AES Puerto Rico LLC – Units 1 & 2
Site-Specific Monitoring Plan
Subpart UUUUU, 40 CFR Part 63

March 1, 2015

Prepared for:

AES Puerto Rico LLC
Carretera 3 KM 142
P.O. Box 1890
Guayama, PR 00785

Document Control No. MATS-001

Prepared by:
RMB Consulting & Research, Inc.
Raleigh, North Carolina

Updated November 8, 2022
Environmental Resources Management

Site-Specific Monitoring Plan
Revision History

Revision Number	Date of Revision	Reason(s) for Revision
0	3/1/2015	Original Edition
1	11/8/2022	Revised by Environmental Resources Management, Nashville, TN

CONTENTS

List of Tables

SECTION 2

SECTION 4

SECTION 5

SECTION 1
SITE-SPECIFIC MONITORING PLAN OVERVIEW

1.1 INTRODUCTION

This Site-Specific Monitoring Plan (SSMP) has been developed by AES Puerto Rico LLC (AES Puerto Rico), in accordance with the requirements set forth by the United States Environmental Protection Agency (USEPA) as codified at Title 40 of Code of Federal Regulations (CFR) Part 63, Subpart UUUUU, *National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units* (more commonly referred to as the MATS Rule). Affected sources are required to develop a SSMP in accordance with §63.10000(d).

The AES Puerto Rico facility includes two (2) units (referred to as Units 1 and 2) that are subject to the MATS Rule. Units 1 and 2 combust bituminous coal and are classified as "coal-fired units not low rank virgin coal" (see Item 1 of Table 2 to Subpart UUUUU). Each Unit has a maximum heat input rate of 2,461.4 MMBtu/hr. For Units 1 and 2, a mercury (Hg) sorbent trap monitoring system is used to demonstrate compliance with the Hg emissions limit. AES Puerto Rico also conducts quarterly performance tests to demonstrate compliance with the emission limit for filterable particulate matter (PM) and hydrogen chloride (HCl).

For the Hg sorbent trap monitoring systems, AES Puerto Rico is also required to develop an electronic and hardcopy Monitoring Plan in accordance with Section 7.1.1, Appendix A, Subpart UUUUU, 40 CFR Part 63. The electronic Monitoring Plan and any updates to the Monitoring Plan are to be submitted to the Administrator via USEPA's Emission Collection and Monitoring Plan (ECMPS) Client Tool software.

For the Units 1 and 2 Hg sorbent trap monitoring systems, AES Puerto Rico is required to develop (and submit if requested) a Site-Specific Performance Evaluation Plan in accordance the Sections 63.8(e) and 63.10007(a). The Site-Specific Performance Evaluation Plan provides detailed information concerning the initial performance evaluation (or initial certification) of the Hg sorbent trap monitoring system.

For Units 1 and 2, AES Puerto Rico is required to develop a Site- Specific Performance Test Plan in accordance with §63.7(c)(2)(i) and 63.10007(a). The Site-Specific Performance Test Plan provides detailed information concerning the initial performance testing for PM and HCl.

1.2 QUALITY ASSURANCE/QUALITY CONTROL POLICY

Consistent with internal policies, AES Puerto Rico operates and maintains Units 1 and 2 in strict adherence to the applicable environmental rules, regulations and policies. AES Puerto Rico is dedicated to obtaining the data necessary to demonstrate that its operations are in compliance with these applicable regulations and is committed to conducting the activities necessary to ensure that environmental measurements achieve the required data quality objectives.

1.3 DEFINITION OF QUALITY ASSURANCE AND QUALITY CONTROL

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

1) Quality assurance is "the system of activities to provide assurance that the quality control system is performing adequately," and

2) 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 activities performed on an occasional basis such as QA audits. Quality control is often used to characterize activities conducted on a more frequent basis, such as periodic calibrations and routine maintenance procedures. Together, quality assurance and quality control form a control loop that ensures data acceptability. This SSMP 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 SITE-SPECIFIC MONITORING PLAN

AES Puerto Rico recognizes that the reliability and acceptability of emission monitoring data depend on completion of the activities stipulated in a comprehensive SSMP. The objective of this SSMP is to delineate the activities necessary to ensure that emission monitoring data are complete, representative, precise and accurate. This SSMP provides an overview of the monitoring strategy implemented at AES Puerto Rico to comply with Subpart UUUUU of 40 CFR Part 63.

1.5 DOCUMENTATION CONTROL

AES Puerto Rico uses a standardized indexing format for this document, which provides for convenient replacement of pages that may be changed due to regulatory updates, procedural and/or policy modification or refinement related to 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 #s

SECTION 2
AFFECTED FACILITY AND SUBPART UUUUU COMPLIANCE LIMITS

2.1 DESCRIPTION OF FACILITY

AES Puerto Rico (ORIS Code # 880102) is a coal-fired power plant located in Guayama, Puerto Rico. The Station includes two (2) units that are subject to the MATS Rule. Units 1 and 2 are circulating fluidized bed (CFB) boilers that combust bituminous coal as the primary fuel and ultra-low sulfur No. 2 diesel fuel as an ignition fuel. Each unit is equipped with an electrostatic precipitator (ESP) for PM control, a circulating dry limestone scrubber for sulfur dioxide (SO_2) and acid gases control and a selective non-catalytic reduction (SNCR) system for oxides of nitrogen (NO_x) control. Mercury control is accomplished by chemical addition to the circulating dry scrubber using patented Nalco MerControl products. Units 1 and 2 are each served by a dedicated stack.

2.2 SUBPART UUUUU COMPLIANCE LIMITS

Consistent with Item 1 of Table 2 of Subpart UUUUU of 40 CFR Part 63, AES Puerto Rico is required to comply with the Hg, filterable PM and HCl emission limits listed in Table 2 – 1 below.

Table 2 - 1. Units 1 and 2 Subpart UUUUU Emission Limits

Units	Hg Emission Limit[1]	PM Emission Limit	HCl Emission Limit
1 & 2	1.2 lb/TBtu or 0.013 lb/GWh	0.030 lb/mmBtu or 0.30 lb/MWh	0.002 lb/mmBtu or 0.02 lb/MWh

[1] The Hg emission limits are based on a 30-boiler operating day average.

The Hg emission limits are based on a 30-boiler operating day basis. A boiler operating day is defined as a 24-hour period between midnight and the following midnight during which any fuel is combusted at any time in the steam generating unit, excluding startup periods and shutdown periods. It is not necessary for fuel to be combusted the entire 24-hour period. Each 30-boiler operating day average is calculated using all of the applicable (i.e., Hg) valid hourly emission rates in the preceding 30 boiler operating days.

Consistent with §63.10000(c)(1)(vi)(B), AES has opted to operate one Hg sorbent trap monitoring system each for Units 1 and 2 to demonstrate compliance with the Hg emission limit at all times (including startup periods and shutdown periods) and the Hg Emissions Averaging requirements found at §63.10009(j)(1).

In accordance with §63.10020, the Hg sorbent trap monitoring systems must be operated at all times that the applicable boiler is operating except for periods of CEMS malfunctions or out-of-control periods and required CEMS QA/QC activities. AES Puerto Rico is required to initiate repairs to the Hg sorbent trap monitoring systems in response to system malfunctions and to return the CEMS to operation "as expeditiously as practicable." Failure to collect required data other than those exceptions detailed above is deemed a deviation from the Subpart UUUUU monitoring requirements.

2.3 CEMS PERFORMANCE SPECIFICATIONS

For Units 1 and 2, AES Puerto Rico uses a Hg sorbent trap monitoring system and a Hg Emissions Averaging Plan to demonstrate compliance with the Hg emission limits. The existing flow monitors are used to control flow proportional sampling for the respective Hg sorbent trap monitoring system. AES Puerto Rico uses the existing O_2 analyzers to calculate MATS Hg emissions in units of lb/TBtu. The Units 1 and 2 O_2 and flow monitors are certified in accordance with the requirements specified in 40 CFR Part 75. Data are recorded on the existing data acquisition and handling system (DAHS). Beginning in the fourth quarter of 2022, following the September 2022 O2 RATA for Units 1 and 2 and other required changes, AES Puerto Rico will use the existing O_2 analyzers to calculate MATS Hg emission in units of lb/TBtu. Table 2 – 2 provides a summary of the monitoring systems that are used for compliance with Subpart UUUUU, 40 CFR Part 63, including the change to O2 monitoring for MATS compliance. Table 2 – 3 summarizes the applicable performance specification for each monitoring system.

Table 2 - 2. MATS Analyzer Summary

Units	Parameter	Manufacturer & Model Number	Serial Number	Span Value
1	Hg	Apex Instruments	1401358	NA
	O_2	Siemens OXYMAT 7	N1N2200396	22%
	Flow	TML Model 150	R-25138K-0914	875 kscfm
2	Hg	Apex Instruments	1405358	NA
	O_2	Siemens OXYMAT 7	N1N2200397	22%
	Flow	TML Model 150	R25139K-0914	875 kscfm

Table 2 - 3. CEMS Performance Specifications

CEMS	Performance Specification
Hg	Section 4, Appendix A, Subpart UUUUU, 40 CFR Part 63 and Performance Specification 12B (PS-12B), Appendix B, 40 CFR Part 60
O_2	Appendices A and B, 40 CFR Part 75
Flow	Appendices A and B, 40 CFR Part 75

A more detailed description of the CEMS may be found in the respective O&M manuals which are maintained on-site in a format suitable for inspection (Reference Section 7.5 of this SSMP).

The O&M manuals also include manufacturer's specifications.

2.3.1 Hg Sorbent Trap Monitoring System Performance Specifications

AES Puerto Rico equipped Units 1 and 2 with a XC-6000EM MercSampler Hg sorbent trap monitoring system manufactured by Apex Instruments. The Apex system includes a probe, paired sorbent traps, a heated umbilical, moisture removal components, sample pump, and a dry gas meter. The gas sample is extracted from the stack proportionally, meaning that the ratio of the sample flow rate and the stack gas flow rate is a constant (within ± 25%) throughout any given sample collection period. To meet this requirement the system uses an automated flow control system and input from the existing flow monitor. The sorbent traps are mounted on the front-end of the heated probe. The sample is collected as a batch process.

