



September 20, 2006

Mr. Steve Munro
Compliance Project Manager
California Energy Commission
1516 9th Street, MS 2000
Sacramento, CA 95814-5512

**Subject: Addendum 1 to Petition for Revisions/Administrative Changes to Air Quality
Conditions Commission Decision (97-AFC-1C)
High Desert Power Project, LLC**

Dear Mr. Munro:

High Desert Power Project, LLC ("HDPP") is enclosing the attached information as an addendum to the August 30, 2006 petition for revisions to the Commission Decision (97-AFC-1C) for the HDPP facility.

The Continuous Emissions Monitoring Systems (CEMS) installed on each combustion turbine are the primary method used by HDPP to determine compliance with the emission limits for the facility. All CEMS were certified in accordance with 40 CFR Parts 60 and 75 prior to the start of operations of the facility. In addition, to ensure that the systems are operating within the required accuracy and specifications, HDPP performs numerous QA/QC checks or tests on the system including annual Relative Accuracy Test Audits (RATA), quarterly Cylinder Gas Audits (CGA), quarterly linearity tests, daily calibrations, and daily CEMS inspections. As shown by the summary of results in Attachment 1, all CEMS have passed every RATA performed over the last three years of operation. All other checks performed on the CEMS demonstrate that the systems are operating within specifications.

HDPP believes that the information in this letter and attachment further supports our petition and justifies the approval of the proposed revisions to AQ-16 conditions as outlined in the petition dated August 30, 2006.

Should you have any questions or need additional information regarding this submittal, please contact me at (949) 425-4755.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Garcia". The signature is fluid and cursive, with a large "R" and "G" and a period at the end.

Ramiro Garcia
Environmental Director
Constellation Energy – West Region

cc: Mr. Alan De Salvio
Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392-2310

Mr. Gerardo Rios
United States Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, CA 94105

Dave Boward, HDPP

Chris Milner, HDPP

Jon Boyer, Constellation Energy

Facility File: 13.1 (CEC Application)

Attachment 1

RATA Test Summaries

EMISSION TEST REPORT
for
INITIAL COMPLIANCE TESTS
AND CONTINUOUS EMISSION MONITOR CERTIFICATIONS
on
THREE COMBINED CYCLE
WESTINGHOUSE 501F TURBINES
at the
HIGH DESERT POWER PROJECT
VICTORVILLE, CALIFORNIA

Volume I
Test Report
Appendix A
Appendix B
Appendix C (partial)

Prepared for
Kiewit Industrial

Test Dates March 1-30, 2003
Report Date: May 16, 2003
Cubix Job No. 7328

Prepared by



Cubix
Corporation

<http://www.cubixcorp.com>

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SUMMARY OF RESULTS

Exhaust gases from three combined cycle turbines were tested to determine the compliance status of the unit with regard to the emission limits set forth by CEC, EPA PSD, and MDAQMD permits as well as to complete initial certification of the NO_x, CO, NH₃, and O₂ CEMSs. The testing was conducted on March 1-3, April 1-7, and April 30, 2003 by Cubix Corporation of Cameron Park, California.

The test matrix consisted of Subpart GG testing, compliance testing, startup/shutdown testing, and CEMS certifications.

The Subpart GG testing on each unit began with an initial O₂ traverse. The initial O₂ traverse consisted of O₂ measurements at 48-points in the stack for 2-minutes per point. The eight points which exhibited the lowest O₂ concentrations were then utilized throughout twelve 16-minute test runs. During each of these test runs, NO_x and O₂ concentrations were measured at these eight points for 2-minutes per point. Three test runs were conducted at each of four separate load conditions. The load conditions chosen spanned from minimum load to base load.

Compliance testing consisted of three gaseous and three PM/PM₁₀ test runs. The gaseous test runs were 1-hour long and included instrumental measurements of NO_x, CO, O₂, and CO₂. These measurements were conducted at the same eight traverse points (7.5 minutes per point) as were used during the Subpart GG tests. A 30-minute ammonia train was run throughout each test run and a SUMA canister was filled for subsequent VOC and acrolein analyses throughout each test run. PM/PM₁₀ test runs were 180-minutes in duration. The PM sample train was also utilized for aldehyde analyses. Both turbines and duct burners fired at full load during the compliance tests. Thirty 6-minute opacity observations were conducted on each of the three units while operating under full load.

Testing on Unit 3 was repeated on April 30 after turbine tuning testing was repeated by Siemens-Westinghouse personnel. The re-test consisted of three 1-hour test runs during which NO_x and O₂ emissions were measured while Unit 3 operated at full load (both turbine and duct burners).

On each unit, instrumental VOC and O₂ measurements were conducted throughout one of each of the following events--a cold startup, a warm startup, a hot startup, and a shutdown. Real-time instrumental VOC measurements were conducted through the use of two THC analyzers. One analyzer operated in the normal mode and provided a continuous measurement of THC. The other was equipped with a charcoal filter which removed all hydrocarbons except for

methane. The difference between these two measurements provided for a measurement of VOC emissions.

Per the permit, a startup was defined as lasting from the moment of fuel ignition through achievement of operating permit limits and a shutdown consisted of the time between initial lowering of unit load until fuel flow ended. Hot startups consist of those within less than 8-hours of firing, cold startups include those with the unit off for more than 72-hours, and warm startups are those when the unit has been off between 8 and 72 hours.

CEMS certifications consisted of a relative accuracy test audit (RATA), cycle time tests, linearity tests, and 7-day calibration drift tests. The RATA consisted of a stratification test followed by nine 21-minute test runs. Some of the emission compliance runs were used for the RATA. During each 21-minute test run, NO_x, O₂, and CO were measurement via instrumental analysis at 3-points within the stack for 7-minutes per point. The stratification test results were used to select those three points by defining the sample port and traverse point locations which provided for the best overall emission average. Cycle time and linearity testing was conducted by Cubix personnel during this project and the results included in this report. The drift test was conducted by Kiewit and Constellation personnel and included in this report. Both duct burners and turbine fired at full load during the RATA. The turbine was combusting fuel and operating at least 50% of base load during the other certification test events.

After completion of the laboratory analyses of the initial RATA samples and re-tuning of Turbine 3, the ammonia RATA was repeated on April 30. Twelve 21-minute ammonia sample trains were conducted during the re-test.

Tables 2-4 provide the results of the initial compliance tests. Each tabular summary provides the pertinent operational parameters, ambient conditions, Cubix measurements, and calculated emission rates during each of the three test runs.

NO_x emissions for the three respective units during the original tests averaged 15.9, 15.8, and 20.1 lbs/hr in comparison to a permit limit of 18.0 lbs/hr for each unit (based on 2.5 ppm @ 15% O₂). CO emission averaged 0.70, 0.26, and 1.07 lbs/hr in comparison to a permit limit of 17.53 lbs/hr. VOC emissions averaged 0.87, 1.31, and 2.47 lbs/hr and the permit limit is 2.51 lbs/hr per unit. VOC was measured as heptane and reported in methane equivalents. The three respective PM/PM₁₀ measurements averaged 16.5, 9.15, and 16.43 lbs/hr with a permit limit of 18.14 lbs/hr. SO_x emissions from each unit averaged <0.009 lbs/hr (below detectable limit of method) with a permit limit of 1.11 lbs/hr. Ammonia concentrations corrected to 15% O₂ averaged 5.38, 6.54, and 0.95 ppmvd for the three respective units in comparison to a permit limit of 10 ppm @ 15% O₂.

During the re-test of Unit 3, NO_x emissions averaged 6.18 lbs/hr. and 2.41 ppmvd @ 15% O₂. The results of the re-test for Unit 3 NO_x is summarized in Table 4a.

Visible emissions were 0% during all opacity observations.

Aldehyde and acrolein measurements were required by the permit although no emission limit was imposed. Aldehydes averaged 0.28, 0.39, and 0.45 lbs/day (reported as formaldehyde) for the three units. Acrolein concentrations were below the minimum detection limit of the method and based that limit were less than 2.99, 3.00, and 3.46 lbs/day for the three units.

All gaseous emission rates (i.e. NO_x, CO, aldehydes, VOC, SO_x) are calculated based on the Method 19 (stoichiometric) calculation of stack flow rate. PM/PM₁₀ emission rates are calculated based on the physical flow rate measurements obtained via the isokinetic sample train.

NO_x, CO, and VOC emissions are also reported in terms of lbs/MMBTU and PM/PM₁₀ in terms of mg/m³ @ 15% O₂ as stipulated by the permit. Additionally, the VOC to CO surrogate relationship (i.e. to allow the CO CEMS to be utilized as an indirect measurement of VOC emissions) averaged 1.27 for Unit 1, 9.79 for Unit 2, and 2.45 for Unit 3.

The NO_x measurements required by Subpart GG (turbine only operations) are summarized in Tables 5-7 for Units 1, 2, and 3, respectively. NO_x concentrations corrected to 15% O₂ were less than 5 ppmvd at all load conditions for all three units in comparison to a Subpart GG emission limit of 75 ppm @ 15% O₂.

The startup and shutdown test results are summarized in Tables 8-10 for Units 1, 2, and 3, respectively. Average concentrations of NO_x, CO, O₂, and VOC and the average fuel rate are provided for each event. The length of each event is also provided. The O₂ concentration and fuel rate were utilized to calculate an average stack flow rate and the total time of the event used to calculate the total mass of emissions during the event for comparison with the applicable permit limits.

The permit stipulates that VOC emissions be characterized during each of the four transient events. For Units 1, 2, and 3, respectively, hot startup VOC emissions were 194.1 lbs, 137.3 lbs, and 32.5 lbs. During warm startup, the VOC emissions were 113.5 lbs, 130.6 lbs, and 195.7 lbs. Cold startup VOC emissions were 409.3 lbs, 332 lbs, and 57.5 lbs. The VOC during the three respective shutdown were 88.8 lbs, 232.7 lbs, and 19.5 lbs. The permit does not stipulate a VOC emission limit during startups or shutdowns.

The CEMS are subject to the requirements of both Part 60 and Part 75 and RATA results are provided based on both.

