Louisville Metro Air Pollution Control Board
Agreed Board Order - Amendment 2

This amended Agreed Board Order is entered into between the Louisville Metro Air Pollution Control Board and the Kosmos Cement Company pursuant to the authority granted in Kentucky Revised Statutes Chapter 77 Air Pollution Control.

Company: Kosmos Cement Company (Kosmos)
15301 Dixie Highway
Louisville, Kentucky 40272

Background and Discussion

Regulation 6.42 *Reasonably Available Control Technology Requirements for Major Volatile Organic Compound- and Nitrogen Oxides-Emitting Facilities* requires the establishment and implementation of reasonably available control technology (RACT) for certain affected facilities that emit oxides of nitrogen (NO_x) and that are located at a major stationary source for NO_x. Section 4.4 requires that each determination of RACT approved by the Louisville Metro Air Pollution Control District (District) be submitted to the U.S. Environmental Protection Agency (EPA) as a site-specific revision of the Kentucky State Implementation Plan (SIP). The Kosmos *Board Order - Amendment 1* was approved into the Kentucky SIP on October 23, 2001 (66 FR 53665).

Kosmos agrees to accept a NO_x emission limit for the cement kiln that is more stringent than the RACT level that is currently in the Kentucky SIP. To be federally enforceable, this more stringent NO_x emission limit must be approved by the EPA as a site-specific revision of the Kentucky SIP.

A Public Hearing on this amended Agreed Board Order was held before the Board on March 31, 2004. Based upon the evidence presented at that hearing, the Board determined that approval of this amended Agreed Board Order and submittal as a site-specific revision of the Kentucky SIP were appropriate.

Now therefore it is agreed that:

1. The attached NO_x RACT Plan - Amendment 2, applicable to Kosmos, is approved by the District. Kosmos shall comply with this plan.

2. Compliance with the attached NO_x RACT Plan - Amendment 2 shall be deemed compliance with the requirements of Regulation 6.42 section 1.2, section 1.3, Section 2 to the extent that this Section applies to section 4.3, section 4.3, and Section 5 to the extent that this Section

applies to verification of compliance with the requirements pursuant to section 4.3.

3. This amended Agreed Board Order shall not be deemed or construed to be the result of any violation of any federal, state, or local statute, regulation, or ordinance for any purpose whatsoever.

4. Kosmos has reviewed this amended Agreed Board Order and consents to all its requirements and terms.

5. The effective date of this Agreed Board Order and the attached NO_x RACT Plan - Amendment 2 is May 3, 2004. The Board Order that was approved on October 18, 2000, shall remain in effect until May 3, 2004.

Dated this 3rd day of May, 2004.

Louisville Metro
Air Pollution Control Board

By: ______________________________
Karen Cassidy
Chair

Kosmos Cement Company

By: ______________________________
Edmo Gutierrez
Plant Manager

Louisville Metro
Air Pollution Control District

By: ______________________________
Jesse M. Goldsmith
Air Pollution Control Officer

Approved as to form and legality for:
Louisville Metro
Air Pollution Control District

By: ______________________________
Lauren Anderson
Assistant District Attorney

NO_x RACT Plan - Amendment 2

1. The oxides of nitrogen (NO_x, expressed as NO_2) emission from the cement kiln shall not exceed 4.755 pounds per ton of clinker produced by the kiln, based upon a rolling 30-day average.

2. The NO_x emission rate for the cement kiln shall be determined using the methods and procedures specified in NO_x RACT Plan Appendix A - Amendment 2 and Appendix B - Amendment 2.

3. The Kosmos Cement Company (Kosmos) shall install, calibrate, maintain, and operate a NO_x continuous emissions monitoring system (CEMS) for the cement kiln and shall keep records and submit reports and other notifications as specified in NO_x RACT Plan Appendix A - Amendment 2 and Appendix B - Amendment 2.

4. Kosmos shall keep a record identifying all deviations from the requirements of this NO_x RACT Plan and shall submit to the District a written report of all deviations that occurred during the preceding semi-annual period. Semi-annual periods shall run from January 1 to June 30 and July 1 to December 31. The semi-annual report shall contain the information specified in NO_x RACT Plan Appendix A - Amendment 2 Section II. A. and B. If no deviation occurred during the semi-annual period, the report shall contain a negative declaration. Each report shall be submitted within 60 days following the end of the semi-annual period.

5. In lieu of the requirements in this NO_x RACT Plan, Kosmos may comply with alternative requirements regarding emission limitations, equipment operation, test methods, monitoring, recordkeeping, or reporting, provided the following conditions are met:
   A. The alternative requirements are established and incorporated into an operating permit pursuant to a Title V Operating Permit issuance, renewal, or significant permit revision process as established in Regulation 2.16,
   B. The alternative requirements are consistent with the streamlining procedures and guidelines set forth in section II.A. of *White Paper Number 2 for Improved Implementation of the Part 70 Operating Permits Program*, March 5, 1996, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. The overall effect of compliance with alternative requirements shall consider the effect on an intrinsic basis, such as pounds per ton of clinker produced by the kiln,
   C. The U.S. Environmental Protection Agency (EPA) has not objected to the issuance, renewal, or revision of the Title V Operating Permit, and either
   D. If the public comment period preceded the EPA review period, then the District had transmitted any public comments concerning the alternative requirements to EPA with the proposed permit, or
   E. If the EPA and public comment periods ran concurrently, then the District had transmitted any public comments concerning the alternative requirements to EPA no later than 5 working days after the end of the public comment period.

