R)							
Calibration Gas Flow Rate							
Analyzer Responses (ppm or %)	Run #						
	1						
	2						
	3						
	Sum (Σ)						
Average of Monitoring System Responses (A)							
% Linearity Error = [(R-A)/R] * 100							
Pass or Fail?[1,2]							
Out-Of-Control for immediately preceding quarter (Yes or No)?							

[1]For NO_x pollutant concentration monitors, the error in linearity for each calibration gas concentration (low-, mid- and high-levels) shall not exceed or deviate from the reference value by more than 5.0%. Linearity check results are also acceptable if the absolute value of the difference between the average of the monitor response values and average for the reference values |R–A| is less than or equal to 5 ppm.

[2]For diluent O_2 monitors, the error in linearity for each calibration gas concentration (low-, mid- and high-levels) shall not exceed or deviate from the reference value by more than 5.0%. Linearity check results are also acceptable if the absolute value of the difference between the average of the monitor response values and average for the reference values |R–A| is less than or equal to 0.5% O_2.

Sumpter Combustion Turbine Facility
Unit _____

Table of Flow Meter Transmitter or Transducer Accuracy Results

Test number: _____ Test completion date: _____ Unit ID: _____

Flow meter serial number: _____ Component/System ID: _____

Full-scale value: _____ Units of measure[3]: _____

Transducer/Transmitter type (check one): _____ Differential Pressure

_____ Static Pressure

Temperature Pressure

Measurement level (percent of full-scale)	Run no. (if multiple runs)[2]	Time of run (HHMM)	Transmitter transducer input (pre-calibration)	Expected transmitter/ transducer output (reference)	Actual transmitter/ transducer output[3]	Percent accuracy (% of full-scale)
Low (Minimum) level ___percent[1] of full-scale						
Mid level ___percent[1] of full-scale						
2nd Mid level ___percent[1,4] of full-scale						
3rd Mid level ___percent[1,4] of full-scale						
High (Maximum) level ___percent[1] of full-scale						

[1] At a minimum, it is required to test at zero-level and at least two other levels across the range of the transmitter or transducer readings corresponding to normal unit operation.
[2] It is required to test at least once at each level.
[3] Use the same units of measure for all readings (e.g., use degrees, in H_2O, psi, or mA).
[4] If tested at more than 3 levels.

APPENDIX C

DATA VALIDATION SCHEMATICS

DATA VALIDATION PROCEDURES -- GRACE PERIOD EXPIRATION (LINEARITY)
DATA VALIDATION PROCEDURES -- TEST PERIOD EXPIRATION (LINEARITY)
DATA VALIDATION PROCEDURES -- GRACE PERIOD EXPIRATION (RATA)
DATA VALIDATION PROCEDURES -- TEST PERIOD EXPIRATION (RATA)
ANALYZER SPAN CHANGE PROCEDURES
DATA VALIDATION PROCEDURES -- RECERTIFICATION
LIKE-KIND ANALYZER REPLACEMENT (≤ 720 HOURS PER UNIT)
LIKE-KIND ANALYZER REPLACEMENT (> 720 HOURS PER UNIT)

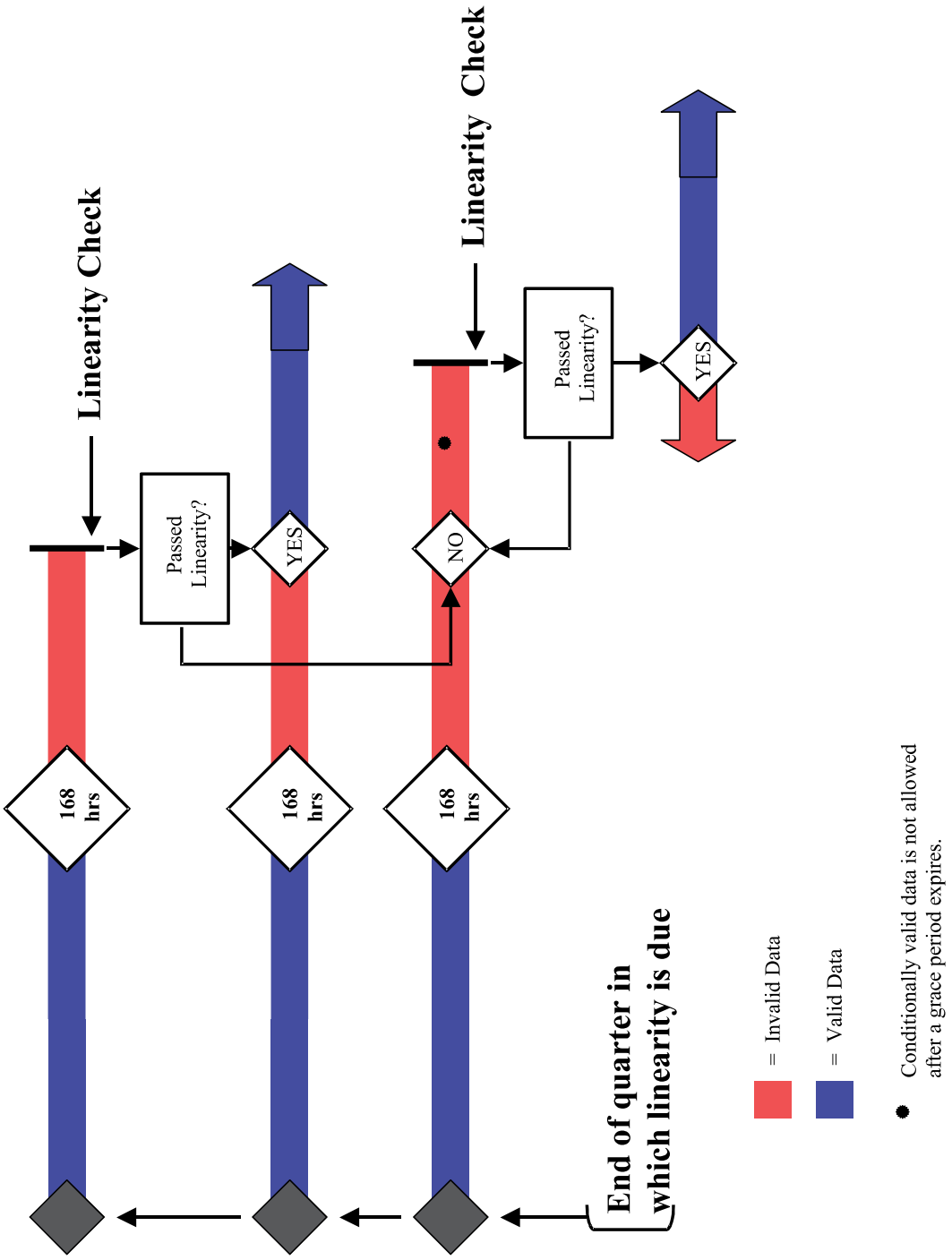

Figure C-1
Data Validation Procedures -- Grace Period Expiration (Linearity)

