AP32 Section:	12.5.1
Background Chapter	3
Reference:	27
Title:	Gaseous Emission Compliance Study. Performed for Beta Steel Corporation at the Steel Reheat Furnace Stack. Portage, IN. January 21, 1993. Project No. 30317.

MOSTARDI-PLATT ASSOCIATES, INC.
Environmental Consultants

GASEOUS EMISSION COMPLIANCE STUDY
PERFORMED FOR
BETA STEEL CORPORATION
AT THE
STEEL REHEAT FURNACE STACK
PORTAGE, INDIANA
JANUARY 21, 1993

PROJECT NO: 30317
DATE SUBMITTED: FEBRUARY 12, 1993

GASEOUS EMISSION COMPLIANCE STUDY
Performed For
BETA STEEL CORPORATION
At The
Steel Reheat Furnace Stack
Portage, Indiana
January 21, 1993

1.0 INTRODUCTION

A gaseous emission compliance test program was performed by MOSTARDI-PLATT ASSOCIATES, INC. (MPA) on the Steel Reheat Furnace Stack at the Portage, Indiana plant of Beta Steel Corporation in Portage, Indiana on January 21, 1993. The tests were authorized by and performed Beta Steel Corporation.

The purpose of this test program was to determine oxides of nitrogen (NO_x) emission rates during full load operating conditions with tests performed at the Steel Reheat Furnace Stack.

The tests were conducted by Messrs. S. Burton and E. Peterson of MPA. Mr. George Halkias, P.E. of Beta Steel Corporation provided assistance and coordinated plant operating conditions during the test program. Mr. Almer Casile of the Indiana Department of Environmental Management (IDEM) observed the tests.

2.0 SUMMARY OF RESULTS

The NO_x emissions averaged 0.0946 pounds per million Btu at an average production throughput of 139.48 tons per hour. A complete test results summary can be found on page 5.

3.0 DISCUSSION OF RESULTS

Three (3) one-hour gaseous tests were run on Steel Reheat Furnace Stack. Each test consisted of simultaneous NO_x and O_2 measurements. The percent O_2 and a standard f-factor of 8710 dscf/million Btu for the natural gas fired was used to calculate NO_x emissions on a pounds per million Btu basis.

No problems were encountered with the testing equipment during the course of the test program. Source operation appeared normal during the entire test program.

4.0 TEST PROCEDURES

All testing, sampling, analytical and calibration procedures used for this test program were performed as described in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 3A and 7E, and the latest revisions thereof. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, EPA 600/4-77-027b was used to determine the precise procedures. Testing was also done in compliance with IDEM procedures and the previously submitted test protocol.

4.1 O_2 Determination

An oxygen (O_2) analyzer was utilized to determine O_2 concentrations in the stack gas in accordance with Method 3A. This instrument has a paramagnetic based detector and operates in the range of 0-25% O_2. Prior to testing the O_2 analyzer was calibrated using a high range, low range, and zero calibration gases. The low range and zero calibrations were checked after each test run.

4.2 Nitrogen Oxide Determination

Method 7E was used for determining nitrogen oxides (NO_x) emissions from the test location. A gas sample was continuously extracted from the gas stream through a heated sampling probe and a gas conditioning system to remove moisture. A portion of the sample stream was conveyed via a sampling line to gas analyzers for determination of NO_x content. Prior to emissions sampling, the NO/NO_x analyzer was zeroed and calibrated. High-range, mid-range and zero gases were introduced into the NO_x sampling system.

The sample gas manifold was then adjusted for emissions sampling. In the course of the testing, the zeroes were checked and mid-range NO_x gas was introduced into the sampling system to check calibration.

The chemiluminescent reaction of NO and O_3 provides the basis for this instrument operation. Specifically:

$$NO + O_3 \text{---} > NO_2 + O_2 + h_v.$$

reaction chamber. The resulting chemiluminescence was monitored through an optical filter by a high-sensitivity photomultiplier positioned at one end of the chamber. The filter/photomultiplier combination responds to light in a narrow-wavelength band unique to the above reaction (hence, no interference). The output from the photomultiplier is linearly proportional to the NO concentration.

To measure NO_x concentrations (i.e., NO plus NO_2), the sample gas flow was diverted through a NO_2-to-NO converter. The chemiluminescent response in the reaction chamber to the converted effluent is linearly proportional to the NO_x concentration entering the converter. The instrument was operated in the NO_x mode during all tests and calibrations.

Calculations were performed by computer and an explanation of the nomenclature and calculations along with the complete test results are appended. Also appended are the calibration data and copies of the raw field data sheets.

