

ACKNOWLEDGMENTS

I would like to thank Mr. Mike Brooks and his associates for their cooperation, patience and input in the coordination of the testing program conducted at Steel Dynamics, Inc., Bar Products Division. Their knowledge and experience in process control and operation, and project development proved invaluable towards the completion of this project.



Fred H. Guenther
Project Manager

TABLE OF CONTENTS

<i>ACKNOWLEDGMENTS</i>	<i>i</i>
<i>PREFACE</i>	<i>iv</i>
1.0 INTRODUCTION	1
2.0 TEST RESULTS SUMMARY	7
3.0 FACILITY DESCRIPTION	18
4.0 TEST PROCEDURES	22
5.0 ANALYTICAL PROCEDURES	27
6.0 QUALITY ASSURANCE PROCEDURES	29
7.0 CONCLUSIONS	30

LIST OF TABLES

TABLES 1-1D . EPA METHOD 51202 . PARTICULATE MATTER EMISSIONS TEST RESULTS . ELECTRIC ARC FURNACE . BAGHOUSE OUTLET (EXHAUST STACK)	9 . 13
TABLE 2 . EPA METHOD 12 . LEAD TEST RESULTS . ELECTRIC ARC FURNACE . BAGHOUSE OUTLET (EXHAUST STACK)	14
TABLE 3 . EPA METHOD 7E . NITROGEN OXIDES (NO_x) EMISSIONS TEST RESULTS . ELECTRIC ARC FURNACE . BAGHOUSE OUTLET (EXHAUST STACK)	15
Table 4 . EPA METHOD 25A-TOTAL GASEOUS ORGANIC COMPOUND E MISSIONS TEST RESULTS . ELECTRIC ARC FURNACE . BAGHOUSE OUTLET (EXHAUST STACK)	16
TABLE 5 . EPA METHOD 7E . NITROGEN OXIDES (NO_x) EMISSIONS TEST RESULTS . REHEAT FURNACE-EXHAUST STACK	17

LIST OF FIGURES

FIGURE 1 - ELECTRIC ARC FURNACE - BAGHOUSE/STACK CONFIGURATION	20
FIGURE 2 - ELECTRIC ARC FURNACE - STACK SAMPLING LOCATION	20
FIGURE 3 - REHEAT FURNACE - STACK CONFIGURATION	21
FIGURE 4 - REHEAT FURNACE - STACK SAMPLING LOCATION	21

APPENDICES

APPENDIX A - FIELD TEST DATA

APPENDIX B - PROCESS OPERATING DATA

APPENDIX C - LABORATORY ANALYSIS AND IAP ANALYTICAL DATA

APPENDIX D - REAGENT CERTIFICATIONS AND MATERIAL SAFETY DATA

APPENDIX E - CALIBRATION AND CERTIFICATION DATA

APPENDIX F - SAMPLE CALCULATIONS, NOMENCLATURE AND EQUATIONS

APPENDIX G - CORRESPONDENCE

PREFACE

I, Fred H. Guenther, do hereby certify that the source emissions testing conducted at Steel Dynamics, Inc., Bar Products Division near Pittsboro, Indiana was performed in accordance with the procedures set forth by the United States Environmental Protection Agency, and that the data and results submitted within this report are an exact representation of the testing.

A handwritten signature in black ink, appearing to read "Fred H. Guenther". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Fred H. Guenther
Test Supervisor

I, Fred H. Guenther, do hereby attest that all work on this project was performed under my direct supervision, and that this report accurately and authentically presents the source emissions testing conducted at Steel Dynamics, Inc., Bar Products Division near Pittsboro, Indiana.

A handwritten signature in black ink, appearing to read "Fred H. Guenther". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Fred H. Guenther
Test Supervisor

SOURCE EMISSIONS COMPLIANCE TESTING
EPA Methods **1, 2, 3, 3A**, 4, 5, 7E, 12, 25A and 202
Performed on the
Electric Arc Furnace
Baghouse Outlet (Exhaust Stack)
and
EPA Method 7E
Performed on the
Reheat Furnace
Exhaust Stack
at
Steel Dynamics, Inc.
Bar Products Division
Pittsboro, Indiana

October 27-28, 2004

Project No. 04-T-294

1.0 INTRODUCTION

This report presents the results of the source emissions compliance testing conducted by Guenther/Shackelford Associates (G/SA) for Steel Dynamics, Inc. (SDI), Bar Products Division near Pittsboro, Indiana.

The primary purpose of this testing program was to:

1. Obtain and analyze Electric Arc Furnace/Ladle Metallurgical Furnace Baghouse exhaust samples for PM₁₀ (particulate matter $\leq$ 10 microns in diameter); particulate matter and condensable particulate matter; and lead (Pb) to assess compliance with air permit limits.
2. Extract gas samples from the Electric Arc Furnace/Ladle

MetallurgicalFurnace Baghouse exhaust to assess compliance with air permit limits for volatile organic compounds and nitrogen oxides (NO_x).

3. Extract gas samples from the Reheat Furnace exhaust to assess compliance with air permit limits for nitrogen oxides (NO_x).

G/SA's responsibility was to collect and analyze PM, CPM and Lead samples, evaluate CEMS opacity data and IAP for SO₂, NO_x, and CO, and perform data reduction for emission concentrations determination. SDI's responsibility was to maintain process operating parameters and to provide process operating data per compliance test requirements.

The following report provides information pertaining to the SDI Bar Products Division operations, emissions testing and analytical results.

The compliance tests for the EAF/LMS Baghouse Outlet (Exhaust Stack) were performed on Wednesday, October 27 and Thursday, October 28, 2004. Testing on the RF Exhaust Stack was performed on Wednesday, October 27 and Thursday, October 28, 2004.

The following requirements were specific for the testing program:

1. Equipment calibrations performed and calibration data provided.
2. Testing was performed consistent with the requirements of SDI's air permit (SSM/PSD 063-16628-00037).

3. Test runs were performed at each sampling location as follows:

EAF/LMS Baghouse Stack

PM10/PM – Three (3) four-hour runs

Lead - Three (2) two-hour runs

VOC and NO_x – Three (3) one-hour runs

Reheat Furnace Exhaust Stack

NO_x Three (3) one-hour runs

4. A Land Premier 4500 Opacity Monitor recorded stack opacity on a continuous basis throughout the test period.
5. Process manufacturing capacities and control devices were maintained at required operating conditions. Production rates and control device operational data were recorded during the emissions testing periods.
6. All testing and analyses were performed in accordance with current U.S. Environmental Protection Agency (USEPA) test methodologies and analytical procedures for PM, NO_x, Lead, VOC, metals and CPM emissions determinations.
7. Applicable Emissions Limits

EAF/LMS BAGHOUSE STACK AIR PERMIT EMISSION LIMITS

PM10 – 0.0052 grains per dry standard cubic foot (gr/dscf)

PM – 0.0018 gr/dscf

Opacity – 3%, as a six-minute average

Lead – 0.134 lb/hr

NO_x – 43.75 lb/hr or 0.35 lb/ton

VOC – 11.5 lb/hr or 0.09 lb/ton

REHEAT FURNACE STACK

NO_x - 0.08 lb/MMBtu

Note: EPA Method 5 (PM) and 201A/202 (PM₁₀/CPM) testing were not required to be performed in this case because all of the PM emissions from the EAF/LMS Baghouse Stack are assumed to be #10 microns in particle size. Therefore, only EPA Method 51202 (PM/CPM) sampling was conducted per IDEM's approval.

The emissions testing program was supervised by G/SA, whose headquarters is in Crown Point, Indiana. In addition to emissions testing, G/SA also performed:

1. Stack gas flow rate, moisture content, carbon dioxide (CO₂), and oxygen (O₂) determinations for the EAF/LMS Baghouse Stack exhaust.
2. All required pretest and post-test analytical equipment calibrations;
3. Data collection and reduction, and final report preparation.
4. The Lead analyses were subcontracted by G/SA's analytical broker, Sampling & Analytical Management, Inc. (SAMI), whose headquarters is in Medina, Ohio, to DataChem Laboratories in Cincinnati, Ohio.

Note: EPA Method 5 (PM) and 201A/202 (PM₁₀/CPM) testing were not required to be performed in this case because all of the PM emissions from the EAF Baghouse are assumed to be ≤ 10 microns in particle size. Therefore, only EPA Method 51202 (PM/CPM) sampling was conducted per IDEM's approval.

The emissions testing was performed in accordance with USEPA Reference Methods 1, 2, 3, 3A, 4, 5 (PM), 6C (SO₂), 7E (NO_x) and 12 (Lead), Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), "Standards of Performance for Stationary Sources", Appendix A, "Test Methods", and Method 202 (CPM), Title 40, Code of Federal Regulations, Part 51, (40 CFR 51), "Standards of Performance for Stationary Sources", Appendix M, "Test Methods" and IDEM Rule 326 IAC 3-2.1.

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

Mike Brooks, Environmental Engineer, SDI-BPD

The emissions testing was performed by the following personnel:

Fred Guenther, Test Supervisor, G/SA

Amir Beheshti, Senior Test Technician, GISA

Brandon Peyton, Senior Test Technician, G/SA

Andy Kendall, Test Technician, GISA

Scott Danford, Test Technician, G/SA

The emissions testing was observed by the following personnel:

Jarrold Fisher, Environmental Scientist, Air Compliance Section, IDEM

2.0 TEST RESULTS SUMMARY

The source emissions compliance testing was performed utilizing USEPA Methods 1, 2, 3, 3A, 4, 5, 7E, 12, 205A and 202 at the EAF baghouse outlet sampling location, and USEPA Methods 3A and 7E at the RF exhaust stack sampling location. A summary of the test results is given below:

EAF PM/CPM Emissions			
Run No.	PM Emissions (Gr/DSCF)	PM ₁₀ , as PM/CPM (Gr/DSCF)	Opacity (%)
1	0.0004	0.0008	0.48
2	0.0003	0.0008	0.44
3	0.0003	0.0007	0.51
Average	0.0004	0.0008	0.48
Emission Limit	0.0018	0.0052	3

EAF Lead Emissions	
Run No.	Lead Emissions (Lbs/Hr)
1	0.044
2	0.000
3	0.021
Average	0.022
Emission Limit	0.134

EAF Gaseous Emissions				
Run No.	NOx Emissions (Lbs/Hr)	NOx Emissions (Lbs/Ton)	VOC Emissions (Lbs/Hr)	VOC Emissions (Lbs/Ton)
1	14.46	0.1446	4.79	0.0479
2	33.80	0.3380	5.40	0.0540
3	31.12	0.2829	4.56	0.0414
Average	26.46	0.2552	4.92	0.0478
Emission Limit	43.75	0.35	11.5	0.09

RF Gaseous Emissions	
Run No.	NOx Emissions (Lbs/MMBtu)
1	0.056
2	0.053
3	0.062
Average	0.057
Emission Limit	0.08

A complete list of test parameters for each Method 5/202, 7E, 12, 25A and 202 emissions test run performed at the EAF sampling location, and each Method 7E emissions test run performed at the RF sampling location can be found in Tables 1 through 4, and Table 5, respectively

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

TABLES

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EAF BAGHOUSE OUTLET

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 5 1202

TOTAL PARTICULATE EMISSIONS TEST RESULTS

CLIENT: STEEL DYNAMICS, INC.

JOB NO.: 04-T-294

SOURCE TESTED: EAF - BAGHOUSE OUTLET

DATA INPUT BY: BTP

INPUT DATA

Run Number	1	2	3
Date	27-Oct-04	27-Oct-04	28-Oct-04
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0843-1318	1456-2043	0843-1322
Sampling Time (Minutes)	260	270	240
Average Process Weight Rate (TPH)	100.0	101.3	100.0
Stack Area (Ft ²)	148.5	148.5	148.5
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.995	0.995	0.995
Nozzle Area (Ft ²)	0.000171	0.000171	0.000171
Barometric Pressure (In. Hg)	29.06	29.06	29.06
Static Pressure (In. H ₂ O)	-0.6	-0.6	-0.6
Dry Gas Meter Sample Volume (DCF)	161.614	175.364	160.378
Average Dry Gas Meter Temperature (°F)	74.7	73.3	73.9
Average Orifice Meter Delta H (In. H ₂ O)	1.304	1.418	1.342
Volume Condensate Collected (MI)	65.6	55.1	53.9
Average CO ₂ Concentration (%)	0.3	0.6	0.5
Average O ₂ Concentration (%)	20.5	20.2	20.5
Average Square Root of Delta P (In. H ₂ O ^{1/2})	1.156	1.190	1.156
Average Stack Gas Temperature (°F)	152.9	135.6	150.2
Total Particulate Matter (Grams, G)	0.0082	0.0090	0.0073

CALCULATED DATA

Absolute Pressure (In. Hg)	29.02	29.02	29.02
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	154.770	168.405	153.823
Water Vapor Volume at Standard Conditions (SCF)	3.088	2.594	2.537
Moisture Fraction (Unitless)	0.020	0.015	0.016
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.87	28.90	28.90
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.66	28.74	28.72
Stack Gas Velocity (FPS)	71.3	72.2	71.0
Stack Gas Flow Rate at Actual Conditions (ACFM)	634,806	643,288	632,917
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	520,091	544,814	522,626
Isokinetic Sampling (%)	99.5	99.6	106.7

TPM Emission Concentration (Gr/DSCF)	0.0008	0.0008	0.0007
TPM Emission Concentration (Lb/DSCF)	1.17E-007	1.18E-007	1.05E-007
TPM Emission Rate (Lb/Hr)	3.65	3.85	3.28
TPM Emission Concentration (Lb/Ton Process Weight)	0.036	0.038	0.033

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	637,004	
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	529,177	Emission Limits
Average TPM Emission Concentration (Gr/DSCF)	0.0008	0.0052 Gr/DSCF
Average TPM Emission Concentration (Lb/DSCF)	1.13E-007	
Average TPM Emission Rate (Lb/Hr)		
Average TPM Emission Concentration (Lb/Ton Process Weight)	0.036	

Signature of Reviewer:



G/SA ENVIRONMENTAL TESTING CONSULTANTS

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

TABLE 1A
EPA METHOD 5 1202**PARTICULATE EMISSIONS TEST RESULTS (FRONT-HALF)**

CLIENT: STEEL DYNAMICS, INC.