Tables 11-13 provide the RATA results based on Part 75 requirements for Units 1, 2, and 3, respectively. For units with NO_x emissions less than 0.20 lbs/MMBTU (as is the case for all three units), the requirement is that the absolute average difference between reference method (RM) and CEMS be less than 0.02 lbs/MMBTU. And, if the differences are also less than 0.015 lbs/MMBTU, future RATAs can be conducted annually rather than semi-annually. The absolute differences were 0.001, 0.000, and 0.003 for the three respective units. All results are rounded to three decimal places as is required by Part 75.

The O₂ CEMS relative accuracy's were 0.38%, 0.87%, and 1.30% with average absolute difference of 0.02, 0.09, and 0.13 vol%. Part 75 requirements are that the O₂ CEMS have an RA of less than 10% or that the absolute difference be less than 1.0 vol%. Annual RATAs are allowed if the RA is less than 7.5%. Part 60 stipulates that the O₂ CEMS have a RA of less than 20% of the RM or that the absolute difference be less than 1.0 vol%, whichever is greater. 20% of the RM is greater than 1.0 vol% and the former requirement applies to all three units.

The bias adjustment factor will be required Unit 3. The BAF for Unit 3 is the 1.111.

Tables 14-16 provide the results of the Part 60 NO_x CEMS RATAs. The RA of the RM was 18.17% for Unit 1, 7.31% for Unit 2, and 19.18% for Unit 3. The RAs of the two applicable standards (i.e. permit limits of 2.5 ppmvd @ 15% O₂ and 18 lbs/hr) are also provided. Performance Specification 2 stipulates that the RA be less than either 20% of the RM or 10% of the applicable standard, whichever is greater. For these units, 20% of the RM is greater than 10% of either applicable standard and the former requirement applies.

Determination of the applicable standards in terms of ppm was accomplished based on the stack conditions during the test. For example, for the stack conditions during the tests on Unit 1 (i.e. flow rate and diluent concentration), 3.21 ppm would result in a corrected concentration of 2.5 ppm @ 15% O₂ and 3.51 ppm would result in an emission rate of 18.0 lbs/hr.

Tables 17-19 provide the CO CEMS RATA results in the same manner as presented for NO_x—based on ppm @ 15% O₂ and lbs/hr. Performance Specification 4a requires an RA of less than 10% of the RM or an absolute difference of less than 5 ppm, whichever is greater. For these units, 5.0 ppm is greater than 10% of the RM and the requirement is that the difference be less than 5.0 ppm. Table 5 shows that the average absolute differences were 0.37 ppm for Unit 1, 0.38 for Unit 2, and 0.56 for Unit 3.

The July, 2002 monitoring plan indicates that Performance Specifications 4a will be applied to the NH₃ CEMS. Tables 20-22 provide the results of the initial NH₃ CEMS RATAs. The average absolute differences were 4.92 ppm for Unit 1, 4.41 ppm for Unit 2, and 8.96 for Unit 3.

Table 22a summarizes the results of the second NH₃ RATA conducted on Unit 3. During the re-test, the average absolute difference was 0.41 ppmvd.

Cycle time tests are summarized in Tables 23-25. The cycle times were 240, 180, and 180 seconds for the three units which meets the minimum requirements of Part 75 (15-minutes). The O₂ and high range NO_x CEMS linearity tests (summarized in Tables 26-28 showed compliance with the 5% and 0.5 vol% difference requirement of Part 75.

The 7-day calibration drift tests required by Part 60 (NO_x, CO, and CO CEMS) as well as the 7-day calibration error tests required by Part 75 (NO_x and O₂) are summarized in Tables 29 and 30 for Unit 1, 31 and 32 for Unit 2, 33 and 34 for Unit 3. These tests were conducted by plant personnel on behalf of Forney Corporation, and the data provided to Cubix for inclusion in this report.

Appendix A contains the field data sheets used for the data collection during these tests. Examples of any calculation used to present the results of this section are contained in Appendix B. Results of the fuel analyses and the operational data provided by Kiewit and Constellation personnel is contained in Appendix C. Appendix F includes copies of the strip chart recordings and data logger records used to determine the emission concentrations. Appendix G provides the results of third party laboratory analyses (i.e. ROG measurements). Appendix H contains the opacity observation data sheets.

Table 1:

Summary of Results - 40CFR75 RATA Results

Plant: Keiwi High Desert
 Source: Unit 1
 Technician(s): LF/CM/JJ/NS/JW/JC
 Cubix Reference Methods: EPA Method 7e, 3a (Method 6c Corrected)

Number of Tests: 9
 t-value (0.025): 2.306

Test Run Number	1-RA-1	1-RA-2	1-RA-3	1-RA-4	1-RA-5	1-RA-6	1-RA-7	1-RA-8	1-RA-9				
Date	4/5/03	4/5/03	4/5/03	4/5/03	4/5/03	4/5/03	4/5/03	4/6/03	4/6/03				
Start Time (24hr)	16:16	16:48	17:19	17:54	18:25	18:52	19:19	12:13	12:42				
End Time (24 hr)	16:37	17:09	17:40	18:15	18:46	18:46	19:40	12:34	13:03	Average	Standard Deviation	Confidence Coefficient	Relative Accuracy
Unit Load (MW)	161	161	161	162	162	163	163	161	161				
Run Status (used or discarded)	used	used	used	used	used	used	used	used	used				
NOx Data													
Cubix RM NOx (ppmv)	2.840	2.890	2.860	2.880	2.910	2.920	2.920	4.040	4.070	3.148	0.515		
CEMS NOx (ppmv)	3.300	3.400	3.400	3.400	3.300	3.400	3.400	3.100	3.100	3.311	0.127		
Difference (ppmv)	-0.460	-0.510	-0.540	-0.520	-0.390	-0.480	-0.480	0.940	0.970	-0.163	0.636	0.488	
O2 Data													
Cubix RM O2 (% dry)	13.380	13.340	13.390	13.370	13.320	13.290	13.280	13.260	13.270	13.322	0.050		
CEMS O2 (% dry)	13.300	13.300	13.300	13.300	13.300	13.300	13.300	13.300	13.300	13.300	0.000		
Difference (% dry)	0.080	0.040	0.090	0.070	0.020	-0.010	-0.020	-0.040	-0.030	0.022	0.050	0.038	
NOx Diluent System Data													
Cubix RM NOx Diluent (lb/MMBtu)	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.011	0.012	0.009	0.002		
CEMS NOx Diluent (lb/MMBtu)	0.009	0.01	0.01	0.01	0.009	0.01	0.01	0.009	0.009	0.010	0.001		25.69%
Difference (lb/MMBtu)	-0.001	-0.002	-0.002	-0.002	-0.001	-0.002	-0.002	0.002	0.003	-0.001	0.002	0.001	0.0008 lb/MMBtu
*RATA Result (Pass or Fail)													PASS

	Mean Difference	Confidence Coefficient	Pass or Fail	Bias Adjustment Factor (BAF)
NOx-Diluent	-0.001	0.0015	Pass	1.000

*Part 75 RATA Acceptance Criteria:

NOx Mass (lb/MMBtu): $\leq 7.5\%$ Relative Accuracy or If CEMS is < 0.200 lb/MMBtu average, difference from RM calculated rate not to exceed ± 0.015 lb/MMBtu (App. B, Section 2.3.1.2 (f)).

**Part 75 Bias Test and Adjustment Factor (Section 7.6)

If the mean difference is less than or equal to the absolute value of the confidence coefficient, the system passes the bias test. If not, a Bias Adjustment Factor (BAF) must be calculated and applied to the raw CEMS data. As per 40CFR75, Appendix A, 7.6.4 and 7.6.5.

Table 12:
Summary of Results - 40CFR75 RATA Results

Plant: Keiwi High Desert
Source: Unit 2
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Reference Methods: EPA Method 7e, 3a (Method 6c Corrected)

Number of Tests: 9
t-value (0.025): 2.306

Test Run Number	2-RA-1	2-RA-2	2-RA-3	2-RA-4	2-RA-5	2-RA-6	2-RA-7	2-RA-8	2-RA-9				
Date	4/7/03	4/7/03	4/7/03	4/7/03	4/7/03	4/7/03	4/7/03	4/7/03	4/7/03				
Start Time (24hr)	13:57	14:28	15:02	15:30	15:58	16:29	16:58	17:26	17:59				
End Time (24 hr)	14:18	14:49	15:23	15:51	16:19	16:50	17:19	17:47	18:20	Average	Standard Deviation	Confidence Coefficient	Relative Accuracy
Unit Load (MW)	159	159	158	158	158	158	158	158	158				
Run Status (used or discarded)	used	used	used	used	used	used	used	used	used				
NOx Data													
Cubix RM NOx (ppmv)	3.160	3.140	3.260	3.350	3.320	3.270	3.270	3.360	3.150	3.253	0.085		
CEMS NOx (ppmv)	3.100	3.100	3.100	3.100	3.100	3.100	3.100	3.100	2.900	3.078	0.067		
Difference (ppmv)	0.060	0.040	0.160	0.250	0.220	0.170	0.170	0.260	0.250	0.176	0.081	0.062	
O₂ Data													
Cubix RM O ₂ (% dry)	13.380	13.440	13.420	13.410	13.380	13.360	13.380	13.420	13.440	13.403	0.029		
CEMS O ₂ (% dry)	13.300	13.400	13.300	13.300	13.300	13.300	13.300	13.300	13.300	13.311	0.033		
Difference (% dry)	0.080	0.040	0.120	0.110	0.080	0.060	0.080	0.120	0.140	0.092	0.032	0.025	
NOx Diluent System Data													
Cubix RM NOx Diluent (lb/MMBtu)	0.009	0.009	0.009	0.010	0.010	0.009	0.009	0.010	0.009	0.009	0.001		
CEMS NOx Diluent (lb/MMBtu)	0.009	0.010	0.010	0.010	0.009	0.010	0.010	0.009	0.009	0.010	0.001		
Difference (lb/MMBtu)	0.000	-0.001	-0.001	0.000	0.001	-0.001	-0.001	0.001	0.000	0.000	0.001	0.001	9.24% 0.0002 lb/MMBtu
*RATA Result (Pass or Fail)													PASS

	Mean Difference	Confidence Coefficient	Pass or Fail	Bias Adjustment Factor (BAF)
*Bias Test and Adjustment Factor				
NOx-Diluent	0.000	0.0006	Pass	1.000

***Part 75 RATA Acceptance Criteria:**

NOx Mass (lb/MMBtu): <= 7.5% Relative Accuracy or if CEMS is < 0.200 lb/MMBtu average, difference from RM calculated rate not to exceed +/- 0.015 lb/MMBtu (App. B, Section 2.3.1.2 (f)).