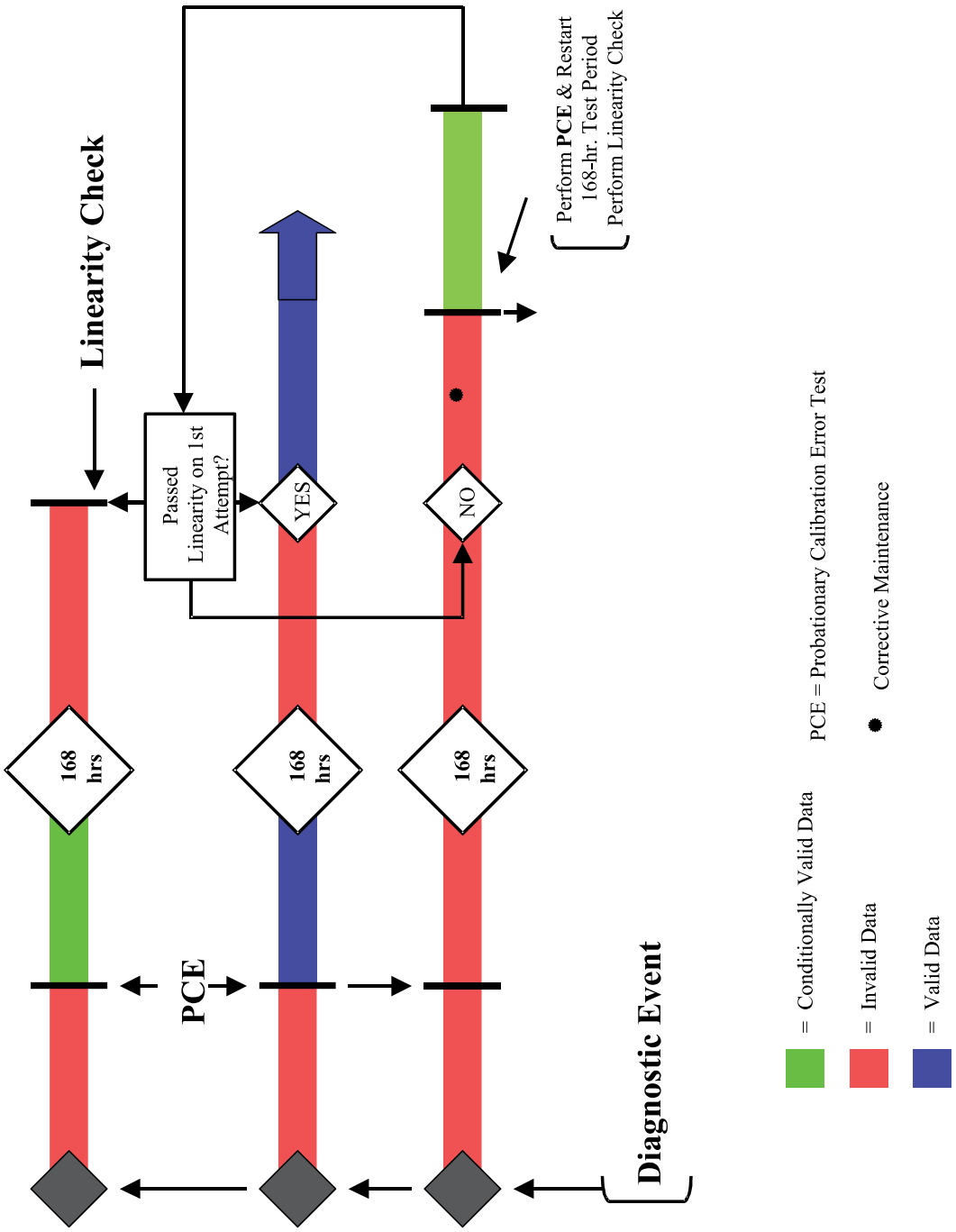

Figure C-2
Data Validation Procedures -- Test Period Expiration (Linearity)

