UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 30 2008

OFFICE OF
AIR AND RADIATION

Mr. Craig R. Eckberg
Alternate CAIR Representative
NRG Texas Power, L.L.C.
1301 McKinney, Suite 2300
Houston, TX 77010

Re: Approval of the Predictive Emission Monitoring Systems Installed on Units THW31 through THW34, and Units THW41 through THW44 at NRG Texas Power's T.H. Wharton Generating Station [Facility ID (ORISPL) 3469]

Dear Mr. Eckberg:

The United States Environmental Protection Agency (EPA) has reviewed the October 23, 2007 and October 31, 2007 petitions submitted by NRG Texas Power (NRG) under §75.66(d) and 40 CFR Part 75, Subpart E, in which NRG requested approval of: (1) predictive emission monitoring systems (PEMS) to continuously monitor nitrogen oxides (NO_x) emissions from eight combustion turbine units at its T.H. Wharton Generating Station; and (2) an application under 40 CFR 75.47 for a class-approved alternative monitoring system (AMS) for two of these units. On December 18, 2008, NRG withdrew its request for a class-approved AMS. For the reasons given below, EPA approves the petitions for the PEMS.

Background

NRG owns and operates eight 60 MW combined-cycle units, i.e., Units THW31, THW32, THW33, THW34, THW41, THW42, THW43, and THW44, at its T.H. Wharton Generating Station in Houston, Texas. Each unit consists of a General Electric (GE) Frame 7B/E gas combustion turbine that exhausts into a heat recovery steam generator (HRSG). The turbines combust pipeline natural gas, exclusively, and normally operate in the combined-cycle mode to generate steam and electricity. Each HRSG operates solely on waste heat from the exhaust of the gas turbine; there are no duct burners or other sources of supplementary firing.

The units commenced operation in the 1970s, and historically have used GE premix and DLN combustion technology to control NO_x emissions. However, in recent years, NRG has initiated a project to retrofit the units with a state-of-the-art dry-low-NO_x (DLN) combustor design, i.e., the PSM LEC III combustion system, which will significantly reduce NO_x emissions. The PSM combustion retrofits were completed on six of the eight turbines prior to June 2007, and retrofits for the remaining units (i.e., Units THW32 and THW44) were scheduled to be completed in 2008.

All eight of the turbines are subject to the Clean Air Interstate Rule (CAIR) for NO_x and sulfur dioxide (SO_2). Therefore, NRG is required to continuously monitor and report NO_x and SO_2 emissions and heat input for these units, in accordance with 40 CFR Part 75, beginning on January 1, 2008 (for NO_x) and January 1, 2009 (for SO_2). To meet the CAIR NO_x monitoring and reporting requirements for these units in 2008, NRG elected to use the low mass emissions (LME) methodology in §75.19. However, pending EPA approval of the October 23 and October 31, 2007 petitions, NRG plans to monitor and report the units' NO_x emissions using PEMS (specifically, CMC Solutions' SmartCEM™-75 PEMS), starting in 2009.

To obtain EPA approval of an alternative monitoring system such as a PEMS, the owner or operator must demonstrate that the AMS provides NO_x emission measurements of comparable precision and reliability to measurements made with a continuous emission monitoring system (CEMS), in accordance with Subpart E of Part 75. To collect the necessary data for the 720 operating hour demonstration required by Subpart E, NRG contracted with CMC Solutions, LLC. Temporary NO_x emission rate CEMS were installed on the units and certified in June 2007. The CEMS were used to provide the hourly reference data during the PEMS training and test periods. Relative accuracy test audits (RATAs) of the CEMS were conducted in June 2007 at a single operating load using EPA Methods 7E and 3A. Following the RATAs, SmartCEM™-75 PEMS were installed on the units and the initial training data for the PEMS were collected. The SmartCEM™-75 PEMS is a statistical hybrid computer software system supplied by CMC Solutions that utilizes turbine sensor inputs to produce NO_x outputs.

Individual models of each of the eight gas turbines were developed from the training data. Additionally, the training data from the retrofitted units were combined to develop a single "master" model, to demonstrate that these six turbines qualify as a "class" of units, under 40 CFR 75.47. Next, the predictive capabilities of all eight PEMS were activated, and the PEMS and CEMS were operated concurrently during the third quarter of 2007 for the 720-hour Subpart E demonstration. At the conclusion of the demonstration period, RATAs of the PEMS were performed in October 2007.

The October 23 and October 31, 2007 petitions documented the methods used to establish the relationship between the PEMS sensor outputs and NO_x emissions, and provided data to demonstrate the precision and reliability of the predictive measurements. NRG also provided the information required by §75.47 in its application for a class-approved AMS.

EPA's Determination

Under Subpart E, the owner or operator of an affected unit applying to the Administrator for approval of an AMS must demonstrate that the AMS has the same or better precision, reliability, accessibility, and timeliness (PRAT) as provided by a CEMS. The demonstration must be made by comparing the AMS to a contemporaneously operating, fully certified CEMS or a contemporaneously operating reference method. As previously stated, NRG installed and certified a temporary CEMS on each unit to obtain the hourly reference data. Sections 75.41 through 75.46 discuss the criteria for evaluating PRAT, daily quality assurance, and missing data substitution for the AMS. Section 75.48 details the information that must be included in the application in order to demonstrate that the criteria in §§75.41– 75.46 are met.

EPA reviewed the certification applications and petitions for approval of the PEMS on each of the eight units, based on the individual unit testing. The Agency finds that NRG has satisfactorily demonstrated the precision, reliability, accessibility and timeliness of the PEMS data for each unit. Therefore, EPA approves the petitions. These approvals apply to DLN and non-DLN NO_x emission rate (i.e., lb/mmBtu) outputs from the PEMS when the units are firing pipeline natural gas.

However, the approvals of the PEMS installed on Units THW32 and THW44 apply only to operation of those units prior to the scheduled retrofits. When Units THW32 and THW44 are retrofitted with the PSM LEC III combustion system, NO_x emissions data from the PEMS may not be used for Part 75 reporting purposes until the recertification tests and procedures described in section 4(g) under "Terms and Conditions of This Approval", below, have been successfully completed. A RATA of the PEMS for each of the eight units (unless the unit is still using the LME provisions in §75.19) shall be performed no later than March 31, 2009.