****Part 75 Bias Test and Adjustment Factor (Section 7.6)**

If the mean difference is less than or equal to the absolute value of the confidence coefficient, the system passes the bias test. If not, a Bias Adjustment Factor (BAF) must be calculated and applied to the raw CEMS data. As per 40CFR75, Appendix A, 7.6.4 and 7.6.5.

Table 13:

Summary of Results - 40CFR75 RATA Results

Plant: Keiwi High Desert
 Source: Unit 3
 Technician(s): LF/CM/JJ/NS/JW/JC
 Cubix Reference Methods: EPA Method 7e, 3a (Method 6c Corrected)

Number of Tests: 9
 t-value (0.025): 2.306

Test Run Number	3-RA-1	3-RA-2	3-RA-3	3-RA-4	3-RA-5	3-RA-6	3-RA-7	3-RA-8	3-RA-9				
Date	4/5/03	4/6/03	4/6/03	4/6/03	4/6/03	4/6/03	4/6/03	4/6/03	4/6/03				
Start Time (24hr)	16:59	8:45	9:38	10:20	11:04	11:40	12:17	14:39	15:24				
End Time (24 hr)	17:20	9:06	9:59	10:41	11:25	12:01	12:38	15:00	15:45	Average	Standard Deviation	Confidence Coefficient	Relative Accuracy
Unit Load (MW)	160	165	164	161	161	160	160	158	157				
Run Status (used or discarded)	used	used	used	used	used	used	used	used	used				
NOx Data													
Cubix RM NOx (ppmv)	3.670	3.770	3.750	3.390	3.730	4.250	4.720	4.120	3.610	3.890	0.404		
CEMS NOx (ppmv)	3.100	3.100	3.100	2.800	3.000	2.900	3.000	3.300	3.000	3.033	0.141		
Difference (ppmv)	0.570	0.670	0.650	0.590	0.730	1.350	1.720	0.820	0.610	0.857	0.403	0.310	
O₂ Data													
Cubix RM O ₂ (% dry)	13.340	13.280	13.420	13.430	13.520	13.420	13.450	13.450	13.430	13.416	0.069		
CEMS O ₂ (% dry)	13.200	13.300	13.300	13.300	13.300	13.300	13.300	13.300	13.300	13.289	0.033		
Difference (% dry)	0.140	-0.020	0.120	0.130	0.220	0.120	0.150	0.150	0.130	0.127	0.063	0.048	
NOx Diluent System Data													
Cubix RM NOx Diluent (lb/MMBtu)	0.011	0.011	0.011	0.010	0.011	0.012	0.014	0.012	0.011	0.011	0.001		
CEMS NOx Diluent (lb/MMBtu)	0.009	0.009	0.009	0.008	0.009	0.008	0.009	0.009	0.009	0.009	0.000		30.81%
Difference (lb/MMBtu)	0.002	0.002	0.002	0.002	0.002	0.004	0.005	0.003	0.002	0.003	0.001	0.001	0.0027 lb/MMBtu
*RATA Result (Pass or Fail)													PASS

	Mean Difference	Confidence Coefficient	Pass or Fail	Bias Adjustment Factor (BAF)
Bias Test and Adjustment Factor				
NOx-Diluent	0.003	0.0009	Fail	1.111

*Part 75 RATA Acceptance Criteria:

NOx Mass (lb/MMBtu): $\leq 7.5\%$ Relative Accuracy or if CEMS is < 0.200 lb/MMBtu average, difference from RM calculated rate not to exceed ± 0.015 lb/MMBtu (App. B, Section 2.3.1.2 (f)).

**Part 75 Bias Test and Adjustment Factor (Section 7.6)

If the mean difference is less than or equal to the absolute value of the confidence coefficient, the system passes the bias test. If not, a Bias Adjustment Factor (BAF) must be calculated and applied to the raw CEMS data. As per 40CFR75, Appendix A, 7.6.4 and 7.6.5.

TABLE
UNIT 1
NO_x PART 60 CEMS DATA

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 1
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: EPA Method 7e

Applicable Standards:

3.21 ppm for ppm @ 15% O₂ limit
3.51 ppm for lbs/hr limit

Number of Tests:
t- value (97.5% confidence)

9
2.306

Test Run No.	Start Time	Stop Time	RM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix NO _x (ppmv dry)	CEM NO _x (ppmv, dry)		RA of RM	RA of app std 1
1-RA-1	16:16	16:37	2.84	3.30	0.46	16.20%	13.11%
1-RA-2	16:48	17:09	2.89	3.40	0.51	28.02%	22.88%
1-RA-3	17:19	17:40	2.86	3.40	0.54	21.09%	17.21%
1-RA-4	17:54	18:15	2.88	3.40	0.52	19.59%	16.01%
1-RA-5	18:25	18:46	2.91	3.30	0.39	19.43%	15.93%
1-RA-6	18:52	18:46	2.92	3.40	0.48	18.73%	15.39%
1-RA-7	19:19	19:40	2.92	3.40	0.48	18.29%	15.06%
1-C-1	11:03	12:03	2.87	3.30	0.43	17.93%	14.75%
1-C-3	14:45	15:45	3.02	3.20	0.18	18.17%	15.03%

Averages 2.90 3.34 0.4433
Standard Deviation 0.05 0.07 0.1090
Confidence Interval 0.08

Relative Accuracy (based on mean of reference method) 18.17%
Relative Accuracy (based on applicable standard-ppm @ 15% O₂ limit) 16.42%
Relative Accuracy (based on applicable standard-lbs/hr limit) 15.03%

EPA Standard: RA must be < 20% of mean of reference method
or RA must be < 10% of applicable standard,
whichever is greater

**COMPLIANCE
STANDARDS**

ppm @ O₂ limit <20% of RM
lbs/hr limit <20% of RM

These runs not used for RA calculation

1-RA-8	12:13	12:34	4.03	3.10	-0.93
1-RA-9	12:42	13:03	4.02	3.10	-0.92
1-C-2	12:11	13:11	3.24	no data	n.a.

TABLE
UNIT 2
NOx PART 60 CEMS RATA

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 2
Technician(s):
Cubix Method:

LF/CM/JJ/NS/JW/JC
EPA Method 7e

Applicable Standards:

Number of Tests:
t- value (97.5% confidence)

3.18 ppm for ppm @ 15% O2 limit
3.59 ppm for lbs/hr limit

9
2.306

Test Run No.	Start Time	Stop Time	FM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix NOx (ppmv dry)	CEM NOx (ppmv, dry)		RA of FM	RA of app std 1
2-RA-1	13:57	14:18	3.16	3.10	-0.06	1.90%	1.67%
2-RA-2	14:28	14:49	3.14	3.10	-0.04	5.62%	4.93%
2-RA-3	15:02	15:23	3.26	3.10	-0.16	7.73%	6.86%
2-RA-4	15:30	15:51	3.35	3.10	-0.25	8.74%	7.85%
2-RA-5	15:58	16:19	3.32	3.10	-0.22	8.08%	7.30%
2-RA-6	16:29	16:50	3.27	3.10	-0.17	7.34%	6.64%
2-RA-7	16:58	17:19	3.27	3.10	-0.17	6.90%	6.25%
2-RA-8	17:26	17:47	3.36	3.10	-0.26	7.16%	6.51%
2-RA-9	17:59	18:20	3.15	2.90	-0.25	7.31%	6.61%

Averages 3.25 3.08 0.1756
Standard Deviation 0.09 0.07 0.0808
Confidence Interval 0.06
Relative Accuracy (based on mean of reference method) 7.31%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 7.48%
Relative Accuracy (based on applicable standard-lbs/hr limit) 6.61%
EPA Standard: RA must be < 20% of mean of reference method
or RA must be < 10% of applicable standard,
whichever is greater

**COMPLIANCE
STANDARDS**

ppm @ O2 limit <20% of RM
lbs/hr limit <20% of RM

TAB 16
UNIT 3
NOx PART 60 CEMS RATA

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 3
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: EPA Method 7a

Applicable Standards:

3.17 ppm	for ppm @ 15% O2 limit
3.46 ppm	for lbs/hr limit

Number of Tests:
t- value (97.5% confidence)

9
2.306

Test Run No.	Start Time	Stop Time	RM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix NOx (ppmv dry)	CEM NOx (ppmv, dry)		RA of RM	RA of app std 1
3-RA-1	16:59	17:20	3.67	3.10	-0.57	15.53%	16.45%
3-RA-2	08:45	09:06	3.77	3.10	-0.67	33.74%	36.24%
3-RA-3	09:38	09:59	3.75	3.10	-0.65	20.41%	21.98%
3-RA-4	10:20	10:41	3.39	2.80	-0.59	19.09%	20.08%
3-RA-5	11:04	11:25	3.73	3.00	-0.73	19.71%	20.83%
3-C-2	12:26	13:26	3.62	3.10	-0.52	19.19%	20.25%
3-C-3	13:36	14:36	3.51	3.00	-0.51	18.73%	19.65%
3-RA-8	14:39	15:00	4.12	3.30	-0.82	19.53%	20.83%
3-RA-9	15:24	15:45	3.61	3.00	-0.61	19.18%	20.41%

Averages	3.69	3.06	0.6300
Standard Deviation	0.20	0.13	0.1001
		Confidence Interval	0.08
Relative Accuracy (based on mean of reference method)			19.18%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit)			22.29%
Relative Accuracy (based on applicable standard-lbs/hr limit)			20.41%
EPA Standard: RA must be < 20% of mean of reference method or RA must be < 10% of applicable standard, whichever is greater			

COMPLIANCE STANDARDS	
ppm @ O2 limit	<20% of RM
lbs/hr limit	<20% of RM

TABLE 17
UNIT 1
CO PART 60 CEMS RATA

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 1

Applicable Standards:

5.14 ppm	for ppm @ 15% O2 limit
5.61 ppm	for lbs/hr limit

Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: EPA Method 10

Number of Tests:
t- value (97.5% confidence)