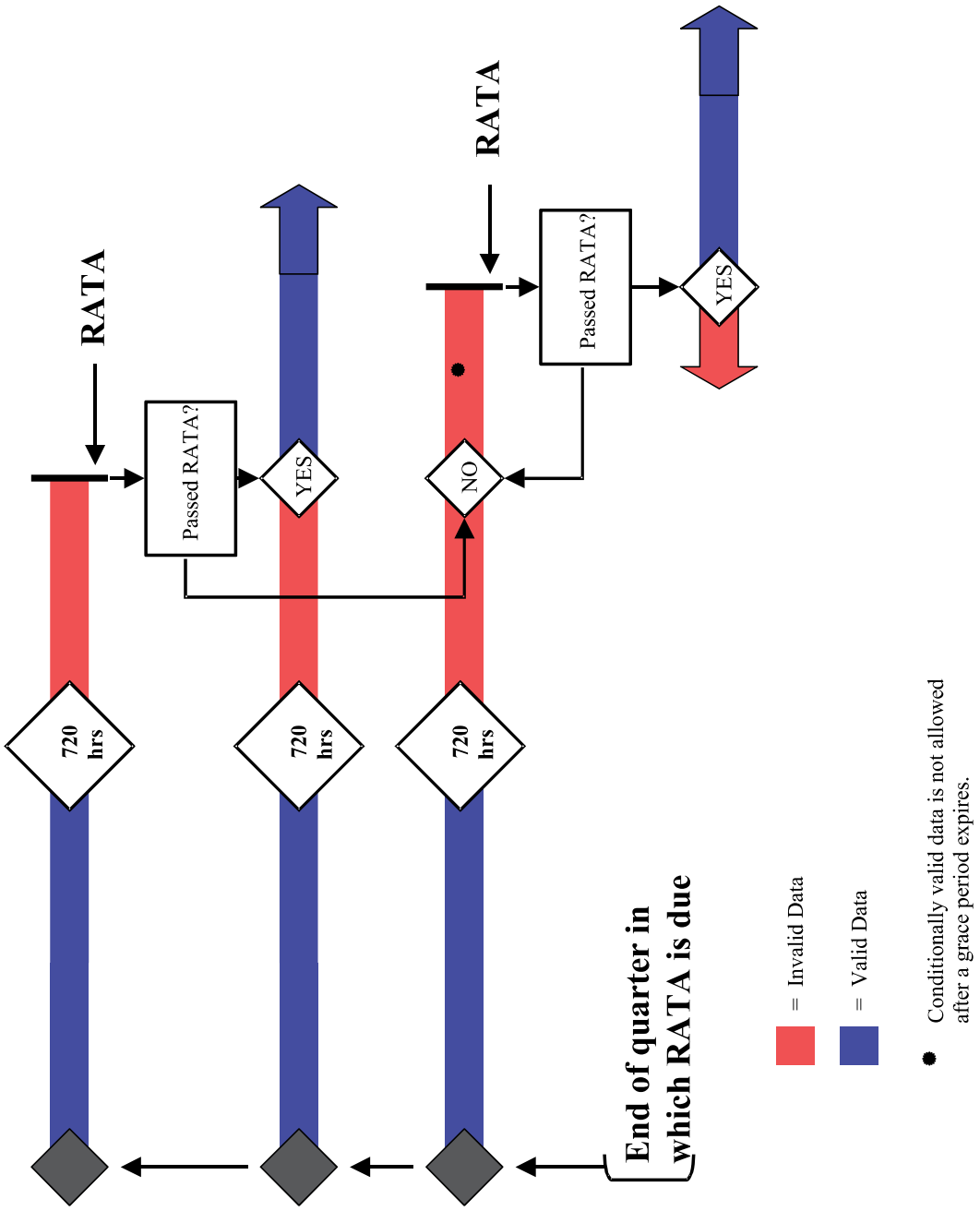

Figure C-3
Data Validation Procedures -- Grace Period Expiration (RATA)

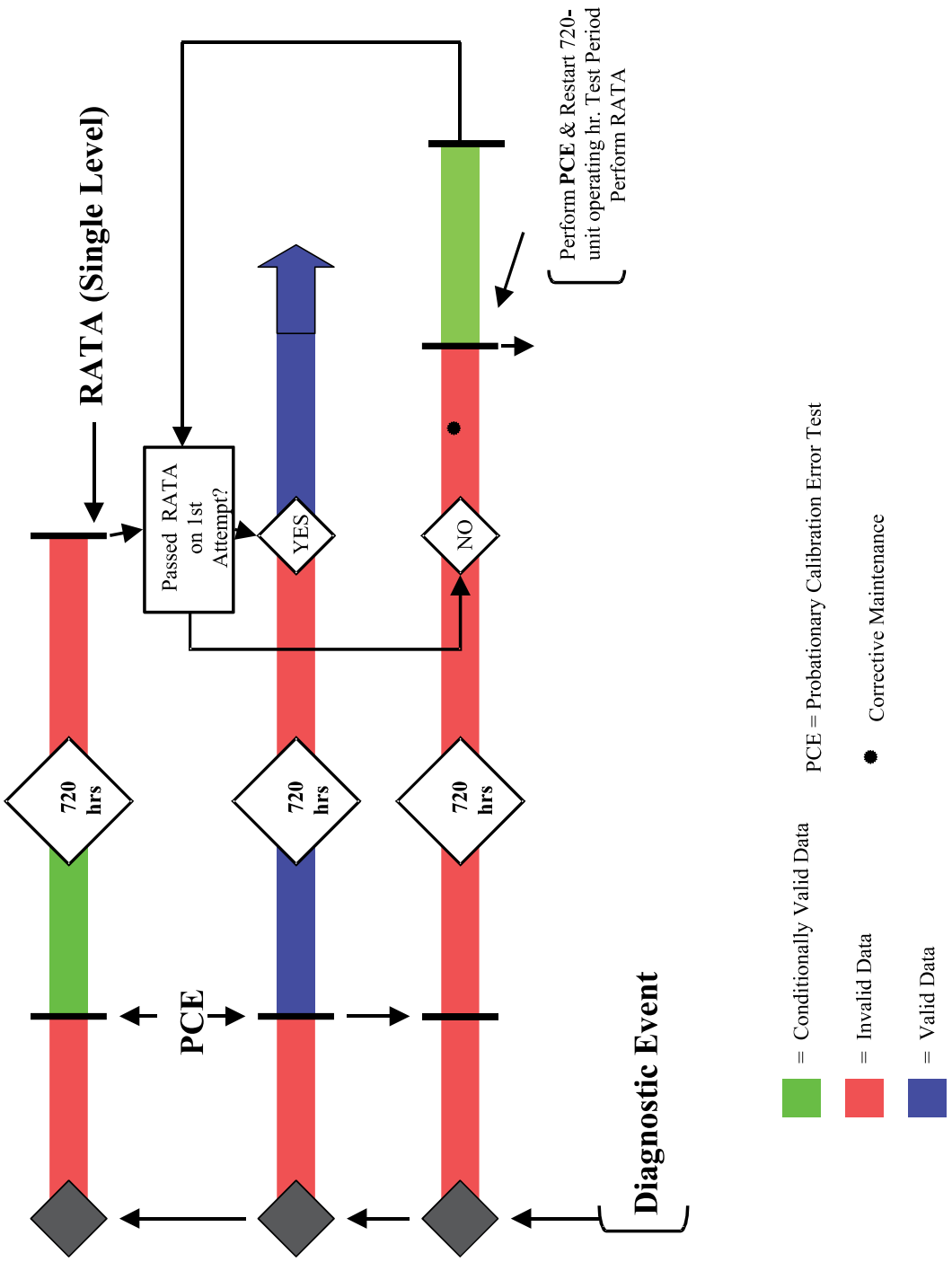

Figure C-4
Data Validation Procedures -- Test Period Expiration (RATA)

