AP32 Section:	12.5.1
Background Chapter	3
Reference:	30
Title:	Source Emissions Test. Performed for Beta Steel Corporation, Portage, IN. Melt Shop Facility Baghouse Inlet, Slag Pit and Baghouse Outlet, Portage, IN. September 24-25, 2001. G/SA Project No. 01-T-141. Prepared for: Mr. Joe Gazarkiewicz, Beta Steel Corporation, Portage, IN.

G/SA

GUENTHER / SHACKELFORD ASSOCIATES

ENVIRONMENTAL CONSULTANTS & TESTING CONTRACTORS

SOURCE EMISSIONS TEST

PERFORMED FOR
BETA STEEL CORPORATION
PORTAGE, INDIANA

MELT SHOP FACILITY BAGHOUSE INLET, SLAG PIT AND BAGHOUSE OUTLET

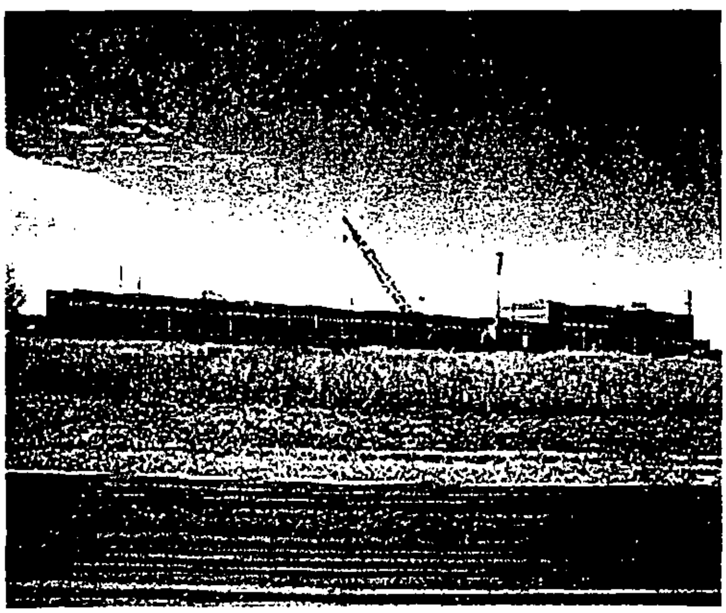
PORTAGE, INDIANA

EPA METHODS 1, 2, 3A, 4, 6C, AND MODIFIED 6C

SEPTEMBER 24 AND 25, 2001
G/SA PROJECT NO. 01-T-141

Prepared for:

Mr. Joe Gazarkiewicz
BETA Steel Corporation
6500 South Boundary Road
Portage, IN 46368



BETA STEEL CORP.

INVESTIGATIVE TEST REPORT

SOURCE EMISSIONS COMPLIANCE TESTING
EPA Methods 1, 2, 3, 3A, 4, *6C and Modified 6C*
Performed at the
Meltshop Facility
on the
Baghouse Inlet, Slag Pit and Baghouse Outlet
at
Beta Steel Corporation
Portage, Indiana

September 24 and 25, 2001

Project No. 01-T-141

1.0 INTRODUCTION

This report presents the results of the source emissions investigative testing conducted by Guenther/Shackelford Associates (G/SA) for Beta Steel Corporation (Beta Steel), in Portage, Indiana.

The primary purpose of this testing program was to perform continuous emissions monitoring (CEM) to determine sulfur dioxide (SO_2) concentrations from the inlet and outlet gas streams of the baghouse serving the Meltshop and associated equipment at Beta Steel's hot rolled, coil steel operation to establish SO_2 emission contributions and aggregate values as required by Region V of the U.S. Environmental Protection Agency (EPA) for steel plants utilizing an electric arc furnace (EAF). Also, to conduct gaseous emissions monitoring to determine concentrations of SO_2 given off by the EAF Slag Pit.

G/SA's responsibility was to conduct, under the witness of the Indiana Department of

Environmental Management (IDEM) as EPA, Region V, representative, and analyze the instrument monitoring of SO_2, and perform data reduction for emission concentrations evaluation. Beta Steel's responsibility was to maintain process operating parameters and to provide process operating data per investigative test requirements.

The following report provides information pertaining to Beta Steel's process operations, emissions testing and analytical results.

The emissions testing conducted at the Meltshop facility was performed on Monday, September 24, 2001 from 12:57 P.M. to 07:11 P.M. and Tuesday, September 25, 2001 from 09:00 A.M. to 04:28 P.M.

The following requirements were specific for the testing program:

1. Equipment calibrations performed and calibration data provided.
2. Three (3), consecutive, one (1)-hour, minimum, SO_2 emissions test runs performed, simultaneously, at the EAF Before Slag Quenching (BSQ) and Slag Quenching Alone (SQA) sampling locations at the Baghouse Inlet, the Slag Pit and the Baghouse Outlet (Exhaust Stack), which shall include complete, individual process heat cycles per test run.
3. Process manufacturing capacities and control devices maintained at required operating conditions, and production rates recorded during the emissions testing periods.

4. All testing and analysis performed in accordance with current EPA test methodologies and analytical procedures for SO_2 emissions determinations.