9
2.306

Test Run No.	Start Time	Stop Time	RM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix CO (ppmv dry)	CEM CO (ppmv, dry)		RA of RM	RA of app std 1
1-RA-1	16:16	16:37	0.26	-0.20	-0.46	176.92%	8.20%
1-RA-2	16:48	17:09	0.21	-0.20	-0.41	320.28%	13.41%
1-RA-3	17:19	17:40	0.18	-0.20	-0.38	238.65%	9.21%
1-RA-4	17:54	18:15	0.28	-0.20	-0.48	217.32%	9.00%
1-RA-5	18:25	18:46	0.18	-0.20	-0.38	215.84%	8.54%
1-RA-6	18:52	18:46	0.20	-0.20	-0.40	211.87%	8.24%
1-RA-7	19:19	19:40	0.14	-0.20	-0.34	218.23%	8.05%
1-RA-8	12:13	12:34	0.01	-0.20	-0.21	247.59%	8.05%
1-RA-9	12:42	13:03	0.05	-0.20	-0.25	260.10%	7.77%

Averages 0.17 -0.20 0.3678
Standard Deviation 0.09 0.00 0.0893
Confidence Interval 0.07
Relative Accuracy (based on mean of reference method) 260.10%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 8.49%
Relative Accuracy (based on applicable standard-lbs/hr limit) 7.77%
EPA Standard: RA must be <10% of RM or within 5 ppmv-PS4a whichever is greater

COMPLIANCE STANDARD-PS4a	
ppm @ O2 limit	<5 ppm diff

**TABLE 18
UNIT 2
CO PART 60 CEMS RATA**

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 2
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: EPA Method 10

Applicable Standards:

Number of Tests:
t- value (97.5% confidence)

5.08 ppm	for ppm @ 15% O2 limit
5.75 ppm	for lbs/hr limit

9
2.306

Test Run No.	Start Time	Stop Time	FM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix CO (ppmv dry)	CEMCO (ppmv, dry)		RA of FM	RA of app std 1
2-RA-1	13:57	14:18	0.30	-0.20	-0.50	166.67%	8.69%
2-RA-2	14:28	14:49	0.14	-0.20	-0.34	652.95%	24.98%
2-RA-3	15:02	15:23	0.03	-0.20	-0.23	442.96%	12.07%
2-RA-4	15:30	15:51	0.17	-0.20	-0.37	335.43%	9.33%
2-RA-5	15:58	16:19	0.20	-0.20	-0.40	291.34%	8.51%
2-RA-6	16:29	16:50	0.22	-0.20	-0.42	266.70%	8.19%
2-RA-7	16:58	17:19	0.18	-0.20	-0.38	255.82%	7.88%
2-RA-8	17:26	17:47	0.23	-0.20	-0.43	244.50%	7.81%
2-RA-9	17:59	18:20	0.12	-0.20	-0.32	246.41%	7.57%

Averages 0.18 -0.20 0.3767
Standard Deviation 0.08 0.00 0.0763
Confidence Interval 0.06
Relative Accuracy (based on mean of reference method) 246.41%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 8.57%
Relative Accuracy (based on applicable standard-lbs/hr limit) 7.57%
EPA Standard: RA must be <10% of RM or within 5 ppmv-PS4a whichever is greater

COMPLIANCE STANDARD-PS4a	
ppm @ O2 limit	<5 ppm diff

TABLE 19
UNIT 3
CO PART 60 CEMS RATA

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 3
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: EPA Method 10

Applicable Standards:

Number of Tests:
t- value (97.5% confidence)

5.07 ppm	for ppm @ 15% O2 limit
5.54 ppm	for lbs/hr limit

9
2.306

Test Run No.	Start Time	Stop Time	RM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix CO (ppmv dry)	CEM CO (ppmv, dry)		RA of RM	RA of app std 1
3-RA-1	16:59	17:20	0.28	-0.20	-0.48	171.43%	8.66%
3-RA-2	08:45	09:06	0.32	-0.20	-0.52	251.37%	13.60%
3-RA-3	09:38	09:59	0.32	-0.20	-0.52	189.93%	10.17%
3-RA-4	10:20	10:41	0.33	-0.20	-0.53	175.29%	9.88%
3-RA-5	11:04	11:25	0.29	-0.20	-0.49	173.67%	9.65%
3-RA-6	11:40	12:01	0.38	-0.20	-0.58	174.05%	10.05%
3-RA-7	12:17	12:38	0.41	-0.20	-0.61	173.09%	10.39%
3-RA-8	14:39	15:00	0.45	-0.20	-0.65	171.98%	10.78%
3-RA-9	15:24	15:45	0.42	-0.20	-0.62	169.45%	10.87%

Averages 0.36 -0.20 0.5556
Standard Deviation 0.06 0.00 0.0611
Confidence Interval 0.05
Relative Accuracy (based on mean of reference method) 169.45%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 11.87%
Relative Accuracy (based on applicable standard-lbs/hr limit) 10.87%
EPA Standard: RA must be <10% of RM or within 5 ppmv-PS4a
whichever is greater

COMPLIANCE STANDARD-PS4a
ppm @ O2 limit <5 ppm diff

TABLE 20
UNIT 1
NH3 CEMS RELATIVE ACCURACY

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 1
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: Bay Area ST-1B

Applicable Standards:

12.84 ppm for ppm @ 15% O2 limit

Number of Tests:
t- value (97.5% confidence)

9
2.306

Test Run No.	Start Time	Stop Time	RM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix NH3 (ppmv dry)	CEMS NH3 (ppmv, dry)		RA of RM	RA of applicable standard
1-RA-1	16:16	16:37	10.76	15.20	4.44	41.33%	34.61%
1-C-1	11:09	11:39	7.10	6.95	-0.15	351.02%	243.99%
1-RA-3	17:19	17:40	4.72	15.50	10.78	247.85%	145.24%
1-C-3	14:50	15:20	7.38	8.53	1.15	157.82%	92.03%
1-RA-5	18:25	18:46	7.31	16.30	8.99	147.05%	85.34%
1-RA-6	18:52	18:46	9.62	16.70	7.08	127.21%	77.40%
1-RA-7	19:19	19:40	7.93	16.70	8.77	124.11%	75.68%
1-RA-8	12:13	12:34	5.70	7.40	1.70	116.28%	68.50%
1-RA-9	12:42	13:03	5.84	7.40	1.56	109.14%	62.66%

Averages 7.37 12.30 4.9238
Standard Deviation 1.91 4.53 4.0642
Confidence Interval 3.12

Relative Accuracy (based on mean of reference method) 109.14%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 62.66%

EPA Standard: RA must be <10% of RM or within 5 ppmv-PS4a
whichever is greater

COMPLIANCE
STANDARD-PS4a

ppm @ O2 limit <5 ppm diff

These runs not used for RA calculation

1-RA-2	16:48	17:09	3.74	15.10	12.00
1-C-2	12:12	12:42	4.72	no data	n.a.
1-RA-4	17:54	18:15	3.82	15.90	13.25

TABLE 21
UNIT 2
NH3 CEMS RELATIVE ACCURACY

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 2
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: Bay Area ST-1B

Applicable Standards:

12.71 ppm for ppm @ 15% O2 limit

Number of Tests: 9
t- value (97.5% confidence) 2.306

Test Run No.	Start Time	Stop Time	FM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix NH3 (ppmv dry)	CEMS NH3 (ppmv, dry)		RA of FM	RA of applicable standard
2-RA-1	13:57	14:18	1.77	6.10	4.33	244.42%	34.07%
2-RA-2	14:28	14:49	2.49	6.40	3.91	318.40%	53.40%
2-RA-3	15:02	15:23	2.54	6.50	3.96	204.47%	36.47%
2-RA-4	15:30	15:51	2.17	7.40	5.23	237.66%	41.94%
2-RA-5	15:58	16:19	2.83	6.50	3.67	211.01%	39.19%
2-RA-6	16:29	16:50	1.62	6.30	4.68	219.14%	38.59%
2-RA-7	16:58	17:19	1.85	6.10	4.25	218.94%	37.60%
2-RA-8	17:26	17:47	1.94	6.20	4.26	218.08%	36.94%
2-RA-9	17:59	18:20	1.49	6.90	5.41	234.11%	38.29%

Averages 2.08 6.49 4.4105
Standard Deviation 0.46 0.42 0.5921

Confidence Interval 0.46

Relative Accuracy (based on mean of reference method) 234.11%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 38.29%
EPA Standard: RA must be <10% of RM or within 5 ppmv-PS4a whichever is greater

COMPLIANCE
STANDARD-PS4a

ppm @ O2 limit <5 ppm diff

TABLE 22
UNIT 3
NH3 CEMS RELATIVE ACCURACY

Date: 4/5-6/03
Plant: Kiewit High Desert
Source: Unit 3

Applicable Standards:

12.69 ppm for ppm @ 15% O2 limit

Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: Bay Area ST-1B

Number of Tests:
t- value (97.5% confidence)

9

2.306

Test Run No.	Start Time	Stop Time	RM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix NH3 (ppmv dry)	CEMS NH3 (ppmv, dry)		RA of RM	RA of applica ble standard
3-RA-1	16:59	17:20	1.96	11.60	9.64	491.14%	75.97%
3-RA-2	08:45	09:06	1.12	12.50	11.38	1401.02%	170.15%
3-RA-3	09:38	09:59	2.83	12.50	9.67	644.79%	100.17%
3-RA-4	10:20	10:41	3.49	13.10	9.61	487.57%	90.35%
3-RA-5	11:04	11:25	1.97	12.10	10.13	484.71%	86.90%
3-RA-6	11:40	12:01	1.83	8.40	6.57	507.42%	88.01%
3-RA-7	12:17	12:38	1.73	6.80	5.07	511.77%	86.03%
3-RA-8	14:39	15:00	1.57	10.70	9.13	514.77%	83.68%
3-RA-9	15:24	15:45	2.15	11.60	9.45	503.92%	82.32%

Averages 2.07 11.03 8.9611
Standard Deviation 0.70 2.10 1.9268
Confidence Interval 1.48

Relative Accuracy (based on mean of reference method) 503.92%
Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 82.32%
EPA Standard: RA must be <10% of RM or within 5 ppmv-PS4a whichever is greater