JOB NO.: 04-T-294

SOURCE TESTED EAF - BAGHOUSE OUTLET

DATA INPUT BY BTP

i

INPUT DATA

Run Number	1	2	3
Date	27-Oct-04	27-Oct-04	28-Oct-04
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0843-1318	1456-2043	0843-1322
Sampling Time (Minutes)	260	270	240
Average Process Weight Rate (TPH)	700.0	701.3	100.0
Stack Area (Ft ²)	148.5	148.5	148.5
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.995	0.995	0.995
Nozzle Area (Ft ²)	0.000171	0.000171	0.000171
Barometric Pressure (In. Hg)	29.06	29.06	29.06
Static Pressure (In. H ₂ O)	-0.6	-0.6	-0.6
Dry Gas Meter Sample Volume (DCF)	161.614	175.364	160.378
Average Dry Gas Meter Temperature (°F)	74.7	73.3	73.9
Average Orifice Meter Delta H (In. H ₂ O)	1.304	1.418	1.342
Volume Condensate Collected (MI)	65.6	55.1	53.9
Average CO ₂ Concentration (%)	0.3	0.6	0.6
Average O ₂ Concentration (%)	20.5	20.2	20.4
Average Square Root of Delta P (In. H ₂ O ^{1/2})	1.156	1.190	1.156
Average Stack Gas Temperature (°F)	152.9	135.6	150.2
Filtered Particulate Matter (Grams, G)	0.0045	0.0037	0.0033

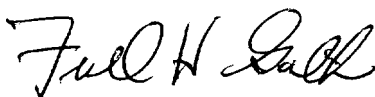
CALCULATED DATA

Absolute Pressure (In. Hg)	29.02	29.02	29.02
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	154.770	168.405	153.823
Water Vapor Volume at Standard Conditions (SCF)	3.088	2.594	2.537
Moisture Fraction (Unitless)	0.020	0.015	0.016
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.87	28.90	28.91
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.66	28.74	28.73
Stack Gas Velocity (FPS)	71.3	72.2	71.0
Stack Gas Flow Rate at Actual Conditions (ACFM)	634,806	643,288	632,822
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	520,091	544,814	522,548
Isokinetic Sampling (%)	99.5	99.6	106.7

FPM Emission Concentration (Gr/DSCF)	0.0004	0.0003	0.0003
FPM Emission Concentration (Lb/DSCF)	6.41E-008	4.84E-008	4.73E-008
FPM Emission Rate (Lb/Hr)	2.00	1.58	1.48
FPM Emission Concentration (Lb/Ton Process Weight)	0.020	0.016	0.015

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	636,972
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	529,151
Average FPM Emission Concentration (Gr/DSCF)	0.0004
Average FPM Emission Concentration (Lb/DSCF)	5.33E-008
Average FPM Emission Rate (Lb/Hr)	
Average FPM Emission Concentration (Lb/Ton Process Weight)	0.017

Signature of Reviewer:



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**TABLE 1B
EPA METHOD 5 1202
PARTICULATE EMISSIONS TEST RESULTS (BACK-HALF)**

CLIENT: STEEL DYNAMICS, INC.

JOB NO.: 04-T-294

SOURCE TESTED: EAF - BAGHOUSE OUTLET

DATA INPUT BY: BTP

INPUT DATA

Run Number	1	2	3
Date	27-Oct-04	27-Oct-04	28-Oct-04
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0843-1318	1456-2043	0843-1322
Sampling Time (Minutes)	260	270	240
Average Process Weight Rate (TPH)	100.0	101.3	100.0
Stack Area (Ft ²)	148.5	148.5	148.5
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.995	0.995	0.995
Nozzle Area (Ft ²)	0.000171	0.000171	0.000171
Barometric Pressure (In. Hg)	29.06	29.06	29.06
Static Pressure (In. H2O)	-0.6	-0.6	-0.6
Dry Gas Meter Sample Volume (DCF)	161.614	175.364	160.378
Average Dry Gas Meter Temperature (°F)	74.7	73.3	73.9
Average Orifice Meter Delta H (In. H2O)	1.304	1.418	1.342
Volume Condensate Collected (MI)	65.6	55.1	53.9
Average CO2 Concentration (%)	0.3	0.6	0.6
Average O2 Concentration (%)	20.5	20.2	20.4
Average Square Root of Delta P (In. H2O ^{1/2})	1.156	1.190	1.156
Average Stack Gas Temperature (°F)	152.9	135.6	150.2
Condensed Particulate Matter (Grams, G)	0.0037	0.0053	0.0040

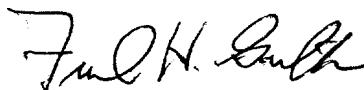
CALCULATED DATA

Absolute Pressure (In. Hg)	29.02	29.02	29.02
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	154.770	168.405	153.823
Water Vapor Volume at Standard Conditions (SCF)	3.088	2.594	2.537
Moisture Fraction (Unitless)	0.020	0.015	0.016
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.87	28.90	28.91
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.66	28.74	28.73
Stack Gas Velocity (FPS)	71.3	72.2	71.0
Stack Gas Flow Rate at Actual Conditions (ACFM)	634,806	643,288	632,822
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	520,091	544,814	522,548
Isokinetic Sampling (%)	99.5	99.6	106.7

CPM Emission Concentration (Gr/DSCF)	0.0004	0.0005	0.0004
CPM Emission Concentration (Lb/DSCF)	5.27E-008	6.94E-008	5.73E-008
CPM Emission Rate (Lb/Hr)	1.64	2.27	1.80
CPM Emission Concentration (Lb/Ton Process Weight)	0.016	0.022	0.018

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	636,972
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	529,151
Average CPM Emission Concentration (Gr/DSCF)	0.0004
Average CPM Emission Concentration (Lb/DSCF)	5.98E-008
Average CPM Emission Rate (Lb/Hr)	1.90
Average CPM Emission Concentration (Lb/Ton Process Weight)	0.019

Signature of Reviewer:



G/SA ENVIRONMENTAL TESTING CONSULTANTS

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TABLE 1C
EPA METHOD 5 1202**PARTICULATE EMISSIONS TEST RESULTS (INORGANICS)**

CLIENT: STEEL DYNAMICS, INC.

JOB NO.: 04-T-294

SOURCE TESTED: EAF - BAGHOUSE OUTLET

DATA INPUT BY: BTP

INPUT DATA

Run Number	1	2	3
Date	27-Oct-04	27-Oct-04	28-Oct-04
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0843-1318	1456-2043	0843-1322
Sampling Time (Minutes)	260	270	240
Average Process Weight Rate (TPH)	100.0	101.3	100.0
Stack Area (Ft ²)	148.5	148.5	148.5
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.995	0.995	0.995
Nozzle Area (Ft ²)	0.000171	0.000171	0.000171
Barometric Pressure (In. Hg)	29.06	29.06	29.06
Static Pressure (In. H ₂ O)	-0.6	-0.6	-0.6
Dry Gas Meter Sample Volume (DCF)	161.614	175.364	160.378
Average Dry Gas Meter Temperature (°F)	74.7	73.3	73.9
Average Orifice Meter Delta H (In. H ₂ O)	1.304	1.418	1.342
Volume Condensate Collected (MI)	65.6	55.1	53.9
Average CO ₂ Concentration (%)	0.3	0.6	0.6
Average O ₂ Concentration (%)	20.5	20.2	20.4
Average Square Root of Delta P (In. H ₂ O ^{1/2})	1.156	1.190	1.156
Average Stack Gas Temperature (°F)	152.9	135.6	150.2
Inorganic Particulate Matter (Grams, G)	0.0015	0.0019	0.0008

CALCULATED DATA

Absolute Pressure (In. Hg)	29.02	29.02	29.02
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	154.770	168.405	153.823
Water Vapor Volume at Standard Conditions (SCF)	3.088	2.594	2.537
Moisture Fraction (Unitless)	0.020	0.015	0.016
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.87	28.90	28.91
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.66	28.74	28.73
Stack Gas Velocity (FPS)	71.3	72.2	71.0
Stack Gas Flow Rate at Actual Conditions (ACFM)	634,806	643,288	632,822
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	520,091	544,814	522,548
Isokinetic Sampling (%)	99.5	99.6	106.7

IPM Emission Concentration (Gr/DSCF)	0.0001	0.0002	0.0001
IPM Emission Concentration (Lb/DSCF)	2.14E-008	2.49E-008	1.15E-008
IPM Emission Rate (Lb/Hr)	0.67	0.81	0.36
IPM Emission Concentration (Lb/Ton Process Weight)	0.007	0.008	0.004

Average Stack Gas Flow Rate at Actual Conditions (ACFM)	636,972
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	529,151
Average IPM Emission Concentration (Gr/DSCF)	0.0001
Average IPM Emission Concentration (Lb/DSCF)	1.92E-008
Average IPM Emission Rate (Lb/Hr)	
Average IPM Emission Concentration (Lb/Ton Process Weight)	0.006

Signature of Reviewer:



G/SA ENVIRONMENTAL TESTING CONSULTANTS

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

TABLE 1D
EPA METHOD 5 / 202
PARTICULATE EMISSIONS TEST RESULTS (ORGANICS)

CLIENT: STEEL DYNAMICS, INC.
 SOURCE TESTED: EAF - BAGHOUSE OUTLET

JOB NO.: 04-T-294
 DATA INPUT BY: BTP

INPUT DATA

Run Number	1	2	3
Date	27-Oct-04	27-Oct-04	28-Oct-04
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0843-1318	1456-2043	0843-1322
Sampling Time (Minutes)	260	270	240
Average Process Weight Rate (TPH)	100.0	101.3	100.0
Stack Area (Ft ²)	148.5	148.5	148.5
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.995	0.995	0.995
Nozzle Area (Ft ²)	0.000171	0.000171	0.000171
Barometric Pressure (In. Hg)	29.06	29.06	29.06
Static Pressure (In. H ₂ O)	-0.6	-0.6	-0.6
Dry Gas Meter Sample Volume (DCF)	161.614	175.364	160.378
Average Dry Gas Meter Temperature (°F)	74.7	73.3	73.9
Average Orifice Meter Delta H (In. H ₂ O)	1.304	1.418	1.342
Volume Condensate Collected (MI)	65.6	55.1	53.9
Average CO ₂ Concentration (%)	0.3	0.6	0.5
Average O ₂ Concentration (%)	20.5	20.2	20.5
Average Square Root of Delta P (In. H ₂ O ^{1/2})	1.156	1.190	1.156
Average Stack Gas Temperature (°F)	152.9	135.6	150.2
Organic Particulate Matter (Grams, G)	0.0022	0.0034	0.0032

CALCULATED DATA

Absolute Pressure (In. Hg)	29.02	29.02	29.02
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	154.770	168.405	153.823
Water Vapor Volume at Standard Conditions (SCF)	3.088	2.594	2.537
Moisture Fraction (Unitless)	0.020	0.015	0.016
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.87	28.90	28.90
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.66	28.74	28.72
Stack Gas Velocity (FPS)	71.3	72.2	71.0
Stack Gas Flow Rate at Actual Conditions (ACFM)	634,806	643,288	632,917
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	520,091	544,814	522,626
Isokinetic Sampling (%)	99.5	99.6	106.7

OPM Emission Concentration (Gr/DSCF)	0.0002	0.0003	0.0003
OPM Emission Concentration (Lb/DSCF)	3.13E-008	4.45E-008	4.59E-008
OPM Emission Rate (Lb/Hr)	0.98	1.46	1.44
OPM Emission Concentration (Lb/Ton Process Weight)	0.010	0.014	0.014

Average Stack Gas Flow Rate at Actual Conditions (ACFM)
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)
Average OPM Emission Concentration (Gr/DSCF)
Average OPM Emission Concentration (Lb/DSCF)
Average OPM Emission Rate (Lb/Hr)
Average OPM Emission Concentration (Lb/Ton Process Weight)

637,004
529,177
0.0003
4.06E-008
1.29
0.013

Signature of Reviewer:



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TABLE 2
EPA METHOD 12
LEAD (PB) EMISSIONS TEST RESULTS

CLIENT: SDI-PITTSBORO PROJECT NO.: 04-T-294
 SOURCE TESTED: ELECTRIC ARC FURNACE - BAGHOUSE OUTLET DATA INPUT BY: FHG

INPUT DATA

Run Number	1	2	3
Date	27-Oct-04	27-Oct-04	28-Oct-04
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	1101-1322	1456-1826	0843-1056
Sampling Time (Minutes)	120	185	120
Average Process Weight Rate (TPH)	100.0	100.0	100.0
Stack Area (Ft ²)	148.49	148.49	148.49
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.997	0.997	0.997
Nozzle Area (Ft ²)	0.000185	0.000185	0.000185
Barometric Pressure (In. Hg)	29.06	29.06	29.15
Static Pressure (In. H2O)	-0.55	-0.55	-0.55
Dry Gas Meter Sample Volume (DCF)	81.746	128.030	78.336
Average Dry Gas Meter Temperature (°F)	78.8	77.4	67.0
Average Orifice Meter Delta H (In. H2O)	1.263	1.312	1.164
Volume Condensate Collected (MI)	52.5	54.9	40.6
Average CO2 Concentration (%)	0.0	0.0	0.0
Average O2 Concentration (%)	20.6	20.6	20.6
Average Square Root of Delta P (In. H2O ^{1/2})	1.159	1.164	1.136
Average Stack Gas Temperature (°F)	152.9	135.3	147.6
Pb Mass Concentration (Milligrams, mg)	0.050	0.000	0.025

CALCULATED DATA

Absolute Pressure (In. Hg)	29.02	29.02	29.11
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	77.828	122.244	76.472
Water Vapor Volume at Standard Conditions (SCF)	2.471	2.584	1.911
Moisture Fraction (Unitless)	0.031	0.021	0.024
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.82	28.82	28.82
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.49	28.60	28.56
Stack Gas Velocity (FPS)	71.6	70.8	69.7
Stack Gas Flow Rate at Actual Conditions (ACFM)	638,220	630,943	621,352
Stack Gas Flow Rate at Standard Conditions (SCFM)	533,377	542,890	525,427
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	516,962	531,651	476,697
Isokinetic Sampling (%)	101.0	100.0	100.0
Pb Emissions Concentration (Gr/DSCF)	0.00001	0.00000	0.00001
Pb Emissions Concentration (Lb/DSCF)	1.42E-009	0.00E+000	7.21E-010
Pb Emissions Rate (Lb/Hr)	0.044	0.000	0.021
Pb Emissions Concentration (Lb/TPW)	0.000	0.000	0.000

Average Stack Gas Flow Rate at Actual Conditions (ACFM)
 Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)
 Average F Emissions Concentration (Gr/DSCF)
 Average F Emissions Concentration (Lb/DSCF)
 Average F Emissions Rate (Lb/Hr)
 Average F Emissions Concentration (Lb/TPW)

630,172	
508,437	
0.00000	Emission
7.12E-010	Limit:
0.022	0.134 Lb/Hr
0.000	

Signature of Reviewer:

Fuel H. Gek

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TABLE 3
EPA METHOD 7E
NITROGEN OXIDES EMISSIONS TEST RESULTS

CLIENT: SDI-PITTSBORO PROJECT NO.: 04-T-294
SOURCE TESTED: ELECTRIC ARC FURNACE - BAGHOUSE OUTLET DATA INPUT BY: FHG

INPUT DATA

Run Number	1	2	3
Date	28-Oct-04	28-Oct-04	28-Oct-04
Sampling Location	Stack	Stack	Stack
Test Time, Start-Stop (24 Hour)	1738-1838	1905-2005	2027-2137
Sampling Time (Minutes)	60	60	60
Average Process Weight Rate (TPH)	100.0	100.0	110.0
Stack Area (Ft ²)	148.5	148.5	148.5
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.995	0.995	0.995
Barometric Pressure (In. Hg)	29.15	29.15	29.15
Static Pressure (In. H ₂ O)	-0.6	-0.6	-0.6
Dry Gas Meter Sample Volume (DSV)	26.237	25.202	25.226
Average Dry Gas Meter Temperature (°F)	72.6	74.2	74.2
Average Orifice Meter Delta H (In. H ₂ O)	1.800	1.800	1.800
Volume Condensate Collected (ML)	9.2	13.0	16.0
Average CO ₂ Concentration (%)	0.3	0.2	0.5
Average O ₂ Concentration (%)	22.0	22.0	21.7
Average Square Root of Delta P (In. H ₂ O ^{1/2})	1.160	1.160	1.175
Average Stack Gas Temperature (°F)	153.8	139.8	147.2
Average Corrected NO_x concentration as NO₂ (ppmv)	3.86	8.97	8.25

CALCULATED DATA

Absolute Pressure (In. Hg)	29.11	29.11	29.11
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	25.334	24.260	24.280
Water Vapor Volume at Standard Conditions (SCF)	0.433	0.612	0.753
Moisture Fraction (Unitless)	0.017	0.025	0.030
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.93	28.91	28.95
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.74	28.64	28.62
Stack Gas Velocity (FPS)	71.3	70.7	72.0
Stack Gas Flow Rate at Actual Conditions (ACFM)	635,404	629,480	641,607
Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)	522,936	525,912	526,593
NO _x Emission Concentration (Gr/DSCF)	3.23E-003	7.50E-003	6.90E-003
NO _x Emission Concentration (Lb/DSCF)	4.61E-007	1.07E-006	9.85E-007
NO _x Emission Rate (Lb/Hr)	14.46	33.80	31.12
NO _x Emission Concentration (Lb/TPW)	0.1446	0.3380	0.2829

Average Stack Gas Flow Rate at Actual Conditions (ACFM)
Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)
Average **NO_x** Emission Concentration (Gr/DSCF)
Average **NO_x** Emission Concentration (Lb/DSCF)
Average **NO_x** Emission Rate (Lb/Hr)
Average **NO_x** Emission Concentration (Lb/TPW)

635,497
525,147
0.0059
8.39E-007
26.46
0.2552

Signature of Reviewer:



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TABLE 4
EPA METHOD 25A
TOTAL GASEOUS ORGANIC EMISSIONS TEST RESULTS

CLIENT: SDI-PITTSBORO

PROJECT NO.: 04-T-294

SOURCE TESTED: ELECTRIC ARC FURNACE - BAGHOUSE OUTLET

DATA INPUT BY: FHG

INPUT DATA

Run Number	1	2	3
Date	28-Oct-04	28-Oct-04	28-Oct-04
Sampling Location	Stack	Stack	Stack
Test Time, Start-Stop (24 Hour)	1738-1838	1905-2005	2027-2137
Sampling Time (Minutes)	60	60	60
Average Process Weight Rate (TPH)	100.0	100.0	110.0
Stack Area (Ft ²)	148.5	148.5	148.5
Pitot Tube Coefficient (Unitless)	0.84	0.84	0.84
Dry Gas Meter Correction Factor (Unitless)	0.995	0.995	0.995
Barometric Pressure (In. Hg)	29.15	29.15	29.15
Static Pressure (In. H ₂ O)	-0.6	-0.6	-0.6
Dry Gas Meter Sample Volume (DCF)	26.237	25.202	25.226
Average Dry Gas Meter Temperature (°F)	72.6	74.2	74.3
Average Orifice Meter Delta H (In. H ₂ O)	1.800	1.800	1.800
Volume Condensate Collected (MI)	9.2	13.0	16.0
Average CO ₂ Concentration (%)	0.3	0.2	0.5
Average O ₂ Concentration (%)	22.0	22.0	21.7
Average Square Root of Delta P (In. H ₂ O ^{1/2})	1.160	1.160	1.175
Average Stack Gas Temperature (°F)	153.8	139.8	147.2
Average Corrected TGO Concentration as Methane (PPMV)	3.61	4.02	3.37

CALCULATED DATA

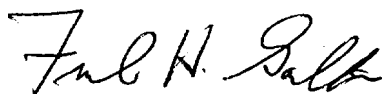
Absolute Pressure (In. Hg)	29.11	29.11	29.11
Dry Gas Meter Sample Volume at Standard Conditions (DSCF)	25.334	24.260	24.280
Water Vapor Volume at Standard Conditions (SCF)	0.433	0.612	0.753
Moisture Fraction (Unitless)	0.017	0.025	0.030
Dry Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.93	28.91	28.95
Wet Molecular Weight of Stack Gas (Lb/Lb-Mole)	28.74	28.64	28.62
Stack Gas Velocity (FPS)	71.3	70.7	72.0
Stack Gas Flow Rate at Actual Conditions (ACFM)	635,404	629,480	641,607
Stack Gas Flow Rate at Standard Conditions (SCFM)	531,875	539,177	542,927

TGO Emission Concentration (Gr/SCF)	1.05E-003	1.17E-003	9.80E-004
TGO Emission Concentration (Lb/SCF)	1.50E-007	1.67E-007	1.40E-007
TGO Emission Rate (Lb/Hr)	4.79	5.40	4.56
TGO Emission Concentration (Lb/Ton Process Weight)	0.0479	0.0540	0.0414

Average Stack Gas Flow Rate at Actual Conditions (ACFM)
 Average Stack Gas Flow Rate at Dry Standard Conditions (DSCFM)
 Average TGO Emission Concentration (Gr/DSCF)
 Average TGO Emission Concentration (Lb/DSCF)
 Average TGO Emission Rate (Lb/Hr)
 Average TGO Emission Concentration (Lb/Ton Process Weight)

635,497
537,993
0.0011
1.52E-007
0.0478

Signature of Reviewer:



RF EXHAUST STACK

G/SA ENVIRONMENTAL TESTING CONSULTANTS

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TABLE 5**EPA METHOD 7E****NITROGEN OXIDES (NO_x) EMISSIONS TEST RESULTS**

CLIENT: STEEL DYNAMICS, INC. - PITTSBORO

PROJECT NO.: 04-T-294

SOURCE TESTED: REHEAT FURNACE

DATA INPUT BY: FHG

INPUT DATA

	1	2	3
Run Number			
Date	27-Oct-04	27-Oct-04	28-Oct-04
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	1858-1958	2013-2113	0744-0844
Sampling Time (Minutes)	30	30	60
Representative NG Fuel (F) Factor (DSCF/mmBtu)	8710	8710	8710
Average O ₂ Concentration (%)	6.2	6.2	7.6
Average Corrected NO_x Concentration as NO₂ (PPMV)	37.59	35.84	37.93

CALCULATED DATA

NO _x Emissions Concentration (Lb/DSCF)	4.49E-006	4.28E-006	4.53E-006
NO _x Emissions Concentration Per "F" Factor (Lb/mmBtu)	0.056	0.053	0.062

Average NO_x Emissions Concentration (Lb/DSCF)

4.39E-006

Emission Limit:

Average NO_x Emissions Concentration Per "F" Factor (Lb/mmBtu)

0.057

0.11 Lb/mmBtu

Signature of Reviewer:



3.0 FACILITY DESCRIPTION

Steel Dynamics, Inc. Bar Products Division is located at 8000 N. County Road 225E, Pittsboro, Indiana. The facility is located by the 1-74 interchange. The facility occupies a 280 acre tract of land, and is surrounded by farmland. The latitude of the facility is 31 degrees, 52 minutes, 30 seconds. The longitude is 86 degrees, 28 minutes, 45 seconds. The facility's Dun and Bradstreet Number is 808202725.

The principal activity at the Steel Dynamics facility is the production of carbon steel. The Standard Industrial Classification (SIC) Code for the facility is 3312 Steel Works, Blast Furnaces, and Rolling and Finishing Mills. The plant employs approximately 300 people.

The facility operates one (1) batch mode Electric Arc Furnace (EAF) with a nominal capacity of 125 tons of steel per hour, utilizing a particulate capture system consisting of a fourth hole duct (direct shell evacuation) system exhausting to a reverse air baghouse. The reverse air baghouse has a design flow rate of 675,000 actual cubic feet per minute.

The facility also operates one (1) Ladle Metallurgical Station (LMS), with a nominal capacity of 125 tons per hour, to refine steel. This process exhausts to a separate LMS baghouse with a design flow rate of 85,000 actual cubic feet per minute.

Both the EAF Baghouse and LMS Baghouse exhaust to the same common stack.

The facility operates one (1) Continuous Caster that is located in a separate room from the EAF and LMS. Particulate emissions are controlled with a lid with fugitives exhausted to a roof monitor (vent).

The facility operates one (1) Reheat Furnace, with a nominal capacity of 185 MMBTU per hour. The Reheat Furnace is equipped with natural gas fueled low NOx burners and exhausts to a stack located adjacent to the furnace.

The compliance test for particulate and lead emissions from the EAF/LMS common stack was performed on October 27 and 28, 2004. The compliance test for NOx emissions from the Reheat Furnace was also performed on October 27 and 28, 2004.

Process operating data recorded during these tests can be found in Appendix B of this report.

FIGURES

FIGURES

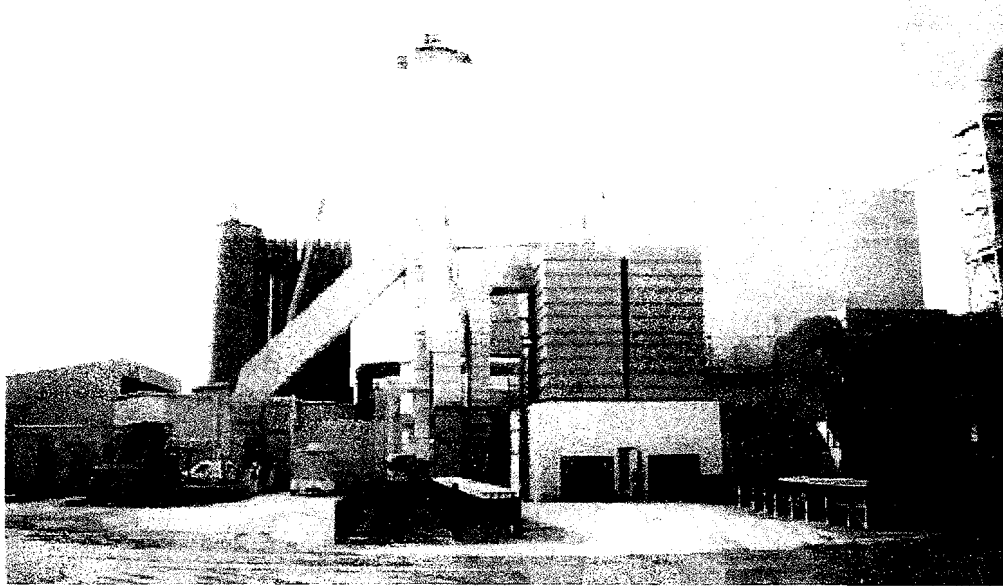


Figure 1 - Electric Arc Furnace - Baghouse/Stack Configuration

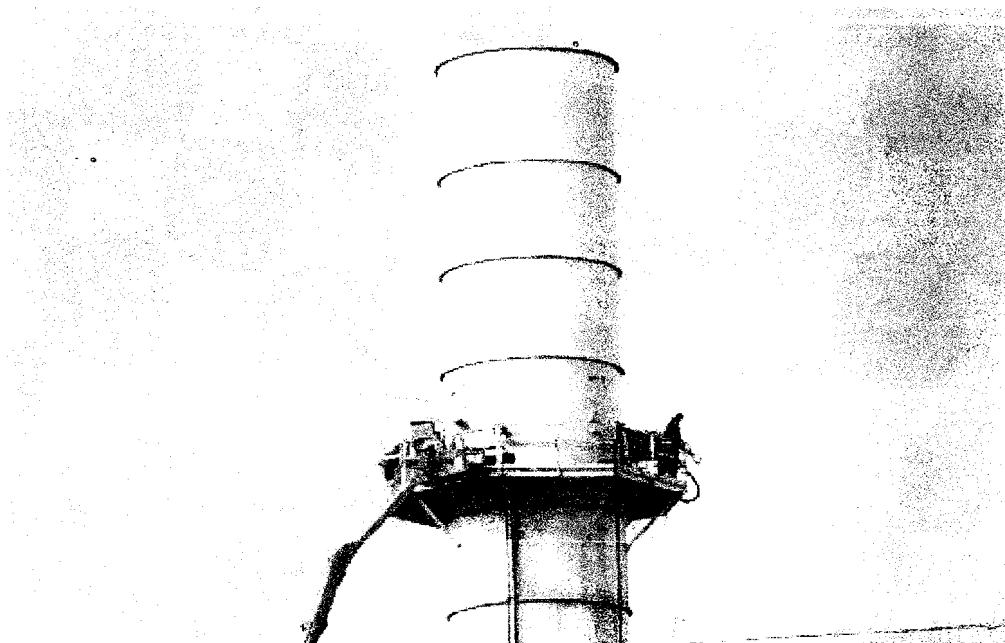


Figure 2 - Electric Arc Furnace - Stack Sampling Location

FIGURES (CONT.)