2.3.2 O_2 Analyzer Performance Specifications

The OXYMAT 7 channel operates using the paramagnetic nature of oxygen (it is attracted to magnetic fields). When two gases with different oxygen concentrations meet in a magnetic field, a pressure difference is produced between them because the oxygen molecules move towards the direction of increased magnetic field strength. In the OXYMAT channel, two gases are introduced into a sample chamber. One of the gases is a reference gas (N2, O2 or air), and the other is the sample gas. The reference gas is introduced into the sample chamber through two channels on each side of the sample chamber (the sample gas is introduced through a separate channel at a central point). One of these reference gas streams meets the sample gas within the area of the magnetic field. The two reference gas channels are connected by a bridge, which lies upstream of the sample chamber. Because of this, the pressure difference causes a flow. This flow is converted into an electric signal, proportional to the oxygen concentration, by a microflow sensor.

2.3.3 Flow Monitor Performance Specifications

For Units 1 and 2, a TML Ultraflow Model 150 ultrasonic flow monitor is used to measure the emission flow rate. The monitor's remote display is located in the CEMS shelter. The monitor determines the volumetric flow rate of the effluent by transmitting ultrasonic pulses across the stack in both directions. The speed of the tone pulse is retarded or accelerated, depending on the flow velocity in the stack. The time required for the tones to traverse the distance of the stack traveling with and against the flow is a function of the sound velocity and the flow velocity. A microprocessor controls the operation and timing of the flow monitoring systems, calculates flow and temperature, and transmits the data. The flow monitoring system also includes a purge system to prevent particulate and moisture from contacting the transducers.

2.3.4 Data Acquisition & Handling System Performance Specifications

The TML RegPerfect DAHS software package enables data collection and computation programs, such as printing and storing data, to run concurrently with operations. A sufficient amount of data are stored on the DAHS to meet the recordkeeping and reporting requirements specified in 40 CFR Part 63, Subpart UUUUU. The DAHS allows the system to perform CEMS control functions together with advanced data logging capabilities.

The DAHS is programmed to fully satisfy the data recordkeeping and reporting requirements in Subpart UUUUU. Comprehensive descriptions of the DAHS equipment and software are contained in vendor O&M manuals maintained on file at the Station. CEMS and DAHS O&M manuals are available in a format suitable for inspection (Reference Section 7.5 of this SSMP).

SECTION 3
CEMS INSTALLATION AND INITIAL PERFORMANCE EVALUATION

3.1 INSTALLATION

The Hg sorbent trap monitoring system and existing 40 CFR Part 60 CEMS probes are installed in the Units 1 and 2 stack. The stack sampling locations meet the USEPA's Reference Method 1 (Appendix A, 40 CFR Part 60) measurement location criteria of eight (8) equivalent stack diameters downstream and two (2) equivalent stack diameters upstream of any flow disturbances. Appendix A to this SSMP provides a schematic of the Units 1 and 2 stack sampling location. The schematic illustrates the monitoring system installation locations relevant to the applicable pollution control equipment for Units 1 and 2.

3.2 Hg SORBENT TRAP INITIAL PERFORMANCE EVALUATION TESTS

In accordance §63.10007(a), AES Puerto Rico was required to develop (and submit if requested) a Site-Specific Performance Evaluation Plan for the initial certification of the Hg sorbent trap monitoring system. Consistent with §63.10030(d), notification of the Hg sorbent trap monitoring system performance evaluation tests (initial certification tests) was submitted no later than thirty (30) days prior to the first performance evaluation test. As specified in Section 4, Appendix A of Subpart UUUUU, the initial performance evaluation test (or initial certification test) for each Hg sorbent trap monitoring system included a relative accuracy test audit (RATA).

Results of the Hg sorbent trap monitoring systems initial performance evaluation (or initial certification test) were submitted to the Department of Natural and Environmental Resources of Puerto Rico (DNRA, formerly known as the Puerto Rico Environmental Quality Board, EQB) and USEPA. The Hg sorbent trap monitoring system certification test results were also submitted via the ECMPS Client Tool software. The Hg sorbent trap monitoring systems initial certification test results are maintained onsite in a format suitable for inspection (Reference Section 7.5 of this SSMP).

3.3 O_2 CEMS INITIAL PERFORMANCE EVALUATION TESTS

Consistent with §63.10010(i), the Units 1 and 2 O_2 analyzers are certified in accordance with Appendices A and B of 40 CFR Part 75. The initial certification tests for the Units 1 and 2 O_2 analyzers include a 7-day calibration error test, linearity check, cycle time test and a single load RATA. Results of the O_2 analyzers certification test results will be submitted via ECMPS Client Tool software. The O_2 analyzers certification test results will be maintained onsite in a format suitable for inspection (Reference Section 7.5 of this SSMP).

3.4 FLOW MONITOR INITIAL PERFORMANCE EVALUATION TESTS

Consistent with §63.10010(c), the Units 1 and 2 flow monitors are certified in accordance with Appendices A and B of 40 CFR Part 75. The initial certification tests for the Units 1 and 2 flow monitors included a 7-day calibration error test and a 3-load (low-, mid- and high-load) RATA. Results of the flow monitors initial performance evaluation (or initial certification test) were submitted to the Puerto Rico EQB and USEPA. The flow monitor certification test results were also submitted via the ECMPS Client Tool software. The flow monitors initial certification test results are maintained onsite in a format suitable for inspection (Reference Section 7.5 of this SSMP).

3.5 QUARTERLY PERFORMANCE TESTS

AES Puerto Rico conducts quarterly performance tests to demonstrate compliance with the applicable filterable PM and HCl emission limits. In accordance with Section 63.10030(d), AES Puerto Rico submits notification to the DRNA and USEPA of each performance test at least thirty (30) days before each test is scheduled to begin.

Consistent with §63.100007(d), each quarterly performance test consists of a minimum of three (3) test runs. The applicable boiler is operated at the normal maximum operating load, generally between 90 and 110% of design capacity.

In accordance with §63.10006(f), each quarterly performance test is conducted at least 45 calendar days after the previous performance test. A quarterly performance test is not required for calendar quarters in which the affected boiler operates for less than 168 boiler operating hours. A boiler operating hour is defined as any clock hour in which the unit combusts any fuel. However, a performance test (for PM and HCl performance test) must be conducted at least once every calendar year as required by §63.10021(d)(1). Reference Appendix B to this SSMP for the equations used to calculate PM and HCl emissions in units of the applicable standard (i.e., lb/MMBtu).

3.5.1 PM Performance Tests

For the PM performance tests, testing is conducted in accordance with USEPA's Reference Method 5 with one exception being that the sample probe and front half filter temperature are maintained at: 320º ± 25ºF (160º ± 14ºC). During each PM performance test run, a minimum sample volume of 1 dry standard cubic meter (dscm) is required.

NOTE: *For performance tests conducted to obtain LEE qualification, §63.10005(h)(2)(i) requires the sample volume for each test run to be increased by a factor of two (i.e., minimum sample volume of 2 dscm for each Method 5 test run).*

3.5.2 HCl Performance Tests

For the HCl performance tests, testing is conducted in accordance with USEPA's Reference Method 26A. During each HCl performance test run, a minimum sample volume of 0.75 dscm is required.

NOTE: *For performance tests conducted to obtain LEE qualification, §63.10005(h)(2)(i) requires the sample volume for each test run to be increased by a factor of two (i.e., minimum sample volume of 1.5 dscm for each Method 26A test run).*

Section 63.7(c)(2)(iii) requires the use of blind audit samples for Reference Method 26A. Section 63.7(c)(2)(iii)(A) details instances in which this requirement is not in effect, including a lack of commercial availability of blind audit samples. Following completion of the testing, AES Puerto Rico is responsible for collecting the test results and audit sample results and submitting them to the Agency (included in final report). Audit samples are ordered at least 30 days in advance of the test date to provide adequate delivery time. NOTE: The blind audit samples may not be analyzed by a laboratory other than the one designated when the order is placed. If another lab conducts the analysis, this breaks the chain-of-custody protocol and invalidates the results. AES Puerto Rico will notify DNRA that audit samples will be used in an upcoming Reference Method 26A test. Additional information concerning the blind audit program including commercial availability status may be found at https://www.epa.gov/emc/emc-technical-support#audit.

3.5.3 LEE Qualification For PM and HCl

In accordance with §63.10005(h)(1)(i), an affected unit can qualify as a LEE unit if it satisfies the scrubber bypass restrictions established by USEPA, and all the required performance test results for three (3) consecutive years are less than 50% of the PM and/or HCl emission standard (reference Table 2-1 of this SSMP).

If a unit qualifies as a LEE unit for PM and/or HCl, then subsequent performance tests will be conducted at least once every three (3) calendar years. If a PM or HCl performance test shows emissions greater than 50% of the emission limit, then AES Puerto Rico will resume quarterly performance tests beginning with the next calendar quarter (provided that the unit operates for more than 168 hours in the quarter). Should either Unit 1 or 2 fail to achieve continuous LEE status, AES Puerto Rico will conduct quarterly performance tests for another three (3) consecutive year period before reapplying for LEE status.

3.6 BOILER TUNE-UPS

Following the Units 1 and 2 boiler tune-up used to demonstrate initial MATS compliance, AES Puerto Rico conducts subsequent boiler tune-ups for each boiler at least once every 36 calendar months or 48 calendar months for units equipped with neural network combustion optimization. The date of the most recent boiler tune-up is reported in the Semi-Annual Compliance Report. Each boiler tune-up must meet the minimum requirements specified in §63.10021(e).

SECTION 4
PERFORMANCE EVALUATION QUALITY CONTROL ACTIVITIES

4.1 INTRODUCTION – QUALITY CONTROL

The QC activities are performed to ensure that the operation and maintenance of the Units 1 and 2 Hg sorbent trap monitoring systems, O_2 analyzers and flow monitors are adequate and appropriate. The QC activities rely upon qualified and well-trained personnel.

4.2 QUALITY CONTROL ACTIVITIES FOR Hg SORBENT TRAP SYSTEMS

The QC requirements for the Units 1 and 2 Hg sorbent trap monitoring system comply with the requirements specified in Section 5.2, Appendix A to Subpart UUUUU. Section 5.2, Appendix A to Subpart UUUUU states that the Hg sorbent trap monitoring system must be operated and maintained in accordance with PS-12B. Appendix C of this SSMP provides the QC/QA criteria for the routine operation of the Hg sorbent trap monitoring system.

According to Section 5.2.1, Appendix A to Subpart UUUUU, each pair of sorbent traps may be used to sample stack gas for up to fifteen (15) operating days. Additional information concerning sample collection and analysis is available in the AES Puerto Rico CEMS QA/QC Plan.

4.3 QUALITY CONTROL ACTIVITIES FOR O_2 ANALYZERS

The QC activities for the O_2 analyzers conform to or exceed the requirements set forth in the specifications detailed in Appendices A and B of 40 CFR 75.