   The District's determination of approval of any alternative requirements is not binding on EPA. Noncompliance with any alternative requirement established pursuant to the Title V Operating

Permit process constitutes a violation of this NO_x RACT Plan.

History: Approved 11-8-99; effective 1-1-00; amended a1/10-18-00 effective 1-1-01, a2/5-3-04 effective 5-3-04.

Appendix A - Amendment 2 to NO_x RACT Plan
Requirements for NO_x CEMS

1. General Operating Requirements

A. Kosmos shall install, calibrate, maintain, and operate a continuous emissions monitoring system (CEMS) for measuring oxides of nitrogen (NO_x) emissions discharged to the atmosphere from the cement kiln and record the output of the system.

B. The NO_x CEMS shall be operated and data recorded during all periods of operation of the cement kiln except for CEMS breakdowns and repairs. Data shall be recorded during calibration checks and zero and span adjustments.

C. The 1-hour average NO_x emission rates measured by the CEMS shall be expressed in pounds per ton of clinker produced by the cement kiln and shall be used to calculate the average emission rates. At least 2 data points shall be used to calculate each 1-hour average.

D. The NO_x rates expressed in pounds per ton of clinker produced shall be calculated using the exhaust flow rate of 233,500 dry standard cubic feet per minute. As an alternative, the NO_x emission rates may be calculated using exhaust flow rates obtained by a flow measuring monitor as approved by the District. A flow measuring monitor shall meet the requirements in NO_x RACT Plan Appendix B - Amendment 2.

E. The procedures under 40 CFR §60.13 (d), (e), (f), and (h) shall be followed for installation, evaluation, and operation of the CEMS.

F. The NO_x CEMS shall be installed and operated in compliance with the requirements of 40 CFR Part 60 Appendix B Performance Specification 2 and the quality assurance and certification requirements of Performance Specification 2 shall be met as well as the requirements in this Appendix.

G. The span value for the NO_x CEMS shall be determined so that all expected concentrations can be accurately measured and recorded as indicated in NO_x RACT Plan Appendix B - Amendment 2.

H. The Quality Assurance Procedures in 40 CFR Part 60 Appendix F shall be followed. All reporting required by 40 CFR Part 60 Appendix F to be submitted to the Agency shall instead be submitted to the District.

I. When NO_x emission data or flow monitor data (if a flow monitor is used) are not obtained because of CEMS breakdowns, repairs, calibration checks, or zero and span adjustments, emission data shall be obtained by using one of the following options to provide emission data for a minimum of 75% of the operating hours in each kiln operating day, in at least 22 out of

30 successive cement kiln operating days:

1. Standby monitoring systems, 40 CFR Part 60 Appendix A Method 7 or Method 7a, or other approved reference methods, or
2. Data substitution as follows:
   a. If the missing data period is 6 hours or less, then substitute an average of the quality-assured data from the hour immediately before and the hour immediately after the missing data period for each hour of missing data, and
   b. If the missing data period is greater than 6 hours, then substitute the greatest emission rate or flow (if a flow monitor is used) recorded during the previous 168 quality-assured monitor operating hours at a clinker production rate that is within 10% of the current operating rate. If there are not enough data to satisfy this requirement, then substitute data from a higher clinker production rate or the maximum design flow or emission rate.

   All "estimated" data shall be reported with a clear notation that they are estimated and not obtained from a certified monitor or EPA-approved test method.

J. The clinker production rate shall be determined and recorded during all periods of operation of the cement kiln except for breakdowns and repairs of the system used to determine the clinker production rate (raw materials weigh feeder and associated data acquisition system). Data shall be recorded during periods of calibration for the weigh feeder, which at a minimum shall be performed annually.

K. The clinker production rate determined from monitoring the rate of raw materials input to the cement kiln shall be calculated by dividing the rate of raw materials input to the cement kiln by the current raw materials conversion factor. The raw materials conversion factor shall be determined on a quarterly basis and this conversion factor shall be used in the calculation of the clinker production rate until the next quarterly raw materials conversion rate test is performed. The raw materials conversion rate factor shall be determined by weighing and recording the raw materials input to the cement kiln with the weigh feeder and weighing and recording the clinker output from the cement kiln with the use of a certified scale over a four- to twelve-hour period and an average calculated from those data. The current raw materials conversion factor shall be included with the semi-annual emissions report.