Figure 3 - Reheat Furnace - Stack Configuration

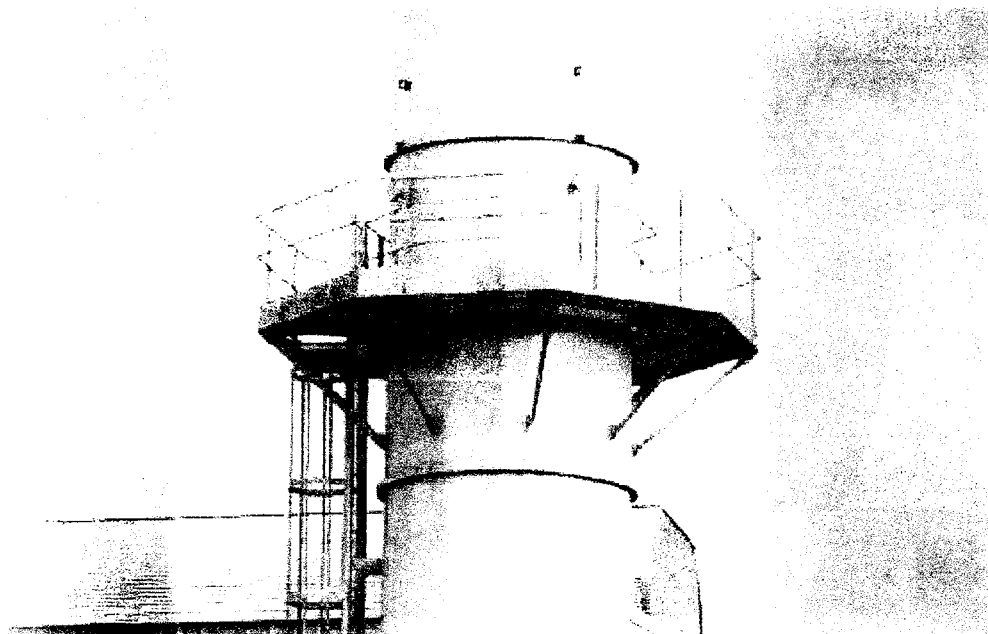


Figure 4 - Reheat Furnace - Stack Sampling Location

4.0 TEST PROCEDURES

G/SA, and G/SA's affiliates and subcontractors use all current USEPA accepted testing methodologies in their Air Quality Programs as listed in the U.S. Code of Federal Regulations, Title 40, Part 51, Appendix M and Part 60, Appendix A. For this testing program, the following specific methodologies were utilized:

USEPA Method 1 - Sample and Velocity Traverses for Stationary Sources

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

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

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

USEPA Method 4 - Determination of Moisture Content in Stack Gases

USEPA Method 5 - Determination of Particulate Emissions from Stationary Sources

USEPA Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)

USEPA Method 12 - Determination of Total Lead Emissions from Stationary Sources

EPA Method 25A - Determination of Total Gaseous Organic Concentration Using

a Flame Ionization Analyzer

USEPA Method 202 - Determination of Condensible Particulate Emissions from Stationary Sources

USEPA Methods 2, 4, 51202 and 12 were performed at the EAF sampling location using two (2) Apex Instruments, Model 522, control units and sampling trains incorporating 7', effective length, stainless-steel probes with heated, borosilicate glass liners, stainless-steel nozzles and Type S, stainless-steel pitot tubes, 1/4" O.D., stainless-steel static pressure/gas sampling tubes and Type K (Chromel/Alumel) thermocouples; aluminum filter ovens and borosilicate glass filter holders with Teflon filter supports with Viton-O-Rings, and 0.3 micron (99.9% retention), Whatman 8.2 cm, glass microfiber filters (Method 51202) or quartz filters (Method 12); foam insulated, aluminum impinger units with the appropriate Greenburg-Smith and modified Greenburg-Smith glass impinger assemblies, and stainless-steel umbilical adapters with Type K (Chromel/Alumel) gas exit thermocouples; and two (2)-90' umbilicals with various interconnecting fittings, plugs and connectors.

USEPA Method 3 was performed at the EAF sampling location during the PM/CPM and Lead testing to determine exhaust gas concentrations of CO, and O₂, using a Bacharach, Duplex Fyrite Kit, Gas Analyzer 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

USEPA Method 3A was performed at the EAF sampling location during the Method 6C and 7E testing, and at the RF sampling location during the Method 7E and 10 testing using a Liston, NDIR CO₂ Monitor and Paramagnetic O₂ Monitor to determine stack gas concentrations of CO, and O₂, respectively.

USEPA Methods 7E and 25A were performed at the EAF and RF IAP testing locations using a Thermo-Electron, Model 43 Chemiluminescent NO/NO_x Monitor (EAF baghouse outlet and RF exhaust stack) and a VIG, Model 20, FID Monitor (EAF exhaust stack), respectively.

The aforementioned monitors at both IAP testing locations incorporated a 6', effective length, stainless-steel, heated sample probe with sintered, stainless-steel filter; a Teflon condenser assembly with peristaltic pump; ¼" O.D. × 300' long Teflon sample line and bias-check line; a Strata, Version 2.0, Data Acquisition System; two (2) #1 cylinders of certified zero grade N₂ gas, several #1 cylinders of protocol CO₂, O₂, NO_x and VOC span gases; and various interconnecting regulators, Teflon tubing, stainless-steel fittings and valves.

Calibration data, including on-site dry gas meter calibration checks, and pretest run and post-test run IAP calibrations of the aforementioned instrumentation, and calibration span gas certifications can be found in Appendix E.

Cyclonic flow checks were omitted at the EAF baghouse outlet and RF 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 at each sampling location.

At the conclusion of each PMICPM test run, impinger sample (CPM) pH levels were determined with EM colorpHast pH Strips with a 0 to 6 pH range. Impinger contents were purged, if applicable, with prefiltered ambient air utilizing a W.A. Hammond Drierite Gas Purifier (ambient air conditioning tube) or nitrogen (N_2) utilizing a Gast ¼ h.p. vacuum pump incorporating a Dwyer, Model RMA-23-SSV, Rate-Master Flowmeter (5-50 lpm range), and ¼" O.D. latex rubber tubing, regulators, interconnecting fittings and valves. Because each impinger sample solution indicated a pH > 4.5, the option to perform a one (1) hour ambient air or N_2 purge was exercised after each PMICPM test run.

The gas stream data collected at the EAF baghouse outlet sampling location during the USEPA Methods 2, 3, 3A, 4, 51202, and 12 testing, to determine stack gas conditions, was used in conjunction with USEPA Methods 7E and 25A testing to obtain NO_x and VOC calculated emissions results.

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

Certifications and material safety data for the chemical reagents used in performing the PM/CPM and Lead testing and sample recovery procedures are included in Appendix D.

No significant process deviations or upsets occurred during the emissions testing periods.

The emissions test data and supporting data collected during the onsite sampling can be found in Appendix A of this report. The PM/CPM, Lead, NO_x and VOC emissions values and CEMS opacities, and relative data are presented in the "Test Results Summary".

5.0 ANALYTICAL PROCEDURES

G/SA, and G/SA's affiliates and subcontractors utilize all current analytical procedures outlined in the following reference methods as listed in the U.S. Code of Federal Regulations, Title 40, Part 51, Appendix M and Part 60, Appendix A:

USEPA Method 1 - Sample and Velocity Traverses for Stationary Sources

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

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

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

USEPA Method 4 - Determination of Moisture Content in Stack Gases

USEPA Method 5 - Determination of Particulate Emissions from Stationary Sources

USEPA Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)

USEPA Method 12 - Determination of Total Lead Emissions from Stationary Sources

EPA Method 25A - Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

USEPA Method 202 - Determination of Condensable Particulate Emissions from Stationary Sources

A Bacharach, Duplex Fyrite Kit, Gas Analyzer was used to perform Method 3 to determine concentrations of CO₂ and O₂. An AND, Model EK-1200G, Electronic Toploading Balance was used to weigh spent silica gel from the USEPA Method 4, 51202 (PMICPM) and 12 (Pb) testing to determine, in part, stack gas moisture contents. A Mettler, Model AE-163 , Electronic Analytical Balance was used to perform USEPA Method 51202 (PMICPM) gravimetric analysis. A Thermo-Electron, Model 43 Chemiluminescent NO/NO_x Monitor and a VIG , Model 20, FID VOC Monitor was used to conduct USEPA Methods 7E and 25A IAP to determine NO_x and VOC emissions concentrations, respectively.

No analytical procedure errors occurred during the PMICPM and Lead analyses phase of the testing program.

All pertinent laboratory analyses and IAP analytical data can be found in Appendix C of this report.

6.0 QUALITY ASSURANCE PROCEDURES

Each reference method presented in the U.S. Code of Federal Regulations details the instrument calibration requirements, sample turnover and analysis, data reduction and verification, types of equipment required and the appropriate sampling and analytical procedures to assure maximum performance and accuracy. G/SA, and G/SA's affiliates and subcontractors adhere to the guidelines for quality control set forth by the United States Environmental Protection Agency. These procedures are outlined in the following documents:

Code of Federal Regulations, Title 40, Part 51

Code of Federal Regulations, Title 40, Part 60

Quality Assurance Handbook, Volume 1, EPA 600/19-76-005

Quality Assurance Handbook, Volume 2, EPA 600/4-77-027a

Quality Assurance Handbook, Volume 3, EPA 600/14-77-027b

7.0 CONCLUSIONS

EAFILMS Baghouse Stack exhaust demonstrated an average total PM_{10} (PM/CPM) emissions concentration of 0.0008 grldscf during the compliance testing, which is 17.1% of the limit (0.0052 grldscf) established in SDI's air permit.

EAFILMS Baghouse Stack exhaust demonstrated an average average PM emissions concentration of 0.0004 grldscf during the compliance testing, which is 22.2% of the 0.0018 grldscf limit established in SDI's air permit.

The average opacity from the EAFILMS Baghouse Stack exhaust throughout the testing periods was 0.48%, with no six-minute average greater than 3.0%. The air permit establishes an opacity limit of 3.0%, as a six-minute average.

The EAFILMS Baghouse Stack exhaust demonstrated an average NO_x emissions rate of 26.46 lblhr during the compliance testing, which is 60.5% of the 43.75 lblhr limit established in SDI's air permit. The average NO_x emissions per ton of steel produced was 0.2552 lblton, well below the 0.35 lb/ton limit established in SDI's air permit.

The EAFILMS Baghouse Stack exhaust demonstrated an average VOC emissions rate of 4.92 lblhr, which is 42.8% of the 11.5 lblhr limit established in SDI's air permit. The

average VOC emissions per ton of steel produced was 0.0478, well below the 0.09 lb/ton limit established in SDI's air permit.

The Reheat Furnace Stack exhaust demonstrated an average NO_x emissions concentration of 0.057 lb/mmBtu during the compliance testing, which is 71.3% of the 0.08 lb/mmBtu limit established in SDI's air permit.

The usefulness and/or significance of the emissions values presented in this document as they relate to the compliance status of the EAF and RF based on process operations shall be determined by others.

For additional information pertaining to the testing program see Appendix G at the end of this report.

APPENDICES

APPENDIX A
FIELD TEST DATA

EAF Baghouse Outlet

1.0

USEPA METHOD 1

S.A.T., LLC

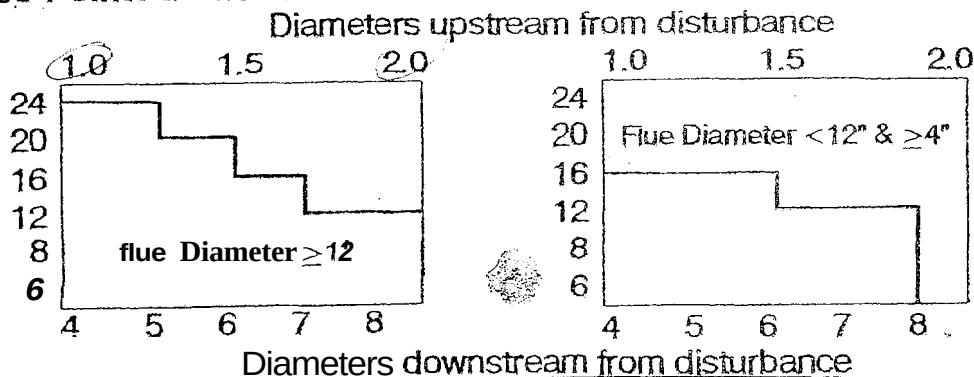
Rt. 2, Box 2165, Wheatland, MO 65779

TEL/FAX (417) 282-6140

EPA METHOD 1 - SITE DETERMINATION FIELD DATA SHEETClient: SDI PITTSBORO
Source: EAF OUTLETProject No.: 04-T-281
Date: 08/20/04**Flue Data:**

Distance from far inside wall to outside of port 171 in.
 Port length 6 in.
 I.D. or depth of flue 110.5 in.
 Width of flue (red.) N/A in.
 Area of flue 148.41 sq. ft.
 Equivalent dia., De = 2LW
 (L+W)

De = 110.5 in.
 Distance from the nearest flow disturbance to the center line of the test ports:
 Upstream (A) 420 in. Downstream (B) 390 in.
 Number of diameters 2.55 unitless Number of diameters 2.30 unitless

Traverse Points Determination:

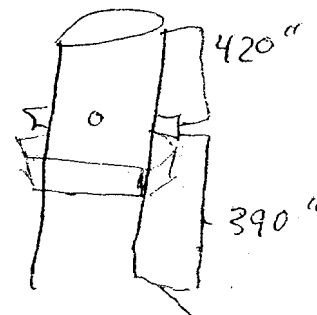
Minimum number of traverse points

Traverse Points Measurements:

Inverse Points Measurements.							
Circular flue (Percentage of flue diameter) /				Rectangular flue (Percentage of flue depth)			
Point No-	2	4	6	8	10	12	
1	74.6	125.0	6.7 / 12.5	4.4 / 8.3	3.2 / 6.3	2.6 / 5.0	2.1 / 4.2
2	85.4 / 75.0	25.0 / 37.5	14.6 / 25.0	10.5 / 18.8	8.2 / 15.0	6.7 / 12.5	
3		75.0 / 62.5	29.6 / 41.7	19.4 / 37.3	14.6 / 25.0	11.8 / 20.8	
4		93.3 / 87.5	70.4 / 58.3	32.3 / 4-38	22.6 / 35.0	17.7 / 29.2	
5			85.4 / 75.0	67.7 / 56.3	34.2 / 45.0	25.0 / 37.5	
6			95.6 / 91.7	80.6 / 68.8	65.8 / 55.0	35.6 / 45.8	
7				89.5 / 81.3	77.4 / 65.0	64.4 / 54.2	
8				96.8 / 93.8	85.4 / 75.0	75.0 / 62.5	
9					91.8 / 85.0	82.3 / 70.8	
10					97.4 / 95.0	88.2 / 79.2	
11						93.3 / 87.5	
12						97.9 / 95.8	

Traverse Points Dimensions:

1	<u>3.47</u>	in.	7	_____	in.
2	<u>11.06</u>	in.	8	_____	in.
3	<u>19.47</u>	in.	9	_____	in.
4	<u>29.21</u>	in.	10	_____	in.
5	<u>41.25</u>	in.	11	_____	in.
6	<u>58.74</u>	in.	12	_____	in.