Terms and Conditions of This Approval

1. Precision

Under §75.41, for the normal unit operating level, the owner or operator must provide paired AMS and fully-certified CEMS hourly data for at least 90 percent of the hours during 720 unit operating hours for the primary fuel supply and for at least 24 successive unit operating hours for all alternative fuel supplies that have significantly different sulfur content. Missing data substitution procedures must not be used to provide sample data. The data may be adjusted to account for any lognormality and/or time dependency autocorrelation. Three statistical tests must be passed, i.e., a linear correlation coefficient $(r) \geq 0.8$, an F-test, and a one-tailed t-test for bias described in Appendix A to Part 75. Further, the owner or operator must provide two separate time series plots for AMS and CEMS data. Each data plot must have a horizontal axis representing the calendar dates and clock hours of the readings, and there must be a separate data point for every hour of the test period. One data plot must show CEMS and AMS readings vs. time, and the other data plot must show the percentage difference between the AMS and CEMS readings vs. time. Finally, a plot of the paired AMS concentrations (on the vertical axis) and CEMS concentrations (on the horizontal axis) must be provided.

NRG provided 720 unit operating hours of paired PEMS and CEMS data for each unit that were collected during the third quarter of 2007. Included in these data sets are hours of "non-DLN" unit operation (i.e., periods of unit startup and shutdown). NRG performed a Subpart E statistical analysis of the 720 hours of paired PEMS and CEMS data on each unit. EPA also performed the same statistics on the non-DLN subset of these data, to demonstrate PEMS performance during unit startup and shutdown.

Tables 1 – 8 below present the results of the statistical tests for the SmartCEM™-75 PEMS outputs.[1] The PEMS NO_x lb/mmBtu output on each unit passed each of the three statistical tests for all unit operations. Further, NRG supplied the appropriate data plots concerning the paired PEMS and CEMS data under §§75.41(a)(9) and (c)(2)(i).

Table 1. NRG Texas Power T.H. Wharton Unit 31 (THW31) SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)

[1] Under §75.41(b), in preparation for conducting the required statistical tests, the data were screened for lognormality and time dependency autocorrelation. If either is detected, certain calculation adjustments are required. NRG detected neither lognormality nor autocorrelation. Therefore, consistent with §75.41(b), no calculation adjustments were made to the data.

N = 720	n = 80
t-test: mean difference, d = - 0.00000476 abs. value of confidence coefficient, cc = 0.0000529 **Evaluation:** Because |cc| ≥ d, the model passed.	**t-test:** mean difference, d = 0.0000064 abs. value of confidence coefficient, cc = 0.000128 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.999 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.9998 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000499 variance of CEMS = 0.000499 F = 1.000 $F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical}$ ≥ F, the model passed.	**F-test:** variance of PEMS = 0.000773 variance of CEMS = 0.000767 F = 1.007 $F_{critical}$ = 1.45 **Evaluation:** Because $F_{critical}$ ≥ F, the model passed.

Table 2. NRG Texas Power T.H. Wharton Unit 32 (THW32) SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	**Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)**
N = 720	n = 74
t-test: mean difference, d = - 0.000555 abs. value of confidence coefficient, cc = 0.000314 **Evaluation:** Because |cc| ≥ d, the model passed.	**t-test:** mean difference, d = - 0.000461 abs. value of confidence coefficient, cc = 0.0019 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.964 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.963 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000234 variance of CEMS = 0.000259 F = 0.903 $F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical}$ ≥ F, the model passed.	**F-test:** variance of PEMS = 0.000905 variance of CEMS = 0.000977 F = 0.926 $F_{critical}$ = 1.47 **Evaluation:** Because $F_{critical}$ ≥ F, the model passed.

Table 3. NRG Texas Power T.H. Wharton Unit 33 (THW33) SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	**Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)**
N = 720	n = 54
t-test: mean difference, d = - 0.000542 abs. value of confidence coefficient, cc = 0.000424 **Evaluation:** Because |cc| ≥ d, the model passed.	**t-test:** mean difference, d = - 0.000924 abs. value of confidence coefficient, cc = 0.0040 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.959 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.880 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000400 variance of CEMS = 0.000419 F = 0.955	**F-test:** variance of PEMS = 0.000923 variance of CEMS = 0.000936 F = 0.986

$F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical} \geq F$, the model passed.	$F_{critical}$ = 1.58 **Evaluation:** Because $F_{critical} \geq F$, the model passed.

Table 4. NRG Texas Power T.H. Wharton Unit 34 (THW34) SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)
N = 720	n = 41
t-test: mean difference, d = - 0.000348 abs. value of confidence coefficient, cc = 0.000418 **Evaluation:** Because |cc| ≥ d, the model passed.	**t-test:** mean difference, d = - 0.0025 abs. value of confidence coefficient, cc = 0.0057 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.936 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.866 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000261 variance of CEMS = 0.000243 F = 1.077 $F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical} \geq F$, the model passed.	**F-test:** variance of PEMS = 0.001345 variance of CEMS = 0.001179 F = 1.141 $F_{critical}$ = 1.69 **Evaluation:** Because $F_{critical} \geq F$, the model passed.

Table 5. NRG Texas Power T.H. Wharton Unit 41 (THW41) SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)
N = 720	n = 72
t-test: mean difference, d = - 0.000103 abs. value of confidence coefficient, cc = 0.0000886 **Evaluation:** Because |cc| ≥ d, the model passed.	**t-test:** mean difference, d = - 0.000294 abs. value of confidence coefficient, cc = 0.000794 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.999 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.993 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000495 variance of CEMS = 0.000492 F = 1.006 $F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical} \geq F$, the model passed.	**F-test:** variance of PEMS = 0.000887 variance of CEMS = 0.000875 F = 1.014 $F_{critical}$ = 1.48 **Evaluation:** Because $F_{critical} \geq F$, the model passed.