COMPLIANCE
STANDARD-PS4a

ppm @ O2 limit <5 ppm diff

TABLE 22a
UNIT 3
NH3 CEMS RELATIVE ACCURACY RETEST

Date: 4/30/03
Plant: Kiewit High Desert
Source: Unit 3
Technician(s): LF/CM/JJ/NS/JW/JC
Cubix Method: Bay Area ST-1B

Applicable Standards:

12.69 ppm for ppm @ 15% O2 limit

Number of Tests: 9
t- value (97.5% confidence) 2.306

Test Run No.	Start Time	Stop Time	RM	CEMS Data	Difference (ppmv abs)	Intermediate Values	
			Cubix NH3 (ppmv dry)	CEMS NH3 (ppmv, dry)		RA of RM	RA of applicable standard
3-RA-12a	19:10	19:31	2.86	3.40	0.54	19.09%	4.30%
3-RA-10a	18:08	18:29	5.76	3.00	-2.76	513.12%	174.23%
3-RA-3a	13:48	14:09	4.82	3.10	-1.72	123.01%	43.42%
3-RA-4a	14:34	14:55	3.30	3.20	-0.10	81.41%	26.84%
3-RA-5a	15:10	15:31	2.95	3.30	0.35	64.08%	19.88%
3-RA-6a	15:42	16:03	2.47	3.50	1.03	53.91%	15.69%
3-RA-7a	16:27	16:48	2.98	3.30	0.32	44.75%	12.67%
3-RA-8a	16:57	17:18	4.62	4.00	-0.62	38.68%	11.34%
3-RA-9a	17:33	17:54	4.05	3.30	-0.75	35.57%	10.53%

Averages 3.76 3.34 0.4115
Standard Deviation 1.11 0.29 1.2029

Confidence Interval 0.92

Relative Accuracy (based on mean of reference method) 35.57%

Relative Accuracy (based on applicable standard-ppm @ 15% O2 limit) 10.53%

EPA Standard: RA must be <10% of RM or within 5 ppmv-PS4a whichever is greater

COMPLIANCE
STANDARD-PS4a

ppm @ O2 limit <5 ppm diff

These runs not used for RA calculation

3-RA-2a	13:19	13:40	12.98	3.00	-9.98
3-RA-11a	18:37	18:58	6.72	3.30	-3.42
3-RA-1a	11:30	11:51	1.09	3.90	2.81

TABLE 23
UNIT 1
CEMS CYCLE TIME TEST RESULTS

Plant: Kiewit/Fornay High Desert
Location: Victorville, California
Technician: LF/CM/NS
Source: Unit 1

	Low NOx	High NOx	O2
Date:	4/7/03	4/7/03	4/7/03
Span Gas Concentration:	9.01 ppm	136.00 ppm	20.80 vol%
Zero Gas Concentration:	0 ppm	0 ppm	0 vol%
Analyzer Span:	10.00 ppm	150.00 ppm	20.90 vol%
Stack Initial Stable Reading:	3.55 ppm	2.90 ppm	13.90 vol%
Initial Stack Reading Change (% of Span)	1.0%	0.0%	0.0%
Zero Stable Reading:	0.10 ppm	0.20 ppm	0.00 vol%
Zero 2-Minute Change (% of Span):	0.0%	0.0%	0.0%
Start Time Stack Injection:	14:32	14:32	14:15
Stack Upscale Stable Reading:	2.05	2.05	13.70
Upscale Step Change:	97.4%	97.3%	100.0%
Time of Upscale Stable Reading:	14:34	14:34	14:17
Upscale Response Time:	120 sec	120 sec	120 sec
Span Stable Reading:	9.20 ppm	141.90 ppm	20.70 vol%
Span 2-Minute Change (% of Span)	0.0%	0.0%	0.0%
Start Time Stack Injection:	14:46	14:15	14:31
Stack Downscale Stable Reading:	2.20 ppm	4.10 ppm	14.05 vol%
Downscale Step Change:	100.0%	100.0%	99.2%
Time of Downscale Stable Reading:	14:50	14:18	14:33
Downscale Response Time:	240 sec	180 sec	120 sec
Component Cycle Time:	240 sec	180 sec	120 sec
System Cycle Time:	240 sec		

TABLE 24
UNIT 2
CEMS CYCLE TIME TEST RESULTS

Plant: Kiewit/Forney High Desert
Location: Victorville, California
Technician: LF/CM/NS
Source: Unit 2

	Low NOx	High NOx	O2
Date:	4/7/03	4/7/03	4/7/03
Span Gas Concentration:	9.03 ppm	135.00 ppm	20.80 vol%
Zero Gas Concentration:	0 ppm	0 ppm	0 vol%
Analyzer Span:	10.00 ppm	150.00 ppm	20.90 vol%
Stack Initial Stable Reading:	2.95 ppm	2.90 ppm	13.30 vol%
Initial Stack Reading Change (% of Span)	1.0%	0.0%	0.0%
Zero Stable Reading:	0.20 ppm	0.25 ppm	0.00 vol%
Zero 2-Minute Change (% of Span):	0.0%	0.1%	0.0%
Start Time Stack Injection:	18:08	18:08	17:59
Stack Upscale Stable Reading:	2.70	2.70	13.30
Upscale Step Change:	100.0%	100.0%	100.0%
Time of Upscale Stable Reading:	18:10	18:10	18:01
Upscale Response Time:	120 sec	120 sec	120 sec
Span Stable Reading:	8.70 ppm	134.05 ppm	20.75 vol%
Span 2-Minute Change (% of Span)	0.0%	0.1%	0.5%
Start Time Stack Injection:	18:17	17:59	18:08
Stack Downscale Stable Reading:	2.70 ppm	2.95 ppm	13.30 vol%
Downscale Step Change:	100.0%	100.0%	100.0%
Time of Downscale Stable Reading:	18:20	18:02	18:10
Downscale Response Time:	180 sec	120 sec	120 sec
Component Cycle Time:	180 sec	120 sec	120 sec
System Cycle Time:	180 sec		

TABLE 25
UNIT 3
CEMS CYCLE TIME TEST RESULTS

Plant: Kiewit/Fomey High Desert
Location: Victorville, California
Technician: LF/CM/NS
Source: Unit 3

	Low NOx	High NOx	O2
Date:	4/7/03	4/7/03	4/7/03
Span Gas Concentration:	9.02 ppm	135.00 ppm	20.80 vol%
Zero Gas Concentration:	0 ppm	0 ppm	0 vol%
Analyzer Span:	10.00 ppm	150.00 ppm	20.90 vol%
Stack Initial Stable Reading:	4.30 ppm	3.05 ppm	14.50 vol%
Initial Stack Reading Change (% of Span)	2.0%	0.1%	0.0%
Zero Stable Reading:	0.00 ppm	0.10 ppm	0.00 vol%
Zero 2-Minute Change (% of Span):	0.0%	0.0%	0.0%
Start Time Stack Injection:	19:34	19:34	19:24
Stack Upscale Stable Reading:	5.10	5.20	14.50
Upscale Step Change:	100.0%	100.0%	100.0%
Time of Upscale Stable Reading:	19:36	19:36	19:26
Upscale Response Time:	120 sec	120 sec	120 sec
Span Stable Reading:	9.45 ppm	135.20 ppm	21.00 vol%
Span 2-Minute Change (% of Span)	1.0%	0.1%	0.0%
Start Time Stack Injection:	19:45	19:24	19:33
Stack Downscale Stable Reading:	3.90 ppm	4.40 ppm	14.50 vol%
Downscale Step Change:	100.0%	100.1%	100.0%
Time of Downscale Stable Reading:	19:48	19:27	19:35
Downscale Response Time:	180 sec	180 sec	120 sec
Component Cycle Time:	180 sec	180 sec	120 sec
System Cycle Time:	180 sec		

**TABLE 26
UNIT 1
CEMS LINEARITY TEST RESULTS**

Plant: Kiewit/Forney High Desert
Location: Victorville, California
Technician: LF/CM/NS

NOx Span: 10-EXEMPT
O2 Span: 20.9
NOx Span: 150

Source: Unit 1
Date: 4/4/03 & 4/7/03
Time: 1426-1530 & 1258-1400

O2 CEMS	Certified Value	Percent of Span	Required % of Span	Calibration Gas Status	Trial 1 Observed	Trial 2 Observed	Trial 3 Observed	CEMS Average	Average Absolute Difference	Average Percent of Span Difference	Requirement	Status
O2 low	6.03	28.9%	20-30	OK	6.00	6.00	6.00	6.00	0.03	0.5%	5%	OK
O2 mid	12.00	57.4%	50-80	OK	11.90	11.90	11.90	11.90	0.10	0.8%	or	OK
O2 high	20.80	99.5%	80-100	OK	20.80	20.70	20.70	20.73	0.07	0.3%	0.5 vol%	OK

NOx CEMS	Certified Value	Percent of Span	Required % of Span	Calibration Gas Status	Trial 1 Observed	Trial 2 Observed	Trial 3 Observed	CEMS Average	Average Absolute Difference	Average Percent of Span Difference	Requirement	Status
NOx low	44.3	29.5%	20-30	OK	44.9	45.5	46.2	45.53	-1.23	2.8%	5%	OK
NOx mid	85.8	57.2%	50-80	OK	85.0	86.2	86.9	86.03	-0.23	0.3%	or	OK
NOx high	136.0	90.7%	80-100	OK	140.4	141.4	142.3	141.37	-5.37	3.9%	5 ppm	OK

TABLE 27
UNIT 2
CEMS LINEARITY TEST RESULTS

Plant: Kiewit/Fomey High Desert
Location: Victorville, California
Technician: LF/CM/NS

NOx Span: 10-EXEMPT
O2 Span: 20.9
NOx Span: 150

Source: Unit 2
Date: 04/02/03
Time: 1202-1600

O2 CEMS	Certified Value	Percent of Span	Required % of Span	Calibration Gas Status	Trial 1 Observed	Trial 2 Observed	Trial 3 Observed	CEMS Average	Average Absolute Difference	Average Percent of Span Difference	Requirement	Status
O2 low	8.03	28.9%	20-30	OK	5.90	8.00	8.00	5.97	0.08	1.1%	5%	OK
O2 mid	11.97	57.3%	50-60	OK	11.90	11.90	11.90	11.90	0.07	0.6%	or	OK
O2 high	20.80	98.5%	80-100	OK	20.80	20.80	20.80	20.80	0.20	1.0%	0.5 vol%	OK