Sketch Of Flue

USEPA METHOD 2/4

EPA Method 2 / 4 (SGFRD / SGMCD) Testing - Field Data Sheet

Run # 1 Traverse Location

Client 301 Project # 01-1-274
 Plant Pittsburg Unit TAFE
 Date 10-28-04 Project Site Pittsburg, TN
 Meter Operator B. Roston
 Probe Operator A. Vachell

Control Unit # 912447 Meter Y (C Factor) 0.995
 Filter Oven # 1019 Meter Delta H@ 1.890
 Condnsr./Impngt. # G54-8 Meter K (Orifice Factor) 3.369
 Pilot # 0-5 Pilot Cp 0.64 Final OK
 Pilot Leak Check: Initial OK
 DGM Leak Rate Before: 0.0 CFM @ 15 in. Hg
 DGM Leak Rate After: 0.0 CFM @ 10 in. Hg
 Static Pressure ($\pm$ in. H₂O) -0.55

Schematic of Stack Cross Section



First traverse point all the way ☒ In ☐ Out
 Inside Dimension(s) Point Dimen.: Gas Flow
 (in.) (in.) Direction
 Diameter 16.5 Dia. 6 In. Out ☒

Ambient Temperature (°F) 67 Baro. Press. (in. Hg) 29.15
 SG Flow Rate (actfm) SG Moisture Content (%)
 Probe Length (ft.) 5
 Probe Heater Setting (°F) 255
 Oven Heater Setting (°F) 255
 IGS Bag # R- Gas Analyzer # G54-1
 %CO₂ %O₂
 Condensate (ml/g) -18 Silica Gel (g)
 Total Volume Of Liquid Collected, Vlc (ml)
 Start Time (24 Hour) 17:26 Stop Time (24 Hour) 18:10

Traverse Point Number	Stack Waits Time (min)	Stack Gas Temp (°F)	Velocity Head Delta Ps (in. H ₂ O)	Orifice Meter Pressure Differential (in. H ₂ O)	Dry Gas Sample Volume (in. H ₂ O)	Dry Gas Meter Temp (°F)	Probe Line Temp (°F)	Filter Oven Temp (°F)	Condensate Impinger Temp (°F)	Pump Vacuum (in. Hg)	Notes
1	1.5	153	1.35	1.80	979.874	72	256	252	54	3.5	
2	3	153	1.41	1.80	982.961	72	255	252	53	3.5	
3	8.5	154	1.38	1.80	983.926	72	254	251	52	3.5	
4	6.5	154	1.35	1.80	986.118	72	255	252	52	3.5	
5	4.5	154	1.35	1.80	986.118	72	254	256	51	3.5	
6	10.5	154	1.30	1.80	987.017	72	254	256	51	3.5	
7	12	152	1.73	1.80	988.224	72	256	258	51	3.5	
8	13.5	152	1.70	1.80	989.575	72	256	258	51	3.5	
9	15	151	1.75	1.80	990.218	72	256	258	51	3.5	
10	15.5	150	1.32	1.80	991.367	72	254	254	52	3.5	
11	18.5	149	1.40	1.80	992.462	73	256	256	53	3.5	
12	18	156	1.45	1.80	993.468	73	255	255	53	3.5	
13	17.5	147	1.05	1.80	994.496	73	256	285	53	3.5	
14	21	146	1.08	1.80	995.661	73	257	285	53	3.5	
15	22.5	147	1.21	1.80	996.617	73	256	285	53	3.5	
16	24	150	1.20	1.80	997.618	73	254	285	53	3.5	
17	25.5	152	1.25	1.80	998.738	73	256	285	53	3.5	
18	27	155	1.28	1.80	999.738	73	256	285	53	3.5	
19	28.5	157	1.30	1.80	1,000.766	73	257	285	53	3.5	
20	30	157	1.35	1.80	1,001.624	73	257	285	53	3.5	
21	31.5	158	1.40	1.80	1,002.911	73	258	285	53	3.5	
22	33	159	1.45	1.80	1,003.956	73	258	285	53	3.5	
23	34.5	160	1.60	1.80	1,005.062	73	259	285	53	3.5	
24	36	163	1.65	1.80	1,006.061	73	259	285	53	3.5	
Averages / Totals					26.737						

EPA Method 2 / 4 (SGFRD / SGMCD) Testing - Field Data Sheet

Run # 2		Traverse Location		Schematic of Stack Cross Section	
Client	SDI	Project #	04-T-294	Ambient Temperature (°F)	60
Plant	Pyrolysis	Unit	FAF	SG Flow Rate (acfm)	
Date	10-29-04	Project Site	Pyrolysis, IN	Probe Length (ft.)	5
Meter Operator	A. R. R.	Probe Heater Setting (°F)	255	Probe Heater Setting (°F)	255
Probe Operator	A. R. R.	Oven Heater Setting (°F)	255	Gas Analyzer #	65A-1
Control Unit #	412047	Meter Y/C Factor	0.995	%CO2	
Filter Oven #	1019	Meter Delta H@	1.416	Condensate (ml/g)	3
Condenser Impinger #	65A-8	Meter K (Orifice Factor)	3.369	Silica Gel (g)	10
Pilot #	P-5	Pilot Cp	0.84	Total Volume Of Liquid Collected, Vlc (ml)	
Pilot Leak Check: Initial	OK	Final	OK	Start Time (24 Hour)	19:20
DGM Leak Rate Before:	0.0	CFM @ 15 in. Hg		Stop Time (24 Hour)	20:03
DGM Leak Rate After:	0.0	CFM @ 10 in. Hg			
Static Pressure (± in. H2O)	-0.55				

See R1

Traverse Point Number	Stack Water Temp (°F)	Stack Gas Temp (°F)	Velocity (ft/min)	Orifice Meter Pressure Differential (in. H2O)	Dry Gas Meter Sample Volume (ft³)	Dry Gas Meter Initial Volume (ft³)	Dry Gas Meter Temp (°F)	Probe Line Temp (°F)	Filter Oven Temp (°F)	Condenser Impinger Outlet Temp (°F)	Pump Vacuum (in. Hg)	Notes
A 1	1.5	138	1.25	1.80	7.950	6.400	75	254	256	51	3.5	
A 2	3	138	1.22	1.80	8.512		75	256	256	51	3.5	
A 3	6	139	1.24	1.80	9.520		75	263	255	51	3.5	
A 4	10	140	1.27	1.80	10.581		75	254	258	51	3.5	
A 5	140	140	1.25	1.80	11.648		75	255	251	51	3.5	
B 1	140	140	1.18	1.80	12.712		74	256	256	51	3.5	
B 2	141	141	1.15	1.80	13.719		74	257	261	51	3.5	
B 3	142	142	1.23	1.80	14.692		74	256	258	51	3.5	
B 4	143	143	1.33	1.80	15.820		74	254	257	51	3.5	
B 5	142	142	1.20	1.80	16.492		74	255	256	51	3.5	
B 6	140	140	1.21	1.80	17.948		75	256	254	51	3.5	
C 1	139	139	1.20	1.80	18.070		74	254	256	51	3.5	
C 2	138	138	1.30	1.80	20.062		74	256	254	51	3.5	
C 3	138	138	1.34	1.80	21.092		74	250	255	51	3.5	
C 4	137	137	1.47	1.80	22.192		74	250	256	51	3.5	
C 5	137	137	1.50	1.80	23.195		74	250	256	50	3.5	
C 6	137	137	1.53	1.80	24.201		74	251	254	50	3.5	
D 1	137	137	1.50	1.80	25.320		74	251	255	50	3.5	
D 2	137	137	1.40	1.80	26.380		74	251	257	50	3.5	
D 3	136	136	1.50	1.80	27.420		74	251	256	50	3.5	
D 4	140	140	1.29	1.80	28.455		74	251	256	50	3.5	
D 5	144	144	1.35	1.80	29.571		74	252	256	50	3.5	
D 6	145	145	1.38	1.80	30.568		74	257	257	50	3.5	
E 1	146	146	1.45	1.80	31.602		74	251	256	50	3.5	
Averages / Totals												

EPA Method 2 / 4 (SGFRD / SGMCD) Testing - Field Data Sheet

Run # 3		Traverse Location		Bachpouse Outlet	
Client	SOT	Project #	04-T-294	Unit	EAF
Plant	Pittsboro	Project Site	Pittsboro	Meter Operator	B. Peyton
Date	10-24-04	Probe Operator	A. Kendall	Control Unit #	812047
		Filler Oven #	1018	Meter Delta H ₂ O	0.995
		Condenser Amps	gr. #GSA-8	Meter K / Office Factor	3.940
		Pilot #	0.5	Pilot Cp	0.44
		Pilot Leak Check: Initial	OK	Final	OK
		DGM Leak Rate Before:	0.0	CFM @ 15	In. Hg
		DGM Leak Rate After:	0.0	CFM @ 11	In. Hg
		Static Pressure (± In. H ₂ O)	-0.55		

Schematic of Stack Cross Section	
see R1	
First traverse point all the way	(In) Out
Inside Dimension(s)	Port Dimen. Gas Flow Direction
(in.)	(in.)
Diameter	Dia. 6 In
	W

Field Data Sheet	
Ambient Temperature (°F)	60 Barometric Press. (in. Hg)
SG Flow Rate (acfm)	SG Moisture Content (%)
Probe Length (ft.)	3
Probe Heater Setting (°F)	255
Oven Heater Setting (°F)	255
GS Bag #	R-3
%CO ₂	
H ₂ O (ml/g)	6
Total Condensate Collected, Vlc (ml)	10
Gas Analyzer #	GSA-1
%O ₂	
Silica Gel (g)	

[illegible]

USEPA METHOD 3

USEPA METHOD 51202

EPA METHOD 5 / 202 FIELD TEST DATA

Client	SDI	Project No.	G/SA 04-T-294
Plant	Pittsboro	Unit	EAF BAGHOUSE OUTLET
Date	10/27/2004	Stack Area (ft ²)	148.5
Operator	B. Peyton	Ambient Temperature (°F)	67
Probe Operator(-)	A. Kendall	Barometric Pressure (inches Hg)	29.06
Control Unit No.	812047	Static Pressure (± inches H2O)	-0.55
Nozzle Diameter (in.)	0.177	%CO2 / %O2	0.3 / 20.5
Pitot Cp	0.84	Condensate (milliliters)	33
Filter No.	04128	Silica Gel (grams)	32.3
Meter Y	0.995	Test Time (24 hour)	0843-1318
Front-half No.	FH-1A	Sample Time (minutes)	260.0
Run No.	1	Back-half No.	BH-1W, BH-1M

Traverse Point Number	Stack Temperature Ts (°F)	Velocity Head Delta P (in. H2O)	Orifice Setting Delta H (in. H2O)	Metered Gas Volume Vm (ft³) Initial Volume 469.210	Dry Gas Meter Temperature Tm (°F)	Notes
A	1	151	1.050	1.010	70	Pretest Nozzle Cal: A = 0.177" B = 0.177" C = 0.177" Avg. = 0.177"
	1	151	1.140	1.090	70	
	2	157	1.240	1.190	72	
	2	157	1.230	1.180	73	
	3	158	1.510	1.450	73	
	3	161	1.300	1.240	73	
	4	159	1.650	1.590	74	
	4	150	1.550	1.520	75	
	5	147	1.730	1.700	75	
	5	150	1.730	1.700	75	
B	6	152	1.600	1.570	76	
	6	161	1.650	1.590	76	
	1	151	1.150	1.130	76	
	1	151	1.150	1.130	76	
	2	143	1.130	1.120	76	
	2	138	1.280	1.280	76	
	3	134	1.350	1.360	76	
	3	134	1.350	1.360	76	
	4	144	1.250	1.240	76	
	4	146	1.190	1.180	76	
	5	144	1.100	1.090	76	
	5	141	1.270	1.270	76	
	6	142	1.300	1.290	75	
	6	143	1.210	1.200	75	
	1	172	1.050	0.990	75	
Average		Avg. Sqrt.	Average	Volume Sampled	Average	

EPA Method 3 - Gas Analysis Field Data Sheet

Client P. J. S. BOND Project # 04-T-294 Fo = 20.9-%O2
 Process EAP Unit NA %CO2
 Date 10/20/11 Fuel Type NA Fo = 1.083 to
 IGS Analyzer I.D. # 1 Leak Check? NA 1.230
 Analyst Fred Allen (for bitum. coal)

Run Number	Location	Bag I.D. Number	Trial	Percent CO2	Percent CO2 + O2	Percent O2	Analytical Time
1	BO	145#1	1	0.3	20.3	20.1	17:30
			2	0.4	20.3	20.1	
			3	0.3	20.3	20.1	
			Average	0.3 ✓		20.1	
2	BO	145#2	1	0.6		20.2	
			2	0.6		20.1	
			3	0.6		20.3	
			Average	0.6 ✓		20.2	
3	BO	145#3	1	0.8		21.5	
			2	0.5		20.5	
			3	0.2		20.4	
			Average	0.5 ✓		20.5	
			1				
			2				
			3				
			Average				
			1				
			2				
			3				
			Average				
			1				
			2				
			3				
			Average				
			1				
			2				
			3				
			Average				
			1				
			2				
			3				
			Average				
			1				
			2				
			3				
			Average				

COMMENTS:

EPA METHOD 5 / 202 FIELD TEST DATA

Client	SDI	Project No.	G/SA 04-T-294
Plant	Pittsboro	Unit	EAF BAGHOUSE OUTLET
Date	10/27/2004	Stack Area (ft ²)	148.5
Operator	B. Peyton	Ambient Temperature (°F)	67
Probe Operator(s)	A. Kendall	Barometric Pressure (inches Hg)	29.06
Control Unit No.	812047	Static Pressure (± inches H ₂ O)	-0.6
Nozzle Diameter (in.)	0.177	%CO ₂ / %O ₂	0.3 / 20.5
Pitot Cp	0.84	Condensate (milliliters)	33.3
Filter No.	04128	Silica Gel (grams)	32.3
Meter Y	0.995	Test Time (24 hour)	843-1322
Run No. 1 (continued)	Back-half No. BH-1W, BH-1M	Sample Time (minutes)	260.0

Traverse Point Number		Stack Temperature	Velocity Head	Orifice Setting	Metered Gas Volume	Dry Gas Meter Temperature	Notes
		Ts (°F)	Delta P (in. H ₂ O)	Delta H (in. H ₂ O)	Vm (ft ³) Initial Volume	Tm (°F)	
C	1	166	1.290	1.230		75	
	2	157	1.200	1.160		74	
	2	150	1.250	1.220	Final Volume	74	
	3	148	1.250	1.220	630.824	74	
	3	148	1.280	1.250		73	
	4	151	1.350	1.310		73	
	4	162	1.200	1.140		73	
	5	164	1.350	1.280		73	
	5	158	1.350	1.300		73	
	6	160	1.400	1.350		74	
	6	163	1.340	1.280		74	
	6	163	1.340	1.280		74	
D	1	173	1.050	0.990		74	
	1	183	1.100	1.020		75	
	2	161	1.250	1.200		75	
	2	156	1.250	1.210		75	
	3	157	1.430	1.390		76	
	3	159	1.550	1.500		76	
	4	164	1.450	1.390		76	
	4	167	1.500	1.440		76	
	5	157	1.500	1.460		76	
	5	149	1.500	1.470		75	
	6	137	1.500	1.500		75	
	6	133	1.550	1.570		76	
D	2	136	1.375	1.385		77	
	4	151	1.445	1.445		75	
Average		152.9	Avg. Sqrt. 1.156	Average 1.304	Volume Sampled 161.614	Average 74.7	

EPA METHOD 5 / 202 FIELD TEST DATA

Client	SDI	Project No.	G/SA 04-T-294
Plant	Pittsboro	Unit	EAF BAGHOUSE OUTLET
Date	10/27/2004	Stack Area (ft ²)	148.5
Operator	B. Peyton	Ambient Temperature (°F)	65
Probe Operator(s)	A. Kendall	Barometric Pressure (inches Hg)	29.06
Control Unit No.	812047	Static Pressure (± inches H ₂ O)	-0.55
Nozzle Diameter (in.)	0.177	%CO ₂ / %O ₂	0.6 / 20.2
Pitot Cp	0.84	Condensate (milliliters)	19
Filter No.	04129	Silica Gel (grams)	36.0
Meter Y	0.995	Test Time (24 hour)	1456-2043
Front-half No.	FH-1A	Sample Time (minutes)	270.0
Run No.	2	Back-half No.	BH-1W, BH-1M