4.3.1 Calibration Gases

For the O_2 analyzers, all calibration gases used by AES Puerto Rico comply with USEPA regulations detailed in Section 5, Appendix A, 40 CFR Part 75. Calibration of all gaseous emission monitors is accomplished using known concentrations of zero air and span gases. Cylinder certification of analysis forms are maintained at the facility in a format suitable for inspection by a regulatory agency.

CAUTION: *Effective May 27, 2011, all EPA Protocol Gases used for Part 75 purposes must be purchased from manufacturers that participate in EPA's Protocol Gas Verification Program (PGVP) or from a reseller that sells unaltered gas from a PGVP participant. This requirement also applies to the calibration gases used by test contractors or internal testing groups when conducting Part 75 RATAs. The rule does allow EPA Protocol gas cylinders certified by or ordered from any* *production site prior to May 27, 2011 to be used up to the earlier of the cylinder's expiration date or 150 psi (whichever occurs first).*

4.3.2 Daily Calibration Error Test (40 CFR Part 75)

The calibration of O_2 analyzers is automatically checked daily (approximately 24 hours apart to the extent practicable) while the unit is on-line. Calibration error tests may also be required as diagnostic tests following CEM component repair or modifications. These tests are controlled by the DAHS. In accordance with Section 6.3.1, Appendix A, 40 CFR Part 75, the analyzers are challenged at two calibration levels. 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 exhaust gas concentration. No zero-level adjustments are to be made before the high-level checks are completed. 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 calibration error test is failed during that period.

In accordance with Section 2.1.3, Appendix B, 40 CFR 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). A "non-routine" adjustment is a manual analyzer adjustment to bring the readings away from the calibration gas tag value. Consistent with Question 9.28 of the *Part 75 Emissions Monitoring Policy Manual*, non-routine adjustments may be necessary since calibration gas concentrations are only guaranteed to be accurate to within 2% of the 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 or equal to twice the applicable performance specification (i.e., 1.0% absolute difference for O_2). After a non-routine adjustment, the calibration error must be ≤ the applicable performance specification (i.e., 0.5 % absolute difference for O_2).

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 USEPA XML Hourly Operating Data record 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 QA/QC 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.

The following is Equation A-5 from Section 7.2.1, Appendix A, 40 CFR Part 75, modified specifically to O_2 only, used to calculate the calibration error:

$$CE = |R - A|$$

Equation 4-1.

Where:

CE	=	O_2 Percentage calibration error
R	=	Reference value of zero- or high-level calibration gas introduced into the monitoring system
A	=	Actual monitoring system response to the calibration gas

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

Table 4 - 1. Calibration Gas Ranges

			Gas Concentrations (% of span)	
Units	Calibration Gas	Instrument Span	Zero (0.0 – 20.0%)	High (50.0 – 60.0%)
1 & 2	O_2 (%)	22.0%	0.0 – 4.4%	11.0 – 13.2%[1]

[1] Close to typical value found in the stack.

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 at the maintenance limit (i.e., one-half of the out-of-control limit) is optional based upon operator experience with the instrument or knowledge of other details such as changing barometric pressure, etc.

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

Analyzer	Out-of-Control Limits
O_2	1% for any one day[1]

[1]Absolute difference between the measured value and the reference value.

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 successful calibration error test occurs.

A successful 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 that 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). Additional information is available in the AES Puerto Rico CEMS QA/QC Plan.

4.4 QUALITY CONTROL ACTIVITIES FOR FLOW MONITORS

For Units 1 and 2, the QC activities for the flow monitors comply with the requirements detailed in Appendices A and B to 40 CFR Part 75. Table 4 - 3 provides a QC activity matrix for the Units 1 and 2 flow monitors.

Table 4 - 3. Quality Control Activity Matrix for Flow Monitors

Activity/Checks	Frequency			
	Daily	*Weekly*	*Quarterly*	*Semiannually*
Check calibration report	X			
Interference Check	X			

4.4.1 Daily Calibration Error Test (Flow)

A daily calibration error test is performed automatically 24 hours apart, to the extent practicable, while the unit is on-line. Calibration error tests may also be required as diagnostic tests following flow monitoring system component repairs or modifications. Each flow monitor is challenged with two signals: (1) 0 to 20% of span and (2) 50 to 70% of span. Each flow monitor is designed to allow the entire flow monitoring system to be challenged by this test procedure. Following a successful ("passed") calibration error test, data are prospectively considered valid for 26 clock hours (i.e., 24 hours plus a 2-hour grace period) unless another calibration error test is failed during that period.

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

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

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

- The unit is in a start-up condition and a start-up event must have begun, as evidenced in a USEPA ECMPS XML Hourly Operating Data record 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 flow monitor 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.

The following is Equation A-5 from Section 7.2.2 of Appendix A to 40 CFR Part 75 used to calculate the calibration error:

$$CE = \frac{|R - A|}{S} \times 100$$

Equation 4-2.

Where:

CE	=	Percentage calibration error, based upon the instrument span
R	=	Low or high level reference value
A	=	Actual flow monitor response to the reference value
S	=	Flow monitor calibration span value

The results of the daily calibration error test are recorded by the DAHS. If corrective maintenance is required, the details are recorded in the maintenance log. A daily calibration error test will be performed before and immediately following any routine maintenance, corrective maintenance and/or calibration procedures conducted on the flow monitor. A flow monitor is considered out-of-control whenever the calibration error exceeds 6.0%. At a minimum, the flow monitors are recalibrated whenever the monitor exceeds the out-of-control limits. The calibration error test procedure is then repeated to demonstrate that the corrective maintenance procedures were successful. An out-of-control period begins with the hour of completion of a failed calibration error test and ends with the hour of completion of a successful calibration error test.

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).

4.4.2 Interference Check

A daily interference check is also performed automatically on the Units 1 and 2 flow monitors. A passed interference check prospectively validates data for 26 clock hours (i.e., 24 hours plus a 2-hour grace period) unless another interference test is failed during that period.

A start-up grace period of up to 8 clock hours is allowed before an on-line interference test must be performed for the flow monitor, 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 a USEPA ECMPS XML Hourly Operating Data record 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 interference 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 flow monitor 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 interference test, CEM data validation is governed by whichever time period expired last.

An out-of-control period occurs whenever interference of the flow monitor occurs. The out-of-control period begins with the completion of a failed interference check and ends with the completion of a successful interference check.

SECTION 5
PERFORMANCE EVALUATION QUALITY ASSURANCE ACTIVITIES

5.1 INTRODUCTION – QUALITY ASSURANCE ACTIVITIES

The QA activities for the Units 1 and 2 Hg sorbent trap monitoring systems, O_2 analyzers and flow monitors include audits performed by the plant personnel (e.g., equipment calibrations) and/or independent contractors (e.g., RATAs).

5.2 QUALITY ASSURANCE ACTIVITIES FOR Hg SORBENT TRAP SYSTEMS

Table 5 - 1 presents a list of all QA activities for the Units 1 and 2 Hg sorbent trap system.

Table 5 - 1. Hg Sorbent Trap Quality Assurance Activities

Audit	Frequency
Dry Gas Meter Calibration	Quarterly
Temperature Sensor Calibration	Quarterly
Barometer Calibration	Quarterly
RATA	Annually

5.2.1 Dry Gas Meter Calibrations

In accordance with Section 10.2.3 of PS-12B, the sorbent system dry gas meter will be checked quarterly. In accordance with Section 10.2.1.1 of PS-12B, the test may be conducted (1) using a wet test meter (accurate to within 1 percent) consistent with the procedures in Section 10.3.1 of USEPA Reference Method 5 or (2) using a dry gas meter as a calibration standard consistent with Section 16 of USEPA Reference Method 5. The test will be conducted at one intermediate flow rate setting representative of the normal operation of the system. If a dry gas meter is being calibrated, at least five revolutions of the meter at each flow rate must be used.

Alternately, in accordance with Section 10.2.1.2 of PS-12B the quarterly calibration may be conducted using a reference gas flow meter (RGFM). The RGFM may either be: (1) a wet test meter calibrated in accordance with Section 10.3.1 of Reference Method 5, (2) a gas flow metering device calibrated in accordance with Section 16 of Reference Method 5 or (3) a NIST-traceable calibration device capable of measuring volumetric flow to an accuracy of one percent. For this procedure, the RGFM is connected to the Hg sorbent trap system discharge. While the sorbent trap system is collecting a sample, concurrently measure and record the dry gas meter volume and the RGFM volume (in units of dscm) for a minimum of ten (10) minutes at each of the three flow rates covering typical operation of the Hg sorbent trap monitoring system.

To calculate a calibration factor (Y), the ratio of the dry gas meter volume is divided by the reference meter volume. The quarterly dry gas meter calibration is acceptable if Y differs from Yi (i.e., the initial calibration factor) by less than or equal to five (5) percent. If the calibration exceeds 5%, then the full 3-level calibration must be repeated to determine a new Y value for the dry gas meter.

After failing a quarterly calibration, a dry gas meter shall not be used to collect Hg emissions data until the full 3-level calibration has been successfully completed.

5.2.2 Temperature Sensor Calibrations

Consistent with Section 10.3 of PS-12B, the thermocouple or sensor will be calibrated quarterly. The test will be conducted in accordance with the procedures specified in Section 10.3 of USEPA Reference Method 2.

The quarterly temperature sensor calibration is acceptable if temperature readings are within ±1.5% of the temperature measured by the reference sensor. If the temperature sensor readings are greater than ±1.5% of the temperature measured by the reference sensor, then that sensor may not be used until a temperature calibration is successfully completed.

5.2.3 Barometer Calibrations

In accordance with Section 10.4 of PS12-B, the sorbent system barometer will be recalibrated quarterly. The test shall be conducted using another barometer that has a NIST-traceable calibration.

At each calibration point, the absolute pressure measured by the barometer must agree to within ± 10 mmHg of the pressure reading of the NIST-traceable barometer. If the barometer readings are greater than ± 10 mmHg of the pressure measured by the NIST-traceable barometer, then that barometer may not be used until a barometer calibration is successfully completed.

5.2.4 Relative Accuracy Test Audit

For the Units 1 and 2 Hg sorbent trap monitoring systems, a RATA is performed annually (i.e., once every four (4) consecutive unit QA operating quarters). However, a RATA must be conducted at least once every eight (8) consecutive calendar quarters. If a RATA has not been conducted, the test must be completed within the eighth calendar quarter or within the 720 unit operating hour grace period following the eighth calendar quarter (reference Sections 5.1.2.4 and 5.2, Appendix A, Subpart UUUUU). Each RATA shall be conducted while the unit operates at normal load.