NOx CEMS	Certified Value	Percent of Span	Required % of Span	Calibration Gas Status	Trial 1 Observed	Trial 2 Observed	Trial 3 Observed	CEMS Average	Average Absolute Difference	Average Percent of Span Difference	Requirement	Status
NOx low	44.3	29.5%	20-30	OK	45.4	48.0	46.2	45.87	-1.57	3.5%	5%	OK
NOx mid	85.8	57.2%	50-60	OK	88.4	88.8	89.0	88.73	-2.93	3.4%	or	OK
NOx high	135.0	90.0%	80-100	OK	137.5	137.6	137.8	137.63	-2.63	2.0%	5 ppm	OK

**TABLE 28
UNIT 3
CEMS LINEARITY TEST RESULTS**

Plant: Kiewit/Forney High Desert
Location: Victorville, California
Technician: LF/CM/NS

NOx Span: 10-EXEMPT
O2 Span: 20.9
NOx Span: 150

Source: Unit 3
Date: 04/03/03
Time: 1008
1235

O2 CEMS	Certified Value	Percent of Span	Required % of Span	Calibration Gas Status	Trial 1 Observed	Trial 2 Observed	Trial 3 Observed	CEMS Average	Average Absolute Difference	Average Percent of Span Difference	Requirement	Status
O2 low	6.03	28.8%	20-30	OK	6.00	6.00	6.00	6.00	0.03	0.5%	5%	OK
O2 mid	11.97	57.3%	50-60	OK	12.00	12.00	12.00	12.00	-0.03	0.3%	or	OK
O2 high	20.80	99.5%	80-100	OK	20.90	20.90	20.90	20.90	-0.10	0.5%	0.5 vol%	OK

NOx CEMS	Certified Value	Percent of Span	Required % of Span	Calibration Gas Status	Trial 1 Observed	Trial 2 Observed	Trial 3 Observed	CEMS Average	Average Absolute Difference	Average Percent of Span Difference	Requirement	Status
NOx low	44.3	29.5%	20-30	OK	46.9	47.1	47.1	47.03	-2.73	6.2%	5%	OK
NOx mid	85.8	57.2%	50-60	OK	84.9	85.1	85.4	85.13	0.67	0.8%	or	OK
NOx high	138.0	90.7%	80-100	OK	133.8	134.4	134.5	134.23	1.77	1.3%	5 ppm	OK

**TABLE 29
UNIT 1: CEMS**

7-DAY DRIFT AND ERROR TEST SUMMARY

Operator/Plant: Kiewit High Desert
Location: Victorville, CA
Unit ID: Unit 1

Low NOx Span: 10
High NOx Span: 150
O2 Span: 21
High CO Span: 1000
Low CO Span: 10
NH3 Span: 10

Low NOx Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
OVERALL STATUS								PASS

High NOx Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	135.0	0.0	0.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	135.6	0.6	0.4%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.3	1.7	1.1%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	133.1	1.9	1.3%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	n.a.	135.0	OK	136.3	1.3	0.9%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	n.a.	135.0	OK	138.3	3.3	2.2%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	n.a.	135.0	OK	134.7	0.3	0.2%	PASS
OVERALL STATUS								PASS

Low NOx Part 75 7-Day Calibration Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	8.9	0.1	1.0%	PASS
2-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.1	0.1	1.0%	PASS
3-Apr	ZERO	unknown	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
4-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	8.9	0.1	1.0%	PASS
5-Apr	ZERO	unknown	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
6-Apr	ZERO	unknown	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	unknown	9.0	OK	9.1	0.1	1.0%	PASS
7-Apr	ZERO	unknown	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	unknown	9.0	OK	8.9	0.1	1.0%	PASS
OVERALL STATUS								PASS

High NOx Part 75 7-Day Calibration Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	135.0	0.0	0.0%	PASS
2-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	135.6	0.6	0.4%	PASS
3-Apr	ZERO	unknown	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	unknown	135.0	OK	133.3	1.7	1.1%	PASS
4-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	133.1	1.9	1.3%	PASS
5-Apr	ZERO	unknown	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	unknown	135.0	OK	136.3	1.3	0.9%	PASS
6-Apr	ZERO	unknown	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	unknown	135.0	OK	138.3	3.3	2.2%	PASS
7-Apr	ZERO	unknown	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	unknown	135.0	OK	134.7	0.3	0.2%	PASS
OVERALL STATUS								PASS

Testing by Plant Operator

TABLE 30
UNIT 1: CEMS
7-DAY DRIFT AND ERROR TEST SUMMARY

Operator/Plant: Kiewit High Desert
Location: Victorville, CA
Unit ID: Unit 1

Low NOx Span: 10
High NOx Span: 150
O2 Span: 21
High CO Span: 1000
Low CO Span: 10
NH3 Span: 10

O2 Part 60/Part 75 7-Day Calibration Drift/Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (vol%)	Reference Status	CEMS Value (vol%)	Difference (vol%)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.8	0.1	n.a.	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.0	0.1	n.a.	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.9	0.0	n.a.	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.9	0.0	n.a.	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.8	0.1	n.a.	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.8	0.1	n.a.	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.9	0.0	n.a.	PASS
OVERALL STATUS								PASS
High CO Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (vol%)	Reference Status	CEMS Value (vol%)	Difference (vol%)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	923	OK	909.0	14.0	1.4%	PASS
2-Apr	ZERO	n.a.	0	OK	-0.4	0.4	0.0%	PASS
	SPAN	n.a.	923	OK	915.0	8.0	0.8%	PASS
3-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	923	OK	947.3	24.3	2.4%	PASS
4-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	923	OK	950.6	27.6	2.8%	PASS
5-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	923	OK	928.9	3.9	0.4%	PASS
6-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	923	OK	939.9	16.9	1.7%	PASS
7-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	923	OK	925.4	2.4	0.2%	PASS
OVERALL STATUS								PASS
Low CO Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.2	OK	9.1	0.1	1.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.3	0.3	3.0%	PASS
	SPAN	n.a.	9.2	OK	9.4	0.2	2.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.2	OK	9.3	0.1	1.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	-0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.2	OK	9.3	0.1	1.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
OVERALL STATUS								PASS
NH3 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	-0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.8	0.2	2.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.7	0.3	3.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.0	OK	8.6	0.4	4.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.3	0.3	3.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.3	0.3	3.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
OVERALL STATUS								PASS

Testing by Plant Operator

TABLE 31
UNIT 2: CEMS

7-DAY DRIFT AND ERROR TEST SUMMARY

Operator/Plant: Kiewit High Desert
Location: Victorville, CA
Unit ID: Unit 2

Low NOx Span: 10
High NOx Span: 150
O2 Span: 21
High CO Span: 1000
Low CO Span: 10
NH3 Span: 10

Low NOx Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	8.8	0.2	2.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.8	0.2	2.0%	PASS
OVERALL STATUS								PASS

High NOx Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	132.8	2.2	1.5%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	133.6	1.4	0.9%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	135.0	0.0	0.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	133.3	1.7	1.1%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.4	1.6	1.1%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	135.0	OK	134.0	1.0	0.7%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.8	1.2	0.8%	PASS
OVERALL STATUS								PASS

Low NOx Part 75 7-Day Calibration Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	8.9	0.1	1.0%	PASS
2-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
3-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	8.9	0.1	1.0%	PASS
4-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	8.8	0.2	2.0%	PASS
5-Apr	ZERO	unknown	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	unknown	9.0	OK	8.9	0.1	1.0%	PASS
6-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.1	0.1	1.0%	PASS
7-Apr	ZERO	unknown	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	unknown	9.0	OK	8.8	0.2	2.0%	PASS
OVERALL STATUS								PASS

High NOx Part 75 7-Day Calibration Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	132.8	2.2	1.5%	PASS
2-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	133.6	1.4	0.9%	PASS
3-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	135.0	0.0	0.0%	PASS
4-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	133.3	1.7	1.1%	PASS
5-Apr	ZERO	unknown	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	unknown	135.0	OK	133.4	1.6	1.1%	PASS
6-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	135.0	OK	134.0	1.0	0.7%	PASS
7-Apr	ZERO	unknown	0.0	OK	0.2	0.2	0.1%	PASS
	SPAN	unknown	135.0	OK	133.8	1.2	0.8%	PASS
OVERALL STATUS								PASS

Testing by Plant Operator

TABLE 32
UNIT 2: CEMS
7-DAY DRIFT AND ERROR TEST SUMMARY

Operator/Plant: Kiewit High Desert
Location: Victorville, CA
Unit ID: Unit 2

Low NOx Span: 10
High NOx Span: 150
O2 Span: 21
High CO Span: 1000
Low CO Span: 10
NH3 Span: 10

O2 Part 60/Part 75 7-Day Calibration Drift/Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (vol%)	Reference Status	CEMS Value (vol%)	Difference (vol%)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.8	0.1	n.a.	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.9	0.0	n.a.	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.9	0.0	n.a.	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.8	0.1	n.a.	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.8	0.1	n.a.	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.9	0.0	n.a.	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.0	0.1	n.a.	PASS
OVERALL STATUS								PASS
High CO Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (vol%)	Reference Status	CEMS Value (vol%)	Difference (vol%)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	924	OK	906.8	17.2	1.7%	PASS
2-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	924	OK	928.3	4.3	0.4%	PASS
3-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	924	OK	923.6	0.4	0.0%	PASS
4-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	924	OK	896.7	27.3	2.7%	PASS
5-Apr	ZERO	n.a.	0	OK	-0.4	0.4	0.0%	PASS
	SPAN	n.a.	924	OK	956.4	32.4	3.2%	PASS
6-Apr	ZERO	n.a.	0	OK	-0.3	0.3	0.0%	PASS
	SPAN	n.a.	924	OK	946.5	22.5	2.3%	PASS
7-Apr	ZERO	n.a.	0	OK	-0.4	0.4	0.0%	PASS
	SPAN	n.a.	924	OK	928.2	4.2	0.4%	PASS
OVERALL STATUS								PASS
Low CO Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.2	OK	8.9	0.3	3.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.2	OK	8.9	0.3	3.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.2	OK	9.1	0.1	1.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.0	0.2	2.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	-0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	-0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.3	0.1	1.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.1	0.1	1.0%	PASS
OVERALL STATUS								PASS
NH3 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.7	0.3	3.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	8.5	0.5	5.0%	FAIL
3-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.6	0.4	4.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	-0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.0	OK	8.8	0.2	2.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.3	0.3	3.0%	PASS
	SPAN	n.a.	9.0	OK	8.6	0.4	4.0%	PASS
OVERALL STATUS								PASS