Table 6. NRG Texas Power T.H. Wharton Unit 42 (THW42) SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)
N = 720	n = 73
t-test: mean difference, d = - 0.0000656	**t-test:** mean difference, d = - 0.000308

abs. value of confidence coefficient, cc = 0.0000871 **Evaluation:** Because |cc| ≥ d, the model passed.	abs. value of confidence coefficient, cc = 0.000397 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.999 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.999 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000552 variance of CEMS = 0.000554 F = 0.998 $F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical} \geq F$, the model passed.	**F-test:** variance of PEMS = 0.001496 variance of CEMS = 0.001512 F = 0.990 $F_{critical}$ = 1.48 **Evaluation:** Because $F_{critical} \geq F$, the model passed.

Table 7. NRG Texas Power T.H. Wharton Unit 43 (THW43)
SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	**Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)**
N = 720	n = 79
t-test: mean difference, d = 0.0000282 abs. value of confidence coefficient, cc = 0.0000551 **Evaluation:** Because |cc| ≥ d, the model passed.	**t-test:** mean difference, d = 0.0000260 abs. value of confidence coefficient, cc = 0.000259 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.999 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.999 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000335 variance of CEMS = 0.000338 F = 0.992 $F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical} \geq F$, the model passed.	**F-test:** variance of PEMS = 0.000578 variance of CEMS = 0.000589 F = 0.983 $F_{critical}$ = 1.45 **Evaluation:** Because $F_{critical} \geq F$, the model passed.

Table 8. NRG Texas Power T.H. Wharton Unit 44 (THW44)
SmartCEM™-75 PEMS

All Data (lbs NO_x/mmBtu)	**Non-DLN Startup/Shutdown Data (lbs NO_x/mmBtu)**
N = 720	n = 56
t-test: mean difference, d = 0.000149 abs. value of confidence coefficient, cc = 0.000285 **Evaluation:** Because |cc| ≥ d, the model passed.	**t-test:** mean difference, d = 0.001206 abs. value of confidence coefficient, cc = 0.0028 **Evaluation:** Because |cc| ≥ d, the model passed.
r-coefficient correlation: r = 0.936 **Evaluation:** Because r ≥ 0.8, the model passed.	**r-coefficient correlation:** r = 0.917 **Evaluation:** Because r ≥ 0.8, the model passed.
F-test: variance of PEMS = 0.000110 variance of CEMS = 0.000122 F = 0.900 $F_{critical}$ = 1.130 **Evaluation:** Because $F_{critical} \geq F$, the model passed.	**F-test:** variance of PEMS = 0.000661 variance of CEMS = 0.000714 F = 0.926 $F_{critical}$ = 1.56 **Evaluation:** Because $F_{critical} \geq F$, the model passed.

2. Reliability

According to §75.42, the owner or operator must demonstrate that the PEMS is capable of providing valid 1-hr averages for 95.0 percent or more of unit operating hours over a 1-year period and that the system meets the applicable CEMS quality-assurance requirements of Part 75. Valid PEMS data were collected by the data acquisition and handling system (DAHS) for more than 95.0 percent of the operating hours in the Subpart E test period, indicating that the PEMS are capable of meeting the long-term data availability requirements of §75.42. By meeting the quality assurance/quality control (QA/QC) requirements described in this petition response, EPA has determined that NRG will also meet the applicable Part 75 QA/QC requirements.

3. Accessibility and Timeliness

According to §§75.43 and 75.44, the owner or operator must demonstrate that the PEMS meets the recordkeeping and reporting requirements of Subparts F and G of Part 75. In the October 23 and October 31, 2007 petitions, NRG states that the PEMS meets these requirements. The DAHS records all parameters needed to calculate the NO_x emission rate on an hourly basis and is equipped to issue a data record for the previous day within 24 hours. The DAHS provides the operator with a continuous display of real-time emission data, including raw NO_x and O_2 concentration data, calculated NO_x emission data, process operating parameters, and the status of the process as it relates to the PEMS. Data are evaluated for compliance within the model's range of training data. The data are then available to generate reports, e.g., Part 60 compliance reports, Part 75 electronic data reports, or custom reports configurable by the end user.

4. Quality Assurance

Under §75.45, the owner or operator must demonstrate either that daily tests equivalent to those in Part 75 can be performed on the PEMS or that such tests are unnecessary for providing quality-assured data. Sections 75.48(a)(8) – (a)(11) require the following information to be submitted: (i) a detailed description of the process used to collect data, including location and method of ensuring an accurate assessment of operating hourly conditions on a real-time basis; (ii) a detailed description of the operation, maintenance, and quality assurance procedures for the AMS as required in Part 75; (iii) a description of methods used to calculate diluent gas concentration; and (iv) results of tests and measurements necessary to substantiate the equivalency of the AMS to a fully certified CEMS or reference method.

EPA has determined that the PEMS installed on the eight T.H. Wharton turbines will satisfy these requirements if the following QA procedures are implemented on each of the eight units:

(a) The PEMS shall use the input parameters listed in Tables 9 – 11 below for the respective units. Each parameter minimum and maximum value is a one-minute average. The PEMS input parameters must stay within the minimum and maximum values (inclusive) shown in the tables below (referred to as "the PEMS operating envelope"), unless the PEMS is retrained according to section 4(g) under "Terms and Conditions of This Approval", in which case, the new training values will supersede the values in the below tables. If any PEMS input parameter value goes below the minimum or above the maximum table value by 5 percent or more[2], and if there is any[3] fifteen-minute quadrant of an hour in which the unit operates without at least one valid set of inputs, the PEMS shall be considered out-of-control, and the maximum potential NO_x emission rate (MER) specified in section 4(h) under "Terms and Conditions of This Approval" shall be reported, starting with the out-of-control hour and ending with the next valid hour. For at least three years, data from each PEMS input parameter shall be maintained on site in a form suitable for inspection.