NOTE 1: *The approved test methods are currently Method 29, Method 30A, Method 30B and ASTM D6784-02 (Reapproved 2008), "Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-fired Stationary Sources (Ontario Hydro Method)."*

NOTE 2: *The sorbent trap material used for the RATA must be the same as the material used during daily operation of the Hg sorbent trap monitoring system. However, the size of the traps used for the RATA may be smaller than those used for daily operation.*

During each RATA, a minimum of nine (9) test runs are performed by the test crew. Additional runs may be performed but only a maximum of three tests (runs) may be rejected and the total number of test results used to determine the relative accuracy must be greater than or equal to nine. During the RATA, the Hg sorbent trap monitoring system must be operated in accordance with PS-12B with the exception of the section 2 breakthrough criteria specified in Table 5 – 2 (reference Section 4.1.2.2, Appendix A, Subpart UUUUU).

Table 5 - 2. RATA Section 2 Breakthrough Criteria

<table>
<tr><th>QA/QC Test</th><th>Acceptance Criteria</th><th>Frequency</th><th>Consequences if not met</th></tr>
<tr><td rowspan="4">Sorbent trap section 2 breakthrough</td><td>For stack Hg concentrations > 1 µg/dscm,
≤ 10% of Section 1 Hg mass</td><td rowspan="4">Every test run</td><td rowspan="4">Test run invalidated</td></tr>
<tr><td>For stack Hg concentrations ≤ 1 µg/dscm and > 0.5 µg/dscm,
≤ 20% of Section 1 Hg mass</td></tr>
<tr><td>For stack Hg concentrations ≤ 0.5 µg/dscm and > 0.1 µg/dscm,
≤ 50% of Section 1 Hg mass</td></tr>
<tr><td>For stack Hg concentrations ≤ 0.1 µg/dscm,
no breakthrough criterion assuming that all other QA/QC specifications are met.</td></tr>
</table>

The RATA results are acceptable if the relative accuracy is less than or equal to 20.0%. Alternatively, if the mean reference method mercury concentration is less than 2.5 $\mu g/m^3$, the results are acceptable if the absolute value of the difference between the mean reference method and Hg sorbent trap monitoring system values does not exceed 0.5 $\mu g/m^3$. A Hg sorbent trap monitoring system is considered out-of-control beginning at the time of a failed RATA and ending at the time of a successful RATA.

When necessary, corrective maintenance occurs and is documented in accordance with established corrective maintenance procedures specified in Hg sorbent trap monitoring system O&M manuals. Following corrective action, another RATA is conducted. Data remains out-of-control until the successful completion of a subsequent RATA.

5.3 QUALITY ASSURANCE ACTIVITIES FOR O_2 ANALYZERS

The QA activities for the Units 1 and 2 O_2 analyzers meet or exceed the requirements set forth in Appendices A and B of 40 CFR Part 75. These QA activities consist of linearity checks RATAs and system appraisals. Table 5 – 3 provides a QA audit summary for the O_2 analyzers.

Table 5 - 3. O_2 Analyzers QA Audit Summary

Quality Assurance Audits	Frequency	Audit Limits (meet either requirement)	
		% of audit gas concentration (linearity) %RA (RATA)	%O_2
Linearity Check	Quarterly[1]	≤ 5.0%	≤ 0.5%
RATA	Semiannually	≤ 10.0%	≤ 1.0%
RATA	Annually[3]	≤ 7.5%	≤ 0.7%
System Appraisal	Periodically	X	X
Quality Control Audits			
Calibration Error Test	Daily	X	≤ 0.5%[4]

[1] Once per unit QA operating quarter which is defined as any quarter in which a unit operates for 168 cumulative operating hours or more.
[2] Conducted in three out of four calendar quarters. Not required for calendar quarter in which RATA is conducted.
[3] Conduct RATA annually (i.e., four unit QA operating quarters) if the previous relative accuracy (RA) was ≤ 7.5% or alternative criteria ≤0.7% O_2
4Whenever 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.

5.3.1 Linearity Check

For the Units 1 and 2 O_2 analyzers, a three (3)-point linearity check is performed once each unit QA operating quarter. A unit QA 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.

The linearity check is conducted in accordance with the requirements specified in Section 2.2.1, Appendix B, 40 CFR Part 75. Linearity checks are performed no less than 30 days apart, to the extent practicable. Additionally, linearity checks may be required to be conducted as a diagnostic test to verify proper CEMS operation following corrective action.

Before initiating a linearity check, routine and non-routine calibration adjustments can be made to the analyzers. Consistent with Question 9.28 of the *Part 75 Emissions Monitoring Policy Manual*, non-routine calibration adjustments may be performed to address uncertainties such as the fact that calibration gas values are only guaranteed to be within 2.0% 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 analyzer 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 or equal to twice the applicable performance specification (e.g., 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., 0.5% absolute difference for O_2).

For the linearity check, the audit gases are introduced at a connection on the probe. Each O_2 analyzer is challenged three times at each of three calibration levels (low, mid, and high) while the unit is operating. The same calibration gas will not be 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 is 50.0 to 60.0% of span and (3) high-level concentration equals 80.0 to 100.0% of span. Only certified USEPA 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 Monitoring 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	Audit Gas	Gas Concentration		
		Low-Level	Mid-Level	High-Level
1 & 2	O_2	4.4 – 6.6%	11.0 – 13.2%	17.6 – 22.0%

For O_2 analyzers, the linearity checks are unacceptable if 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. 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. Data remain out-of-control until the successful completion of a subsequent linearity check, unless the data validation procedures specified in Section 5.3.1.2 are followed.

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

$$LE = \frac{|R - A|}{R} \times 100$$

Equation 5-1.

Where:

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

5.3.1.1 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 operation four successive calendar quarters have elapsed since the previous linearity check without conducting a subsequent linearity check, AES Puerto Rico 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 are 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 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.

5.3.1.2 Linearity check data validation procedures. If a linearity check is failed or aborted due to problems with the O_2 analyzers, data from the monitoring system are invalidated prospectively from the hour of the failed or aborted linearity check until the completion of a probationary calibration error test that initiates a conditionally valid data period.

If a subsequent linearity check 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 are 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.

If a linearity check is not completed by the end of a calendar quarter in which it was due, unless the conditionally valid data procedures are applied, then data from the O_2 analyzers are invalid beginning with the first unit operating hour after the end of the calendar quarter until the successful completion of a linearity check.

5.3.2 Relative Accuracy Test Audit (40 CFR Part 75)

A single load RATA shall be conducted on each of the O_2 analyzers.

NOTE 1: *For Part 75 purposes, the RATA must be conducted by an Air Emissions Testing Body (AETB). The AETB shall provide certification (in a format suitable for review) to the affected sources that testing is being conducted in accordance with ASTM-D7036-04. The AETB shall provide a qualified individual onsite to either conduct or oversee the RATA testing.*

NOTE 2: *When conducting a RATA, the calibration gases used by test contractors or internal testing groups must be EPA Protocol Gases purchased from manufacturers that participate in EPA's PGVP (reference Section 4.3.1 of this SSMP).*

A RATA is performed semiannually (i.e., once every two successive unit QA operating quarters) or annually (i.e., once every four successive unit QA operating quarters) based on the previous RATA results for each monitor and monitoring system of the CEMS. RATAs are conducted in accordance with the requirements specified in Appendices A and B of 40 CFR Part 75. A RATA is conducted on an annual basis only if the previous RATA results meet the requirements specified in Section 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 if the mean difference between the average reference method value and the average monitor value for the RATA was less than 0.7% O_2). If the RA was greater than 7.5% (and less than or equal to 10%), then the audit is conducted semiannually (if the alternative criteria is used, the score must be less than 1.0% O_2). At a minimum, a RATA must be performed within eight successive calendar quarters since the last RATA. Each single load RATA must be completed within a period of 168 consecutive unit operating hours, while the unit combusts its normal fuel.

According to Section 2.3.2 of Appendix B to Part 75, 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. Trial RATA runs may be performed after the calibration adjustments and additional adjustments within the allowable limits in section 2.1.3 of appendix B to Part 75 may be made prior to the RATA, as necessary, to optimize the performance of the CEMS. The trial RATA runs need not be reported, provided that they meet the specification for trial RATA runs in § 75.20(b)(3)(vii)(E)(2), or

3) After repair, maintenance, re-linearization or reprogramming of the monitoring system. In this case, the monitoring system shall be considered out-of-control from the hour in which the repair, corrective maintenance, re-linearization or reprogramming is commenced until the RATA has been passed.

AES Puerto Rico will determine the upper and lower boundaries of the range of operation for Units 1 and 2. The lower boundary of the range of operation of a unit will be the minimum safe, stable load. The upper boundary of the range of operation of a unit will be the maximum sustainable load. The "maximum sustainable load" is the higher of either: (1) the nameplate or rated capacity of the unit, less any physical or regulatory limitations or other de-ratings; or (2) the highest sustainable unit load, based on at least four quarters of representative historical operating data. The load values are expressed in units of megawatts or thousands of lbs/hr of steam load. AES Puerto Rico will identify the "normal" load level or levels (low, mid or high) based on the operating history of each unit. To identify the normal load level(s), AES Puerto Rico will, at a minimum, determine the relative number of operating hours at each of the three load levels, (low, mid and high) over the past four representative operating quarters. AES Puerto Rico will then determine, to the nearest 0.1 percent, the percentage of the time that each load level (low, mid, high) has been used during that time period. A summary of the data used for this determination and the calculated results is maintained in the DAHS.

A RATA will not be initiated if the CEMS is out-of-control with respect to any daily or quarterly QA/QC tests. 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 Section 2.3.2(h), Appendix B, 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

O_2 analyzers, 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 O_2 analyzers during a RATA other than routine calibration adjustments following a daily calibration error test.

Before initiating a RATA, trial RATA runs may be performed as a means to check the accuracy of the O_2 analyzers. 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 Section 2.1.3, Appendix B, 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.

The RATA results are acceptable if the relative accuracy is less than or equal to 10.0% for the 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 Section 5.2.2.6 are followed. Per Section 6.5(g) of Appendix A to Part 75, there is no bias test or bias adjustment factor for O_2 monitors.

5.3.2.1 RATA grace period. Section 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 Section 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 deadline for the next RATA shall set as follows:

1) If the grace period RATA qualifies for the annual frequency, the deadline shall be set three (3) unit QA operating quarters after the quarter in which the grace period RATA is completed, not to exceed eight (8) calendar quarters.

2) If the grace period RATA qualifies for the semi-annual frequency, the deadline shall be set two (2) unit QA operating quarters after the quarter in which the grace period RATA is completed, not to exceed eight (8) calendar quarters.