L. If a flow monitor is used in the determination of the pounds NO_x per ton of clinker produced by the cement kiln, then the flow monitoring system shall meet all the requirements specified in NO_x RACT Plan Appendix B - Amendment 2.

M. The data acquisition and handling system used in recording and reporting the necessary information required for the determination of compliance with the limit set for the pounds of NO_x per ton of clinker produced by the cement kiln shall meet all of the requirements specified in NO_x RACT Plan Appendix B - Amendment 2.

N. A monitoring plan shall be created and kept current for the system used to determine compliance with the pounds of NO_x per ton of clinker produced by the cement kiln limit. The most current version of the monitoring plan shall be submitted to the District and also be easily accessed by the monitoring system operation personnel.

II. Reporting and recordkeeping requirements

A. Kosmos shall keep records of all of the following information for each operating day and submit semi-annual reports that include the information required in item 12 and, if applicable, in items 4 to 10:

1. Calendar date,
2. The average hourly NO_x emission rates measured, expressed as pounds per ton of clinker produced by the cement kiln,
3. The 30-day average NO_x emission rates, expressed as pounds per ton clinker produced by the cement kiln, calculated at the end of each cement kiln operating day from the measured hourly nitrogen oxide emission rates for the preceding 30 cement kiln operating days. The average shall not include data recorded during periods of CEMS breakdowns, repairs, calibration checks, and zero and span adjustments,
4. Identification of the cement kiln operating days when the calculated rolling 30-day average NO_x emission rates are in excess of the NO_x emissions standard of the NO_x RACT Plan - Amendment 2. Kosmos shall submit excess emission reports for any excess emissions that occurred during the reporting period. This report shall include the magnitude of the excess emissions in pounds per ton of clinker produced and the date and time of the commencement and completion of each period of excess emissions as well as the nature and cause of each period of excess emissions and any corrective actions taken or preventive measures adopted,
5. Identification of the cement kiln operating days for which pollutant data have not been obtained, including reasons for not obtaining sufficient data and a description of corrective actions taken,
6. Identification of the times when emission data have been excluded from the calculation of average emission rates, the reasons for excluding data, and description of corrective action taken,
7. Identification of times when hourly averages have been obtained based on 40 CFR Part 60 Appendix A Method 7 or Method 7a,
8. Identification of times which the CEMS (including all monitors) was inoperative, including the date and time and the nature of the system repairs or adjustments except for zero and span checks,
9. Identification of the times when the pollutant concentration exceeded full span of the CEMS,
10. Description of any modifications to the CEMS that could affect the ability of the CEMS to comply with 40 CFR Part 60 Appendix B Performance Specification 2,
11. Results of daily CEMS drift tests and quarterly accuracy assessments as required under 40 CFR Part 60 Appendix F Procedure 1,
12. Results of the quarterly raw materials conversion factor testing, and

13. Clinker production rates used to determine the pounds of NO_x per ton of clinker produced by the cement kiln.

All semi-annual reports and Summary Reports shall be postmarked by the 60th day following the end of each semi-annual period.

B. Kosmos shall submit a Summary Report with every semi-annual report. The Summary Report shall be in the format given in 40 CFR §60.7 Figure 1.

C. All records required by this NO_x RACT Plan - Amendment 2 shall be maintained by Kosmos for a period of 5 years following the date of such record.

NO_x RACT Plan Appendix B - Amendment 2 Requirements for Flow Monitors and Additional Requirements for NO_x CEMS

I. Installation of the Flow Monitor

Install the flow monitor in a location that provides representative volumetric flow over all operating conditions. Such a location is one that provides an average velocity of the flue gas flow over the stack or duct cross section, provides a representative NO_x emission rate (in lb/ton of clinker produced by the cement kiln), and is representative of the pollutant concentration monitor location. Where the moisture content of the flue gas affects volumetric flow measurements, use the procedures in both Reference Methods 1 and 4 of 40 CFR Part 60 Appendix A to establish a proper location for the flow monitor. The District recommends (but does not require) performing a flow profile study following the procedures in 40 CFR Part 60 Appendix A Method 1 section 2.5 or 2.4 for each of the three operating or load levels indicated in section V.B. to determine the acceptability of the potential flow monitor location and to determine the number and location of flow sampling points required to obtain a representative flow value. The procedure in 40 CFR Part 60 Appendix A Test Method 1 section 2.5 may be used even if the flow measurement location is greater than or equal to 2 equivalent stack or duct diameters downstream or greater than or equal to ½ duct diameter upstream from a flow disturbance. If a flow profile study shows that cyclonic (or swirling) or stratified flow conditions exist at the potential flow monitor location that are likely to prevent the monitor from meeting the performance specifications of this Appendix, then the District recommends either (1) selecting another location where there is no cyclonic (or swirling) or stratified flow condition or (2) eliminating the cyclonic (or swirling) or stratified flow condition by straightening the flow, e.g., by installing straightening vanes. The District also recommends selecting flow monitor locations to minimize the effects of condensation, coating, erosion, or other conditions that could adversely affect flow monitor performance.