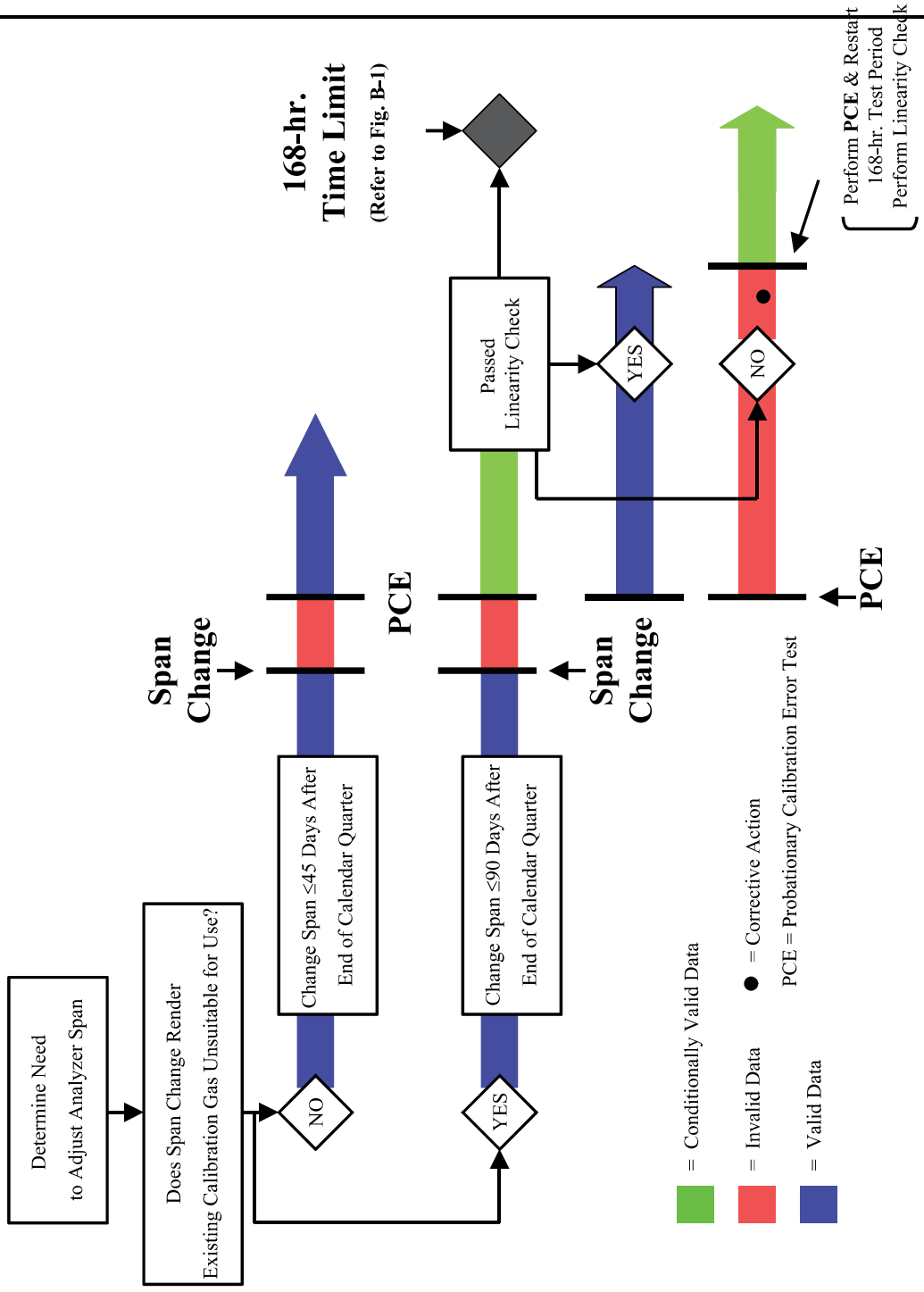

Figure C-5
Analyzer Span Change Procedures

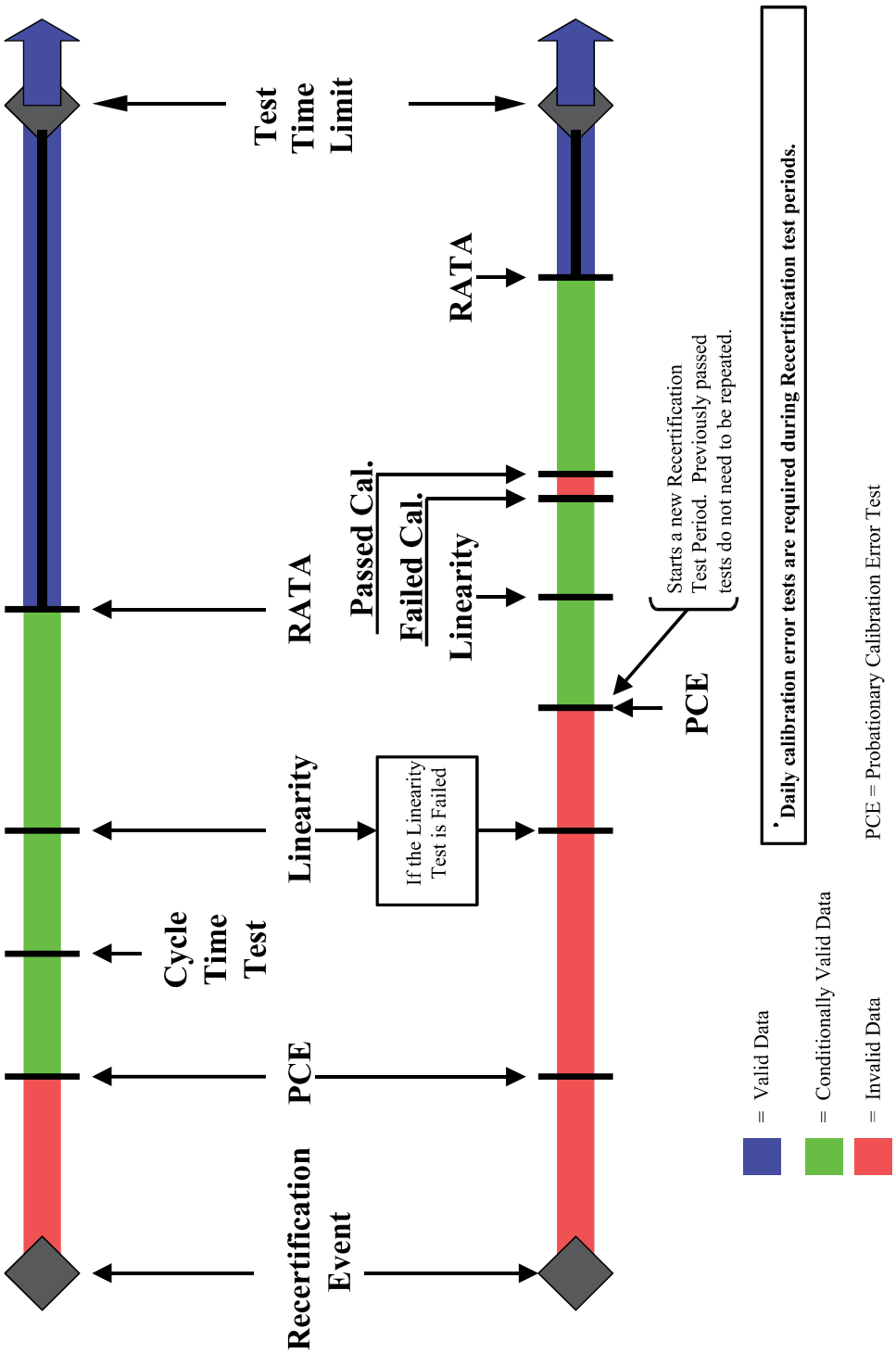

Figure C-6