Table 9. NRG Texas Power T.H. Wharton Units 31, 33, 34, 41, 42, and 43 SmartCEM™-75 PEMS Operating Envelope

PEMS Input Parameter	Minimum Value	Maximum Value
Mega-watt load (MW)	0.00	63.9
Gas flow (lb/hr)	0.00	38,445.2
Guide vane position (degrees)	50.20	84.4
Firing temperature reference (deg F)	0.0	1,997.7
Fuel stroke gas (percent)	0.0	73.1
Fuel stroke reference (percent)	0.0	74.5
IGV temperature cont rev (def F)	0.0	1,259.9
Average exhaust temperature (deg F)	74.06	1,099.0
Bell-mouth differential pressure (psi)	0.00	68.6
Compressor discharge pressure (psi)	0.00	132.6
Air flow (scfh)	0.0	548.6
Air flow dry (scfh)	0.0	546.5
Splitter valve position (percent)	0.0	101.0
Turbine exhaust pressure (psi)	0.0	16.55

Table 10. NRG Texas Power T.H. Wharton Unit 32 SmartCEM™-75 PEMS Operating Envelope

PEMS Input Parameter	Minimum Value	Maximum Value
Mega-watt load (MW)	0	64.23
Gas flow (lb/hr)	0	36,980.35
Firing temperature reference (deg F)	0	2,097.46
Fuel stroke gas (percent)	0.53	70.58
P2 pressure (psi)	0	283.24
Fuel stroke reference (percent)	6.24	69.58
Transfer valve position (percent)	0	81.97

[2] The PEMS analyzer component additionally scans the historical training dataset to determine if the critical parameters contained in the current process vector correspond to any of the data previously collected (using a configurable tolerance or threshold that is maintained at 5% of the parameter range or less). Thus, a combination of critical input parameters that is not represented in the historical training dataset will invalidate the current minute record even if each of the individual critical parameters are within 5% of the minimum and maximum values established by the model envelope.

[3] However, an hourly average may be computed from at least two valid sets of inputs separated by a minimum of 15 minutes (where the unit operates for more than one quadrant of an hour) if data are unavailable as a result of the performance of calibration, quality assurance, or preventive maintenance activities pursuant to section 4 of this response, or backups of data from the data acquisition and handling system, or recertification, pursuant to paragraph (g).

Splitter valve position (percent)	0	105.41
Ln-Ln setpoint (percent)	0	68.25
Turbine speed (rpm)	0	3,787.46
IGV temperature cont rev (def F)	0	1,303.18
Average exhaust temperature (deg F)	65.27	1,137.23

Table 11. NRG Texas Power T.H. Wharton Unit 44
SmartCEM™-75 PEMS Operating Envelope

PEMS Input Parameter	Minimum Value	Maximum Value
Mega-watt load (MW)	0	66.19
Gas flow (lb/hr)	0	36,261.76
Firing temperature reference (deg F)	0	2,097.49
Fuel stroke gas (percent)	0.94	66.52
P2 pressure (psi)	0	283.27
Fuel stroke reference (percent)	9.20	65.90
Transfer valve position (percent)	0	82.00
Splitter valve position (percent)	0	105.01
Ln-Ln setpoint (percent)	0	65.55
Turbine speed (rpm)	0	3,740.44
IGV temperature cont rev (deg F)	0	1,239.37
Average exhaust temperature (deg F)	67.89	1,133.64

(b) Ongoing QA/QC tests of the PEMS shall be performed according to the following table:

Table 12. PEMS Ongoing QA/QC Tests

Test	Performance Specification	Frequency
Daily QA/QC	PEMS output - PEMS output ≤ 0.002 lb NO_X/mmBtu [see section 4(e)]	Daily
3-run RAA	• Accuracy ≤ 10.0% or • For a low emitting source,[1] results are acceptable if the mean value for the PEMS is within ± 0.020 lb/mmBtu of the reference mean value	Monthly [see section 4(f)].
RATA	For semiannual RATA frequency: • RA > 7.5% and ≤ 10.0% or • For a low emitting source,[1] results are acceptable if the mean value for the PEMS is within ± 0.020 lb/mmBtu of the reference method mean value. For annual RATA frequency: • RA ≤ 7.5% or • For a low emitting source,[1] results are	Semiannual or annual (depending on the RATA results) for routine QA (see §75.74(c)(2)(ii)) Recertification RATA is required when a RAA or a RATA is failed or when operating conditions change. ≥ 9 test runs are required at normal operating level for annual or semiannual QA.

Table 12. PEMS Ongoing QA/QC Tests

Test	Performance Specification	Frequency
	acceptable if the mean value for the PEMS is within ± 0.015 lb/mmBtu of the reference method mean value	≥ 30 test runs are required at each of 3 operating levels for recertification. [see sections 4(f) and (g)].
Sensor validation system (minimum data capture)	Check for production of at least 1 valid data point per 15 minutes [see section 4(c)]	Before each RATA [see sections 4(f) and (g)].
~~Sensor validation system~~ (failed sensor alert)	~~Alert operator of any failed sensors [see~~ sections 4(c) and (d)]	~~Hourly~~
Bias adjustment factor	If $d_{avg} \leq \lvert cc \rvert$, bias test is passed	After each RATA. Perform bias test at the normal operating level [see sections 4(f) and (g)].
PEMS training (Linear correlation and F-test)	$r \geq 0.8$, and $F_{critical} \geq F$	According to section 4(g)
Sensor validation system (alarm system set-up)	[see sections 4(c) and (d)]	After each PEMS training [see section 4(g)]

[1] The unit is a low-emitting source if the mean reference value during the RATA or RAA is ≤ 0.200 lb/mmBtu NO_x.

The sensor alarm system validation procedure is described in sections 4(c) and (d). The daily QA/QC test is described in section 4(e). The RATAs, 3-run RAAs, and bias adjustment factor are discussed in sections 4(f) and (g). Recertification, including training, of the PEMS is discussed in section 4(g).

(c) The sensors for the PEMS' input parameters must be maintained in accordance with the manufacturer's recommendations. A sensor validation system is required to identify sensor failures hourly to the operator and to reconcile failed sensors by: comparing each sensor to several other sensors, determining, based on the comparison, if a sensor has failed, and calculating a reasonable substitute value for the parameter measured by the failed sensor. NRG must ensure that the sensor validation system validates sensor data in this way every minute of PEMS operation. To comply with §75.10(d)(1), hourly averages must be computed using at least one valid set of inputs in each[4] fifteen-minute quadrant of an hour in which the unit operates. All valid data input to the PEMS during the hour must be used to calculate the hourly averages. All data points collected during an hour shall be, to the extent practicable, evenly spaced over the hour. If the provisions of this paragraph are not met, the PEMS is out-of-control, and Subpart D missing data procedures shall be followed.