II. Acceptability of Monitor Location

If the flow monitor is installed in a location that does not satisfy these physical criteria, but nevertheless the monitor achieves the performance specifications of this Appendix, then the location is acceptable, notwithstanding the requirements of this Appendix.

Whenever Kosmos successfully demonstrates that modifications to the exhaust duct or stack (such as installation of straightening vanes, modifications of ductwork, and the like) are necessary for the flow monitor to meet the performance specifications, the District may approve an interim alternative flow monitoring methodology and an extension to the required certification date for the flow monitor.

Where no location exists that satisfies the physical siting criteria in the previous two paragraphs, where the results of flow profile studies performed at two or more alternative flow monitor locations are unacceptable, or where installation of a flow monitor in either the stack or the ducts is demonstrated to be technically infeasible, Kosmos may petition the District for an alternative method for monitoring flow.

III. Equipment Specifications

A. Instrument Span

To the extent practicable, measure at a range such that the majority of readings obtained during normal operation are between 25 and 75 percent of full-scale range of the instrument. Select the full-scale range of the flow monitor so that it can accurately measure all potential volumetric flow rates at the flow monitor installation site. For this purpose, determine the span value of the flow monitor using the following procedure:

Determine the MPV or maximum potential flow rate (MPF) in scfh (wet basis) from velocity traverse testing. Use the highest velocity measured at or near the maximum unit operating load. Calculate the MPV in units of wet standard fpm. Then, if necessary, convert the MPV to equivalent units of flow rate (e.g., scfh or kscfh) or differential pressure (inches of water), consistent with the measurement units used for the daily calibration error test to calculate the span value. Multiply the MPV (in equivalent units) by 125 percent, and round up the result to no less than 2 significant figures. Report the full-scale range setting, and calculations of the span value, MPV, and MPF to the District and include this information in the monitoring plan.

If conditions change such that the maximum potential velocity may change significantly, adjust the range to assure the continued accuracy of the flow monitor. Calculate an adjusted span using the procedures in this section. Select the full-scale range of the instrument to be greater than or equal to the adjusted span value. Record and report the new full-scale range setting, calculations of the span value, MPV, and MPF, and the adjusted span value to the District and include this information in the monitoring plan. Record and report the adjusted span and reference values as parts of the records for the calibration error test. Whenever the span value is adjusted, use reference values for the calibration error test based on the most recent adjusted span value.

Perform a calibration error test according to section III.B. whenever making a change to the flow monitor span or range. Recertification is required whenever making a significant change in the flow monitor's range that requires an internal modification to the monitor.

B. Design for Quality Control Testing

1. Design of the Flow Monitor

Design all the flow monitors to meet the applicable performance specifications.

2. Calibration Error Test

Design and equip each flow monitor to allow for a daily calibration error test consisting of at least two reference values: (1) Zero to 20 % of span or an equivalent reference value (e.g., pressure pulse or electronic signal) and (2) 50 to 70 % of span. Flow monitor response, both before and after any adjustment, must be recorded. Design each flow monitor to allow a daily calibration error test of (1) the entire flow monitoring system, from and including the probe tip (or equivalent) through and including the data acquisition and handling system, or (2) the flow monitoring system from and including the transducer through and including the data acquisition and handling system.

3. Interference Check

a. Design and equip each flow monitor with a means to ensure that the moisture expected to occur at the monitoring location does not interfere with the proper functioning of the flow monitoring system. Design and equip each flow monitor with a means to detect, on at least a daily basis, pluggage of each sample line and sensing port, and malfunction of each resistance temperature detector (RTD), transceiver, or equivalent.

b. Design and equip each differential pressure flow monitor to provide (1) an automatic, periodic back purging (simultaneously on both sides of the probe) or equivalent method of sufficient force and frequency to keep the probe and lines sufficiently free of obstructions on at least a daily basis to prevent velocity sensing interference, and (2) a means for detecting leaks in the system on at least a quarterly basis (manual check is acceptable).

c. Design and equip each thermal flow monitor with a means to ensure on at least a daily basis that the probe remains sufficiently clean to prevent velocity sensing interference.

d. Design and equip each ultrasonic flow monitor with a means to ensure on at least a daily basis that the transceivers remain sufficiently clean (e.g., backpurging system) to prevent velocity sensing interference.

IV. Performance Specifications

A. Calibration Error

The calibration error of flow monitors shall not exceed 3.0 % based upon the span of the instrument as calculated using Equation A-6 of 40 CFR Part 75 Appendix A.

B. Relative Accuracy for Flow

The relative accuracy of flow monitors shall not exceed 10.0 %. Where the average of the flow monitor measurements of gas velocity during one or more operating levels of the relative accuracy test audit is less than or equal to 10.0 fps, the mean value of the flow monitor velocity measurements shall not exceed ±2.0 fps of the reference method mean value in fps wherever the relative accuracy specification above is not achieved.