Data Validation Procedures -- Recertification

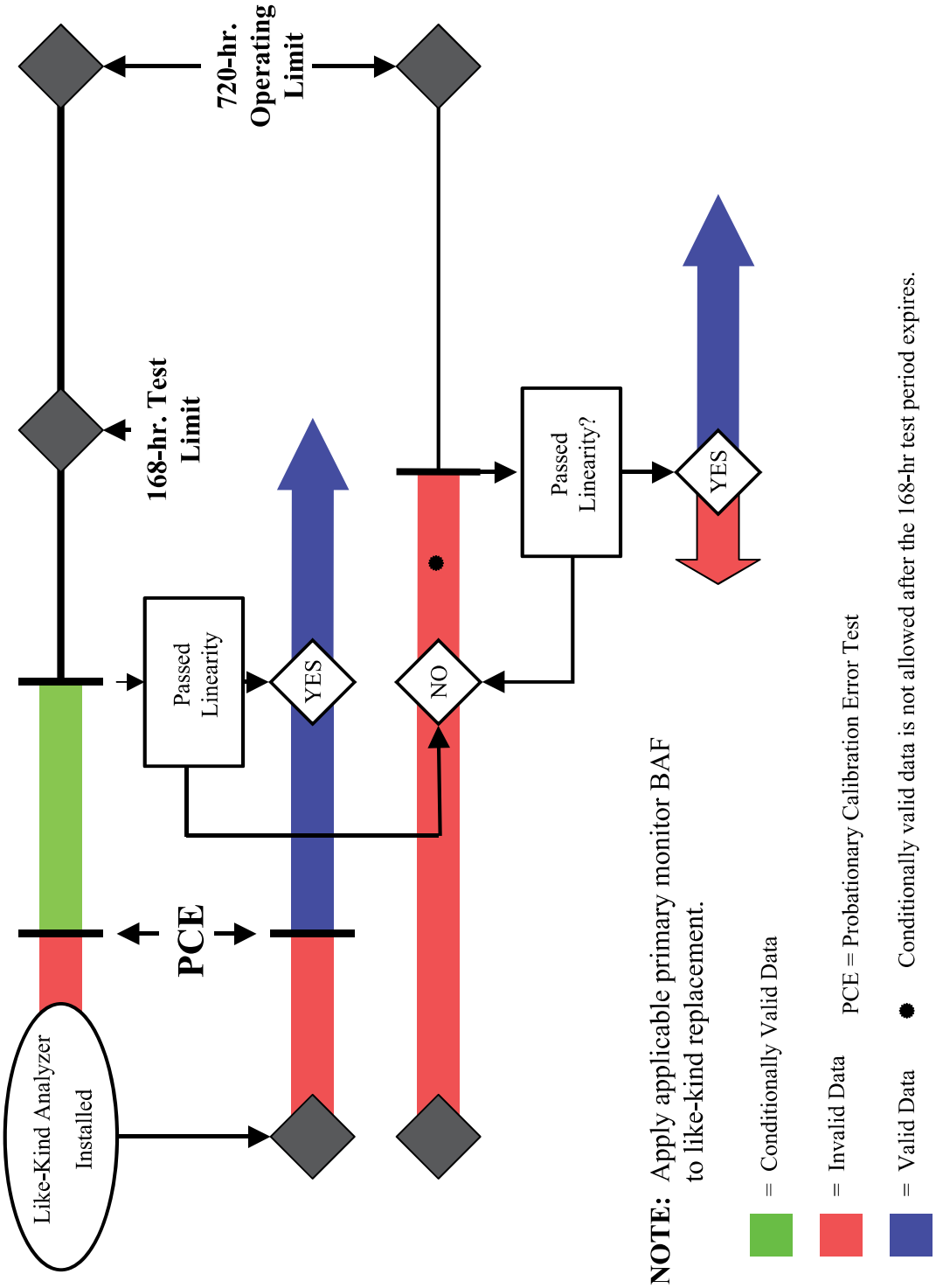

Figure C-7
Like-kind Analyzer Replacement (≤ 720 hours per unit)