(d) The sensor validation system shall include an alarm to inform the operator when sensors need repair and to indicate that the PEMS is out-of-control. In setting up the alarm system, a demonstration shall be performed at a minimum of four different

[4] However, an hourly average may be computed from at least two valid sets of inputs separated by a minimum of 15 minutes (where the unit operates for more than one quadrant of an hour) if data are unavailable as a result of the performance of calibration, quality assurance, or preventive maintenance activities pursuant to section 4 of this response, or backups of data from the data acquisition and handling system, or recertification, pursuant to paragraph (g).

PEMS training conditions, which must be representative of the entire range of expected turbine operations. For each of the four or more training conditions, the demonstration shall consist of the following:

(1) For all of the sensors used in the PEMS model, input a set of reference sensor values that were recorded either during the training of the PEMS or during a RATA of the PEMS (these values will all be within the PEMS operating envelope). Verify that these reference inputs produce the expected PEMS output, i.e., the expected NO_x emission rate;

(2) Perform one-sensor failure analysis, as follows. Artificially fail one of the sensors and then, using the calculated replacement value for that sensor [see section 4(c), above], assess the effect on the accuracy of the PEMS. Calculate the percent difference between the reference NO_x emission rate from step (1) and the PEMS output. Repeat this procedure for each sensor, individually;

(3) Identify the sensor failure in step (2) that results in the worst accuracy. If the highest percent deviation exceeds ± 10.0 percent, then set up the PEMS to alarm when any single sensor fails. If none of the percent difference values exceeds 10.0 percent, proceed to step (4);

(4) Perform two-sensor failure analysis, as follows: Artificially fail the sensor from step (3) that produced the worst accuracy and also fail one of the other sensors. Then, using the calculated replacement values for both sensors, assess the accuracy of the PEMS hourly average output, as in step (2). Repeat this procedure, evaluating each sensor in turn with the sensor from step (3);

(5) Identify the combination of dual sensor failures that results in the worst accuracy. If the highest percent deviation exceeds ± 10.0 percent, then set up the PEMS to alarm when any two sensors fail. If none of the percent difference values exceeds 10.0 percent, then set up the PEMS to alarm with three sensor failures.

The results of this demonstration shall be maintained on site in a form suitable for inspection. For every hour of PEMS operation, the PEMS shall check for failed sensors and provide an alarm to alert the operator of any sensors needing repair. When the PEMS alarms, the PEMS is out-of-control, and NRG shall report the NO_x MER specified in section 4(h), starting with the hour after the sensor validation alarm system alarms and ending with the hour after the sensor value is back within the expected range.

(e) A daily QA/QC test must be performed whenever the unit operates for any portion of the day. NRG shall input to the PEMS a set of turbine operating parameters used by the PEMS during a passed PEMS RATA or the most recent PEMS training. (Note: It is important that the same number of decimal places for the PEMS inputs be used here as was used in the passed PEMS RATA or most recent PEMS training.) The resulting PEMS NO_x lb/mmBtu output, if bias-adjusted, shall be divided by the bias adjustment factor (BAF) currently in use (this removes the BAF by resetting it to

1.000, as it was during the passed PEMS RATA or most recent PEMS training). Then, the unbiased PEMS output shall be compared to the corresponding PEMS NO_x lb/mmBtu output produced at the time of the RATA or PEMS training. If the difference between the two PEMS NO_x outputs is within ± 0.002 lb NO_x/mmBtu, the daily QA/QC test is passed. If a daily QA/QC test is failed or not performed, the PEMS is out-of-control. Subpart D missing data procedures shall be followed starting with the hour of the failed test or, if the test was not performed, the hour after the test due date, and ending with the hour in which a daily QA/QC test is passed. No grace periods are allowed. The results of this check (pass/fail) shall be reported in the Daily Test Summary Records see Section 2.2 of the ECMPS Emissions Reporting Instructions. (Note: Report code "PEMSCAL" as the Test Type Code for the daily QA/QC check.)

(f) Ongoing semi-annual or annual RATAs shall be performed at the normal operating level according to the procedures in Part 75, Appendix B, Section 2.3.1, and shall be calculated on a lb/mmBtu basis. The reference method traverse point selection shall be consistent with Part 75, Appendix A, section 6.5.6. Notification of ongoing RATAs shall be provided according to §75.61(a)(5). Immediately prior to a RATA, the BAF shall be set to 1.000. Before each RATA, NRG shall ensure that the sensor validation system is set to provide at least one valid data point per 15 minute period, as discussed in section 4(c). After the RATA, NRG shall calculate and apply a bias adjustment factor at the normal operating level according to Part 75, Appendix A, section 7.6. Report the RATA and bias test data and results as described in Section 2.4 "Relative Accuracy Test Audit (RATA)" of the ECMPS Quality Assurance and Certification Reporting Instructions.

Monthly, 3-run (minimum) relative accuracy audits (RAAs), described below, shall be performed in every calendar month of the year in which the unit operates for at least 56 hours, except for a month in which a full 9-run RATA or PEMS recertification is performed.

All required RAAs shall be done on a lb NO_x/mmBtu basis, and shall be performed using either EPA Reference Methods 7E and 3A in Part 60, Appendix A-4 or portable analyzers. To the extent practicable, each RAA shall be done at different operating conditions from the previous one. Follow the portable analyzer manufacturer's recommended maintenance procedures.

The minimum time per RAA run shall be 20 minutes. The reference method traverse point selection shall be consistent with Part 75, Appendix A, section 6.5.6. Alternatively, a single measurement point located at least 1.0 meter from the stack or duct wall may be used without performing a stratification test.

Results of the RAA shall be calculated using Equation 1-1 in Appendix F to Part 60. Bias-adjusted data from the PEMS (using the bias adjustment factor from the most-recent RATA) shall be used in the calculations. The results of the RAA are acceptable if the performance specifications in the "PEMS Ongoing QA/QC Tests" table in section 4(b) are met. If the RAA is failed, follow the provisions in section 4(g). No grace periods are allowed.

Report the results of all RAAs in the appropriate quarterly electronic data report. As detailed in Section 4.0 "Miscellaneous Tests" of the ECMPS Quality Assurance and Reporting Instructions, report the results of each test as either "pass" or "fail". Report the Test Type Code as "PEMSACC "to indicate this is a 3 Run Relative Accuracy Audit (RAA) for PEMS with RM or portable analyzer.