Traverse Point Number	Stack Temperature Ts (°F)	Velocity Head Delta P (in. H ₂ O)	Orifice Setting Delta H (in. H ₂ O)	Metered Gas Volume Vm (ft ³) Initial Volume 632.152	Dry Gas Meter Temperature Tm (°F)	Notes
D	1	120	1.450	1.460	68	
	1	117	1.500	1.510	68	
	2	118	1.500	1.520	69	
	2	125	1.550	1.550	69	
	3	138	1.400	1.370	70	
	3	145	1.500	1.460	71	
	4	142	1.580	1.550	71	
	4	142	1.650	1.620	72	
	5	148	1.580	1.540	72	
	5	152	1.470	1.420	72	
	6	161	1.400	1.330	72	
	6	171	1.450	1.360	72	
C	1	155	1.450	1.390	72	
	1	149	1.400	1.360	72	
	2	147	1.350	1.320	73	
	2	154	1.300	1.260	74	
	3	158	1.300	1.250	74	
	3	160	1.350	1.300	75	
	4	160	1.350	1.300	75	
	4	158	1.330	1.290	75	
	5	158	1.400	1.350	75	
	5	152	1.500	1.470	76	
	6	148	1.300	1.280	76	
	6	148	1.300	1.280	76	
B	1	129	1.290	1.310	76	
Average		Avg. Sqrt.	Average	Volume Sampled	Average	

EPA METHOD 5 / 202 FIELD TEST DATA

Client SDI
 Plant Pittsboro
 Date 10/27/2004
 Operator B. Peyton
 Probe Operator(-) A. Kendall
 Control Unit No. 812047 Nozzle Diameter (in.) 0.177
 Pitot Cp 0.84 Filter No. 04129
 Meter Y 0.995 Front-half No. FH-1A
 Run No. 2 Back-half No. BH-1W, BH-1M

Project No. G/SA 04-T-294
 Unit EAF BAGHOUSE OUTLET Stack Area (ft²) 148.5
 Ambient Temperature (°F) 65
 Barometric Pressure (inches Hg) 29.06 —
 Static Pressure (± inches H2O) -0.55
 %CO2 / %O2 0.6 / 20.2
 Condensate (milliliters) 19 Silica Gel (grams) 36.0
 Test Time (24 hour) 1456-2043
 Sample Time (minutes) 270.0

Traverse Point Number	Stack Temperature Ts (°F)	Velocity Head Delta P (in. H2O)	Orifice Setting Delta H (in. H2O)	Metered Gas Volume Vm (ft ³) Initial Volume	Dry Gas Meter Temperature Tm (°F)	Notes
B	1	127	1.330	1.360	76	
	2	126	1.280	1.310	76	
	2	124	1.450	1.490	76	
	3	123	1.300	1.340	76	
	3	122	1.380	1.420	76	
	4	121	1.450	1.490	75	
	4	117	1.350	1.400	75	
	5	110	1.400	1.470	76	
	5	109	1.300	1.370	75	
	6	105	1.450	1.530	74	
A	6	104	1.450	1.530	74	
	1	101	1.500	1.590	74	
	1	102	1.550	1.640	73	
	2	111	1.550	1.010	73	
	2	137	1.400	1.390	73	
	3	142	1.350	1.300	73	
	3	140	1.400	1.380	73	
	4	139	1.350	1.340	73	
	4	130	1.400	1.410	73	
	5	131	1.600	1.610	73	
A	5	130	1.650	1.660	73	
	6	140	1.700	1.680	73	
	6	140	1.700	1.680	73	
	2	156	1.370	1.330	73	
	4	138	1.350	1.340	73	
Average		Avg. Sqrt	Average	Volume Sampled	Average	
135.6		1.190	1.418	175.364	73.3	

EPA METHOD 5 / 202 FIELD TEST DATA

Client	SDI	Project No.	G/SA 04-T-294
Plant	Pittsboro	Unit	EAF BAGHOUSE OUTLET
Date	10/28/2004	Stack Area (ft ²)	148.5
Operator	B. Peyton	Ambient Temperature (°F)	65
Probe Operator(~)	A. Kendall	Barometric Pressure (inches Hg)	29.06
Control Unit No.	812047	Static Pressure (± inches H2O)	-0.55
Nozzle Diameter (in.)	0.177	%CO2 / %O2	0.5 / 20.5
Pitot Cp	0.84	Condensate (milliliters)	23.3
Filter No.	04129	Silica Gel (grams)	30.6
Meter Y	0.995	Test Time (24 hour)	0843-1322
Front-half No.	FH-1A	Sample Time (minutes)	240.0
Run No.	3	Back-half No.	BH-1W, BH-1M

Traverse Point Number		Stack Temperature	Velocity Head	Orifice Setting	Metered Gas Volume	Dry Gas Meter	Notes
		Ts (°F)	Delta P (in. H2O)	Delta H (in. H2O)	Vm (ft ³) Initial Volume 819.282	Tm (°F)	
A	1	134	1.280	1.230		64	
	1	132	1.280	1.240		64	
	2	133	1.350	1.300		65	
	2	137	1.350	1.300		66	
	3	139	1.500	1.450		67	
	3	140	1.550	1.500		68	
	4	135	1.700	1.670		69	
	4	132	1.750	1.720		69	
	5	134	1.650	1.630		70	
	5	134	1.650	1.630		70	
	6	154	1.800	1.580		72	
	6	159	1.150	1.710		72	
B	1	144	1.200	1.120		72	
	1	139	1.250	1.180		72	
	2	141	1.200	1.230		72	
	2	145	1.350	1.170		72	
	3	140	1.300	1.330		72	
	3	140	1.380	1.280		72	
	4	138	1.380	1.360		72	
	4	140	1.150	1.360		72	
	5	163	1.000	1.090		72	
	5	175	1.000	0.930		73	
	6	187	1.050	0.920		74	
	6	188	1.050	0.960		74	
C	1	150	1.200	1.160		75	
		Average	Avg. Sqrt.	Average	Volume Sampled	Average	

EPA METHOD 5 / 202 FIELD TEST DATA

Client	SDI	Project No.	G/SA 04-T-294
Plant	Pittsboro	Unit	EAF BAGHOUSE OUTLET
Date	1012812004	Stack Area (ft ²)	148.5
Operator	B. Peyton	Ambient Temperature (°F)	65
Probe Operator(=)	A. Kendall	Barometric Pressure (inches Hg)	29.06
Control Unit No.	812047	Static Pressure (± inches H2O)	-0.55
Nozzle Diameter (in.)	0.177	%CO2 1%O2	0.5 / 20.5
Pitot Cp	0.84	Condensate (milliliters)	23.3
Filter No.	04129	Silica Gel (grams)	30.6
Meter Y	0.995	Test Time (24 hour)	0843-1322
Run No.	3	Sample Time (minutes)	235.0
Front-half No.	FH-1A		
Back-half No.	BH-1W, BH-1M		

Traverse Point Number	Stack Temperature Ts (°F)	Velocity Head Delta P (in. H2O)	Orifice Setting Delta H (in. H2O)	Metered Gas Volume Vm (ft ³) Initial Volume	Dry Gas Meter Temperature Tm (°F)	Notes
C	1	155	1.200	1.160	75	Post-test Nozzle Cal: A = 0.178" B = 0.176" C = 0.177" Avg. = 0.177"
	2	145	1.280	1.260	75	
	2	140	1.350	1.340	75	
	3	133	1.400	1.410	76	
	3	130	1.480	1.510	77	
	4	144	1.300	1.300	79	
	4	146	1.320	1.320	79	
	5	154	1.450	1.430	79	
	5	157	1.500	1.470	79	
	6	146	1.550	1.550	80	
	6	140	1.550	1.570	81	
D	1	160	1.180	1.150	78	
	1	167	1.200	1.160	79	
	2	161	1.450	1.400	77	
	2	150	1.450	1.430	77	
	3	146	1.550	1.540	77	
	3	152	1.500	1.470	77	
	4	168	1.250	1.200	77	
	4	170	1.350	1.290	77	
	5	160	1.500	1.450	77	
	5	160	1.400	1.360	77	
	6	166	1.410	1.350	77	
	6	166	1.500	1.440	77	
D	2	175	1.320	1.240	77	Stop 13:22
	4	167	1.320	1.240	76	
Average		Avg. Sqrt.	Average	Volume Sampled	Average	
150.2		1.156	1.342	160.378	73.9	

[illegible]

Run #	Sampling Location	EA#	Q#
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Client		Project # 04-T-294		Schematic of Stack Cross Section 		Ambient Temperature (°F)		Barometric Press. (in. Hg)	
Plant		Unit				Assumed Moisture (%)		Calculated Moisture (%)	
Date		Project Site							
Meter Operator						Nozzle #		Probe Length (ft.)	
Probe Operator				Nozzle Diameter (in.)		Probe Liner Material			
				Nozzle Material		Probe Heater Setting (°F)			
				Probe #		Oven Heater Setting (°F)			
Control Unit #		Meter γ (C Factor)		First traverse point all the way		In		Out	
Filter Oven #		Meter Delta H@		Inside Dimension(s)		Port Dimen.		Gas Flow	
Impinger Unit #		Meter K / Orifice Factor		(in.)		(in.)		Direction	
Pitot #		Pitot Cp		Diameter		Dia.		In	
				L		L		Out	
Pitot Leak Check: Initial		Final		Filter Number(s)					
DGM Leak Rate Before:		CFM @		in. Hg					
DGM Leak Rate After:		CFM @		in. Hg					
Static Pressure ($\pm$ in. H ₂ O)				Front-half Number(s)					
				Back-half Number(s)					
				IGS Bag #				%CO ₂	
				Condensate (g/ml)				%O ₂	
				Total Vle (ml)				Silica Gel (g)	
				Gas Purge? Yes No / N ₂ O ₂				Sample Solution pH	
				Total D.I. H ₂ O Rinse (ml)				Total Acetone Wash (ml)	
				Start Time (24 hour)				Total MeCl ₂ Rinse (ml)	
				Stop Time (24 hour)					

[illegible]

EPA Method 5 / 202 (PM / CPM) Testing - Field Data Sheet

Run #	Sampling Location
1	EAF Outlet

Client	Project # 64-T-294	Schematic of Stack Cross Section		1 of 3	Assumed Moisture (%)	Barometric Press. (in. Hg)	Calculated Moisture (%)	Nozzle #	Nozzle Diameter (in.)	Nozzle Material	Probe Length (ft.)	Probe Liner Material	Probe Heater Setting (°F)	Probe Heater Setting (°F)	Probe #	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)
Meter Operator	Project Site	First traverse point all the way in Out		Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)
Meter Operator	Unit																							
Control Unit #	Meter Y (Q Factor)	First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	
Filter Oven #	Meter Delta H ₂ O	First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	
Impinger Unit #	Meter K / Office Factor	First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	
Pitot #	Pitot Cp	First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	
Pitot Leak Check: Initial	Final	First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	
DGM Leak Rate Before:	CFM @	First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	
DGM Leak Rate After:	CFM @	First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	
Static Pressure (± in. H ₂ O)		First traverse point all the way in Out	Diameter (in.)	Port Dimen. (in.)	Gas Flow Direction	Diameter (in.)	Dia. (in.)	L Out	Condensate (g/ml)	Total Vlc (ml)	Sample Solution pH	Total Acetone Wash (ml)	Total MeCi2 Rinse (ml)	Start Time (24 hour)	IGS Bag #	%CO2	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)	Gas Purge? Yes No / N2 O2	Total D.I. H2O Rinse (ml)	Total MeCi2 Rinse (ml)	Stop Time (24 hour)	

[illegible][illegible]

Run #	2	Sampling Location	Bashore Ditch
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Client SDI	Project # 04-T-294	Schematic of Stack Cross Section			Ambient Temperature (°F) 65	Barometric Press. (in. Hg) 29.06
Plant Pittsboro	Unit EAF Outlet	See R1			Assumed Moisture (%) 2	Calculated Moisture (%)
Date 10-27-04	Project Site Pittsboro, IN					
Meter Operator B. Payton						
Probe Operator A. Kendall						
Control Unit # 312042	Meter Y (C Factor) 0.995	First traverse point all the way In Out			Nozzle # 11-17	Probe Length (ft.) 5
Filter Oven # 1218	Meter Delta H@ 1.840	Inside Dimension(s) (in.)	Port Dimen. (in.)	Gas Flow Direction	Nozzle Diameter (in.) 0.177	Probe Liner Material glass
Impinging Unit # GSA-3	Meter K / Orifice Factor 2.369	Diameter 165	Dia. 6	In	Nozzle Material SS	Probe Heater Setting (°F) 255
Pitot # P-5	Pitot Cp 0.84	L - W -	L 6	Out ☒	Probe # P-5	Oven Heater Setting (°F) 255
Pitot Leak Check: Initial OK	Final OK				IGS Bag # R-2	%CO2
DGM Leak Rate Before: 0.0	CFM @ 15 in. Hg	Filter Number(s) 04-129			Condensate (g/ml)	%O2
DGM Leak Rate After: 0.0	CFM @ -0.55 in. Hg	Front-half Number(s)			Total Vlc (ml)	Silica Gel (g)
Static Pressure (± in. H2O)		Back-half Number(s)			Gas Purge? Yes No / N2 O2	Sample Solution pH
					Total D.I. H2O Rinse (ml)	Total Acetone Wash (ml)
					Start Time (24 hour) 19:56	Total MeCl2 Rinse (ml)
					Stop Time (24 hour) 20:43	

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EPA Method 5 / 202 (PM / CPM) Testing - Field Data Sheet

Run # 3		Location E 4E Bridgeport Rd		Schematic of Stack Cross Section	
Client	Project # 04-T-294	Unit		Project Site	
Plant					
Data					
Probe Operator					
Control Unit #	Meter Y (C Factor)	Meter Delta H₂O	Meter K / Orifice Factor	Pilot Cp	Pilot Op
Filter Oven #					
Impinger Unit #					
Pilot #					
Pilot Leak Check: Initial	CFM @	Final			
DGM Leak Rate Before:	CFM @	CFM @			
DGM Leak Rate After:	CFM @	CFM @			
Static Pressure (± in. H₂O)	In. Hg	In. Hg			
First traverse point all the way	Port Dimen. (in.)	Dia. (in.)	In	Out	Gas Flow Direction
Inside Dimension (in.)	Port Dimen. (in.)	Dia. (in.)	In	Out	Gas Flow Direction
Diameter	Filter Number(s)	Front-half Number(s)	Back-half Number(s)		
IGS Bag #	Condensate (g/ml)	Total Vol (ml)	Gas Purge? Yes	No	O₂
%CO₂	Silica Gel (g)	Sample Solution pH	Total Acetone Wash (ml)		
%O₂	Total D.I. H₂O Rinse (ml)	Total MeCl₂ Rinse (ml)	Stop Time (24 hour)		
Probe Length (ft.)	Probe Liner Material	Probe Heater Setting (°F)	Oven Heater Setting (°F)		
Nozzle Diameter (in.)	Nozzle Material	Nozzle #			
Probe #					