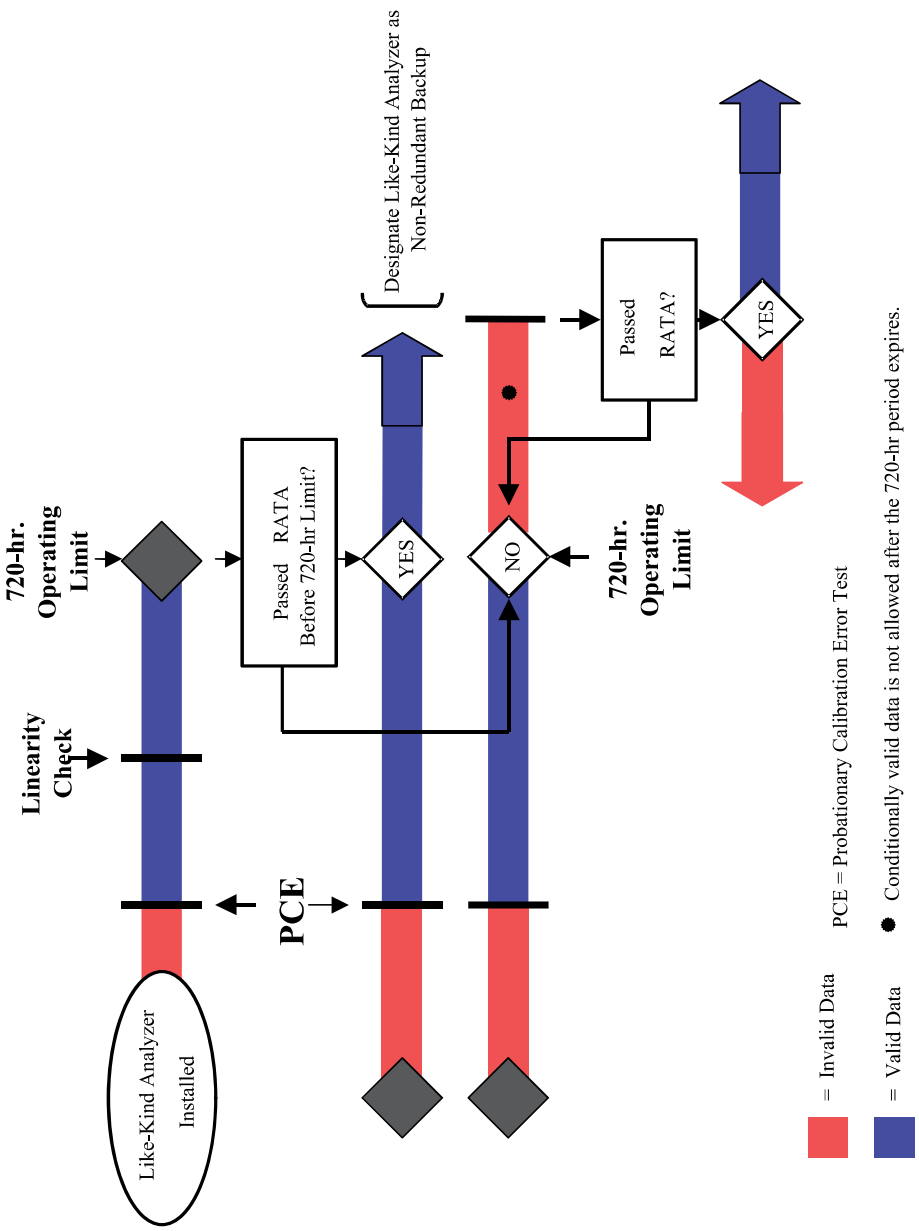

Figure C-8
Like-kind Analyzer Replacement (> 720 hours per unit)

APPENDIX D

LIST OF "MINOR" COMPONENTS

CEMS Minor Component List

Component Repair or Replacement	
PMT Base	Pressure switches
High voltage power supply	Temperature controllers
Analyzer circuit boards (with the exception of the processor board)	Pneumatic controllers
Analyzer optical windows	Timers
O-rings	Communication cable (e.g., fiber optic)
Zero air scrubber	Rotometers
Thermister	Analyzer mirrors and/or reflecting surfaces
Reaction chamber heater	All wiring terminations, plugs, cables
Photomultiplier cooler	All amplifiers, A/D converters and transformers
Photomultiplier cooler fins	Fuses
Analyzer DC power supply	Electronic sample flow meters
Analyzer displays	Flow sensor switches
Solenoid valves	Analyzer and cabinet fans
Regulators	Electric termination strips
Pressure and vacuum gauges	Electrical relays
Thermocouples and thermometers	Sample gas manifold
Pressure transducers and transmitters	Exhaust gas manifold
Temperature transmitters and readouts	UPS repair (including battery replacement)
Manual valves (e.g., check valves, ball valves)	Calibration gas tubing (excluding sample umbilical)
Manual switches	All fittings, bulkheads, unions (excluding fittings associated with dilution probe)
Desiccant replacement (e.g., drierite, purafil, charcoal)	Rotometers
Pressure switches	Flow sensor switches
Temperature controllers	Purge blowers (and components thereof)
Pneumatic controllers	Moisture removal system (chiller)
Vacuum pump (not analyzer pumps)	

GLOSSARY OF ACRONYMS, TERMS AND DEFINITIONS

The following terms are used in the application of a Continuous Emissions Monitoring System:

ACRONYMS

ADR	Alternate Designated Representative
BACT	Best Available Control Technology
CAIR	Clean Air Interstate Rule
CEMS	Continuous Emission Monitoring System
COMS	Continuous Opacity Monitoring System
CFR	Code of Federal Regulations
CAMD	Clean Air Markets Division (formally Acid Rain Program)
DAHS	Data Acquisition and Handling System
DR	Designated Representative
dscf	dry standard cubic feet
EDR	Electronic Data Report
US EPA	Environmental Protection Agency
MDEQ	Michigan Department of Environmental Quality
GCV	Gross Caloric Value
NDIR	Non-dispersive Infrared
NIST	National Institute of Standards and Testing
NO_x	Nitrogen Oxides
O_2	Oxygen
PC	Personal Computer
PNG	Pipeline Natural Gas
Ppb	parts per billion
ppm	parts per million
ppmdv	parts per million dry (by volume)
QA	Quality Assurance
QA/QC Plan	Quality Assurance/Quality Control Plan
QC	Quality Control
RACT	Reasonable Available Control Technology
RATA	Relative Accuracy Test Audit
RM	Reference Method
scfh	standard cubic feet per hour
SO_2	Sulfur Dioxide

DEFINITIONS
(Partial List of Applicable Definitions from 40 CFR Part 72.2 – Not Comprehensive)

40 CFR Part 75 - A group of federal regulations that define standards and procedures for utility's under the Clean Air Markets Program (formerly the Acid Rain Program).

Acid Rain Program – The national sulfur dioxide and nitrogen oxides air pollution control and emissions reduction program established in accordance with the Title IV of the Clean Air Act, 40 CFR Parts 72, 73, 74, 75, 76, 77, and 78.

Add-on Control – A pollution reduction control technology that operates independent of the combustion process.

Administrator – Administrator means the Administrator of the United States Environmental Protection Agency or the Administrator's duly authorized representative.

Allowance – An authorization by the Administrator under the Acid Rain Program to emit up to one tone of SO_2 during or after a specified calendar year.

Alternate Monitoring System – A system or a component of a system designed to provide direct or indirect data of mass emissions per time period or pollutant concentrations, or volumetric flow, that is demonstrated to the Administrator as having the same precision, reliability, accessibility, and timeliness as the data provided by a certified CEMS or certified CEMS component in accordance with 40 CFR Part 75.

As-fired – The taking of a fuel sample just prior to its introduction into the unit for combustion.

Automated Data Acquisition and Handling System (e.g., DAHS) – The component of the CEMS or other emissions monitoring system approved by the Administrator for use in the Acid Rain Program, designed to interpret and convert individual output signals from pollutant concentration monitors, diluent gas monitors, and other component parts of the monitoring system to produce a continuous record of the measured parameters in the measurement units required by 40 CFR Part 75.

Bias – A systematic error, resulting in measurements that will be either consistently low or high relative to the reference value.

Calibration Error (CE) - The difference between the response of a gaseous monitor to a calibration gas and the known concentration of the calibration gas.

Calibration Gas – (1) A standard reference material; (2) A standard reference material equivalent compressed gas primary reference material; (3) A NIST traceable reference material; (4) NIST/US EPA-approved certified reference materials; (5) A gas manufacturer's intermediate standard; (6) An US EPA protocol gas; (7) Zero air material; or (8) A research gas mixture.