The emissions testing program was supervised by G/SA, whose headquarters is in Crown Point, Indiana. G/SA also performed EPA Methods 1, 2, 4 and Modified 6C emissions testing at the Meltshop SQA, Slag Pit and Exhaust Stack sampling locations, the overall emissions data review and prepared, in part, the final report. EPA Methods 1, 2 and 4 emissions testing conducted at the Meltshop BSQ sampling location was performed by G/SA's affiliate, Source Assessment Technologies, LLC (S.A.T.), whose headquarters is in Wheatland, Missouri. S.A.T. also performed EPA Method 3 testing for carbon dioxide (CO_2) and oxygen (O_2) content at the SQA sampling location, Methods 1, 2 and 4 pretest and post-test equipment calibrations, the SO_2 data reduction and, in part, the final report preparation. EPA Method 6C CEM testing for SO_2 emissions, and Method 3A CEM testing for CO_2 and O_2 content at the BSQ and Exhaust Stack sampling locations was performed by G/SA's subcontractor, Grace Consulting, Inc. (GCI), whose headquarters is in Wellington, Ohio.

The emissions testing was performed in accordance with EPA Reference Methods 1, 2, 3, 3A, 5 (PM) and 6C (SO_2), Title 40, Part 60, Appendix A of the U.S. Code of Federal Regulations (40 CFR 60).

The testing program was approved by and/or coordinated with the following personnel:

Joe Gazarkiwicz, Manager Environmental Services, Beta Steel

Mike King, Pulpit Operator, Beta Steel

Berto Guerra, Pulpit Operator, Beta Steel

The emissions testing was performed by the following personnel:

Fred Guenther, Test Supervisor, G/SA

Terry Shackelford, Senior Test Engineer, G/SA (S.A.T.)

Amir Beheshti, Test Engineer, G/SA

Brandon Peyton, Senior Test Technician, G/SA

Gerri Gonzalez, Test Technician, G\SA

Paul Fabian, Test Technician, G\SA

Carl Vineyard, Senior Test Engineer, GCI

Hal Stiles, Senior Test Engineer, GCI

Kurt Kinter, Senior Test Technician, GCI

Pete Pitrone, Test Technician, GCI

The emissions testing was observed by the following personnel:

Steve Friend, Environmental Scientist, Air Compliance Section, IDEM

2.0 TEST RESULTS SUMMARY

The source emissions testing was performed utilizing EPA Methods 1, 2, 3, 3A, 5, 6C, and Modified 6C at the Meltshop Baghouse Inlet, Slag Pit and Baghouse Outlet (Exhaust Stack) sampling locations. A summary of the test results is given below:

SAMPLING LOCATION	RUN NO.	SO_2 (Lb/DSCF)
Meltshop	1	1.20E-06
Before Slag Quenching	2	1.01E-06
Baghouse Inlet	3	9.25E-07
	Avg.	1.05E-06

SAMPLING LOCATION	RUN NO.	SO_2 (Lb/DSCF)
Meltshop	1	1.53E-07
Slag Quenching Alone	2	9.98E-08
Baghouse Inlet	3	8.15E-08
	Avg.	1.11E-07

SAMPLING LOCATION	RUN NO.	SO_2 (Lb/DSCF)
Meltshop	1	3.33E-08
Electric Arc Furnace	2	1.66E-09
Slag Pit	3	6.65E-08
	Avg.	3.38E-08

SAMPLING LOCATION	RUN NO.	SO_2 (Lb/DSCF)
Meltshop	1	1.28E-06
Electric Arc Furnace	2	7.70E-07
Baghouse Outlet	3	9.11E-07
	Avg.	9.86E-07

A complete list of test parameters for each Method 6C (SO_2) and Modified Method 6C (SO_2) emissions test run performed at the sampling locations can be found in Tables 1 through 4.

Sample calculations and examples of the equations used to generate the test results can be found in Appendix E.

TABLES

G/SA .... ENVIRONMENTAL TESTING CONSULTANTS
P.O. Box 807, Crown Point, IN 46307 TEL (219) 663-5394 / FAX (219) 662-7037

TABLE 1
EPA METHOD 6C
SULFUR DIOXIDE EMISSIONS TEST RESULTS

CLIENT: BETA STEEL CORPORATION — PROJECT NO.: 01-T-141
SOURCE TESTED: MELTSHOP - BEFORE SLAG QUENCHING — DATA INPUT BY: TLS

INPUT DATA

Run Number	1	2	3
Date	24-Sep-01	24-Sep-01	24-Sep-01
Sampling Location	**Baghouse Inlet**	**Baghouse Inlet**	**Baghouse Inlet**
Test Time, Start-Stop (24 Hour)	1257-1356	1526-1625	1812-1911
Sampling Time (Minutes)	60	60	60
Average Process Weight Rate (TPH)	**108.6**	**87.5**	**118.2**
Stack Area (Ft^2)	196.900	196.900	196.900
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.989	0.989	0.989
Barometric Pressure (In. Hg)	29.62	29.62	29.62
Static Pressure (In. H2O)	-4.02	-4.23	-4.08
Dry Gas Meter Sample Volume (DCF)	22.326	22.403	22.358
Average Dry Gas Meter Temperature (°F)	57.7	58.2	59.8
Average Orifice Meter Delta H (In. H2O)	1.650	1.650	1.650
Volume Condensate Collected (Ml)	8.8	8.9	7.4
Average CO2 Concentration (%)	0.2	0.3	0.4
Average O2 Concentration (%)	21.2	21.0	20.9
Average Square Root of Delta P (In. H2O½)	1.351	1.171	1.207
Average Stack Gas Temperature (°F)	112.2	188.8	130.5
Average Corrected SO2 Concentration (PPMV)	**7.21**	**6.10**	**5.56**