V. Certification Testing

A. Flow Monitor 7-day Calibration Error Test

Measure the calibration error of each flow monitor according to the following procedures:

1. Introduce the reference signal corresponding to the values specified in section III.B.2. to the probe tip (or equivalent) or to the transducer.
2. During the 7-day certification test period, conduct the calibration error test while the cement kiln is operating once each operating day (as close to 24-hour intervals as practicable). In the event that extended cement kiln outages occur after the commencement of the test, the 7 consecutive operating days need not be 7 consecutive calendar days.
3. Record the flow monitor responses by means of the data acquisition and handling system.
4. Calculate the calibration error using Equation A-6 of 40 CFR Part 75 Appendix A.
5. Do not perform any corrective maintenance, repair, or replacement upon the flow monitor during the 7-day certification test period other than that required for normal daily operation as specified by the monitor manufacturer or by the NO_x RACT Plan - Amendment 2.
6. Do not make adjustments between the zero and high reference level measurements on any day during the 7-day test.
7. If the flow monitor operates within the calibration error performance specification (i.e., less than or equal to 3 % error each day and requiring no corrective maintenance, repair, or replacement during the 7-day test period) the flow monitor passes the calibration error test portion of the certification test.
8. Record all maintenance activities and the magnitude of any adjustments.
9. Record output readings from the data acquisition and handling system before and after all adjustments.
10. Record and report all calibration error test results using the unadjusted flow rate measured in the calibration error test prior to resetting the calibration.
11. Record all adjustments made during the 7-day period at the time the adjustment is made and report them in the certification application.

B. Relative Accuracy

1. Perform relative accuracy test audits for the flow monitor at three different exhaust gas velocities, expressed in terms of percent of flow monitor span, or different operating levels. Select the operating levels as follows: (1) A frequently used low operating level selected within the range between the minimum safe and stable operating level and 50 % load, (2) a frequently used high operating level selected within the range between 80 % of the maximum operating level and the maximum operating level, and (3) the normal operating level.

2. If the normal operating level is within 10.0 % of the maximum operating level of either (1) or (2) above, use a level that is evenly spaced between the low and high operating levels used. The maximum operating level shall be equal to the design capacity less any physical or regulatory limitations or other deratings. Calculate flow monitor relative accuracy at each of the three operating levels. If a flow monitor fails the relative

accuracy test on any of the three levels of a three-level relative accuracy test audit, the three-level relative accuracy test audit shall be repeated.

3. If the kiln is normally operated at only one level, then it is acceptable to perform relative accuracy test audits at the normal operating level only.

C. Calculations

Using the data from the relative accuracy test audits, calculate relative accuracy in accordance with the procedures and equations specified in section VI.

D. Reference Method Measurement Location

Select a location for reference method measurements that is (1) accessible, (2) in the same proximity as the monitor or monitoring system location, and (3) meets the requirements of Method 1 (or 1A) in 40 CFR Part 60 Appendix A for volumetric flow, except as otherwise indicated in this section or as approved by the District.

E. Reference Method Traverse Point Selection

Select traverse points that (1) ensure acquisition of representative samples of flue gas flow rate over the flue cross section, and (2) meet the requirements of 40 CFR Part 60 Appendix A Method 1 (or 1A)(for volumetric flow).

F. Sampling Strategy

Conduct the reference method tests so they will yield results representative of the flue gas flow rate from the cement kiln and can be correlated with the flow monitor CEMS measurements. To properly correlate the volumetric flow rate data with the reference method data, mark the beginning and end of each reference method test run (including the exact time of day) on the individual chart recorder or other permanent recording device.

G. Correlation of Reference Method and Continuous Emission Monitoring System

1. Confirm that the monitor or monitoring system and reference method test results are on consistent moisture basis (e.g., since the flow monitor measures flow rate on a wet basis, Method 2 test results shall also be on a wet basis).
2. Compare flow-monitor and reference method results on an scfh basis. Also, consider the response times of the flow monitoring system to ensure comparison of simultaneous measurements.
3. For each relative accuracy test audit run, compare the measurements obtained from the monitor or continuous emission monitoring system against the corresponding reference method values. Tabulate the paired data in a table such as the one shown in Figure 2 of 40 CFR Part 75 Appendix A.

H. Number of Reference Method Tests

Perform a minimum of 9 sets of paired monitor (or monitoring system) and reference method test data for every required relative accuracy test. For the certification and annual quality assurance relative accuracy test audits for flow monitors, perform a minimum of 9 sets at each operating level as specified in section V.B. Conduct each set within a period of 30 to 60 minutes.

Note: The tester may choose to perform more than 9 sets of reference method tests. If this option is chosen, the tester may reject a maximum of 3 sets of the test results as long as the total number of test results used to determine the relative accuracy or bias is greater than or equal to 9. Report all data, including the rejected data, and reference method test results.