Traverse Point Number	Stop Watch Time Minutes / Sample Point	Stack Gas Temp. (°F)	Velocity Head Delta Ps (in. H ₂ O)	Orifice Meter Pressure Differential Delta H (in. H ₂ O)	Dry Gas Meter Sample Volume Vm (ft³)		Dry Gas Meter Temp. (°F)	Probe Liner Temp. (°F)	Filter Oven Temp. (°F)	Filter Holder Outlet Temp. (°F)	Impinger Outlet Temp. (°F)	Pump Vacuum (in. Hg)	Notes
					Initial Volume	Final Volume							
B 1	5	128	1.33	1.31	712.481	712.481	76	256	256	NA	55	2.0	Start 17:06
2	10	127	1.33	1.36	715.682	715.682	76	254	257		56	2.3	
	15	126	1.28	1.31	718.810	718.810	76	257	254		55	2.3	
3	20	124	1.45	1.49	722.112	722.112	76	254	257		55	2.5	
	25	123	1.30	1.34	725.209	725.209	76	256	257		54	2.5	
4	30	122	1.60	1.42	728.486	728.486	76	257	254		55	2.5	
	35	121	1.45	1.49	731.689	731.689	75	254	254		55	2.5	
5	40	117	1.35	1.40	735.088	735.088	75	257	258		55	2.5	
	45	116	1.40	1.52	738.308	738.308	76	258	256		55	2.5	
6	50	109	1.30	1.37	741.527	741.527	75	256	267		55	2.5	
	55	109	1.45	1.53	744.892	744.892	74	255	258		55	2.5	
	60	104	1.30	1.53	748.311	748.311	74	254	256		55	2.5	
A 1	65	101	1.30	1.59	751.750	751.750	74	256	254		55	2.5	
	70	102	1.55	1.64	755.218	755.218	73	256	257		56	2.5	
2	75	151	1.55	1.61	758.721	758.721	73	257	256		56	2.5	
	80	151	1.40	1.59	761.812	761.812	73	256	257		56	2.5	
3	85	142	1.35	1.33	765.060	765.060	73	258	257		55	2.5	
	90	140	1.40	1.38	768.210	768.210	73	256	258		55	2.5	
4	95	139	1.55	1.34	771.406	771.406	73	257	256		56	2.5	
	100	130	1.40	1.41	774.649	774.649	73	252	256		56	2.5	
5	105	131	1.60	1.61	778.090	778.090	73	255	256		56	2.5	
	110	130	1.65	1.66	781.582	781.582	73	256	257		56	2.5	
6	115	140	1.70	1.68	784.881	784.881	73	254	256		56	2.5	
	120	140	1.70	1.68	788.651	788.651	73	255	259		55	2.5	
Average / Total													

18:06 stop
18:10 start

Run #	2	Sampling Location	12 A F	Boys' Out
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Client	Project # 04-T-294	Schematic of Stack Cross Section	
Plant	Unit		Page 1 of 3
Date	Project Site		
Meter Operator			
Probe Operator			
Control Unit #	Meter Y (C Factor)	First traverse point all the way	
Filter Oven #	Meter Delta H ₂ O	Inside Dimensions (in.)	Port Dimen.
Impinger Unit #	Meter K / Office Factor	Diameter (in.)	Direction
Pilot #	Pilot Cp		
Pilot Leak Check: Initial	Final	L	Out
DGM Leak Rate Before:	CFM @	Filter Number(s)	
DGM Leak Rate After:	CFM @	Front-half Number(s)	
Static Pressure (± in. H ₂ O)		Back-half Number(s)	
Stop Time (24 hour)		Start Time (24 hour)	
Total MeC ₁₂ Rinse (ml)		Total D.I. H ₂ O Rinse (ml)	
Total Acetone Wash (ml)		Gas Purge? Yes No / N ₂ O ₂	
Sample Solution pH		Total Vic (ml)	
Silica Gel (g)		Condensate (g/ml)	
%CO ₂		IGS Bag #	
%O ₂			
Oven Heater Setting (F)		Probe #	
Probe Heater Setting (F)		Nozzle Material	
Probe Liner Material		Nozzle Diameter (in.)	
Probe Length (ft.)		Nozzle #	
Assumed Moisture (%)			
Calculated Moisture (%)			
Barometric Press. (in. Hg)			
Ambient Temperature (F)			

[illegible]

Average / Total	1.05
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[illegible]

EPA Method 5 / 202 (PM / CPM) Testing - Field Data Sheet

Run # 3 Sampling Location EAF Baghouse Duct									
Client		Project # 04-T-294							
Plant		Unit							
Date		Project Site							
Meter Operator									
Probe Operator									
Control Unit #		Meter Y (C Factor)							
Filter Oven #		Meter Delta H@							
Impinger Unit #		Meter K / Orifice Factor							
Pitot #		Pitot Cp							
Pitot Leak Check: Initial		Final							
DGM Leak Rate Before:		CFM @							
DGM Leak Rate After:		CFM @							
Static Pressure (± in. H ₂ O)									
Schematic of Stack Cross Section									
1 of 3									
Ambient Temperature (°F)		Assumed Moisture (%)		Barometric Press. (in. Hg)		Calculated Moisture (%)			
Nozzle #		Nozzle Diameter (in.)		Probe Length (ft.)					
Nozzle Material		Probe #		Probe Heater Setting (°F)					
IGS Bag #		Condensate (g/ml)		%CO ₂		Silica Gel (g)			
Total V/c (ml)		Gas Purge? Yes		No / N ₂ O ₂		Sample Solution pH			
Total D.I. H ₂ O Rinse (ml)		Start Time (24 hour)		Stop Time (24 hour)					

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Run # 3 Sampling Location EAF Bay house Offet

Client		Project # 04-T-294		Schematic of Stack Cross Section		Ambient Temperature (°F)		Barometric Press. (in. Hg)	
Plant		Unit				Assumed Moisture (%)		Calculated Moisture (%)	
Date		Project Site							
Meter Operator						Nozzle #		Probe Length (ft.)	
Probe Operator				1 of 3		Nozzle Diameter (in.)		Probe Liner Material	
						Nozzle Material		Probe Heater Setting (°F)	
						Probe #		Oven Heater Setting (°F)	
Control Unit #		Meter Y (Factor)		First traverse point all the way In Out					
Filter Oven #		Meter Delta H@		Inside Dimension(s) Port Dimen. Gas Flow					
Impinger Unit #		Meter K / Orifice Factor		(in.) (in.) Direction					
Pitot #		Pitot Cp		Diameter Dia. In Out					
Pitot Leak Check: Initial		Final		L W L Out					
DGM Leak Rate Before:		CFM @ in. Hg		Filter Number(s)				IGS Bag # %CO2 %O2	
DGM Leak Rate After:		CFM @ in. Hg		Front-half Number(s)				Condensate (g/ml) Silica Gel (g)	
Static Pressure (± in. H2O)				Back-half Number(s)				Total Vic (ml) Sample Solution pH	
								Gas Purge? Yes No / N2 O2 Total Acetone Wash (ml)	
								Total D.I. H2O Rinse (ml) Total MeCl2 Rinse (ml)	
								Start Time (24 hour) Stop Time (24 hour)	

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Bay View 07/10/04

Start Time (24 Hour)	16:50	Stop Time (24 Hour)	17:20
Total Volume Of Liquid Collected, Vic (ml)			
Condensate (ml/g)	-1	Silica Gel (g)	
%CO ₂		%O ₂	
IGS Bag #	R-3	Gas Analyzer #	684-1
Oven Heater Setting (°F)			
Probe Heater Setting (°F)			
Probe Length (ft)			
SG Flow Rate (acfm)			
SG Moisture Content (%)			
Ambient Temperature (°F)			
Barometric Press. (in. Hg)			

USEPA METHODS 3A, 7E AND 25A

Test Run 1 Begin. STRATA Version 2.01

Operator: AMIR BEHESHTI

Plant Name: SDI

Location: EAF

		O ₂ %	NO _x ppm	THC ppm
10-28-2004	17:38:50	20.234	21.74	4.59
10-28-2004	17:39:51	20.602	23.98	4.38
10-28-2004	17:40:52	20.753	21.52	4.25
10-28-2004	17:41:52	20.829	15.14	5.56
10-28-2004	17:42:53	20.77	10.39	5.4
10-28-2004	17:43:53	20.662	10.61	6.55
10-28-2004	17:44:48	20.627	8.42	4.67
10-28-2004	17:45:49	20.6	5.41	4.45
10-28-2004	17:46:49	20.508	3.19	4.19
10-28-2004	17:47:50	20.467	1.74	4.04
10-28-2004	17:48:50	20.465	1.21	4.19
10-28-2004	17:49:51	20.484	1.01	3.95
10-28-2004	17:50:52	20.449	0.85	3.86
10-28-2004	17:51:52	20.438	0.67	3.81
10-28-2004	17:52:53	20.383	0.52	3.73
10-28-2004	17:53:53	20.403	0.44	3.47
10-28-2004	17:54:48	20.369	0.44	3.45
10-28-2004	17:55:48	20.358	0.44	3.42
10-28-2004	17:56:49	20.36	0.44	3.4
10-28-2004	17:57:50	20.254	0.44	3.33
10-28-2004	17:58:50	20.249	0.44	3.36
10-28-2004	17:59:51	20.235	0.39	3.33
10-28-2004	18:00:51	20.272	0.34	3.42
10-28-2004	18:01:52	20.505	3.57	3.89
10-28-2004	18:02:53	20.744	14.32	4.06
10-28-2004	18:03:53	20.713	8.13	3.72
10-28-2004	18:04:54	20.691	14.34	3.6
10-28-2004	18:05:48	20.716	10.78	3.67
10-28-2004	18:06:49	20.671	8.76	3.55
10-28-2004	18:07:49	20.648	4.05	3.6
10-28-2004	18:08:50	20.638	2.84	3.61
10-28-2004	18:09:51	20.634	2.27	3.59
10-28-2004	18:10:51	20.624	1.91	3.6
10-28-2004	18:11:52	20.535	1.7	3.63
10-28-2004	18:12:52	20.503	1.55	3.71
10-28-2004	18:13:53	20.471	1.23	3.75
10-28-2004	18:14:53	20.548	1.01	3.65
10-28-2004	18:15:48	20.528	0.68	3.42
10-28-2004	18:16:49	20.468	0.39	3.34
10-28-2004	18:17:49	20.323	0.39	3.18
10-28-2004	18:18:50	20.207	0.48	3.12
10-28-2004	18:19:50	20.198	0.54	3.09
10-28-2004	18:20:51	20.107	0.49	3.33
10-28-2004	18:21:52	20.169	0.44	3.34
10-28-2004	18:22:52	20.168	0.53	3.19
10-28-2004	18:23:53	20.219	0.54	3.13
10-28-2004	18:24:53	20.216	0.57	3.04
10-28-2004	18:25:48	20.189	0.64	2.94

10-28-2004	18:26:48	20.212	0.64	2.91
10-28-2004	18:27:49	20.159	0.66	2.98
10-28-2004	18:28:50	20.204	0.74	2.93
10-28-2004	18:29:50	20.148	0.74	2.95
10-28-2004	18:30:51	20.151	0.88	2.95
10-28-2004	18:31:51	20.164	0.96	2.97
10-28-2004	18:32:52	20.155	1.43	2.89
10-28-2004	18:33:53	20.115	1.86	2.88
10-28-2004	18:34:53	20.115	2.04	2.93
10-28-2004	18:35:54	20.071	1.98	2.95
10-28-2004	18:36:48	20.05	1.83	2.99
10-28-2004	18:37:49	20.093	1.69	2.92

Test Run 1 End

Averages	20.397	3.790	3.613
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Average	20.40	3.79
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Average Zero	0.3	0.17
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Span Value	10.94	54.7
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Span Average	10.3	51.45
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Bias Corrected	21.99	3.86
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Test Run 2 Begin. STRATA Version 2.01

Operator: AMIR BEHESHTI

Plant Name SDI

Location: EAF

		0 2 %	NOx ppm	THC ppm
10-28-2004	19:05:06	20.767	51.65	6.44
10-28-2004	19:06:07	20.785	51.1	6.28
10-28-2004	19:07:07	20.792	53.52	8.74
10-28-2004	19:08:08	20.744	38.84	8.29
10-28-2004	19:09:09	20.627	40.94	7.23
10-28-2004	19:10:03	20.598	33.91	6.36
10-28-2004	19:11:04	20.571	17.45	5.96
10-28-2004	19:12:04	20.591	10.33	7.57
10-28-2004	19:13:05	20.58	8.28	6.92
10-28-2004	19:14:06	20.548	6.48	6.15
10-28-2004	19:15:06	20.477	5.93	6.04
10-28-2004	19:16:07	20.428	6.27	5.63
10-28-2004	19:17:07	20.437	5.91	5.85
10-28-2004	19:18:08	20.358	5.94	7.02
10-28-2004	19:19:08	20.31	5.71	4.29
10-28-2004	19:20:09	20.251	4.91	4.08
10-28-2004	19:21:04	20.239	3.89	3.9
10-28-2004	19:22:04	20.282	1.56	3.6
10-28-2004	19:23:05	20.297	0.96	3.54
10-28-2004	19:24:05	20.245	1.44	3.43
10-28-2004	19:25:06	20.167	1.69	3.26
10-28-2004	19:26:07	20.115	1.64	3.19
10-28-2004	19:27:07	20.098	1.86	3.12
10-28-2004	19:28:08	20.143	1.74	3.09
10-28-2004	19:29:08	20.177	1.64	3.17
10-28-2004	19:30:09	20.401	5.28	3.5
10-28-2004	19:31:03	20.608	13.35	4.54
10-28-2004	19:32:04	20.537	9.14	5.17
10-28-2004	19:33:05	20.466	9.16	4.88
10-28-2004	19:34:05	20.489	6.95	4.82
10-28-2004	19:35:06	20.539	3.88	3.88
10-28-2004	19:36:06	20.516	2.8	3.48
10-28-2004	19:37:07	20.429	3.02	3.42
10-28-2004	19:38:08	20.431	2.91	3.57
10-28-2004	19:39:08	20.379	2.71	3.49
10-28-2004	19:40:09	20.385	2.5	3.42
10-28-2004	19:41:03	20.366	2.34	3.1
10-28-2004	19:42:04	20.363	2.24	2.94
10-28-2004	19:43:04	20.383	2.07	2.9
10-28-2004	19:44:05	20.368	2.21	2.8
10-28-2004	19:45:06	20.385	2.07	2.78
10-28-2004	19:46:06	20.376	1.69	2.67
10-28-2004	19:47:07	20.381	1.76	2.68
10-28-2004	19:48:07	20.324	1.94	2.71
10-28-2004	19:49:08	20.29	2.06	2.71
10-28-2004	19:50:08	20.347	2.04	2.7
10-28-2004	19:51:03	20.378	2.24	2.73
10-28-2004	19:52:04	20.478	2.67	2.84