Testing by Plant Operator

**TABLE 33
UNIT 3: CEMS**

7-DAY DRIFT AND ERROR TEST SUMMARY

Operator/Plant: Kiewit High Desert
Location: Victorville, CA
Unit ID: Unit 3

Low NOx Span: 10
High NOx Span: 150
O2 Span: 21
High CO Span: 1000
Low CO Span: 10
NH3 Span: 10

Low NOx Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	-0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
OVERALL STATUS								PASS

High NOx Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.5	1.5	1.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.5	1.5	1.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.9	1.1	0.7%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.9	1.1	0.7%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	n.a.	135.0	OK	133.9	1.1	0.7%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	n.a.	135.0	OK	134.5	0.5	0.3%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	n.a.	135.0	OK	134.3	0.7	0.5%	PASS
OVERALL STATUS								PASS

Low NOx Part 75 7-Day Calibration Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.1	0.1	1.0%	PASS
2-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
3-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
4-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
5-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
6-Apr	ZERO	unknown	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	unknown	9.0	OK	9.1	0.1	1.0%	PASS
7-Apr	ZERO	unknown	0.0	OK	-0.1	0.1	1.0%	PASS
	SPAN	unknown	9.0	OK	9.0	0.0	0.0%	PASS
OVERALL STATUS								PASS

High NOx Part 75 7-Day Calibration Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	unknown	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	unknown	135.0	OK	133.5	1.5	1.0%	PASS
2-Apr	ZERO	unknown	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	unknown	135.0	OK	133.5	1.5	1.0%	PASS
3-Apr	ZERO	unknown	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	unknown	135.0	OK	133.9	1.1	0.7%	PASS
4-Apr	ZERO	unknown	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	unknown	135.0	OK	133.9	1.1	0.7%	PASS
5-Apr	ZERO	unknown	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	unknown	135.0	OK	133.9	1.1	0.7%	PASS
6-Apr	ZERO	unknown	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	unknown	135.0	OK	134.5	0.5	0.3%	PASS
7-Apr	ZERO	unknown	0.0	OK	0.1	0.1	0.1%	PASS
	SPAN	unknown	135.0	OK	134.3	0.7	0.5%	PASS
OVERALL STATUS								PASS

Testing by Plant Operator

TABLE 34
UNIT 3: CEMS
7-DAY DRIFT AND ERROR TEST SUMMARY

Operator/Plant: Kiewit High Desert
Location: Victorville, CA
Unit ID: Unit 3

Low NOx Span: 10
High NOx Span: 150
O2 Span: 21
High CO Span: 1000
Low CO Span: 10
NH3 Span: 10

O2 Part 60/Part 75 7-Day Calibration Drift/Error Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (vol%)	Reference Status	CEMS Value (vol%)	Difference (vol%)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	20.9	0.0	n.a.	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.0	0.1	n.a.	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.0	0.1	n.a.	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.0	0.1	n.a.	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.0	0.1	n.a.	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.0	0.1	n.a.	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	n.a.	PASS
	SPAN	n.a.	20.9	OK	21.1	0.2	n.a.	PASS
OVERALL STATUS								PASS
High CO Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (vol%)	Reference Status	CEMS Value (vol%)	Difference (vol%)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0	OK	-0.6	0.6	0.1%	PASS
	SPAN	n.a.	933	OK	930.5	2.5	0.3%	PASS
2-Apr	ZERO	n.a.	0	OK	-0.6	0.6	0.1%	PASS
	SPAN	n.a.	933	OK	932.1	0.9	0.1%	PASS
3-Apr	ZERO	n.a.	0	OK	-0.6	0.6	0.1%	PASS
	SPAN	n.a.	933	OK	928.6	4.4	0.4%	PASS
4-Apr	ZERO	n.a.	0	OK	-0.6	0.6	0.1%	PASS
	SPAN	n.a.	933	OK	931.7	1.3	0.1%	PASS
5-Apr	ZERO	n.a.	0	OK	-0.6	0.6	0.1%	PASS
	SPAN	n.a.	933	OK	931.7	1.3	0.1%	PASS
6-Apr	ZERO	n.a.	0	OK	-0.6	0.6	0.1%	PASS
	SPAN	n.a.	933	OK	935.5	2.5	0.3%	PASS
7-Apr	ZERO	n.a.	0	OK	-0.6	0.6	0.1%	PASS
	SPAN	n.a.	933	OK	932.8	0.2	0.0%	PASS
OVERALL STATUS								PASS
Low CO Part 60 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.0	0.0	0.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.2	OK	9.3	0.1	1.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.3	0.1	1.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.3	0.1	1.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.2	OK	9.2	0.0	0.0%	PASS
OVERALL STATUS								PASS
NH3 7-Day Calibration Drift Test Results								
Date		Firing Rate (MMBTU/hr)	Reference Value (ppm)	Reference Status	CEMS Value (ppm)	Difference (ppm)	% of Span (%)	Status
1-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.9	0.1	1.0%	PASS
2-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
3-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
4-Apr	ZERO	n.a.	0.0	OK	0.2	0.2	2.0%	PASS
	SPAN	n.a.	9.0	OK	9.1	0.1	1.0%	PASS
5-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
6-Apr	ZERO	n.a.	0.0	OK	0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	8.8	0.2	2.0%	PASS
7-Apr	ZERO	n.a.	0.0	OK	-0.1	0.1	1.0%	PASS
	SPAN	n.a.	9.0	OK	9.0	0.0	0.0%	PASS
OVERALL STATUS								PASS

Testing by Plant Operator

**TEST REPORT
ON
ANNUAL COMPLIANCE AIR EMISSION TESTING
OF THREE
WESTINGHOUSE MODEL 501F COMBUSTION TURBINES WITH
HEAT RECOVERY STEAM GENERATORS**

**AT THE
HIGH DESERT POWER PROJECT LLC**

**PREPARED FOR
CONSTELLATION ENERGY**

CUBIX JOB NO. 8288

Report Revised 6/30/04

**TEST DATES:
APRIL 6-7, 2004
JUNE 4, 2004 VOC Re-sample**

SUMMARY OF RESULTS

Exhaust gases from the exhaust stacks of three combined cycle combustion turbines were tested to determine the relative accuracy of the Continuous Emission Monitor System (CEMS) associated with each stack. This testing program was conducted for annual quality assurance as required by state and federal CEMS regulations. The results of the Relative Accuracy Test Audit (RATA) are presented in this report. Cubix Corporation of Cameron Park, California conducted this testing project April 6-7, 2004.

The testing program included testing the turbines at base load. The turbine exhaust stacks have a CEMS associated with them that monitors NO_x, CO, O₂, and NH₃, continuously. Twelve (12) test runs were conducted on each unit during which stack gas was analyzed for NO_x, CO, O₂, and NH₃ concentrations, and these concentrations were compared to the CEMS values obtained for the same time period to determine the relative accuracy of the CEMS. To meet the requirements of Part 75, the concentrations of NO_x and O₂ were measured and used to tabulate NO_x (lbs/MMBtu). The reference NO_x emission rate (lbs/MMBtu) was compared with the CEMS measurement of NO_x (lbs/MMBtu) during the same time period. The results of all RATA tests are briefly summarized in the following Part 75 and Part 60 Executive Summary tables.

Part 75: Executive Summary

Unit #	Requirement	Component	Specification	Result	Pass/Fail
1	RATA	NO _x -diluent	Average difference must be within 0.015 lbs/MMBtu	0.001 lbs/MMBtu	*Pass
2	RATA	NO _x -diluent	Average difference must be within 0.015 lbs/MMBtu	0.001 lbs/MMBtu	*Pass
3	RATA	NO _x -diluent	Average difference must be within 0.015 lbs/MMBtu	0.000 lbs/MMBtu	*Pass

* Meets the requirement for annual RATA testing

Part 60: Executive Summary

Unit #	Requirement	Component	Specification	Result	Pass/Fail
1	RATA	NOx (ppm @15% O ₂)	≤ 20% of Mean Reference Method	12.6 %	Pass
		CO (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.36 ppm	Pass
		O ₂ (%)	≤ 1.0% absolute difference	0.10 %	Pass
		NH ₃ (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	1.55 ppm	Pass
2	RATA	NOx (ppm @15% O ₂)	≤ 20% of Mean Reference Method	19.1 %	Pass
		CO (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.26 ppm	Pass
		O ₂ (%)	≤ 1.0% absolute difference	0.14 %	Pass
		NH ₃ (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	1.47 ppm	Pass
3	RATA	NOx (ppm @15% O ₂)	≤ 20% of Mean Reference Method	6.0 %	Pass
		CO (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.27 ppm	Pass
		O ₂ (%)	≤ 1.0% absolute difference	0.03 %	Pass
		NH ₃ (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.69 ppm	Pass

Tables 2, 3, and 4 provide the Part 75 (NOx-diluent), Part 60 (NOx, CO and O₂), and Ammonia RATA results for the CEMS on Unit 1. Tables 5, 6, and 7 provide the RATA results for the CEMS on Unit 2. Tables 8, 9, and 10 provide the RATA results for the CEMS on Unit 3. These tables present the comparative RM (reference method) and CEMS data, the calculated RA acceptance criteria, and a test summary.

The data used to generate these tables are supported by the documents presented in the appendices of this report. Appendix A contains stack drawings, traverse point layouts of the stacks, and sampling data sheets. Appendix B contains examples of all calculations necessary for the reduction of the data presented in this section of the report. Appendix C contains the QA/QC summaries for all RM tests. Appendix D contains the calibration documentation of the calibration gases and dry gas meters. Appendix E contains the strip charts records and data logs used to record the NOx, CO, and O₂ RATA tests. Appendix F contains the CEMS test data collected by the data acquisition and handling system (DAHS) during the RATAs.