CALCULATED DATA

Absolute Pressure (In. Hg)	29.32	29.31	29.32
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	22.390	22.446	22.329
Water Vapor Volume at Standard Conditions (SCF)	0.414	0.419	0.348
Moisture Fraction (Unitless)	0.018	0.018	0.015
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.88	28.89	28.90
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.68	28.69	28.73
Stack Gas Velocity (FPS)	80.0	73.9	72.5
Stack Gas Flow Rate at Actual Conditions (ACFM)	945,120	873,055	856,515
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	839,381	683,601	739,367
SO2 Emission Concentration (Gr/DSCF)	0.0084	0.0071	0.0065
SO2 Emission Concentration (Lb/DSCF)	1.20E-06	1.01E-06	9.25E-07
SO2 Emission Rate (Lb/Hr)	60.39	41.61	41.02
SO2 Emission Concentration (Lb/TPW)	0.556	0.476 TPH	0.347
	108.6 TPH	87.5	118.2 T

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	891,563
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	754,116
Average SO2 Emission Concentration (Gr/DSCF)	0.0073
Average SO2 Emission Concentration (Lb/DSCF)	1.05E-06
Average SO2 Emission Rate (Lb/Hr)	47.67
Average SO2 Emission Concentration (Lb/TPW)	0.460

Signature of Reviewer: Fred H. Guentter

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TABLE 2
EPA METHOD 6C
SULFUR DIOXIDE EMISSIONS TEST RESULTS

CLIENT: BETA STEEL CORPORATION — PROJECT NO.: 01-T-141
SOURCE TESTED: MELTSHOP - SLAG QUENCHING ALONE — DATA INPUT BY: TLS

INPUT DATA

Run Number	1	2	3
Date	24-Sep-01	24-Sep-01	24-Sep-01
Sampling Location	**Baghouse Inlet**	**Baghouse Inlet**	**Baghouse Inlet**
Test Time, Start-Stop (24 Hour)	1257-1356	1526-1625	1812-1911
Sampling Time (Minutes)	60	60	60
Average Process Weight Rate (TPH)	**108.6**	**87.5**	**118.2**
Stack Area (Ft^2)	38.490	38.490	38.490
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	1.000	1.000	1.000
Barometric Pressure (In. Hg)	29.52	29.52	29.52
Static Pressure (In. H2O)	-4.30	-3.80	-3.80
Dry Gas Meter Sample Volume (DCF)	22.980	22.796	22.765
Average Dry Gas Meter Temperature (°F)	59.0	56.0	56.0
Average Orifice Meter Delta H (In. H2O)	1.980	1.980	1.980
Volume Condensate Collected (Ml)	5.8	7.7	6.8
Average CO2 Concentration (%)	0.3	0.4	0.3
Average O2 Concentration (%)	20.8	20.9	21.0
Average Square Root of Delta P (In. H2O½)	0.226	1.346	1.479
Average Stack Gas Temperature (°F)	100.7	79.8	79.2
Average Corrected SO2 Concentration (PPMV)	**0.92**	**0.60**	**0.49**

CALCULATED DATA

Absolute Pressure (In. Hg)	29.20	29.24	29.24
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	23.184	23.132	23.100
Water Vapor Volume at Standard Conditions (SCF)	0.273	0.362	0.320
Moisture Fraction (Unitless)	0.012	0.015	0.014
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.88	28.90	28.89
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.75	28.73	28.74
Stack Gas Velocity (FPS)	13.2	77.5	85.1
Stack Gas Flow Rate at Actual Conditions (ACFM)	30,484	178,979	196,530
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	27,684	168,549	185,472
SO2 Emission Concentration (Gr/DSCF)	0.0011	0.0007	0.0006
SO2 Emission Concentration (Lb/DSCF)	1.53E-07	9.98E-08	8.15E-08
SO2 Emission Rate (Lb/Hr)	0.25	1.01	0.91
SO2 Emission Concentration (Lb/TPW)	0.002	0.012	0.008

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	**135,331**
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	**127,235**
Average SO2 Emission Concentration (Gr/DSCF)	**0.0008**
Average SO2 Emission Concentration (Lb/DSCF)	**1.11E-07**
Average SO2 Emission Rate (Lb/Hr)	**0.72**
Average SO2 Emission Concentration (Lb/TPW)	**0.007**

Signature of Reviewer: Fred H. Guantter

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TABLE 3
MODIFIED EPA METHOD 6C
SULFUR DIOXIDE EMISSIONS TEST RESULTS

CLIENT: BETA STEEL CORPORATION — PROJECT NO.: 01-T-141
SOURCE TESTED: MELTSHOP - ELECTRIC ARC FURNACE — DATA INPUT BY: TLS

INPUT DATA

Run Number	1	2	3
Date	25-Sep-01	25-Sep-01	25-Sep-01
Sampling Location	**Slag Pit**	**Slag Pit**	**Slag Pit**
Test Time, Start-Stop (24 Hour)	0900-1001	1004-1104	1500-1628
Sampling Time (Minutes)	60	60	60
Average Process Weight Rate (TPH)	**37.1**	**28.0**	**87.6**
Stack Area (Ft^2)	N/A	N/A	N/A
Pitot Tube Coefficient (Unitless)	"	"	"
Dry Gas Meter Correction Factor (Unitless)	"	"	"
Barometric Pressure (In. Hg)	"	"	"
Static Pressure (In. H2O)	"	"	"
Dry Gas Meter Sample Volume (DCF)	"	"	"
Average Dry Gas Meter Temperature (°F)	"	"	"
Average Orifice Meter Delta H (In. H2O)	"	"	"
Volume Condensate Collected (Ml)	"	"	"
Average CO2 Concentration (%)	"	"	"
Average O2 Concentration (%)	"	"	"
Average Square Root of Delta P (In. H2O½)	"	"	"
Average Stack Gas Temperature (°F)	"	"	"
Average SO2 Concentration (PPMV)	**0.20**	**0.01**	**0.40**