I. Reference Methods

The following methods from 40 CFR Part 60 Appendix or their approved alternatives are the reference methods for performing relative accuracy test audits: Method 1 or 1A for siting; Method 2 (or 2A, 2C, or 2D) for velocity , and Method 4 for moisture.

VI. Calculations

A. Flow Monitor Calibration Error

For each reference value, calculate the percentage calibration error based upon span using the equation A-6 as given in 40 CFR Part 75 Appendix A.

B. Relative Accuracy for Flow Monitors

Analyze the relative accuracy test audit data from the reference method test for flow monitors using the following procedures:

1. Summarize the results on a data sheet. An example is shown in Figure 3 of 40 CFR Part 75 Appendix A.
2. Calculate the mean of the monitor or monitoring system measurement values.
3. Calculate the mean of the reference method values.
4. Using data from the source CEMS, calculate the arithmetic differences between the reference method and monitor measurement data sets.
5. Calculate the arithmetic mean of the difference, the standard deviation, the confidence coefficient, and the monitor or monitoring system relative accuracy using the procedures and equations found in 40 CFR Part 75 Appendix A as is specified in the following sections.

C. Arithmetic Mean

Calculate the arithmetic mean of the differences using equation A-7 as given in 40 CFR Part 75 Appendix A.

D. Standard Deviation

Calculate the standard deviation of a data set using equation A-8 as given in 40 CFR Part 75 Appendix A.

E. Confidence Coefficient

Calculate the confidence coefficient using equation A-9 as given in 40 CFR Part 75 Appendix A.

F. Relative Accuracy

Calculate the relative accuracy of a data set using equation A-10 as given in 40 CFR Part 75 Appendix A.

VII. Quality Assurance and Quality Control

A. Calibration Error Test

Perform the daily calibration error test of each flow monitoring system according to the procedure in this section.

1. Perform the daily calibration error tests on each scale that has been used since the previous calibration error test. For example, if the flow has not exceeded the low scale value (based on the maximum expected concentration) since the previous calibration error test, the calibration error test may be performed on the low scale only. If, however, the flow has exceeded the low scale span value for one hour or longer since the previous calibration error test, perform the calibration error test on both the low and high scales.
2. All daily calibration error tests shall be performed while the unit is in operation at normal, stable conditions (i.e. "on-line").

B. Daily Flow Interference Check

Perform the daily flow monitor interference checks specified in section III.B.3. while the unit is in operation at normal, stable conditions.

C. Recalibration

The District recommends adjusting the calibration, at a minimum, whenever the daily calibration error exceeds the limits of the applicable performance specification for the flow monitor in section IV.

D. Out-of-Control Period

1. An out-of-control period occurs when the calibration error of a flow monitor exceeds 6.0 % based upon the span value, which is twice the applicable specification of this section. The out-of-control period begins with the hour of completion of the failed calibration error test and ends with the hour of completion following an effective recalibration. Whenever the failed calibration, corrective action, and effective recalibration occur within the same hour, the hour is not out of control if 2 or more valid readings are obtained during that hour.
2. An out-of-control period also occurs whenever interference of a flow monitor is identified. The out-of-control period begins with the hour of completion of the failed interference check and ends with the hour of completion of an interference check that is

passed.

E. Quality Assurance of Data With Respect to Daily Assessments
When a monitoring system passes a daily assessment (i.e., daily calibration error test or daily flow interference check), data from that monitoring system are prospectively validated for 26 clock hours (i.e., 24 hours plus a 2-hour grace period) beginning with the hour in which the test is passed, unless another assessment (i.e. a daily calibration error test, an interference check of a flow monitor, or a relative accuracy test audit) is failed within the 26-hour period.

F. Data Invalidation with Respect to Daily Assessments
Data from a monitoring system are invalid beginning with the first hour following the expiration of a 26-hour data validation period.

G. Daily Assessment Start-Up Grace Period
For the purpose of quality assuring data with respect to a daily assessment (i.e. a daily flow interference check), a start-up grace period may apply when a unit begins to operate after a period of non-operation. The start-up grace period for a daily calibration error test is independent of the start-up grace period for a daily flow interference check. To qualify for a start-up grace period for a daily assessment, there are two requirements:

1. The unit must have resumed operation after being in outage for 1 or more hours (i.e., the unit must be in a start-up condition) as evidenced by a change in unit operating time from zero in one clock hour to an operating time greater than zero in the next clock hour, and
2. For the monitoring system to be used to validate data during the grace period, the previous daily assessment of the same kind must have been passed on-line within 26 clock hours prior to the last hour in which the unit operated before the outage. In addition, the monitoring system must be in-control with respect to quarterly and semi-annual or annual assessments.

If both of the above conditions are met, then a start-up grace period of up to 8 clock hours applies, beginning with the first hour of unit operation following the outage. During the start-up grace period, data generated by the monitoring system are considered quality-assured. For each monitoring system, a start-up grace period for a calibration error test or flow interference check ends when either: (1) a daily assessment of the same kind (i.e., calibration error test or flow interference check) is performed, or (2) 8 clock hours have elapsed (starting with the first hour of unit operation following the outage), whichever occurs first.