If the RATA is conducted after the 720-operating hour grace period has expired, the deadline for the next RATA shall be either (1) two unit QA operating quarters (if the RATA meets the semi-annual criteria) or (2) four unit QA operating quarters (if the RATA meets the annual criteria) after the quarter in which the RATA was completed, not to exceed eight (8) calendar quarters.

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

If a RATA is failed or aborted due to problems with the O_2 analyzers, data from the monitoring system are 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 remain 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.

5.4 QUALITY ASSURANCE ACTIVITIES FOR FLOW MONITORS

For Units 1 and 2, the QA activities for the flow monitors meet the requirements set forth in Appendix B of 40 CFR Part 75. The QA activities conducted on the flow monitor include flow-to-load ratio tests and RATAs. Table 5 - 5 lists the frequency for each audit.

Table 5 - 5. Frequency for Flow Monitor Audits

Quality Assurance Audits	Frequency	Audit Limits For Flow Monitors
RATA	Semiannually	≤ 10.0%
RATA	Annually[1]	≤ 7.5%[2]
Flow-to-load Ratio Test[3]	Quarterly	X
Quality Control Audits		
Calibration Error Test[4]	Daily	≤ 3.0%
Interference Check	Daily	X

[1] 40 CFR Part 75 allows for a RATA to be conducted annually (i.e., four QA operating quarters) if the previous relative accuracy (RA) for flow (2-level RATA) was ≤ 7.5%.
[2] Conduct annual RATA at two most frequently used operating levels. A 3-level RATA must be conducted at least once every twenty (20) consecutive calendar quarters or whenever changes to polynomial coefficients are made.
[3] Conduct a flow-to-load ratio test each unit QA operating quarter.
[4] 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.

5.4.1 Flow-to-Load Ratio Test

A flow-to-load ratio test will be performed on the flow monitor once every unit QA operating quarter. A unit QA operating quarter is defined as any quarter in which a unit operates for at least 168 cumulative operating hours; where a unit operating hour is any hour or partial hour that a unit combusts fuel.

NOTE: *The flow-to-load ratio test is a data evaluation conducted by the DAHS.*

Each time that a flow RATA is performed, AES Puerto Rico will determine the reference value for the ratio of volumetric flow rate to unit load (R_{ref}). This ratio is determined at normal load only. If two load levels have been designated as "normal", then a R_{ref} value must be determined for each load. The current R_{ref} value must be reported in the quarterly EDRs. R_{ref} is calculated using Equation A-13 located in Appendix A to 40 CFR Part 75. In addition to or as an alternative to determining R_{ref}, a reference value for the gross heat rate (GHR) may be determined. This option requires quality assured diluent (O_2) data for each hour of the most recent normal load RATA. GHR is calculated using Equation A-13a located in Appendix A to 40 CFR Part 75.

At the end of each unit QA operating quarter, the flow-to-load ratio for each hour during which (1) the unit operated within ±10% of the average load during the most recent normal load RATA

(L_{avg}) and (2) quality assured volumetric flow data was collected by a certified flow monitor will be calculated.

Each data analysis shall be conducted on a minimum of 168 recorded hourly average flow rates. If fewer than 168 hourly flow-to-load ratios (or GHR values) are available at any load level designated as "normal" then a flow-to-load ratio (or GHR value) evaluation is not required for that calendar quarter.

For an affected unit with two load levels designated as normal, the analysis must be performed on the higher load level. When there are fewer than 168 data points at the higher load level, the analysis must be conducted at the lower load level.

Calculate E_h, which is the absolute percentage difference between each hourly flow-to-load ratio (R_h) and the reference flow-to-load value (R_{ref}). R_{ref} is always based on the most recent normal load RATA, even if that RATA was conducted during the calendar quarter being evaluated. Next, calculate the arithmetic average of all the E_h values. The results of the flow-to-load (or GHR value) evaluation must be reported in the quarterly EDR.

The flow-to-load (or GHR value) evaluation results are acceptable and no further action is required if the arithmetic average (E_f) of all the E_h values is less than or equal to:

- 15.0% if L_{avg} for the most recent normal load RATA is ≥ 60 megawatts and unadjusted flow rates were used in the equation
- 10.0% if L_{avg} for the most recent normal load RATA is ≥ 60 megawatts and if bias adjusted flow rates were used in the equation
- 20.0% if L_{avg} for the most recent normal load RATA is < 60 megawatts and unadjusted flow rates were used in the equation
- 15.0% if L_{avg} for the most recent normal load RATA is < 60 megawatts and if bias adjusted flow rates were used in the equation

If the flow-to-load (or GHR value) test results do not meet the above criteria, then the facility will either:

1) Recalculate E_f after excluding the non-representative flow data,

2) Implement Option 1 (reference Section 5.4.1.2 of this SSMP), or

3) Conduct a RATA as specified in Option 2 (reference Section 5.4.1.3 of this SSMP).

5.4.1.1 Recalculation of E_f. The owner or operator may exclude the data meeting the criteria listed below and recalculate E_f. The data exclusions criterions are:

- Any hour in which the unit combusted a different fuel than the fuel combusted during the most recent normal load RATA.
- Any hour in which the unit's operating load was rapidly increased or decreased (i.e., hourly load differed by more than ±15.0% from the load of the preceding or subsequent hour.
- If a normal load RATA was conducted and passed during the quarter being analyzed, exclude any data for any hour prior to the completion of this RATA.
- If a problem with the flow monitor accuracy was discovered during the quarter and was corrected, any hour prior to the completion of the required abbreviated flow-to-load test.

After eliminating these data, the data may be analyzed a second time. A minimum of 168 representative data points must be available to conduct the evaluation, or the evaluation is not required for that particular quarter. If the recalculation meets the acceptance criteria, then no further action is required. However, if the recalculated E_f exceeds the acceptance criteria then the flow monitor is out-of-control, beginning with the first hour of the quarter following the quarter in which E_f exceeded the applicable limit.

5.4.1.2 Option 1. For Option 1, within 14 unit operating days after the end of the calendar quarter for which a flow-to-load ratio evaluation failed to meet the applicable acceptance criteria, the cause of the flow monitor problems will be investigated. If corrective maintenance fails to uncover a problem with the flow monitor, then a single load RATA at normal load must be conducted.

If corrective maintenance uncovers a problem with the flow monitor then all repairs, corrective actions, etc. must be documented in the maintenance log. If corrective action is required to relinearize the flow monitor, then a 3-level RATA is required. Data from the flow monitor is invalid back to the first unit operating hour after the end of the calendar quarter for which the E_f exceeded the limit until a probationary calibration error test is successfully completed following corrective action. Following the probationary calibration error test, either an abbreviated flow-to-load ratio test, a single load RATA or a 3-level RATA will be performed.

5.4.1.3 Option 2. If the flow-to-load ratio test exceeds the applicable limits, the facility may opt to perform a RATA at normal load. If the RATA is passed hands-off, no further action is required and the out-of-control period for the monitor ends at the date and hour of completion of a successful RATA unless the option to use conditionally valid data is utilized. In that case, all conditionally valid data from the monitor are considered to be quality-assured, back to the first unit operating hour following the end of the calendar quarter for which the E_f value was above the applicable limit. If the RATA is failed, all data from the monitor shall be invalidated, back to the first unit operating hour following the end of the calendar quarter for which the E_f value was above the limit. Data from the monitor are considered invalid until a normal load RATA is successfully completed. Alternately, following a failed RATA and corrective action a probationary calibration error test may be performed to conditionally validate the data until the RATA has been passed. If the corrective actions taken following the failed RATA include adjustment of the polynomial coefficients of the flow monitor, a 3-level RATA is required.

5.4.1.4 Abbreviated flow-to-load ratio test. An abbreviated flow-to-load ratio test may be conducted following any documented repair, etc. to demonstrate that the repairs have not significantly affected the monitor's ability to measure volumetric flow. This test may not be used following changes to the linearity of the flow monitors (e.g., changes to the k-factors).

A probationary calibration error test must be performed before starting an abbreviated flow-to-load ratio test, thereby initiating a conditionally valid data period. The abbreviated test must be completed within 168 cumulative operating hours of the probationary calibration error test. During the test, operate the unit to as closely as possible duplicating the operating conditions during the most recent normal load RATA. 40 CFR Part 75 recommends that the operating load be held constant to within ±10.0% of the average load during the most recent RATA and that the diluent gas concentration be maintained within ±0.5% O_2 of the average diluent concentration during the most recent normal load RATA. After setting the process parameters, record a minimum of six and a maximum of twelve consecutive hourly average flow rates.
The results of the abbreviated test are acceptable and no further action is required if the test results meet the applicable limits. All conditionally valid data will be considered quality assured beginning with the hour of completion of the probationary calibration error test. If, however, the abbreviated flow-to-load test results are unacceptable, then a normal load RATA is required and the flow monitor data are considered invalid back to the hour of completion of the probationary calibration error test. Another probationary calibration error test may be conducted to initiate another conditionally valid data period until completion of the required RATA.

5.4.2 Relative Accuracy Test Audit

For the Units 1 and 2 flow monitors, RATAs are performed either semiannually (i.e., once every two unit QA operating quarters) or annually (i.e., once every four unit QA operating quarters) based on the previous RATA results for the flow monitors. Semiannual RATAs will be conducted at a single load level (i.e., normal) and annual RATAs will be conducted at two operating levels (i.e., the two most frequently used operating levels). A RATA must be performed within eight successive calendar quarters since the last RATA. A 3-level RATA must be performed on each flow monitor at least once during each period of twenty (20) consecutive calendar quarters.

NOTE 1: *A single-load annual flow RATA may be performed in lieu of a 2-level RATA, if a unit has operated at a single load level (low, mid or high) for at least 85.0 percent of the time. Unit operating time must be based on historical operating data beginning with the date of the last RATA to a date no greater than 21 days before the scheduled RATA. In this instance, the results of this single-load flow RATA can determine an annual RATA frequency. The USEPA ECMPS Reporting Instructions for Quality Assurance and Certification XML EDRs, requires a Test Qualification Data element record included with an "SLC" Test Claim code whenever this single load provision is used in lieu of conducting multiple-load flow RATAs.*

NOTE 2: *For Part 75 purposes, a RATA must be conducted by an AETB. This requirement became effective March 27, 2012.*

The flow monitor RATAs are conducted in accordance with the requirements specified in Appendices A and B of 40 CFR Part 75. A RATA will not be initiated if the monitoring system is operating out-of-control with respect to any other required QA/QC tests. The operating levels for the RATAs are based on the unit's "range of operation," as defined below (see Table 5 - 6 for a summary of unit operating ranges for Units 1 and 2):

(1) The low operating level is the first 30.0 percent of the range of operation;

(2) The mid operating level is the middle portion (30.0 to 60.0 percent) of the range of operation; and

(3) The high operating level is the upper end (60.0 to 100.0 percent) of the range of operation.