If a portable chemiluminescent NO_x analyzer is used to perform the required RAAs, the procedures of Method 7E in Part 60, Appendix A-4 shall be followed. The analyzer performance specifications in Method 7E for calibration error, system bias, and calibration drift shall be met.

If a portable electrochemical analyzer is used to perform the required RAAs, ASTM Method D6522-00[5], as modified below, shall be followed. ASTM D6522-00 applies to the measurement of NO_x (NO and NO_2), CO, and O_2 concentrations in emissions from natural gas-fired combustion systems using electrochemical analyzers. The method was developed based on studies sponsored by the Gas Research Institute (GRI)[6]. It has also been peer-reviewed, approved by ASTM Committees D22.03 and D22, and accepted by EPA as a conditional test method (CTM-030). ASTM D6522-00 prescribes analyzer design specifications, test procedures, and instrument performance requirements that are similar to the checks in EPA's instrumental test methods (e.g., Method 7E). These checks include linearity, interference, stability, pre-test calibration error, and post-test calibration error.

Based on the results of EPA's portable analyzer study[7], the following modifications to ASTM D6522-00 are required to make the method more practical without sacrificing accuracy: (i) NO_x analyzers must provide readings to 0.1 ppm to improve the likelihood of passing the performance specifications for sources with low NO_x levels; (ii) an alternative performance specification (i.e., $\pm$ 1.0 ppm difference from reference value) will be applied to take account of sources with low concentrations of NO_x; and (iii) the measurement system must be purged with ambient air between gas injections during the stability check, to reduce degradation of electrochemical cell performance (see the footnote in the table below).

The measurement system performance specifications as modified by the EPA portable analyzer study are shown in Table 13.

5 ASTM D6522-00, "Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers."

6 GRI (Gas Research Institute), "Topical Report, Development of an Electrochemical Cell Emission Analyzer Test Method," July, 1997.

7 "Evaluation of Portable Analyzers for Use in Quality Assuring Predictive Emission Monitoring Systems for NO_x," The Cadmus Group, Inc., September 8, 2004.

Table 13. ASTM Method D6522-00 Measurement System Performance Specifications (as Modified by EPA Portable Analyzer Study)

Performance Check	Gas	Acceptance Criteria
Zero Calibration Error	NO, NO_2	≤ 3 percent of span gas value or ± 1.0 ppm difference, whichever is less restrictive
	O_2	≤ 0.3 percent O_2
Span Calibration Error	NO, NO_2	≤ 5 percent of span gas value or ± 1.0 ppm difference, whichever is less restrictive
	O_2	≤ 0.5 percent O_2
Interference	NO, NO_2, O_2	≤ 5 percent of average stack NO concentration for each test run (using span gas checks)
Linearity	NO, O_2	≤ 2.5 percent of span gas concentration or ± 1.0 ppm difference, whichever is less restrictive
	NO_2	≤ 3.0 percent of span gas concentration or ± 1.0 ppm difference, whichever is less restrictive
Stability[1]	NO, NO_2 O_2	≤ 2.0 percent of span gas concentration or ± 1.0 ppm max-min difference, whichever is less restrictive, for 30-minute period ≤ 1.0 percent of span gas concentration or ± 1.0 ppm max-min difference, whichever is less restrictive, for 15-minute period
Cell Temperature		± 5 °F from initial temperature

[1] When conducting this check for three cells in an analyzer, the system must be purged with ambient air between gas injections to minimize the possibility of problems with the electrochemical cells. Otherwise, the cells will be exposed to high NO and NO_2 concentrations for prolonged periods of time, which can cause degradation in the cell's performance (i.e., the so-called "O_2-starved exposure").

(g) If a RAA or a RATA is failed due to a problem with the PEMS, or if changes occur that result in a significant change in NO_x emission rate relative to the previous PEMS training conditions (e.g., process modification, new process operating modes, or changes to emission controls), the following recertification tests and procedures shall be performed, in this order:

(1) Ensure that the Sensor Validation System meets the requirements of section 4(c).

(2) If required, re-train the PEMS according to the manufacturer's recommendations.[8]

(3) Ensure that the requirements in section 4(d) are met.

(4) Perform a RATA, following the procedures in Part 75, Appendix A, section 6.5, using three different operating levels (low, mid, and high) as defined in section 6.5.2.1 of Part 75, Appendix A. Use paired PEMS and reference method data to calculate the results on a lb NO_x/mmBtu basis. Calculations shall be based on a minimum of 30 runs at each operating level. NRG shall apply to each operating level the RATA performance

[8] If a reference method is used to provide training data for the PEMS, the training data may be used to calculate the relative accuracy at each operating level and the normal level bias, and to set up the alarm system.

specifications contained in the "PEMS Ongoing QA/QC Tests" table in section 4(b). Report the RATA data and results of only the normal operating level as described in Section 2.4 "Relative Accuracy Test Audit (RATA)" of the ECMPS Quality Assurance and Certification Reporting Instructions and keep the data and results for the other two operating levels on-site, available for inspection. The RATA result for the normal operating level determines when the next RATA is due.

(5) Ensure that requirements in section 4(e) are met.

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(6) Conduct an F-test, and a correlation analysis (r-test) using Part 75, Subpart E equations at low, mid, and high operating levels.[9] The r-test shall be performed using all data collected at the three operating levels combined. When the mean value of the reference method NO_x data is less than 5 ppm, data from that operating level may be removed before applying the r-test. The F-test is to be applied to data at each operating level separately. If the standard deviation of the reference method NO_x data at any operating level is less than either 3 percent of the span or 5 ppm, a reference method standard deviation of either 3 percent of span or 5 ppm may be used at that operating level when applying the F-test. Report the calculated F-value, and the critical value of F at the 95-percent confidence level with n-1 degrees of freedom for each operating level, and report the calculated r-value (using Equation 27 in §75.41(c)(2)(ii)) for data from the three operating levels combined using Section 4.0 "Miscellaneous Tests" of the ECMPS Quality Assurance and Reporting Instructions.

(7) Perform a bias test (one-tailed t-test) at the normal operating level according to Part 75, Appendix A, section 7.6. If a bias test is failed, calculate and apply a bias adjustment factor (BAF) to the subsequent NO_x emission rate data.