Raw data are kept on file at the MPA offices in Elmhurst, Illinois. All samples from this test program (not already used in analysis) will be retained for 60 days after the submittal of the report, after which they will be discarded unless MPA is advised otherwise.

5.0 QUALITY ASSURANCE PROCEDURES

MPA recognizes the previously described reference methods to be very technique oriented and attempts to minimize all factors which can increase error by implementing its Quality Assurance Program into every segment of its testing activities.

Calibration gases were either Protocol One standard gases or certified standard gases which had been verified in accordance with alternative Number 2, Section 6.1.2 of Method 6C, 40CFR60.

7.0 TEST RESULT SUMMARY

Beta Steel Corporation
Steel Reheat Furnace Stack
January 21, 1993

Test No.	Time	NO_x ppm	O_2 %	NO_x Emission lbs/10^6 Btu	Production tons/hr
1	0925-1025	59.4	7.25	0.0946	139.56
2	1040-1140	59.6	7.18	0.0944	140.60
3	1155-1255	57.6	7.69	0.0948	138.59
Average		58.9	7.37	0.0946	139.48

F_d = 8710 for Natural Gas

BETA STEEL CORP.

JANUARY 21, 1993

SLABS DISCHARGED FROM FURNACE
BETWEEN 9:25 A.M. & 10:25 A.M.

HEAT #	SLAB #	WEIGHT (KG)
2449449	21	15870
2450012	161	16140
2428655	71	15890
2448668	111	15300
2449188	141	15830
2449188	111	15650
2449508	151	16250
2449508	121	15940
		126870

TOTAL OF 139.56 N.T.

SLABS DISCHARGED FROM FURNACE
BETWEEN 10:40 A.M. & 11:40 A.M.

HEAT #	SLAB #	WEIGHT (KG)
2450012	151	16010
2448945	81	16370
2449667	51	15600
2449667	71	15840
2449508	111	16210
2449016	71	15780
2449162	51	16280
2450083	31	15730
		127820

TOTAL OF 140.60 N.T.

BETA STEEL CORP: 6600 U.S. Highway 12 Portage, Indiana 46368 Telephone (219) 787-8200 Facsimile (219) 787-8725
EXECUTIVE OFFICES: 1040 Second Avenue, New York, N.Y. 10022 Telephone (212) 319-9440 Facsimile (212) 826-3276

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SLABS DISCHARGED FROM FURNACE BETWEEN 11:55 A.M. & 12:55 P.M.

HEAT #	SLAB #	WEIGHT (KG)
2450197	21	15500
1435504	51	16250
2449797	81	15430
1435591	31	15380
2449553	61	16190
1435012	81	15430
1436239	81	15840
1435344	71	15970
		125990

TOTAL OF 138.59 N.T.

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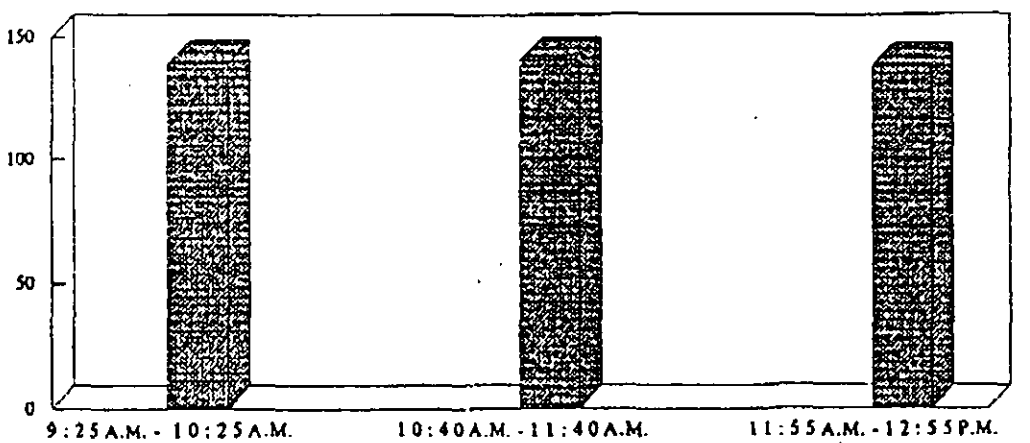
FURNACE HOURLY PERFORMANCE

TIME INTERVAL	FURNACE PRODUCTION IN N.T. / HOUR
9:25 A.M. - 10:25 A.M.	139.56
10:40 A.M. - 11:40 A.M.	140.6
11:55 A.M. - 12:55 P.M.	138.59

FURNACE PRODUCTION

3-HOUR INTERVAL



BETA STEEL'S ENGINEERING DEPT.
JANUARY 21, 1993

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