Table 5 - 6. Range of Operation

Units	Range of Operation[1]		Low-Load (MW)	Mid-Load (MW)	High-Load[2] (MW)
	Lower/Upper Boundary	Total MW In Range			
1 & 2	150 - 264	114	150 - 184	185 - 218	219 - 264

[1] For all multi-load flow RATAs, each load level tested (e.g., mid and high) shall be separated by 25% of the "range of operation" (i.e., 38 MW).

[2] High-load is the designated normal load for Units 1 and 2.

AES Puerto Rico will determine the upper and lower boundaries of the range of operation for the unit. The lower boundary of the range of operation of a unit will be the minimum safe, stable load. The upper boundary of the range of operation of a unit will be the maximum sustainable load. The "maximum sustainable load" is the higher of either: (1) the nameplate or rated capacity of the unit, less any physical or regulatory limitations or other de-ratings; or (2) the highest sustainable unit load, based on at least four quarters of representative historical operating data. The load values are expressed in either units of megawatts or thousands of lbs/hr of steam load.

AES Puerto Rico will identify the "normal" load level or levels (low, mid or high) based on the operating history of Units 1 and 2. To identify the normal load level(s), the facility will, at a minimum, determine the relative number of operating hours at each of the three load levels, (low, mid and high) over the past four representative operating quarters. The facility will then determine, to the nearest 0.1 percent, the percentage of the time that each load level (low, mid, high) has been used during that time period.

Based on the analysis of the historical load data the owner or operator shall designate the most frequently used load level as the normal load level for the unit. The owner or operator may also designate the second most frequently used load level as an additional normal load level for the unit. If the manner of operation of the unit changes significantly, such that the designated normal load(s) or the two most frequently used load levels change, the owner or operator shall repeat the historical load analysis and shall re-designate the normal load(s) and the two most frequently used load levels, as appropriate. A minimum of two representative quarters of historical load data are required to document that a change in the manner of unit operation has occurred.

A single-load annual flow RATA may be performed in lieu of a 2-level RATA, if a unit has operated at a single load level (low, mid or high) for at least 85.0 percent of the time. Unit operating time must be based on historical operating data beginning with the date of the last RATA to a date no greater than 21 days before the scheduled RATA. In this instance, the results of this single-load flow RATA can determine an annual RATA frequency.

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 conditionally valid data if the specifications listed below are followed:

- For trial RATA runs, the average reference method reading and the average CEMS reading differ by no more than ±10% of the average reference value
- No adjustments can be made to the calibration (other than those specified in Section 2.1.3 of Appendix B to 40 CFR Part 75) of the CEMS following trial
- No repairs or re-linearizations (e.g., changes to the k-factors) 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.

The RATA results are acceptable if the RA is less than or equal to 10.0%. The RATA will be performed on an annual basis only, if the RA for the preceding RATA was 7.5% or less for each operating load tested. For 2- and 3-level RATAs, when a RATA is passed at one or more operating levels but is failed at a subsequent operating level, it is required to repeat only the failed RATA (at that particular load). If the monitor fails the RATA at any one of the operating levels, corrective action is taken and the RATA is repeated.

Apply the Bias Test and calculate the Bias Adjustment Factor as described in Section 7.6 of Appendix A to Part 75. Follow the below procedures:

- For 2-load or 3-load flow RATAs, when only one load level has been designated as normal and the bias test is passed at the normal load level, apply a BAF of 1.000 to the subsequent flow rate data. If the bias test is failed at the normal load level, calculate the normal load BAF and then perform an additional bias test at the second most frequently-used load level. If the bias test is passed at this second load level, apply the normal load BAF to the subsequent flow rate data. If the bias test is failed at this second load level, calculate the BAF at the second load level and apply the higher of the two BAFs (either from normal load level or from the second load level) to the subsequent flow rate data.

- For 2-load or 3-load flow RATAs, when two load levels have been designated as normal and the bias test is passed at both normal load levels, apply a BAF of 1.000 to the subsequent flow rate data. If the bias test is failed at one of the normal load levels but not at the other, calculate the BAF for the normal load level at which the bias test was failed and apply that BAF to the subsequent flow rate data. If the bias test is failed at both designated normal load levels, calculate the BAF at each normal load level and apply the higher of the two BAFs to the subsequent flow rate data.
- Each time a RATA is passed and the appropriate bias adjustment factor has been determined, apply the BAF prospectively to all monitoring system data, beginning with the first clock hour following the hour in which the RATA was completed.

Each single load flow RATA must be completed within a period of 168 consecutive unit operating hours, while the unit combusts its normal fuel. For multi-level flow RATAs, all testing at each of the required operating levels must be completed within 720 consecutive unit operating hours. 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. When a RATA is terminated due to problems with the CEMS flow monitor that is being certified, it must be reported. No adjustments, corrective actions, repairs, or replacements will be made to the CEMS flow monitor during a RATA other than routine calibration adjustments following daily calibration error tests.

5.4.2.1 RATA grace period. Section 2.3.3, Appendix B, 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) twenty consecutive unit calendar quarters have elapsed without a 3-level flow RATA being performed; or (3) 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 Section 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 deadline for the next RATA shall set as follows:

(1) If the grace period RATA qualifies for the annual frequency, the deadline shall be set three (3) unit QA operating quarters after the quarter in which the grace period RATA is completed, not to exceed eight (8) calendar quarters.

(2) If the grace period RATA qualifies for the semi-annual frequency, the deadline shall be set two (2) unit QA operating quarters after the quarter in which the grace period RATA is completed, not to exceed eight (8) calendar quarters.

If the RATA is conducted after the 720-operating hour grace period has expired, the deadline for the next RATA shall be either (1) two unit QA operating quarters (if the RATA meets the semi-annual criteria) or (2) four QA operating quarters (if the RATA meets the annual criteria) after the quarter in which the RATA was completed, not to exceed eight (8) calendar quarters.

5.4.2.2 Data validation. If a calibration error test is failed before completing the RATA, the RATA must be repeated. Data from the flow monitor 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 calibration error test is failed at a particular load during a multi-level flow RATA, the RATA for that load only must be repeated.

If a RATA is failed or aborted due to problems with the CEMS, data from the flow monitoring system are 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 remain 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 multi-level flow RATAs, if one or more RATAs have been successfully passed only the failed RATA must be repeated. Data from the flow monitoring system are 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.

.

SECTION 6
ONGOING OPERATION AND MAINTENANCE PROCEDURES

Preventive and corrective maintenance are important QC activities in the ongoing operation of the AES Puerto Rico's MATS CEMS program. Preventive maintenance is based on the CEMS manufacturers' recommended procedures, as well as AES Puerto Rico's operating experience. Step-by-step preventive maintenance procedures for the Hg sorbent trap monitoring systems, O_2 analyzers and flow monitors are provided in the applicable O&M manuals. Corrective maintenance is also performed based on the step-by-step procedures for the Hg sorbent trap monitoring systems, O_2 analyzers and flow monitors presented in the applicable vendor O&M manuals.

6.1 OVERVIEW OF PREVENTIVE MAINTENANCE

Preventive maintenance for the Hg sorbent trap monitoring systems, O_2 analyzers, and flow monitors 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 personnel.

6.2 OVERVIEW OF CORRECTIVE MAINTENANCE

Corrective maintenance of the Hg sorbent trap monitoring systems, O_2 analyzers, and flow monitors will be performed by the Instrument Technicians, whenever necessary, based on results of QC checks, QA audits, failure of a monitoring system or CEMS out-of-control events. In the event of a monitoring system failure or out-of-control events, the DAHS will alert the operators to an abnormal condition. The operators will investigate the alarm to attempt resolution per procedure. If the operators cannot remedy the alarm condition, plant technical personnel will be notified. If plant personnel are unable to diagnose the problem or repair the component, a manufacturer's service representative is contacted to resolve the problem.

6.3 SPARE PARTS

AES Puerto Rico maintains an inventory of Hg sorbent trap monitoring system, O_2 analyzer, and flow monitor 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 spare parts inventory is periodically updated based on usage experience, as necessary.

SECTION 7
REPORTING AND RECORDKEEPING

7.1 INTRODUCTION

Methods for documenting QA and QC data and information are an integral part of this SSMP. This section describes the reports, and other records, that document QA and QC activities conducted on the Hg sorbent trap monitoring systems, O_2 analyzers, and flow monitors. AES Puerto Rico 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 CEMS data acquisition and processing system. Therefore, the DAHS plays an integral role in generating data summaries and other information included in regulatory 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 record keeping and reporting requirements contained in the regulatory permit for AES Puerto Rico. Additional information concerning the DAHS is detailed in the facility's Quality Assurance Program Manual. 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 PLC 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. The reports would include but not be limited to the following: period of CEMS malfunctioning or inoperative (including out-of-control periods as defined by §63.8(c)(7)(ii)), daily calibrations, etc.
- 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 Record Keeping – Hourly averages of all data inputs are stored for historical reference.
- Data Archiving – The DAHS archives data and reports. The backup process functions automatically and manually.

7.3 MANUAL DOCUMENTATION AND REPORTING

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

- Maintenance Records, and
- Audit Reports

The following subsections describe these types of documentation.

7.3.1 Maintenance Log

The Instrument Technicians maintain a maintenance log in the CEM shelter. Consistent with Appendix B of 40 CFR Part 75, the Instrument Technicians 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 re-characterizes a system's ability to record 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.

Preventive and corrective maintenance records are maintained in a format suitable for inspection. Reference Section 7.5 of this SSMP.

7.3.2 Performance Evaluation Reports

A detailed description of the periodic QA/QC performance evaluation activities, such as the daily calibrations, quarterly Hg sorbent trap monitoring system calibrations and RATAs, are included in Sections 4 and 5 of this SSMP. Supporting data and performance evaluation reports shall be maintained at AES Puerto Rico in the CEMS recordkeeping system (Reference Section 7.5 of this SSMP).

7.4 SUBPART UUUUU, 40 CFR PART 63 REPORTING REQUIREMENTS

There are several different reporting requirements under Subpart UUUUU. The subsections below discuss the various reporting requirements specified by Subpart UUUUU.