H. Data Recording
Record and tabulate all calibration error test data according to month, day, clock-hour, and magnitude in scfh. Program monitors that automatically adjust data to the corrected calibration values (e.g., microprocessor control) to record either: (1) the unadjusted flow rate measured in the calibration error test prior to resetting the calibration, or (2) the magnitude of any adjustment. Record the following applicable flow monitor interference check data: (1) sample line/sensing port pluggage, and (2) malfunction of each RTD, transceiver, or

equivalent.

VIII. Quarterly Assessments

For a differential pressure flow monitor or flow monitoring system, perform a leak check of all sample lines (a manual check is acceptable) during each unit operating quarter. This requirement is effective as of the calendar quarter following the calendar quarter in which the flow monitor or flow emission monitoring system is provisionally certified.

IX. Annual Assessments

For the flow monitor, perform the relative accuracy test audit (RATA) assessment once annually (within four calendar quarters) after the calendar quarter in which the monitor or monitoring system was last tested, as specified below for the type of test and the performance achieved. This requirement is effective as of the calendar quarter following the calendar quarter in which the monitor or continuous monitoring system is provisionally certified.

A. Relative Accuracy Test Audit (RATA)

Perform relative accuracy test audits annually and, to the extent practicable, no less than 4 months apart for the flow monitor. The three-level audit shall be performed at the three different operating or load levels specified in V.B.

B. Out-of-Control Period

An out-of-control period occurs under any of the following condition : the relative accuracy of a flow monitor exceeds 10.0 %, for low flow situations (£10.0 fps) or the flow monitor mean value (if applicable) exceeds ±2.0 fps of the reference method mean whenever the relative accuracy is greater than 15.0 %. For a flow relative accuracy test audit at 3 operating levels, the out-of-control period begins with the hour of completion of the first failed relative accuracy test audit at any of the three operating levels, and ends with the hour of completion of a satisfactory three-level relative accuracy test audit.

X. Other Audits

Affected units may be subject to relative accuracy test audits at any time. If a monitor or continuous emission monitoring system fails the relative accuracy test during the audit, the monitor or continuous emission monitoring system shall be considered to be out-of-control beginning with the date and time of completion of the audit, and continuing until a successful audit test is completed following corrective action.

XI. Span Determination for the NO_x Monitor

A. To the extent practicable, measure the NO_x emissions at a range such that the majority of readings obtained during normal operation are between 25 and 75 % of full-scale range of the instrument.

B. Maximum Potential Concentration

1. The monitor must be capable of accurately measuring up to 125 % of the maximum potential concentration (MPC) as determined below in this section. To determine the maximum potential concentration, Kosmos may use NO_x emission test results or historical fully quality assured CEMS data over the previous 30 unit operating days. Multiply the MPC by 125 % and round up to the nearest multiple of 100 ppm to determine the span value. The span value shall be used to determine the concentrations of the calibration gases.
2. Report the full-scale range setting and calculations of the MPC, maximum potential NO_x emission rate, and span to the District and record them in the monitoring plan. Select the full-scale range of the instrument to be consistent with section XI.A., and to be greater than or equal to the span value. This selected monitor range with a span rounded up from 125 % of the maximum potential concentration shall be the "high scale" of the NO_x pollutant concentration monitor.
3. If NO_x emission testing is used to determine the maximum potential NO_x concentration, use the following guidelines:
   a. Use Method 7E from 40 CFR Part 60 Appendix A to measure total NO_x concentration.
   b. Operate the unit at the minimum safe and stable production level, the normal production level, and the maximum production level. If the normal load and maximum load are identical, an intermediate level need not be tested.
   c. Operate at the highest excess O_2 level expected under normal operating conditions.
   d. Make at least 3 runs with 3 traverse points of at least 20 minutes duration at each operating condition.
   e. Select the highest NO_x concentration from all measured values as the maximum potential concentration for NO_x. If historical CEM data are used to determine the MPC, the data must represent various operating conditions, including the minimum safe and stable production level, normal production level, and production level load.
   f. Calculate the MPC and span using the highest hourly NO_x concentration in ppm.

C. Maximum Expected Concentration

1. If the majority of NO_x concentrations are expected to be less than 25 % of the full-scale range of the instrument selected under section XI.B., use a "low scale" measurement range.
2. Calculate the span for the additional (lower) range by multiplying the maximum expected concentration by 125 % and by rounding up the resultant concentration to the nearest multiple of 10 ppm. The span value of this additional (lower) range shall also be used to determine the concentrations of the calibration gases.
3. Include the full-scale range setting and calculations of the MEC and span and report these to the District and record them in the monitoring plan.
4. Select the full scale range of the instrument to be consistent with section XI.A., and to be

greater or equal to the lower range span value. This selected monitor range with a span rounded up from 125 % of the maximum expected concentration is the "low scale" of NO_x pollutant concentration monitors.