CALCULATED DATA

Absolute Pressure (In. Hg)	N/A	N/A	N/A
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	"	"	"
Water Vapor Volume at Standard Conditions (SCF)	"	"	"
Moisture Fraction (Unitless)	"	"	"
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	"	"	"
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	"	"	"
Stack Gas Velocity (FPS)	"	"	"
Stack Gas Flow Rate at Actual Conditions (ACFM)	"	"	"
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	"	"	"
SO2 Emission Concentration (Gr/DSCF)	0.00023	0.00001	0.00047
SO2 Emission Concentration (Lb/DSCF)	3.33E-08	1.66E-09	6.65E-08
SO2 Emission Rate (Lb/Hr)	N/A	N/A	N/A
SO2 Emission Concentration (Lb/TPW)	"	"	"

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	N/A
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	"
Average SO2 Emission Concentration (Gr/DSCF)	0.00024
Average SO2 Emission Concentration (Lb/DSCF)	3.38E-08
Average SO2 Emission Rate (Lb/Hr)	N/A
Average SO2 Emission Concentration (Lb/TPW)	"

Signature of Reviewer: Fred H. Guenther

G/SA.......... ENVIRONMENTAL TESTING CONSULTANTS
P.O. Box 807, Crown Point, IN 46307 TEL (219) 663-5394 / FAX (219) 662-7037

TABLE 4
EPA METHOD 6C
SULFUR DIOXIDE EMISSIONS TEST RESULTS

CLIENT: BETA STEEL CORPORATION PROJECT NO.: 01-T-141
SOURCE TESTED: MELTSHOP - ELECTRIC ARC FURNACE - BO DATA INPUT BY: TLS

INPUT DATA

Run Number	1	2	3
Date	24-Sep-01	24-Sep-01	24-Sep-01
Sampling Location	**Exhaust Stack**	**Exhaust Stack**	**Exhaust Stack**
Test Time, Start-Stop (24 Hour)	1257-1356	1526-1625	1812-1911
Sampling Time (Minutes)	60	60	60
Average Process Weight Rate (TPH)	**108.6**	**87.5**	**118.2**
Stack Area (Ft^2)	240.500	240.500	240.500
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.993	0.993	0.993
Barometric Pressure (In. Hg)	29.51	29.51	29.51
Static Pressure (In. H2O)	1.30	1.30	1.30
Dry Gas Meter Sample Volume (DCF)	27.330	27.179	27.178
Average Dry Gas Meter Temperature (°F)	63.1	60.0	57.0
Average Orifice Meter Delta H (In. H2O)	1.740	1.740	1.740
Volume Condensate Collected (Ml)	13.0	15.7	11.3
Average CO2 Concentration (%)	0.5	0.6	0.6
Average O2 Concentration (%)	20.6	20.6	20.6
Average Square Root of Delta P (In. H2O½)	1.235	1.247	1.205
Average Stack Gas Temperature (°F)	126.0	119.3	130.0
Average Corrected SO2 Concentration (PPMV)	**7.67**	**4.63**	**5.48**

CALCULATED DATA

Absolute Pressure (In. Hg)	29.61	29.61	29.61
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	27.140	27.150	27.307
Water Vapor Volume at Standard Conditions (SCF)	0.612	0.739	0.532
Moisture Fraction (Unitless)	0.022	0.026	0.019
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.90	28.92	28.92
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.66	28.63	28.71
Stack Gas Velocity (FPS)	73.7	74.0	72.1
Stack Gas Flow Rate at Actual Conditions (ACFM)	1,063,491	1,067,820	1,040,403
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	927,595	938,289	904,069
SO2 Emission Concentration (Gr/DSCF)	0.0089	0.0054	0.0064
SO2 Emission Concentration (Lb/DSCF)	1.28E-06	7.70E-07	9.11E-07
SO2 Emission Rate (Lb/Hr)	70.99	43.35	49.43
SO2 Emission Concentration (Lb/TPW)	0.654	0.495 87.5	0.418

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	1,057,238
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	923,318
Average SO2 Emission Concentration (Gr/DSCF)	0.0069
Average SO2 Emission Concentration (Lb/DSCF)	9.86E-07
Average SO2 Emission Rate (Lb/Hr)	54.59
Average SO2 Emission Concentration (Lb/TPW)	0.522

Signature of Reviewer: Fred H. Quentter

3.0 FACILITY DESCRIPTION

Beta Steel Corporation owns and operates a steel manufacturing and processing plant which produces hot rolled steel coils. Tons of iron, scrap steel and various metals are charged into an electric arc furnace (EAF) and transformed to molten steel which is transferred to a ladle metallurgy station (LMS) for refining, then to a caster mold for forming and cooling, and then to a finishing mill for reheating, thickness sizing, recooling and coiling.

Beta Steel is located at 6500 South Boundary Road within the Port of Indiana in Portage, Indiana which is in Porter County.