7.4.1 Notification of Compliance Status

Consistent with §63.10030(e) and 63.9(h)(2)(ii), AES Puerto Rico submitted a Notification of Compliance Status to the DNRA and USEPA no later than sixty (60) days after completing all relevant compliance demonstrations. For AES Puerto Rico Units 1 and 2, the Notification of Compliance Status is due no later the 60 days after demonstrating compliance with the applicable emission limit (reference Table 2 – 1 of this SSMP) using the initial 30 boiler operating day average (for Hg) or PM and HCL performance test results.

7.4.2 Performance Test Reports

Consistent with §63.10031(f), results of required Subpart UUUUU performance tests must be submitted no later than sixty (60) days after completing each performance test. The performance test reports will be submitted electronically (as a .pdf file) via the ECMPS Client Tool.

7.4.3 Quarterly Reports

In accordance with Section 63.10031(f)(3) and Section 7.2.5, Appendix A to Subpart UUUUU, emissions data and QA test data for the Hg sorbent trap monitoring systems, O_2 analyzers and flow monitors will be submitted via the ECMPS Client Tool. The quarterly emissions reports and QA test results are due no later than thirty (30) days after the end of each calendar quarter.

NOTE 1: *Monitoring Plan changes, QA tests results and quarterly emission EDRs are submitted as three separate submittals using the ECMPS Client Tool. Any Monitoring Plan changes must be reported first followed by the quarterly QA test results and then the quarterly emissions file. The QA tests results (and Monitoring Plan changes) may be submitted prior to or in conjunction with the quarterly emissions file submission.*

NOTE 2: *The Hg sorbent trap monitoring system Monitoring Plan (Appendix A to Subpart UUUUU) and initial certification/recertification data will also be submitted via the ECMPS Client Tool.*

NOTE 3: *The MATS Hg Emissions Averaging Plan has been prepared and implemented effective June 1, 2022.*

7.4.4 Semiannual Compliance Reports

In accordance with §63.10031, AES Puerto Rico must submit Semiannual Compliance Reports for Units 1 and 2. The Semiannual Compliance Report summarizes the MATS compliance status for Units 1 and 2 and must contain certain information regarding Hg sorbent trap monitoring systems, O_2 analyzers and flow monitors performance during the reporting period.

Additionally, as specified in §63.10031(d) any excess emissions must also be submitted with the Semi-Annual Compliance Report. Section 63.10(e)(3)(v) provides a listed of information required for the excess emissions report.

As specified in §63.10031(f)(4), after conducting AES Puerto Rico's internal review process, the Semiannual Compliance Reports will be submitted electronically (as a .pdf file) via the ECMPS Client Tool. In accordance with §63.10031(b), the Semiannual Compliance Reports must be submitted (or postmarked if AES Puerto Rico is unable to submit electronically) no later than July 31 and January 31 of each calendar year.

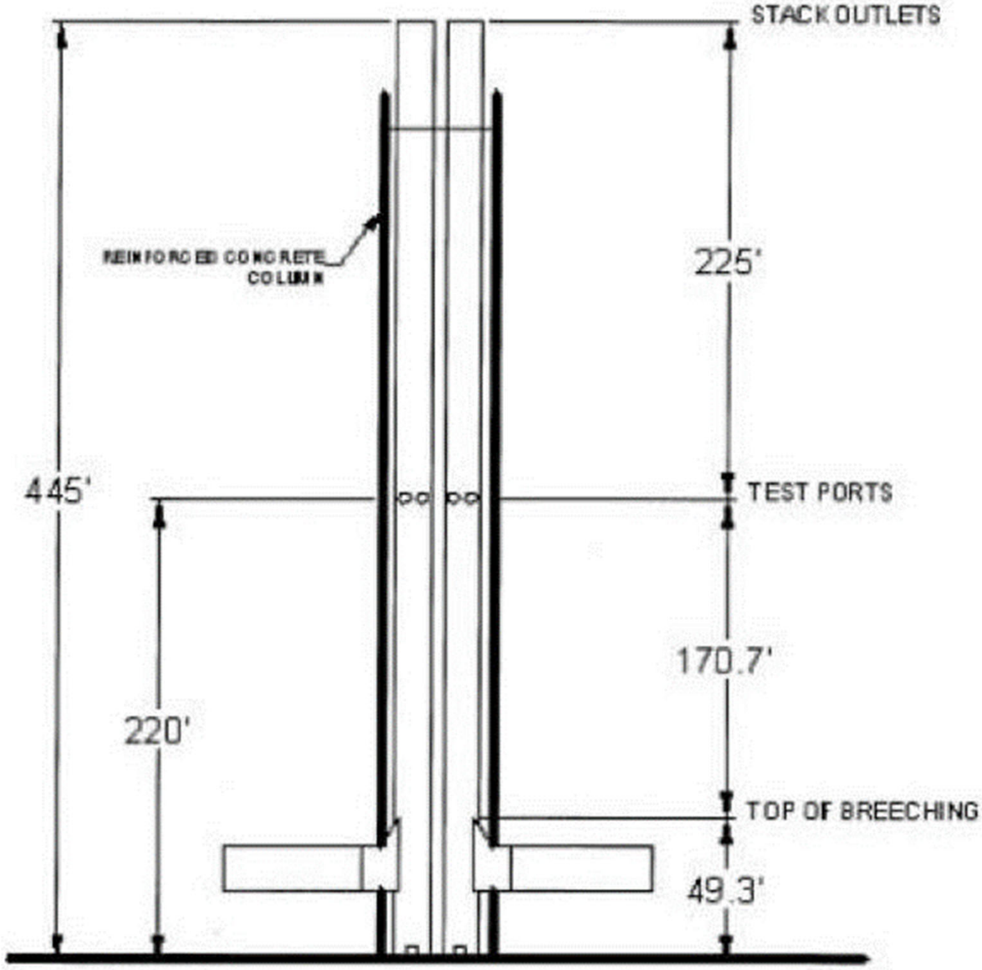
7.5 RECORDKEEPING REQUIREMENTS

Consistent with §63.10033, AES Puerto Rico will maintain the AES Puerto Rico Units 1 and 2 Subpart UUUUU-related records for a minimum of five (5) years from the date of each occurrence. Records must be maintained onsite for at least two (2) years. Records can be maintained offsite for the remaining three (3) years. AES Puerto Rico shall maintain the applicable records specified in §63.1(b) and 63.10030.

APPENDIX A
AES PUERTO RICO UNITS 1 AND 2 SCHEMATIC

CFB Boiler Stacks Configuration

Stack Diameter = 192 inches (both units)



Notes: CEMS probes, H_2O probes, Flow and Opacity Transducers, and the entire Hg Sampling Systems are located at the test port level 220' above ground.
Gas is transported to ground level where all analyzers, gas conditioning equipment, and dilution systems are located in a conditioned space.
The base of the stack is located at 19' above sea level.

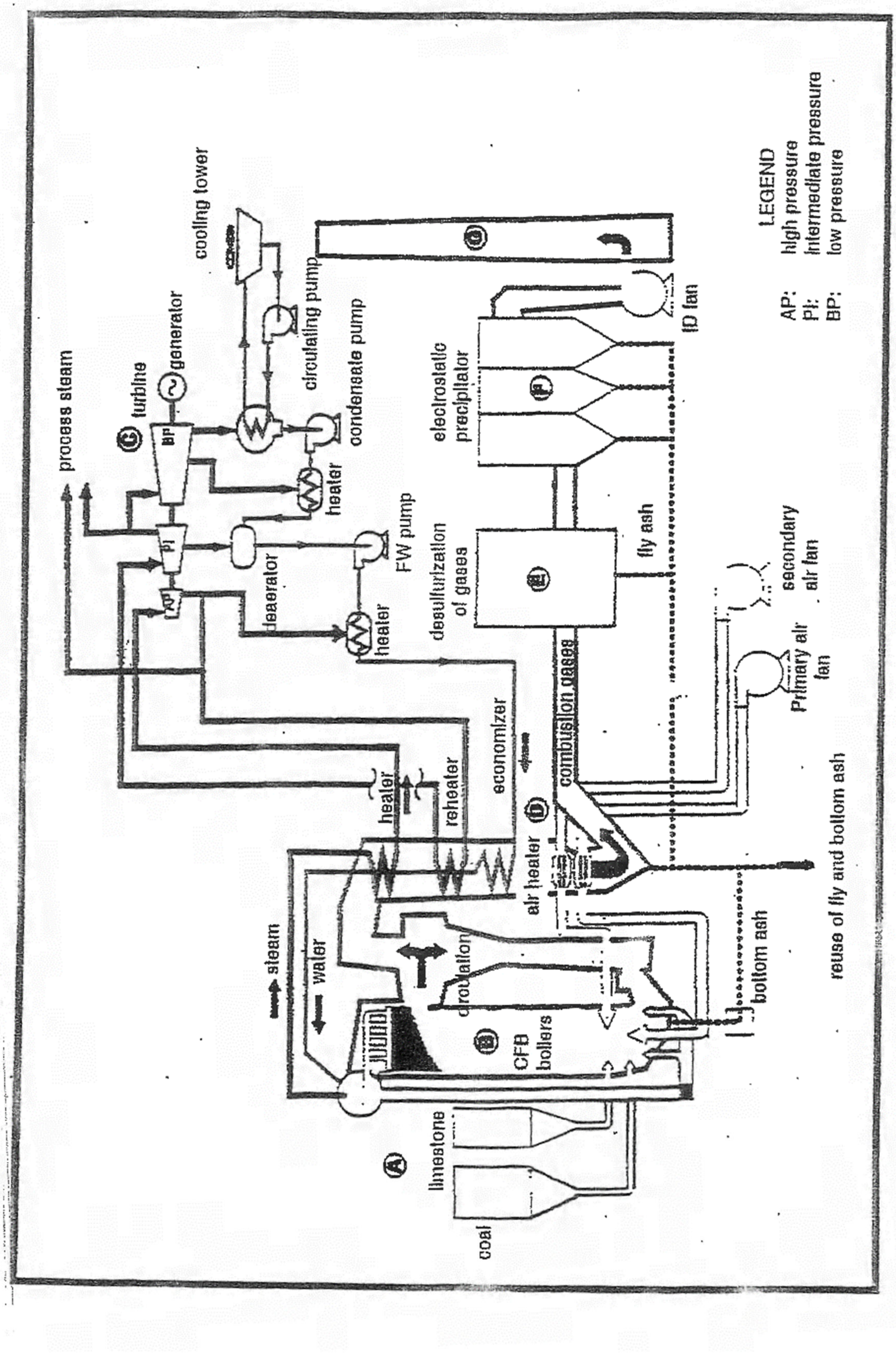


Figure 1B-1
Simplified Schematic of the CFB Boilers
and the Emission Controls (EU-1 and EU-2)

APPENDIX B
CONCENTRATION AND EMISSION RATE CALCULATIONS

1. PS-12B Sorbent Trap Concentration [PS-12B, Equation 12B-6]

$$C_d = \frac{M^*}{V_t}$$

Where:

C_d	=	Hg concentration for the collection period (µg/dscm)
M*	=	Total mass of Hg recovered from sections 1 and 2 of the sorbent trap (µg)
V_t	=	Total volume of dry gas meter during the collection period (dscm). Standard temperature and pressure are defined as 20 ºC and 760 mm Hg.