The following recertification tests shall be performed *for only startup/shutdown (non-DLN):*

(8) Collect at least 24 successive unit operating hours of paired hourly PEMS and reference method data and conduct an F-test, correlation analysis (r-test) and bias test. If a bias test is failed, calculate and apply a bias adjustment factor (BAF) to the subsequent non-DLN NO_x emission rate data. Report the

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9 EPA performed a Subpart E statistical analysis of 720 hours of matched pairs of PEMS and CEMS data for one participating combustion turbine and 830 matched data pairs for another, and then performed the same statistics on 30-point subsets of these data. (See: "Evaluation and Field Testing of Nitrogen Oxide (NO_x) Predictive Emission Monitoring Systems (PEMS) for Gas-fired Combustion Turbines - Synthesis Report," The Cadmus Group, Inc., December 29, 2004.) The results of these analyses showed that most of the 30-point subsets passed the same combination of statistical tests as the full data set. The field test data also illustrated the importance of testing the PEMS over the full operating range of the unit because of the strong correlation between NO_x emissions to certain unit operating parameters. Based on this evaluation, EPA believes that whenever the PEMS is recertified, a three load RATA (with a minimum of 30 paired data points at each load level) should be required in conjunction with input sensor failure checks and certain abbreviated Subpart E statistical tests, in particular, the F-test, the correlation analysis, and the t-test.

calculated F-value, and the critical value of F at the 95-percent confidence level with n-1 degrees of freedom, and the calculated r-value (using Equation 27 in §75.41(c)(2)(ii)) using Section 4.0 "Miscellaneous Tests" of the ECMPS Quality Assurance and Reporting Instructions. For at least three years, bias test results shall be maintained on site in a form suitable for inspection.

The tests and procedures in this section 4(g) shall be completed by the earlier of 60 unit operating days (as defined in §72.2) or 180 calendar days after the failed RAA or failed RATA or after the change that caused a significant change in NO_x emission rate, except in the case of the retrofits of Units THW32 and THW44 described above. For those retrofits, the recertification tests and procedures shall be done as soon as practicable.

For a failed RAA or RATA, NRG shall use the appropriate Part 75 missing data procedures (see section 5 below), starting from the hour of the failed RAA or RATA and ending with the hour of successful passage or completion of the tests and procedures in steps (1) through (8) above. For a change that caused a significant change in NO_x emission rate, NRG shall report the NO_x MER from section 4(h) and shall use a Method of Determination Code of "55" (i.e., "Other substitute data approved through petition by EPA") in Derived Hourly Value Data (Section 2.5.2 of the ECMPS Emissions Reporting Instructions) for reporting lb NO_x/mmBtu emission rate, starting with the hour after the change that caused a significant change in NO_x emission rate and ending with the hour of successful passage or completion of the tests and procedures in steps (1) through (8) above. Notification of recertification of the PEMS shall be provided according to §75.61.

(h) For the purposes of this approval, the NO_x MER shall be 0.146 lb/mmBtu (twice the highest low mass emitter test value for the 8 units) when the unit is firing pipeline natural gas. A Method of Determination Code "55" (i.e., "Other substitute data approved through petition by EPA") shall be used in Derived Hourly Value Data (Section 2.5.2 of the ECMPS Emissions Reporting Instructions) when reporting the MER.

5. Missing Data Substitution

Under §75.46, the owner or operator must demonstrate that all missing data can be accounted for in a manner consistent with the applicable missing data procedures in Subpart D of Part 75 (except where alternate procedures are required in this approval). The Subpart D missing data substitution requirements for NO_x emission rate include, but are not limited to: the initial missing data procedures in §75.31; determination of the percent monitor data availability; and the standard missing data procedures in §75.33. The missing data substitution requirements for fuel flow rate are found in Part 75, Appendix D, section 2.4. In the October 23 and October 31, 2007 petitions, NRG states that the data acquisition and handling system (DAHS) for the PEMS has already been programmed to meet these missing data substitution requirements.

6. Reporting Requirements

NRG shall submit the operating envelopes for each PEMS to the Texas Commission of Environmental Quality (TCEQ) and EPA Region 6 for inclusion in the hardcopy monitoring plan. Any time changes are made to the PEMS operating envelope, the complete, revised PEMS operating envelope shall be submitted in a hardcopy monitoring plan by the applicable deadline in §75.62(a)(2). More information on monitoring plan submittals, revisions and other submittals can be found at: http://www.epa.gov/airmarkets/monitoring/submissions/ monplan.html.

To report emissions data from the PEMS, NRG shall follow the current published ECMPS Reporting instructions, found at: http://www.epa.gov/airmarkt/business/ecmps/reporting-instructions.html, in conjunction with the supplementary, PEMS-specific ECMPS reporting instructions attached to this petition response.

EPA notes that the U.S. Court of Appeals for the District of Columbia Circuit recently issued a decision to vacate and remand CAIR. North Carolina v. EPA, 531 F.3d 896 (2008). The Court has not yet issued a mandate in the case and is considering petitions for rehearing. The approval and requirements in this determination are subject to the ongoing proceedings in North Carolina. EPA's determination relies on the accuracy of the information provided by NRG in the October 23, 2007 and October 31, 2007 petitions and is appealable under Part 78. If there are any further questions or concerns about this matter, please contact John Schakenbach of my staff at (202) 343-9158 or at (schakenbach.john@epa.gov).

Thank you for your continued cooperation.

Sincerely,

Sam Napolitano, Director
Clean Air Markets Division

cc: John Schakenbach, EPA, CAMD
Travis Johnson, EPA, CAMD
Joyce Johnson, EPA Region 6
Marie Conroy, EPA Region 6
John Smith, Texas Commission on Environmental Quality

Attachment

December 15, 2008

Attachment

Supplementary Reporting Instructions for PEMS

For a unit with an approved petition to use a predictive emissions monitoring system (PEMS), use the following supplementary instructions, in conjunction with the ECMPS Reporting Instructions documentation, to prepare the required submittals. This document is intended to provide additional instructions to the existing ECMPS reporting instructions, unless otherwise noted, fields or data elements not specifically addressed in these instructions should be completed using the ECMPS reporting instructions. These guidelines are organized by the three ECMPS submission types:

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1. Monitoring Plan;
2. Quality Assurance and Certification; and
3. Emissions reporting.