Capacity Factor – (1) the ratio of a unit's actual annual electric output (expressed In MWe-hr) to the unit's nameplate capacity times 8760 hours, or (2) the ratio of a unit's annual heat input (in million British thermal units or equivalent units of measure) to the unit's maximum design heat input (in million British thermal units

Commence Commercial Operation – To have begun to generate electricity for sale, including the sale of test generation.

Commence Operation – To have begun any mechanical, chemical, or electronic process, including start-up of an emissions control technology or emissions monitoring or of a unit's combustion chamber.

Conditionally Valid Data – The data from a continuous monitoring system that are not quality assured, but which may become quality assured if certain conditions are met. Examples of data that may quality as conditionally valid are: data recorded by an uncertified monitoring system prior to its initial certification; or data recorded by a certified monitoring system following a significant change to the system that may affect its ability to accurately measure and record emissions. A monitoring system must pass a probationary calibration error test, in accordance with §2.1.1 of Appendix B to 40 CFR Part 75, initiate the conditionally valid data status. In order for conditionally valid emission data to become quality assured, one or more quality assurance tests or diagnostic tests must be passed within a specified time period in accordance with §75.20(b)(3).

Continuous Emission Monitoring System (CEMS) - The equipment required by 40 CFR Part 75 used to sample, analyze, measure, and provide, by readings taken at least once every 15 minutes (using an automated DAHS), a permanent record of emissions, expressed in British thermal units (lb/mmBtu) for nitrogen oxides. The following systems are component parts included in a continuous emission monitoring system at the facility:

(1) Nitrogen oxides pollutant concentration monitor, (2) Diluent gas monitor (oxygen),

(3) Data acquisition and handling system.

Designated Representative – A responsible natural person authorized by the owners and operators of an affected source and of all affected units at the source or by the owners and operators of a combustion source or process sources, as evidenced by a certificate or representation submitted in accordance with subpart B of 40 CFR Part 72, to represent and legally bind each owner and operator, as a matter of Federal law, in matters pertaining to the Acid Rain Program. Whenever the term "responsible official" is used in 40 CFR Part 70, in any other regulations implementing Title V of the Clean Air Act, or in a State operating permit program, it shall be deemed to refer to the "designated representative" with regard to all matters under the Acid Rain Program.

Diluent Cap Value – A default value of percent CO_2 or O_2 which may be used to calculate the hourly NO_x emission rate, CO_2 emission rate, or heat input rate, when the measured hourly average percent CO_2 is below the default value or when the measured hourly average percent O_2

is above the default value. For combustion turbines, the diluent cap values are 1.0 percent CO_2 and 19.0 percent O_2.

Diluent Gas - A major constituent in a gaseous pollutant mixture for combustion sources. Oxygen (O_2) is the major gaseous constituent of interest.

Diluent Gas Monitor – That component of the continuous emission monitoring system that measures the diluent gas concentration in a unit's flue gas.

Emissions – Air pollutants exhausted from a unit or source into the atmosphere, as measured, recorded, and reported to the Administrator by the designated representative *and as determined by the Administrator*, in accordance with the emissions monitoring requirements of 40 CFR Part 75.

EPA Protocol Gas – A calibration gas mixture prepared and analyzer according to §2 of the "US EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards," September 1997, EPA-600/R-97/121 or such revised procedure as approved by the Administrator.

Excepted Monitoring System – A monitoring system that follows the procedures and requirements of Appendix D or E of Part 75 for approved exceptions to the use of continuous emission monitoring systems.

Excess Emission - The emission of any air contaminant in excess of the applicable limitation or standard as specified by regulation or as stated in the facility's operating permit.

Flow Meter Accuracy – The closeness of the measurement made by a flow meter to the reference value of the fuel flow being measured, expressed as the difference between the measurement and reference value.

Fossil Fuel – Natural gas, petroleum, coal or any form of solid, liquid, or gaseous fuel derived from such material.

Fuel Flow Meter QA Operating Quarter – A unit operating quarter in which the unit combusts the fuel measured by the fuel flow meter for at least 168 cumulative operating hours.

Fuel Flow Meter System – An excepted monitoring system which provides a continuous record of the flow rate of fuel oil or gaseous fuel, in accordance with Appendix D to 40 CFR Part 75. A fuel flow meter system consists of one or more fuel flow meter components, all necessary auxiliary components (e.g., transmitter, transducers, etc.), and a DAHS.

Fuel Usage Time – The portion of a clock hour during which a unit combusts a particular type of fuel. The fuel usage time, in hours is expressed as a decimal fraction, with valid values ranging from 0.00 to 1.00.

Gas-fired – ...(2) For purposes of Part 75, the combustion of: (i) Natural gas or other gaseous fuel (including coal-derived gaseous fuel) for at least 90.0% of the unit's average annual heat input during the previous three calendar years and for at least 85.0% of the annual heat input in each of those calendar years; and (ii) Fuel oil, for the remaining heat input, if any...

Gaseous Fuel – A material that is in the gaseous state at standard atmospheric temperature and pressure conditions and that is combusted to produce heat.

Malfunction – Any sudden or unavoidable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures are caused entirely, or in part, by poor maintenance, careless operation, or any other means.

Missing Data Period – The total number of consecutive hours during which any component part of a certified CEMS or approved alternative monitoring system is not providing quality-assured data, regardless of the reason.

Non-Routine - A manual adjustment to bring the readings away from the calibration gas tag value. Consistent with question 10.35 of the *Acid Rain Program Policy Manual*, non-routine adjustments may be necessary since calibration gas concentrations are only guaranteed accurate to within 2% of the tag value.

Operating Day – A calendar day in which a unit combusts any fuel.

Out-of-Control Period – Any period: (1) beginning with the hour corresponding to the completion of a daily calibration error, linearity check, or quality assurance audit that indicates that the instrument is not measuring and recording within the applicable performance specifications; and (2) ending with the hour corresponding to the completion of an additional calibration error, linearity check, or quality assurance audit following corrective action that demonstrates that the instrument is measuring and recording within the applicable performance specifications.

Permit – The legally binding written document or portion of such document, including any permit revisions, that is issued by a permitting authority that is written under part 72 and specifies the Acid Rain Program requirements applicable to an affected source and to the owners and operators and the designated representative of the affected source of the unit.