D. Auto-ranging monitors

For monitors that can continuously and automatically adjust their range of measurement, the monitor shall be capable at any time of accurately measuring up to 125 % of the maximum potential concentration as defined in section XI.B. Define the span value for an auto-ranging monitor as 125 % of the maximum potential concentration and 125 % of the maximum expected concentration if a second span is determined to be necessary under section XI.C. Determine concentrations of the calibration gases based upon the span value.

E. Adjustment of Span

1. Whenever the fuel supply, emission controls, or other process parameters change such that the maximum expected concentration or the maximum potential concentration may change significantly, adjust the NO_x pollutant concentration span and monitor range to assure the continued accuracy of the monitoring system. Determine the adjusted span value using the procedures in sections XI.B. or XI.C. Select the new full scale range of the instrument to be greater than or equal to the adjusted span value and to be consistent with the guidelines of section XI.A.
2. Record and report the new full-scale range setting, calculations of the span value, MPC, and MEC (if appropriate), maximum potential NO_x emission rate and the adjusted span value to the District and record them in the monitoring plan. In addition, record and report the adjusted span as part of the records for the daily calibration error test and linearity check.
3. Whenever the span value is adjusted, use calibration gas concentrations based on the most recent adjusted span value. Perform a cylinder gas audit (CGA) according to 40 CFR Part 60 Appendix F whenever making a change to the monitor span or range. Recertification is required whenever a significant change is made in the monitor's range that requires an internal modification to the monitor (e.g., a change of measurement cell length).

XII. Data Acquisition and Handling Systems

Automated data acquisition and handling systems shall meet the following requirements:

A. Read and record the full range of potential NO_x emission concentrations and volumetric flow from zero through span, raw materials input rates to the cement kiln, and flow (if used),

B. Provide a continuous, permanent record of all measurements and required information as an ASCII flat file capable of transmission via an IBM-compatible personal computer diskette or other electronic media,

C. Interpret and convert the individual output signals from a flow monitor (if used) and a NO_x CEMS to produce a continuous readout of pollutant mass emission rates in the units of pounds NO_x per ton of clinker produced by the cement kiln,

D. Calculate and record intermediate values necessary to obtain emissions rates such as NO_x concentration, raw materials input to the cement kiln, and flow (if used), and

E. Calculate and record emissions in units of the standard (pounds NO_x per ton of clinker produced by the cement kiln).

XIII. Data Preparation

If the NO_x concentration is in ppm, multiply it by 1.194×10^{-7} (lb/dscf)/ppm to convert it to units of lb/dscf. If the NO_x concentration is in mg/dscm, multiply it by 6.24×10^{-8} (lb/dscf)/(mg/dscm) to convert it to lb/dscf. Then, use the appropriate gas flow rate and clinker production rate to calculate the emissions in terms of pounds NO_x per ton of clinker produced by multiplying lb/dscf by the appropriate dscf and dividing by the appropriate tons of clinker production rate from the cement kiln.

XIV. NO_x Emission Rate (Monitoring System)

For each test run in a data set, calculate the average NO_x emission rate (in lb per ton of clinker produced), by means of the data acquisition and handling system, during the time period of the test run. Tabulate the results as shown in 40 CFR Part 75 Appendix A Figure 4 (replace lb/mmBtu with lb/tons of clinker produced by the cement kiln).

XV. Relative Accuracy

Use the equations and procedures in 40 CFR Part 60 Appendix B Specification 2 to calculate the relative accuracy for the NO_x CEMS. In using Equation 2-1, "d" is, for each run, the difference between the NO_x emission rate values (in lb per ton of clinker produced by the cement kiln) obtained from the reference method data and the NO_x CEMS.

XVI. Quality Assurance and Quality Control Procedures

A. Quality Control Program

Develop and implement a quality control program for the continuous emission monitoring systems and their components. As a minimum, include in each quality control program a written plan that describes in detail complete, step-by-step procedures and operations for each of the following activities:

1. Calibration Error Test and Linearity Check Procedures. Identify calibration error test and linearity check procedures specific to the CEMS that may require variance from the procedures in this NO_x RACT Plan - Amendment 2.
2. Calibration and Linearity Adjustments. Explain how each component of the CEMS will be adjusted to provide correct responses to calibration gases, reference values, and/or indications of interference both initially and after repairs or corrective action. Identify equations, conversion factors, assumed moisture content, and other factors affecting calibration of each CEMS.

3. Preventive Maintenance. Keep a written record of procedures, including those specified by the manufacturers, needed to maintain the CEMS in proper operating condition and a schedule for those procedures. Include provisions for maintaining an inventory of spare parts.
4. Audit Procedures. Keep a written record of procedures and details peculiar to the installed CEMS that are to be used for relative accuracy test audits, such as sampling and analysis methods.
5. Recordkeeping and Reporting. Keep a written record describing procedures that will be used to implement the recordkeeping and reporting requirements.