TEST REPORT
ON
ANNUAL COMPLIANCE AIR EMISSION TESTING
OF THREE
WESTINGHOUSE MODEL 501F COMBUSTION TURBINES WITH
HEAT RECOVERY STEAM GENERATORS

AT THE
HIGH DESERT POWER PROJECT, LLC

PREPARED FOR
CONSTELLATION ENERGY

CUBIX JOB NO. 45696

TEST DATES:
MARCH 29-31, 2005

SUMMARY OF RESULTS

Annual Continuous Emission Monitoring System (CEMS) Relative Accuracy Test Audits (RATA) were conducted on continuous emission monitoring systems in service on three combined cycle turbines operating at the High Desert Power Project in Victorville, California. The purpose of these tests was to determine the Relative Accuracy of the CEMS associated with each source with regard to federal and Mojave Desert Air Quality Management regulations. Cubix Corporation of Austin, Texas conducted the Relative Accuracy Test Audit (RATA) testing March 29-31, 2005. The sampling event was conducted while the units were operating at rates prescribed in pertinent federal regulations.

Test Matrix

The Relative Accuracy Test Audit (RATA) test matrix for each source consisted of twelve valid test runs during which NO_x, CO and O₂ concentrations were continuously monitored via instrumental analysis. Nine runs on each source were utilized to determine relative accuracy. The tests were conducted in conjunction with annual compliance tests prescribed by the MDAQMD permit. These results are presented in a separate document. As such, certain gaseous test runs on each source were 60-minutes in length; all other runs were 21-minutes in length. Each NH₃ test run was 30-minutes in length as mandated by the published method. For each test run, CEMS measurements were compared with the reference method (RM) measurements.

Summary of Test Results

Tables 2 and 3 are executive summaries of all tests, with Table 2 presenting 40CFR75 results and Table 3 40CFR60 results. Tables 4-12 present (in chronological order) the detailed results of all tests conducted on each source to complete the sampling program. These tables present the comparative RM (reference method) and CEMS data, the calculated relative accuracy (RA), acceptance criteria and a test summary.

These sources are subject to 40CFR75. The NO_x RATA requirements for Part 75 are that the RA be less than 10% of the RM (concentration monitor) or that the difference between CEMS and RM measurements be less than 0.02 lbs/MMBTU (NO_x/diluent rate monitor) if the 10% relative accuracy

requirement is not achieved. To be allowed to conduct future RATA tests on an annual basis, Part 75 requires that the RA be less than 7.5% of the RM, or ± 0.015 lbs/MMBtu. Each component analyzer meets or exceeds these latter criteria.

Each source is also subject to 40CFR60 and criteria presented in the MDAQMD permit. For each component analyzer or calculated mass emission determined from concentrations recorded by that analyzer, relative accuracy may be determined in terms of percent or absolute difference between the reference method results and those recorded by the CEMS, or in terms of an applicable standard established by the permit. The latter criteria may only be utilized if the value of the measured component is less than 50% of the established standard. The criterion for NO_x analyzers is a RA of $\leq 20\%$ of Mean Reference Method (PS2); for O₂ analyzers 1% by volume (PS3); and for CO analyzers 5 ppm absolute (PS4A). The RA of the NH₃ analyzer is also determined using PS4A as discussed in the CEMS monitoring plan.

Document Organization

The data used to generate the tables found in this section are supported by the documents presented in the appendices of this report. Appendix A contains a stack drawing, traverse point layout, and other field data sheets. Examples of the calculations necessary for the reduction of the data presented in this section of the report are shown in Appendix B. Appendix C gives the QA/QC summaries for all RM tests. Appendix D contains the calibration certifications for the equipment and calibration gases used during the sampling event. The logged data records used to record the NO_x, CO and O₂ test runs are presented in Appendix E; data was also recorded on strip charts, which serve as the permanent record of the tests and are kept on file at Cubix's Austin, Texas office. The CEMS data as recorded in the control room by the source's Data Acquisition and Handling (DAHS) system during each test run is provided in Appendix F. Appendix G contains field data sheets used for the collection of and results of analyses of NH₃.

Table 2
Part 75: Executive Summary

Unit #	Requirement	Component	Specification	Result	Pass/Fail
CT1	RATA	NOx-diluent	Average difference must be within 0.015 lbs/MMBtu	0.001 lbs/MMBtu	*Pass
CT2	RATA	NOx-diluent	Average difference must be within 0.015 lbs/MMBtu	0.002 lbs/MMBtu	*Pass
CT3	RATA	NOx-diluent	Average difference must be within 0.015 lbs/MMBtu	0.001 lbs/MMBtu	*Pass

* Meets the requirement for annual RATA testing



REPORT OF FINDINGS

ANNUAL COMPLIANCE AIR EMISSION TESTS

OF THREE

**WESTINGHOUSE MODEL 501F COMBUSTION TURBINES
WITH HEAT RECOVERY STEAM GENERATORS**

IN SERVICE AT THE
HIGH DESERT POWER PROJECT, LLC
VICTORVILLE, CALIFORNIA

PREPARED FOR
HIGH DESERT POWER PROJECT, LLC
CONSTELLATION ENERGY

TRC-CUBIX PROJECT NUMBER 51471

TEST DATES:
MARCH 21-23, 2006

SUMMARY OF RESULTS

Annual Continuous Emission Monitoring System (CEMS) Relative Accuracy Test Audits (RATA) were conducted on continuous emission monitoring systems in service on three combined cycle turbines operating at the High Desert Power Project in Victorville, California. The purpose of these tests was to determine the Relative Accuracy of the CEMS associated with each source with regard to federal and Mojave Desert Air Quality Management regulations. TRC-Cubix of Austin, Texas and Bakersfield, California conducted the Relative Accuracy Test Audit (RATA) testing March 21-23, 2006. The sampling event was conducted while the units were operating at rates prescribed in pertinent federal regulations.

Test Matrix

The Relative Accuracy Test Audit (RATA) test matrix for each source consisted of nine valid test runs during which NO_x, CO and O₂ concentrations were continuously monitored via instrumental analysis. The tests were conducted in conjunction with annual compliance tests prescribed by the MDAQMD permit. These results are presented in a separate document. As such, certain gaseous test runs on each source were 60-minutes in length; all other runs were 21-minutes in length. Each NH₃ test run was 30-minutes in length as mandated by the published method. For each test run, CEMS measurements were compared with the reference method (RM) measurements.

Summary of Test Results

Tables 2 and 3 are executive summaries of all tests, with Table 2 presenting 40CFR75 results and Table 3 40CFR60 results. Tables 4-12 present (in chronological order) the detailed results of all tests conducted on each source to complete the sampling program. These tables present the comparative RM (reference method) and CEMS data, the calculated relative accuracy (RA), acceptance criteria and a test summary.

These sources are subject to 40CFR75. The NO_x RATA requirements for Part 75 are that the RA be less than 10% of the RM (concentration monitor) or that the difference between CEMS and RM measurements be less than 0.02 lbs/MMBTU (NO_x/diluent rate monitor) if the 10% relative accuracy requirement is not achieved. To be allowed to conduct future RATA tests on an annual basis, Part 75 requires that the RA be less than 7.5% of the RM, or +/- 0.015 lbs/MMBTU. Each component analyzer meets or exceeds these latter criteria.

Each source is also subject to 40CFR60 and criteria presented in the MDAQMD permit. For each component analyzer or calculated mass emission determined from concentrations recorded by that analyzer, relative accuracy may be determined in terms of percent or absolute difference between the reference method results and those recorded by the CEMS, or in terms of an applicable standard established by the permit. The latter criteria may only be utilized if the value of the measured component is less than 50% of the established standard. The criterion for NO_x analyzers is a RA of ≤ 20% of Mean Reference Method (PS2); for O₂ analyzers 1% by volume (PS3); and for CO analyzers 5 ppm absolute (PS4A). The RA of the NH₃ analyzer is also determined using PS4A as discussed in the CEMS monitoring plan.

Document Organization

The data used to generate the tables found in this section are supported by the documents presented in the appendices of this report. Appendix A contains a stack drawing, traverse point layout, and other field data sheets. Examples of the calculations necessary for the reduction of the data presented in this section of the report are shown in Appendix B. Appendix C gives the QA/QC summaries for all RM tests. Appendix D contains the calibration certifications for the equipment and calibration gases used during the sampling event. The logged data records used to record the NO_x, CO and O₂ test runs are presented in Appendix E; data was also recorded on strip charts, which serve as the permanent record of the tests and are kept on file at TRC-Cubix's Austin, Texas office. The CEMS data as recorded in the control room by the source's Data Acquisition and Handling (DAHS) system during each test run is provided in Appendix F. Appendix G contains field data sheets used for the collection of and results of analyses of NH₃.

Table 2
Part 75: Executive Summary

Unit #	Requirement	Component	Specification	Result	Pass/Fail
3F1	RATA	NOx-diluent	Average difference must be within 0.015 lbs/MMBtu	0.001 lbs/MMBtu	*Pass
3F2	RATA	NOx-diluent	Average difference must be within 0.015 lbs/MMBtu	0.001 lbs/MMBtu	*Pass
3F3	RATA	NOx-diluent	Average difference must be within 0.015 lbs/MMBtu	0.001 lbs/MMBtu	*Pass

* Meets the requirement for annual RATA testing

Table 3
Part 60: Executive Summary

Unit #	Requirement	Component	Specification	Result	Pass/Fail
3F1	RATA	NOx (ppm @15% O ₂)	≤ 20% of Mean Reference Method	11.6%	Pass
		CO (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.08 ppm	Pass
		O ₂ (%)	≤ 1.0% absolute difference	0.62%	Pass
		NH ₃ (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	1.19 ppm	Pass
3F2	RATA	NOx (ppm @15% O ₂)	≤ 20% of Mean Reference Method	11.4%	Pass
		CO (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.08ppm	Pass
		O ₂ (%)	≤ 1.0% absolute difference	0.13%	Pass
		NH ₃ (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	1.28 ppm	Pass
3F3	RATA	NOx (ppm @15% O ₂)	≤ 20% of Mean Reference Method	7.0%	Pass
		CO (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.08 ppm	Pass
		O ₂ (%)	≤ 1.0% absolute difference	0.09 %	Pass
		NH ₃ (ppm @15% O ₂)	≤ 5ppm absolute average difference plus confidence coefficient	0.81 ppm	Pass