The Beta Steel facility consists basically of a Meltshop and a Hot Strip Mill. See Figure 1 which is a schematic process flow diagram of the plant.

The Meltshop is comprised of the following: A Direct Shell EAF and a LMS system, which were the primary sources tested for compliance purposes; a continuous slab caster; slag air cooling bays; four (4) ladle preheat/holding stations with natural gas-fired burners; a tundish dry-out/preheater station with a natural gas-fired burner; a water-cooled caster mold; a natural gas and oxygen, oxy-fuel cut-off torch; a slag processing operation consisting of a grizzly/feeder, covered conveyors, material sizing screens and storage piles; a carbon, lime and flux additive handling system with pneumatic conveyors, storage bins and enclosed conveyors to the EAF blending area; and close-capture exhaust hoods, a direct evacuation system, a side draft evacuation/collection system and collection canopies which exhaust to a jet-pulse, fabric filter baghouse with a dust silo and 200' high exhaust stack.

The Meltshop process operation is as follows: Scrap, carbon bearing materials and fluxing agents are used as raw materials to produce molten or liquid steel in the EAF. The liquid steel produced in the EAF is produced in batches or heats. When the melting and preliminary refining of the steel is completed, the steel is poured or tapped from the EAF into ladles. The liquid steel in the ladles is transferred to the LMS where the steel is heated by a small capacity electric arc and further refined by the introduction of metallurgical alloys to the desired specifications. Upon completion of the refining process at the LMS, the liquid steel in the ladles is transferred to a continuous slab caster (Caster). At the Caster, the liquid steel is poured or cast from the ladles into a tundish from which it flows into a water-cooled caster mold. In the caster mold, the liquid steel, in contact with the water-cooled surfaces of the mold, solidifies, forming a partially solidified strand. The strand is moved from the mold by powered rollers through a series of water sprays. The water sprays cool the strand which causes solidification of the strand from the outside surfaces to the interior. The solid steel strand is cut into solid steel slabs by a cut-off torch near the exit end of the Caster. The solid steel slabs are transferred to the Hot Strip Mill where they are hot rolled into steel bands or coils.

The Meltshop building is enclosed except for truck, rail and personnel doors at grade level, which are required for entrance to and exit from the building. There are no openings (e.g., roof monitors or ventilators) in the roof of the Meltshop building. All exhaust air requirements are provided by the Meltshop fume collection and control system. All handling and storage of slag produced at the EAF is conducted inside the Meltshop building. Slag dumping and load out operations are conducted in a dedicated room inside the Meltshop. Air is exhausted from the room to the fume collection and control system. The fume collection and control system is serviced by the Meltshop Baghouse which cleans the exhausted air prior to discharge to the atmosphere through the Meltshop Baghouse Stack. The gaseous emissions testing was performed at the Meltshop Baghouse Inlets, the EAF Slag Pit and the Meltshop Baghouse Stack. See Figures 2, 3, 4 and 5.

The Hot Strip Mill is comprised of the following: A natural gas-fired slab reheat furnace; hot rolling mills (roughing and finishing mills); high pressure water sprays; a strip cooling line; a coiler; and a selective catalytic reduction (SCR) unit and 100′ high exhaust stack.