I. Monitoring Plan Reporting Instructions

6.0 Monitoring Method Data

Parameter Code. Report a "NOXR" for NO_x Rate.

Monitoring Method Code. Report "PEM" to indicate NO_x rate is calculated using a petition approved PEMS methodology.

Substitute Data Code. Report "SPTS"

7.0 Component Data

The PEMS monitoring system consists of either one or two data acquisition and handling system (DAHS) components. For single-component PEMS systems or for systems where the PEMS software and standard DAHS software have the same manufacturer/provider, model or version number, report one DAHS component. If the PEMS software and the standard DAHS software have different manufacturer/providers, model or version numbers, report two DAHS components. Otherwise report the DAHS components normally as you would according to Section 7.0 of the ECMPS reporting instructions. You may also report the additional components of "DL" to indicate a data logger or recorder or "PLC" to indicate a programmable logic controller.

8.0 Monitoring System Data

Monitoring System ID. Assign a unique three character alphanumeric ID for each PEMS monitoring system.

System Type Code. Report system type code "NOXP" to indicate this is a NO_x emission rate PEMS system.

System Designation Code. Report "P" to indicate this is the primary monitoring system.

8.2 Monitoring System Component Data

Associate the DAHS component(s) with the NOXP system described as above. While you may associate additional components such as a data logger or a programmable logic controller with the system, a PEMS must have a minimum of one associated DAHS component.

10.0 Monitoring Default Data

Parameter Code. Report "NOXR" as the parameter monitored. (You should report one default record for each fuel type.)

Default Value. Report the fuel specific maximum potential NO_x emission rate (MER), in units of lb/mmBtu.

Default Units of Measure Code. Report "LBMMBTU".

Default Purpose Code. Report "MD" for missing data.

Fuel Code. Report "NFS" to indicate Non-Fuel-Specific.

Operating Condition Code. Report "A" for any hour.

Default Source Code. Report "TEST" to indicate the value was determined from unit/stack testing.

II. Quality Assurance and Certification Instructions

2.4.2 RATA Data

Number of Load Levels. Report "1". (Note: Ongoing RATAs are performed at the normal operating level only. Recertifications are performed following procedures in Part 75, Appendix A, §6.5, using three operating levels (low, mid, and high) as defined in §6.5.2.1 of Part 75, Appendix A. Only the normal operating level data is reported; the other two operating levels are kept on site.)

Relative Accuracy. Report the result of the relative accuracy test, as required and defined for the appropriate test method and in Part 75, Appendix A. Leave this field blank for a RATA that is aborted prior to completion, due to a problem with the monitoring system.

RATA Frequency Code. Report "2QTRS" or "4QTRS" (depending on the RATA results).

Overall Bias Adjustment Factor. Report the BAF at the normal operating level.

2.4.3 RATA Summary Data

Mean CEM Value. Report the arithmetic mean of the PEMS values for the normal operating level.

Bias Adjustment Factor. Report the BAF at the normal operating level.

2.4.4 RATA Run Data

CEM Value. Report the average value recorded by the PEMS, for each RATA run.

4.0 Miscellaneous Tests

Both the 3-run Relative Accuracy Audit (RAA) and the PEMS linear correlation and F-test QA tests are reported using the miscellaneous test type. To report the 3-run RAA tests using the miscellaneous test type do the following:

Test Type Code. Report "PEMSACC" for a 3-run Relative Accuracy Audit (RAA) for PEMS with RM or portable analyzer.

Monitoring System ID. Report the PEMS NO_x monitoring system ID.

To report the PEMS linear correlation and F-tests do the following:

Test Type Code. Report "OTHER".

Monitoring System ID. Report the PEMS NO_x monitoring system ID.

Test Reason Code. Report either "INITIAL" or "RECERT".

Test Description. Report either "PEMS Initial Certification" or "PEMS Recertification".

Test Comment. Report the results of the F-test and correlation analysis (r-test) as specified by the PEMS Petition Approval documentation.

5.0 QA Certification Event Data

Monitoring System Id. Report the monitoring system ID of the NO_x PEMS system.

QA Cert Event Code. Report the appropriate PEMS specific event code. (Please see Section 5.0 Table 47 of the ECMPS Quality Assurance and Certification Reporting Instructions for a list of appropriate event codes).

Required Test Code. Report the appropriate PEMS specific required test code. (Please see Section 5.0 Table 48 of the ECMPS Quality Assurance and Certification Reporting Instructions for a list of appropriate required test codes).

Conditional Begin Date. If conditional data validation is used, report the date and hour that the probationary PEMS daily QA/QC test was successfully completed according to the provisions of §75.20(b)(3)(ii).

Note: For PEMS, you may only use conditional data validation if the "event" in column 16 requires RATA testing. If you elect to use conditional data validation, you must complete the RATA within the allotted time in §75.20(b)(3)(iv).

Conditional Begin Hour. If applicable report the hour during which conditional data validation began.

III. Emissions Reporting Instructions

2.2 Daily Test Summary Data

Monitoring System ID. Report the three character Monitoring System ID for the NOXP system.

Component ID. Report the PEMS software component ID.

Test Type Code. Report "PEMSCAL" for daily PEMS calibration tests.

2.5.1 Monitor Hourly Value Data

Do not report a Monitor Hourly Value record. PEMS hourly data should be reported using the Derived Hourly Value records as discussed below.

2.5.2 Derived Hourly Value Data

Parameter Code. Report "NOXR".

Unadjusted Hourly Value. Report the average unadjusted NO_x emission rate for the hour, rounded to three decimal places, as determined by the PEMS. For hours in which you use missing data procedures, leave this field blank.

Adjusted Hourly Value. For each hour in which you report NO_x emission rate in unadjusted hourly value, apply the appropriate factor (1.00 or the BAF) to the unadjusted average emission rate, and report the result rounded to three decimal places. For each hour in which you use missing data procedures, report the appropriate substitute value.

MODC Code. Report "03" when you use the PEMS to determine the NO_x emissions rate. Report "55" when you report the fuel specific maximum NO_x emission rate. During hours when you use other missing data procedures, report the appropriate MODC listed in Section 2.5.2, Table 22 of the Emissions Reporting Instructions.