Pipeline Natural Gas – A naturally occurring fluid mixture of hydrocarbons (e.g., methane, ethane, or propane) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions, and which is provided by a supplier through a pipeline. Pipeline natural gas contains 0.5 grains or less of total sulfur per 100 standard cubic feet. Additionally, pipeline natural gas must either be composed of at least 70 percent methane by volume of have a GCV between 950 and 1100 Btu per standard cubic foot.

Probationary Calibration Error Test – An on-line calibration error test performed in accordance with §2.1.1 of Appendix B to 40 CFR Part 75 that is used to initiate a conditionally valid data period.

QA Monitor Operating Hour – Any unit operating hour or portion thereof over which a certified CEMS, or other monitoring system approved by the Administrator under Part 75, is operating: (1) Within the performance specifications set forth in part 75, appendix A and the quality assurance/quality control procedures set forth in part 75, appendix B, without unscheduled maintenance, repair, or adjustment; and (2) In accordance with §75.10(d), (e), and (f).

QA Operating Quarter – A calendar quarter in which there are at least 168 cumulative operating hours.

Reference Value or Reference Signal – The known concentration of a calibration gas, the known value of an electronic calibration signal, or the known value of any other measurement standard approved by the Administrator, assumed to be the true value for the pollutant or diluent concentration being measured.

Relative Accuracy - The absolute mean difference between the gas concentration or emission rate, determined by the CEMS, and the value determined by the Reference Method (RM) plus the 2.5 percent error confidence coefficient of a series of tests divided by the mean of the RM tests or the applicable emission limit.

Required Maintenance - The basic maintenance requirements and procedures specified by the equipment manufacturer which must be followed to ensure accurate and reliable instrument service as specified by the manufacturer's periodic maintenance schedule. Required maintenance includes the procedures established as a result of operating experience and recurring problems.

Response Time – The amount of time it takes the CEMS to display a 95 percent change in value on the data recorder.

Routine Adjustment – A manual analyzer adjustment to bring the readings as close as practicable to the known calibration gas tag value(s).

Span - The highest pollutant or diluent concentration that a monitor component is required to be capable of measuring under 40 CFR Part 75.

Substitute Data – Emissions data provided to assure 100 percent recording and reporting of emissions when all or part of the continuous emission monitoring system is not functional or is operating outside applicable performance specifications.

Unit Operating Hour – A clock hour (or fraction of an hour) during which a unit combusts any fuel, either for part of the hour or the entire hour.

Unit Operating Quarter – A calendar quarter in which a unit combusts any fuel.

Unit Operating Time – The portion of a clock hour during which a unit combusts any fuel. The unit operating time, in hours, is expressed as a decimal fraction, with valid values ranging from 0.00 to 1.00.

Zero Value – The zero gas concentration measurement value which is artificially induced using optical filters or by injecting gases for the purpose of checking analyzer response and linearity.

24-Hour Period – The period of time from 12:01 am to 12:00 midnight.

REGULATORY REFERENCES

(All references apply to 40 CFR Part 75 unless otherwise indicated)

7-DAY CALIBRATION ERROR TEST

Procedures	Appendix A, Section 6.3.1
Calibration Gases	Appendix A, Section 5
Equation	Gaseous Monitors - Equation A-5 of Appendix A
USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 12

ALTERNATIVE SYSTEM RESPONSE TEST

USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Question 12.10

ABBREVIATED LINEARITY CHECK

USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Question 12.10

BIAS TEST

Definition	§72.2
Bias Test	Appendix A, Section 7.6.4
Bias Adjustment	Appendix A, Section 7.6.5; Appendix B, Section 2.3.3
Equation	Equation A-12 of Appendix A
USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 9

CALIBRATION DRIFT TEST

Definition	40 CFR Part 60, Appendix F, Section 4
Frequency	40 CFR Part 60, Appendix F, Section 4
Procedures	40 CFR Part 60.13(d)
Calibration Gas Concentrations	40 CFR Part 60.13(d)
Out of Control	40 CFR Part 60, Appendix F, Section 4

CALIBRATION ERROR TEST

Definition	§72.2
Frequency	Appendix B, Section 2.1.1
Procedures	Appendix A, Section 6.3.1
Additional Calibration Error Test	Appendix B, Section 2.1.3
Calibration Gases	Appendix A, Section 5.1
Calibration Gas Concentrations	Appendix A, Section 5.2
Performance Specifications	Appendix A, Section 3.1
Probationary Calibration Error Test	§75.20(b)(3)(ii)
Equation	Gaseous Monitors - Equation A-5 of Appendix A
Out of Control	Appendix B, Section 2.1.5
USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 10

CERTIFICATION/RECERTIFICATION

Requirements	§75.20
Application Submittal	*Part 75 Emissions Monitoring Policy Manual*, Question 12.30
USEPA Certification Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 12
USEPA Recertification Policy	*Part 75 Emissions Monitoring Policy Manual*, Sections 13 & 14

CYCLE TIME TEST

Procedures	Appendix A, Section 6.4
Calibration Gases	Appendix A, Section 5
USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 12

CYLINDER GAS AUDIT

Definition	Part 60, Appendix F, Section 5.1.2
Frequency	Part 60, Appendix F, Section 5.1.2 & 5.1.4
Procedures	Part 60, Appendix F, Section 5.1.2
Calibration Gases	Part 60, Appendix F, Section 5.1.2(3)
Calibration Gas Concentrations	Part 60, Appendix F, Section 5.1.2
Performance Specifications	Part 60, Appendix F, Section 5.2.3(2)
Equation	Part 60, Appendix F, Section 6.3
Out of Control	Part 60, Appendix F, Section 5.2 and 5.3

FUEL SAMPLING REQUIREMENTS

Approved Sampling Methods	§75.6(a)
Gas – Gross Calorific Value	Appendix D, Section 2.3.4.1
Pipeline Natural Gas Documentation	Appendix D, Section 2.3.1.4
USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 25

LINEARITY CHECK

Definition	§72.2
Frequency	Appendix B, Section 2.2.1
Procedures	Appendix A, Section 6.2
Calibration Gases	Appendix A, Section 5.1
Calibration Gas Concentrations	Appendix A, Section 5.2
Performance Specifications	Appendix A, Section 3.2
Grace Period	Appendix B, Section 2.2.4
Equation	Equation A-4 of Appendix A
Out of Control	Appendix B, Section 2.2.3
USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 10

PRIMARY ELEMENT INSPECTION

Frequency	Appendix D, Section 2.1.6(c)
Procedures	Appendix D, Section 2.1.6.4
USEPA Policy	*Part 75 Emissions Monitoring Policy Manual*, Section 25

RECORDKEEPING

General Requirements	§75.50
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