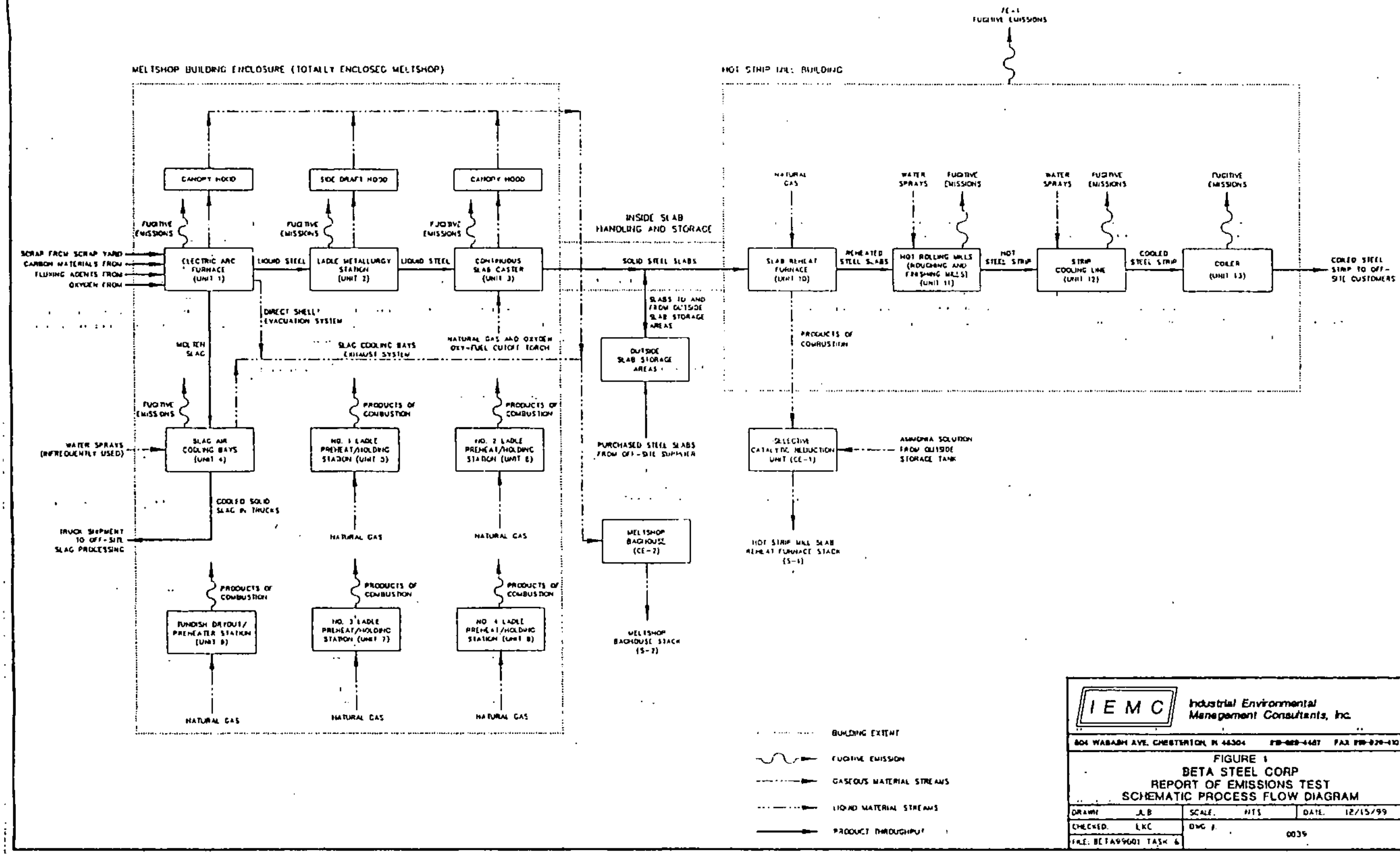
The Hot Strip Mill process operation is as follows: The solid steel slabs transferred from the Meltshop are placed in a natural gas-fired slab reheat furnace where the slabs are heated to temperatures required for hot rolling. The heated slabs are transferred from the furnace to a hot rolling line. The slabs are then passed through a roughing mill to remove scale from the outside surfaces of the slab by high pressure water spray and to reduce the thickness of the slabs. The heated slabs are transferred from the roughing mill to a finishing mill where the thickness of the slabs is reduced to a final desired hot rolled strip thickness. From the finishing mill, the hot rolled strip is passed through a series of water sprays to cool the strip. Downstream of the water sprays, the cooled strip is coiled, secured and temporarily stored for shipment to off-site customers.

The slab reheat furnace in the Hot Strip Mill building is serviced by a SCR for control of oxides of nitrogen in the waste gas, which are products of natural gas combustion, from the furnace. The waste gas from the SCR is discharged to the atmosphere through the Hot Strip Mill Slab Reheat Furnace Stack.

During the emissions testing on September 24, 2001, the Meltshop steel processing weight rate averaged 104.8 tons/hr, and on September 25 the weight rate averaged 50.9 tons/hr.

Process operating data recorded during the emissions testing can be found in Appendix B of this report.

FIGURES



IEMC Industrial Environmental Management Consultants, Inc.
804 WABASH AVE. CHESTERTON, IN 46304