NOTE 1: *Per Section 12.8.1 of SP-12B, report the average collection period Hg concentration as, ½(C_a + C_b).*

NOTE 2: *The measured Hg concentration for each collection period is applied to each unit operating hour in the applicable collection period.*

2. Moisture Correction [Method 30B, Equation 30B-4]

$$C_w = C_d \times (1 - B_{ws})$$

Where:

C_w	=	Hg concentration, wet basis (µg/scm)
C_d	=	Hg concentration, dry basis (µg/dscm)
B_{ws}	=	Moisture content of the sample gas (%). May use Part 75 default moisture value of 6.0% for bituminous coal.

NOTE 1: *When using the O_2 analyzer going forward, the above formula will no longer be needed, since the O_2 analyzer operates on a dry gas basis.*

3. Hg Emission Rate (lb/TBtu) [Method 19, Equation 19-7] (When using the CO_2 analyzer)

$$\boldsymbol{E = KC_w F_c \frac{100}{CO2_w} \times 10^6}$$

Where:

E	=	Hg emission rate for the collection period (lb/TBtu)
K	=	6.24 x 10^{-11} lb-scm/ µg-scf
C_w	=	Hg concentration for the sorbent trap collection period, wet basis (µg/wscm)
F_c	=	1,800 for bituminous coal (scf CO_2/MMBtu)
CO_{2w}	=	Average CO_2 value measured by the Part 75 analyzer for the sorbent trap collection period (%)
10^6	=	Factor to convert lb/MMBtu to lb/TBtu

NOTE: *Do not use Part 75 CO_2 substituted data in the calculation. Calculate the average CO_2 based only on the valid Part 75 CO_2 data collected during the sorbent trap collection period.*

4. Hg Emission Rate (lb/TBtu) [Method 19, Equation 19-1] (When using the O_2 analyzer)

$$E = KC_dF_d\frac{20.9}{20.9 - O2_d} \times 10^6$$

Where:

E	=	Hg emission rate for the collection period (lb/TBtu)
K	=	6.24 x 10^{-11} lb-dscm/ µg-dscf
C_d	=	Hg concentration for the sorbent trap collection period, dry basis (µg/dscm)
F_d	=	9,780 for bituminous coal (dscf O_2/mmBtu)
O_{2d}	=	Average dry O_2 value measured by the Part 75 analyzer for the sorbent trap collection period (%)
10^6	=	Factor to convert lb/MMBtu to lb/TBtu

NOTE: *Do not use Part 75 O_2 substituted data in the calculation. Calculate the average O_2 based only on valid Part 75 O_2 data collected during the sorbent trap collection period.*

5. PM and HCl Emission Rate (lb/mmBtu) [Method 19, Equation 19-6] (When using the CO2 analyzer)

$$E = KC_dF_c\frac{100}{CO2_d}$$

Where:

E	=	Pollutant emission rate for the performance test (lb/mmBtu)
K	=	6.24 x 10^{-8} for PM and HCl
C_d	=	Average performance test reference method pollutant concentration, dry basis. For PM (mg/dscm) and for HCl (mg/dscm)
F_c	=	1,800 for bituminous coal (scf CO_2/mmBtu)
$CO2_d$	=	Average reference method CO_2 concentration measured, dry basis (%)

6. PM and HCl Emission Rate (lb/mmBtu) [Method 19, Equation 19-1] (When using the O_2 analyzer)

$$E = KC_dF_d\frac{20.9}{20.9 - O2_d}$$

Where:

E	=	Hg emission rate for the collection period (lb/TBtu)
K	=	6.24 x 10^{-8} for PM and HCl
C_d	=	Average performance test reference method pollutant concentration, dry basis. For PM (mg/dscm) and for HCl (mg/dscm)
F_d	=	9,780 for bituminous coal (dscf O_2/MMBtu)
O_{2d}	=	Average reference method O_2 concentration measured, dry basis (%)

APPENDIX C
PERFORMANCE SPECIFICATION 12B QC/QA CRITERIA

Table C-1. PS 12B Sorbent Trap Data Validation Criteria

QA/QC Test	Acceptance Criteria	Frequency	Consequences if not met
Pre-test leak check	≤ 4% of target sampling rate	Prior to monitoring	Monitoring shall not commence until the leak check is passed
Post-test leak check	≤ 4% of average sampling rate	After monitoring	Invalidate the data from the paired traps or, if certain conditions are met, report adjusted data from a single trap (see PS 12B Section 12.8.3).
Ratio of stack gas flow rate to sample flow rate	No more than 5% of the hourly ratios or 5 hourly ratios (whichever is less restrictive) may deviate from the reference ratio by more than ± 25%	Every hour of the collection period	Invalidate the data from the paired traps or, if certain conditions are met, report adjusted data from a single trap (see PS 12B Section 12.8.3).
Sorbent trap section 2 breakthrough	≤ 5% of Section 1 Hg mass; or ≤ 10% of Section 1 Hg mass if the avg. Hg concentration is ≤ 0.5 µg/dscm No criterion when Hg concentration for trap is less than 10% of the applicable emission limit (must meet all other QA/QC specifications	Every sample	Invalidate the data from the paired traps or, if certain conditions are met, report adjusted data from a single trap (see PS 12B Section 12.8.3).
Paired sorbent trap agreement	≤ 10% Relative Deviation (RD) if the average concentration is > 1.0 µg/dscm. ≤ 20% RD if the average concentration is ≤ 1.0 µg/m^3. Results also acceptable if the absolute difference between concentrations from paired traps is ≤ 0.03 µg/dscm.	Every sample	Either invalidate data from the paired traps or report the results from the trap with the higher Hg concentration.
Spike recovery study	Average recovery between 85% and 115% for each of the 3 spike concentration levels.	Prior to analyzing field samples and prior to use of new sorbent media.	Field samples must not be analyzed until the percent recovery criteria has been met.
Multipoint analyzer calibration	Each analyzer reading within ± 10% of true value and $r^2 \geq 0.99$.	On the day of analysis, before analyzing any samples.	Recalibrate until successful.
Analysis of independent calibration standard.	Within ± 10% of true value	Following daily calibration, prior to analyzing field samples.	Recalibrate and repeat independent standard analysis until successful.
Spike recovery from section 3 of both sorbent traps	75 – 125% of spike amount	Every sample	Invalidate the data from the paired traps or, if certain conditions are met, report adjusted data from a single trap (see PS 12B Section 12.8.3).Use data from single trap that met all criteria multiplied by 1.111.
Relative Accuracy	RA ≤ 20.0% of RM mean; or if RM mean value ≤ 5.0 µg/scm absolute difference between RM and sorbent trap monitoring system mean values ≤ 1.0 µg/scm.	For initial certification and annually thereafter.	Data from the system is invalid until RA test is passed.

Table C-1. PS 12B Sorbent Trap Data Validation Criteria continued

QA/QC Test	Acceptance Criteria	Frequency	Consequences if not met
Gas flow meter calibration	An initial calibration factor (Y) has been determined at 3 settings; for mass flow meters, initial calibration with stack gas has been performed. For subsequent calibrations, Y within ± 5% of average value from the most recent 3-point calibration,	At three settings prior to initial use and at least quarterly at one setting thereafter.	Recalibrate meter at 3 settings to determine new Y value.
Temperature sensor calibration	Absolute temperature measured by sensor within ± 1.5% of a reference sensor.	Prior to initial use and at least quarterly thereafter.	Recalibrate: sensor may not be used until specification is met.
Barometer calibration	Absolute pressure measured by instrument within ± 10 mm Hg of reading with a mercury barometer.	Prior to initial use and at least quarterly thereafter.	Recalibrate: instrument may not be used until specification is met.

APPENDIX D
QUARTERLY O_2 LINEARITY CHECK FORM

QUARTERLY O_2 LINEARITY (TRIMESTRAL LINEALIDAD) CHECKSHEET

Note: *It is very important that each quarter the technicians perform linearities as described in the emissions regulations. The technicians shall fill out each part of this form. The linearity will be done three times at low, mid, and high gas levels. Do not inject the same concentration level of gas twice in succession.*

Aviso: *Es muy importante que cada trimestral los tecnicos hacer los linealidades describido en los regulaciones de emisiones. Los tecnicos deberán llenar cada parte de esta foma. Hacer un linealidad a tres veces con gas a nivel bajo, nivel medio, y nivel alto. No repetir la misma concentración de gas en sucesión.*

Plant/Unit:		**Audit Date: Fecha de Auditoría:**		**Auditor:**	
Parameter: Parámetro:		**Monitor S.N.: Monitor N.S.:**		**Span: Lapso:**	

**Low Level
Nivel Bajo
(20 - 30% span /de lapso)**

Cylinder S.N. Cilindro N.S.:	
Concentration (%O2): Concentracíon (%O2):	
Expiration Date: Fecha de vencimiento:	
PGVP ID:	

Run Number Verification de Numero	Tiempo de inyección	CEMS Response CEMS Medicíon
1		
2		
3		
Average CEMS Response Promedio CEMS Medicíon		

**Mid Level
Nivel Medio
(50 - 60% span /de lapso)**

Cylinder S.N. Cilindro N.S.:	
Concentration (%O2): Concentracíon (%O2):	
Expiration Date: Fecha de vencimiento:	
PGVP ID:	

Run Number Verification de Numero	Injection Time Tiempo de inyección	CEMS Response CEMS Medicíon
1		
2		
3		
Average CEMS Response Promedio CEMS Medicíon		

**Audit - High Level
Auditoría – Nivel Alto
(80 - 100% span /de lapso)**

Cylinder S.N. Cilindro N.S.:	
Concentration (%O2): Concentracíon (%O2):	
Expiration Date: Fecha de vencimiento:	
PGVP ID:	

Run Number Verification de Numero	Injection Time Tiempo de inyección	CEMS Response CEMS Medicíon
1		
2		
3		
Average CEMS Response Promedio CEMS Medicíon		

Pass if Percent Error < ±5% or Absolute Error < ±0.5% O2 (at each level)
Pasar si Porcentaje de Error < ±5% or Error Absoluto < ±0.5% O2 (en cada nivel)