FIGURE 1
BETA STEEL CORP
REPORT OF EMISSIONS TEST
SCHEMATIC PROCESS FLOW DIAGRAM

DRAWN: JLB	SCALE: NTS	DATE: 12/15/99	
CHECKED: LKC	DWG #: 0039		
FILE: BETA99001 TASK 6			

FIGURES

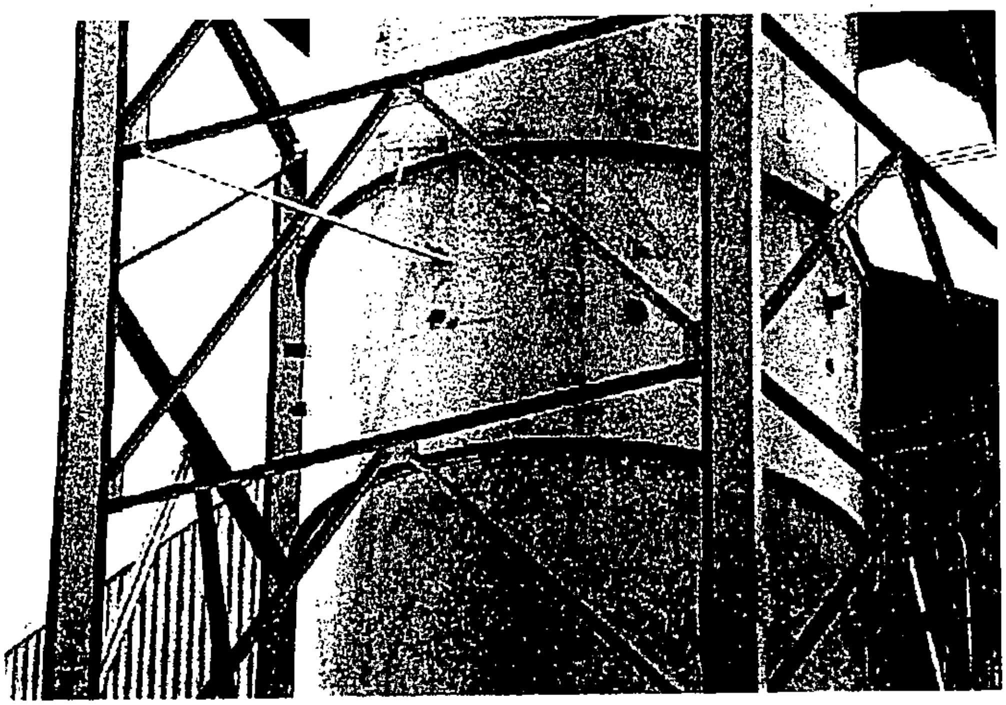


Figure 2. Melt Shop - Before Slag Quenching - Baghouse Inlet Sampling Location

Figure 3. Melt Shop - Slag Quenching Alone - Baghouse Inlet Sampling Location

FIGURES

Figure 4. Melt Shop - EAF - Slag Pit Sampling Location

Figure 5. Melt Shop - EAF - Stack Sampling Location

4.0 TEST PROCEDURES

G/SA, and G/SA's affiliates and subcontractors use all current EPA accepted testing methodologies in their Air Quality Programs as listed in the U.S. Code of Federal Regulations, Title 40, Part 60, Appendix A. For this testing program, the following specific methodologies were utilized:

EPA Method 1 - Sample and Velocity Traverses for Stationary Sources

EPA Method 2 - Determination of Stack Gas Velocity and Volummetric Flow Rate (Type S Pitot Tube)

EPA Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

EPA Method 3A - Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)

EPA Method 4 - Determination of Moisture Content in Stack Gases

EPA Method 6C - Determination of Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)

EPA Methods 1, 2 and 4 were performed at the Baghouse Inlet and Outlet sampling locations using Apex Instruments, Model 522, control units and sampling trains incorporating 8′ (SQA sampling location), 9′ (Exhaust Stack sampling location) and 16′ (BSQ sampling location) effective length, stainless-steel probes with heated, borosilicate glass liners, 5/8"O.D. x 4"long borosilicate glass liner extensions, Type S, stainless-steel pitot tubes, ¼" O.D., stainless-steel static pressure/gas sampling tubes and Type K

(Chromel/Alumel) thermocouples; aluminum probe/impinger support frames and foam insulated, aluminum impinger units with one (1) Greenburg-Smith and three (3) modified Greenburg-Smith glass impinger bottles, and stainless-steel umbilical adapters with Type K (Chromel/Alumel) gas exit thermocouples; and 25′ (SQA sampling location), 60′ (Exhaust Stack sampling location) and 90′ (BSQ sampling location) umbilicals with various interconnecting fittings, plugs and connectors.

EPA Method 3A was performed at the BSQ and Exhaust Stack sampling locations during the SO_2 CEM testing using Fuji, NDIR CO_2 Monitors and California Analytical, Paramagnetic O_2 Monitors to determine flue gas concentrations of CO_2 and O_2, respectively.

EPA Method 6C was performed at the BSQ, SQA and Exhaust Stack sampling locations using Western Research, NDIR SO_2 Monitors to determine flue gas concentrations of SO_2.

Modified EPA Method 6C was performed at the EAF Slag Pit sampling location using an ECOM-S Plus Portable Stack Emissions Analyzer to determine flue gas concentrations of SO_2 incorporating a 8', effective length, stainless-steel, heated sample probe with a sintered stainless-steel filter; an integrated condenser assembly with peristaltic pump; a #1 cylinder of protocol SO_2 span gas; and a stainless-steel regulator, Teflon tubing, fittings and valves. Gaseous samples were taken just above and across the surface of the open Slag Pit.

The aforementioned monitors at the BSQ, SQA and Exhaust Stack sampling locations incorporated 6', effective length, stainless-steel, heated sample probes with sintered stainless-steel filters; Teflon condenser assemblies with peristaltic pumps; ¼" O.D. × 225' long Teflon sample lines and bias-check lines; Strata version 2.0 Data Acquisition Systems; two (2) #1 cylinders of certified zero grade N_2 gas, several #1 cylinders of protocol CO_2, O_2, and SO_2 span gases; and various interconnecting regulators, Teflon tubing, fittings and valves.

Calibration data, including an on-site dry gas meter calibration check, and pretest run and post-test run CEM calibrations of the above instrumentation, and calibration span gas certifications can be found in Appendix D.

Cyclonic flow checks were omitted at the BSQ, SQA and Exhaust Stack sampling locations due to the acceptable stack and test port configurations based on Method 1 requirements, and relatively laminar flows noted during the preliminary traverse procedures conducted prior to the emissions testing a the sampling locations.

EPA Method 3 was performed at the SQA sampling location during the SO_2 CEM testing to determine exhaust gas concentrations of CO_2 and O_2 using a Bacharach, Duplex Fyrite Kit, Gas Analyzer (Orsat) to extract and measure integrated gas samples collected in

Calibrated Instruments, Inc. 10 liter, pillow type, Tedlar bags at the outlet of the stainless-steel probe's gas sampling tube.

The gas streams data collected during EPA Methods 2, 3, 3A, and 4 testing, to determine stack gas conditions, was used in conjunction with EPA Method 6C testing to obtain SO_2 calculated emissions results.

The Modified EPA Method 6C testing at the EAF Slag Pit was postponed one (1) day because of a failed on/off switch in the portable SO2 analyzer being used at that sampling location. Another analyzer was delivered late afternoon on September 24, 2001 and put into operation the following morning on September 25, 2001.

No testing or sample recovery deviations or procedural errors occurred during the onsite sampling phase of the testing program.

No significant process deviations or upsets occurred during the emissions testing periods on September 24, 2001. However, on September 25, 2001 during the SO_2 sampling at the Slag Pit, lower EAF charge rates were encountered because of continuous caster problems downstream of the furnace.

The BSQ, SQA, Slag Pit and Exhaust Stack emissions test data and supporting data collected during the field sampling can be found in Appendix A of this report. The SO_2

emissions values and associated data are presented in the "Test Results Summary".

NOMENCLATURE

acf	= actual cubic feet
acfm	= actual cubic feet per minute
A	= inside cross-sectional area of stack or duct (ft^2)
A_n	= inside cross-sectional area of sampling nozzle (ft^2)
%AM	= percent ash moisture content
Btu	= British thermal units
B_{ws}	= water vapor (moisture) in gas stream, proportion by volume
C	= mass conentration of effluent
C_a	= concentration of gaseous analyte (ppmv or %)
C_m	= average of initial and final bias check responses for upscale cal gases
C_{ma}	= actual concentration of upscale cal gases
C_o	= average of initial and final bias check responses for zero or low level cal gases
C_{oa}	= actual concentration of low level cal gases
C_p	= pitot tube coefficient (unitless)
C_s	= sample concentration
C_{s7}	= sample concentration corrected to 7% O_2
C_{s12}	= sample concentration corrected to 12% CO_2
C_{s50}	= sample concentration corrected to 50% excess air
$C_{s50/rga}$	= sample concentration corrected to 50% excess air per raw gas analysis
CEM	= continuous emission monitor
$C_{(1+2)}$	= corrected TGNMO concentration for 1 trap and 2 tanks
%C	= percent carbon by weight, dry basis
%CO	= percent carbon monoxide by volume, dry basis
$\%CO_2$	= percent carbon dioxide by volume, dry basis
dcf	= dry cubic feet
dscf	= dry standard cubic feet
dscfm	= dry standard cubic feet per minute
dsm^3	= dry standard cubic meter
%EA	= percent excess air
F_d	= ratio factor of dry gas volume to heat value of combusted fuel (dscf/mmBtu)
fps	= feet per second
ft^2	= square feet
ft^3	= cubic feet
°F	= degrees Fahrenheit
G_{mfr}	= mass flow rate of stack gas (lb/hr)
gr	= grains
g	= grams
H_c	= heat of combustion, dry basis (Btu/lb)
hr	= hour
ΔH	= average orifice meter pressure differential (in. H_2O)
$\Delta H_@$	= orifice meter calibration factor (in. H_2O)

NOMENCLATURE, Continued

%H	= percent hydrogen by weight, dry basis
%I	= percent of isokinetic sampling
in. Hg	= inches of mercury
in. H_2O	= inches of water
lb	= pounds
lb/lb-mole	= pound per pound-mole
m	= thousand
mm	= million
M_b	= mass concentration of media blank
M_c	= mass concentration of target analyte collected (mg, μg, ng or ppmC)
M_n	= mass concentration of PM collected (g)
MgPW	= megagram process weight
μg	= micrograms
meq	= milliequivalents
mg	= milligrams
ml	= milliliters
MW	= molecular weight of analyte (lb/lb-mole)
M_d	= molecular weight of stack gas, dry basis (lb/lb-mole)
M_s	= molecular weight of stack gas, wet basis (lb/lb-mole)
ng	= nanograms
N	= normality of barium perchlorate titrant (meq/ml)
%N	= percent nitrogen by weight, dry basis
$\%N_2$	= percent nitrogen by difference, dry basis
%O	= percent oxygen by weight, dry basis
$\%O_2$	= percent oxygen by volume, dry basis
ppmC	= parts per million concentration equivalent
ppmv	= parts per million by volume
P_f	= particulate loading per heat input in lb/mmBtu per F_d constant
$P_{f'}$	= particulate loading per heat input in lb/mmBtu per F_d calculated
P_a	= absolute stack gas pressure (in. Hg)
P_{bar}	= barometric pressure at sampling site (in. Hg)
P_s	= static stack gas pressure (in. H_2O)
ΔP	= stack gas velocity head (in. H_2O)
$\sqrt{\Delta P}$	= average square root of stack gas velocity head (in. H_2O)
Q_a	= volumetric stack gas flow rate at actual conditions (acfm)
Q_{std}	= volumetric stack gas flow rate corrected to dry standard conditions (dscfm)
R_{gu}	= natural or propane gas usage rate (mscfh)
R_{ho}	= stack gas density (lb/ft^3)
R_p	= process rate (tph)
std	= standard conditions at 29.92 in. Hg and 68°F
scf	= standard cubic feet

scfh	= standard cubic feet per hour
%S	= percent sulfur by weight, dry basis
T_m	= average dry gas meter temperature (°F)
T_s	= average stack gas temperature (°F)
TGNMO	= total gaseous nonmethane organic
TPH	= tons per hour
TPW	= ton process weight
V_a	= volume of sample aliquot titrated (ml)
V_{lc}	= total volume of liquid condensed in impingers and collected in silica gel (ml)
V_m	= total volume of dry metered gas (dcf)
$V_{m, std}$	= volume of dry metered gas corrected to standard conditions (scf)
V_s	= stack gas velocity (fps)
V_{soln}	= total volume of sample solution (ml)
V_t	= average volume of titrant used for sample titration (ml)
V_{tb}	= average volume of titrant used for blank titration (ml)
$V_{w, std}$	= volume of water vapor in sampled gas corrected to standard conditions (scf)
Y	= dry gas meter calibration (correction) factor (unitless)
θ	= total sampling time (minutes)