10-28-2004	19:53:04	20.433	2.19	2.6
10-28-2004	19:54:05	20.269	1.23	2.47
10-28-2004	19:55:05	20.12	1.49	2.81
10-28-2004	19:56:06	20.094	2.16	3.2
10-28-2004	19:57:07	20.086	2.31	3.04
10-28-2004	19:58:07	20.069	1.87	2.81
10-28-2004	19:59:08	20.124	2.31	2.44
10-28-2004	20:00:08	20.152	2.82	2.35
10-28-2004	20:01:09	20.186	3.17	2.23
10-28-2004	20:02:03	20.196	3.3	2.09
10-28-2004	20:03:04	20.297	9.87	2.09
10-28-2004	20:04:05	20.531	35.4	2.36
Test Run 2 End				
Averages		20.380	8.646	4.023
Average		20.38	8.65	
Average Zero		0.2	0.28	
Span Value		10.94	54.7	
Span Average		10.25	51.3	
Bias Corrected		21.97	8.97	

Test Run 3 Begin. STRATA Version 2.01

Operator: AMIR BEHESHTI

Plant Name SDI

Location: EAF

		O ₂ %	NO _x ppm	THC ppm
10-28-2004	20:27:10	20.751	56.61	5.73
10-28-2004	20:28:04	20.749	59.04	6.02
10-28-2004	20:29:05	20.772	60.1	14.89
10-28-2004	20:30:05	20.711	46.44	16.21
10-28-2004	20:31:06	20.621	41.99	8.16
10-28-2004	20:32:07	20.548	31.08	5.25
10-28-2004	20:33:07	20.532	13.66	3.31
10-28-2004	20:34:08	20.441	7.52	2.44
10-28-2004	20:35:08	20.369	5.14	2.39
10-28-2004	20:36:09	20.394	4.74	2.91
10-28-2004	20:37:10	20.383	4.49	3.17
10-28-2004	20:38:04	20.384	3.86	2.89
10-28-2004	20:39:05	20.309	3.13	2.28
10-28-2004	20:40:05	20.25	2.05	2.28
10-28-2004	20:41:06	20.302	1.65	2.63
10-28-2004	20:42:06	20.301	1.39	1.8
10-28-2004	20:43:07	20.267	1.05	5.13
10-28-2004	20:44:08	20.203	1.52	4.61
10-28-2004	20:45:08	20.261	3.99	2.69
10-28-2004	20:46:09	20.252	4.7	2.85
10-28-2004	20:47:09	20.31	1.58	6.41
10-28-2004	20:48:10	20.338	0.91	4.68
10-28-2004	20:49:05	20.336	0.95	6.04
10-28-2004	20:50:05	20.349	1.78	4.46
10-28-2004	20:51:06	20.399	2.6	4.35
10-28-2004	20:52:06	20.551	4.02	3.09
10-28-2004	20:53:07	20.667	7.46	4.21
10-28-2004	20:54:07	20.641	8.11	4.38
10-28-2004	20:55:08	20.551	12.07	3.92
10-28-2004	20:56:09	20.554	12.03	3.38
10-28-2004	20:57:09	20.545	7.26	3.8
10-28-2004	20:58:10	20.517	4.01	4.32
10-28-2004	20:59:04	20.506	2.92	4.18
10-28-2004	21:00:05	20.494	2.18	3.13
10-28-2004	21:01:06	20.476	1.82	2.75
10-28-2004	21:02:06	20.493	1.41	2.56
10-28-2004	21:03:07	20.478	2.52	2.78
10-28-2004	21:04:07	20.472	3.11	2.91
10-28-2004	21:05:08	20.463	3.42	2.28
10-28-2004	21:06:08	20.434	3.03	1.65
10-28-2004	21:07:09	20.29	2.32	1.49
10-28-2004	21:08:10	20.194	1.95	1.4
10-28-2004	21:09:04	20.092	2.02	1.43
10-28-2004	21:10:05	20.149	1.99	1.52
10-28-2004	21:11:05	20.096	1.4	1.54
10-28-2004	21:12:06	20.082	0.72	1.51
10-28-2004	21:13:07	20.162	0.57	1.5
10-28-2004	21:14:07	20.21	0.51	1.49

10-28-2004	21:15:08	20.276	0.59	1.53
10-28-2004	21:16:08	20.258	1.18	1.59
10-28-2004	21:17:09	20.216	1.62	1.51
10-28-2004	21:18:09	20.099	2.2	1.43
10-28-2004	21:19:10	20.052	2.63	1.34
10-28-2004	21:20:05	20.056	2.82	1.39
10-28-2004	21:21:05	20.048	2.87	1.57
10-28-2004	21:22:06	19.888	3.31	1.41
10-28-2004	21:23:06	19.807	3.85	1.36
10-28-2004	21:24:07	19.912	3.54	1.34
10-28-2004	21:25:07	20.009	3.22	1.34
10-28-2004	21:26:08	20.127	3.46	1.46
Test Run 3 End				
Averages		20.34	8.00	3.37
Average		20.34	8.00	
Average Zero		0.1	0.28	
Span Value		10.94	54.7	
Span Average		10.3	51.45	
Bias Corrected		21.71	8.25	

USEPA METHOD 12

EPA METHOD 12 FIELD TEST DATA

Client STEEL DYNAMICS, INC.
 Plant Bar Products Division - Pittsboro, IN
 Date 10/27/2004
 Operator B. Peyton
 Probe Operator(s) A. Kendall
 Control Unit No. 609198 Nozzle Diameter (in.) 0.184
 Pitot Cp 0.84 Filter No. F-1 (Blank)
 Meter Y 0.997 Front-half No. FH-1
 Run No. 1 Back-half No. BH-1

Project No. G/SA 04-T-294
 Unit Electric Arc Furnace - BO (ES) Stack Area(ft²) 148.49
 Ambient Temperature (°F) 68
 Barometric Pressure (inches Hg) 29.06
 Static Pressure (± inches H2O) -0.55
 %CO2 / %O2 0.3 / -20.5
 Condensate (milliliters) 34.0 Silica Gel (grams) 18.5
 Test Time (24 hour) 1101-1322
 Sample Time (minutes) 120.0

Traverse Point Number		Stack Temperature Ts (°F)	Velocity Head Delta P (in. H2O)	Orifice Setting Delta H (in. H2O)	Metered Gas Volume Vm (ft³) Initial Volume 346.300	Dry Gas Meter Temperature Tm (°F)	Notes
S-	1	163	1.450	1.310		74	Pretest Nozzle Cal: A = 0.182" B = 0.184" C = 0.184" Avg. = 0.184"
	2	154	1.200	1.100		74	
	3	150	1.050	0.970		74	
	4	143	1.500	1.400		76	
	5	149	1.550	1.440		76	
	6	156	1.650	1.530		78	
W-	1	159	1.100	1.010		78	
	2	161	1.050	0.970		78	
	3	161	1.210	1.120		79	
	4	162	1.150	1.060		79	
	5	170	1.090	0.990		79	
	6	183	1.450	1.300		80	
N-	1	157	1.190	1.110		80	
	2	156	1.230	1.150		80	
	3	159	1.350	1.250		80	
	4	164	1.250	1.150		80	
	5	158	1.410	1.320		81	
	6	144	1.550	1.460		80	
E-	1	138	1.210	1.170		81	
	2	131	1.450	1.420		81	
	3	130	1.450	1.420		81	
	4	136	1.700	1.650		81	
	5	139	1.550	1.490	Final Volume 428.046	81	
	6	146	1.600	1.520		81	
Average		152.9	Avg. Sqrt. 1.159	Average 1.263	Volume Sampled 81.746	Average 78.8	

EPA METHOD 12 FIELD TEST DATA

Client	STEEL DYNAMICS, INC.	Project No.	G/SA 04-T-294
Plant	Bar Products Division - Pittsboro, IN	Unit	Electric Arc Furnace - BO (ES) Stack Area (ft ²) 148.49
Date	10/27/2004	Ambient Temperature (°F)	65
Operator	B. Peyton	Barometric Pressure (inches Hg)	29.06
Probe Operator(s)	A. Kendall	Static Pressure (± inches H ₂ O)	-0.55
Control Unit No.	609198	Nozzle Diameter (in.)	0.184
Pitot Cp	0.84	Filter No.	F-1 (Blank)
Meter Y	0.997	Front-half No.	FH-1
Run No.	2	Back-half No.	BH-1
		%CO ₂ / %O ₂	0.8 1 20.2
		Condensate (milliliters)	30.0 Silica Gel (grams) 24.9
		Test Time (24 hour)	1456-1826
		Sample Time (minutes)	185.0

Traverse Point Number	Stack Temperature		Velocity Head Delta P (in. H2O)	Orifice Setting Delta H (in. H2O)		Metered Gas Volume	Dry Gas Meter Temperature		Notes	
	Ts (°F)					Vm (ft³)	Tm (°F)			
						Initial Volume				
						428.400				
E-	1	123	125	1.510	1.450	1.530	1.550	73	81	
	2	117	122	1.450	1.390	1.190	1.200	69	81	
	3	119	125	1.310	1.250	1.280	1.300	69	80	
	4	127	118	1.750	1.650	1.430	1.430	70	81	
	5	137	117	1.650	1.540	1.210	1.210	71	81	
	6	145	115	1.350	1.250	1.440	1.450	72	79	
S-	1	142	108	1.120	1.050	1.620	1.610	74	79	
	2	144	106	1.230	1.150	1.710	1.700	75	78	
	3	149	104	1.150	1.070	1.620	1.600	75	78	
	4	153	100	1.250	1.160	1.260	1.250	76	76	
	5	166	114	1.080	0.980	1.090	1.100	76	77	
	6	165	130	1.150	1.050	1.150	1.200	77	78	
W-	1	149		1.200	1.120			76		
	2	148		1.390	1.310			78		
	3	145		1.310	1.240			78		
	4	151		1.300	1.210			78		
	5	156		1.250	1.160			79		
	6	162		1.250	1.150			79		
N-	1	165		1.450	1.340			81		
	2	153		1.580	1.460			81		
	3	151		1.580	1.490			81		
	4	145		1.290	1.340			82		
	5	143		1.350	1.300			82		
	6	135		1.470	1.430			81		
		131		1.500	1.460			80		
Average		Avg. Sqrt.		Average		Volume Sampled		Average		
135.3		1.164		1.312		128.030		77.4		
						Final Volume				
						556.430				

EPA METHOD 12 FIELD TEST DATA

Client	STEEL DYNAMICS, INC.		Project No.	G/SA 04-T-294	
Plant	Bar Products Division - Pittsboro, IN		Unit	Electric Arc Furnace - BO (ES)	Stack Area (ft ²) 148.49
Date	10/28/2004		Ambient Temperature (°F)	60	
Operator	B. Peyton		Barometric Pressure (inches Hg)	29.15	
Probe Operator(s)	A. Kendall		Static Pressure (± inches H2O)	-0.55	
Control Unit No.	609198	Nozzle Diameter (in.)	%CO2 / %O2 0.6 / 20.4		
Pitot Cp	0.84	Filter No.	F-1 (Blank)	Condensate (milliliters)	21.0 Silica Gel (grams) 19.6
Meter Y	0.997	Front-half No.	FH-1	Test Time (24 hour)	0843-1056
Run No.	3	Back-half No.	BH-3	Sample Time (minutes)	120.0

Traverse Point Number		Stack Temperature	Velocity Head	Orifice Setting	Metered Gas Volume	Dry Gas Meter Temperature	Notes
		Ts (°F)	Delta P (in. H2O)	Delta H (in. H2O)	Vm (ft ³) Initial Volume 565.293	Tm (°F)	
N-	1	131	1.050	0.950		62	
	2	134	1.100	0.990		62	
	3	135	1.210	1.090		62	
	4	136	1.450	1.310		63	
	5	139	1.250	1.130		64	
	6	143	1.200	1.080		66	
E-	1	133	1.150	1.050		66	
	2	134	1.300	1.190		67	
	3	134	1.350	1.240		68	
	4	148	1.390	1.250		68	
	5	159	1.230	1.090		68	
	6	159	1.550	1.380		68	
S-	1	141	1.200	1.090		68	
	2	137	1.400	1.290		68	
	3	137	1.390	1.280		68	
	4	141	1.510	1.380		68	
	5	137	1.350	1.240		68	
	6	134	1.430	1.320		68	
W-	1	144	1.200	1.090		68	
	2	162	1.150	1.010		68	
	3	178	1.250	1.080		69	
	4	189	1.100	0.940		70	
	5	186	1.450	1.240	Final Volume	70	
	6	171	1.400	1.230	643.629	71	
Average			Avg. Sqrt.	Average	Volume Sampled	Average	
		147.6	1.136	1.164	78.336	67.0	

EPA Method 12 (PM) Testing - Field Data Sheet

Run # 1 Sampling Location EAF Outlet

Client SDI Project # 04-T-294
 Plant Pittsburgh, IN Unit EAF Outlet
 Date 10/27/2004 Project Site Pittsburgh, IN
 Meter Operator A. Kendall
 Probe Operator B. Peyton

Control Unit # 629188		Meter Y (C Factor) - 996		Schematic of Stack Cross Section		Ambient Temperature (°F) 28		Barometric Press. (in. Hg) 29.06	
Filter Oven # 1019		Meter Delta H @ 1.652				Assumed Moisture (%) 2		Calculated Moisture (%)	
Impinger Unit # 534 5		Meter K / Orifice Factor 2.729				Nozzle # N104		Probe Length (ft.) 5	
Pilot # 2-5		Pilot Cp. 84		First traverse point all the way In		Nozzle Diameter (in.) .184		Probe Liner Material 55	
Pilot Leak Check: Initial 0.0		Final 0.0		Port Dimen. (in.)		Probe Heater Setting (°F) 255		Oven Heater Setting (°F) 255	
DGM Leak Rate Before: 0.0		CFM @ 15		Dia. 6		Probe # P-5		IGS Bag # 145 1202 1	
DGM Leak Rate After: 0.0		CFM @ 16.6		L 6		IGS Analyzer #		%CO2	
Static Pressure (± in. H2O) -.55				Filter Number(s)		Condensate (ml/g)		Silica Gel (g)	
				Front-half Number(s)		Total Vlc (ml)		Total Acetone Wash (ml)	
				Back-half Number(s)		Total 0.1 HNO3 Rinse (ml)		Start Time (24 Hour) 13:22	

Traverse Point Number	Stop-watch Time	Stack Gas Temp Ts (°F)	Velocity Head Delta Ps (in. H2O)	Orifice Meter Pressure Differential Delta H (in. H2O)	Dry Gas Meter Sample Volume Vm (Ft³)	Dry Gas Meter Temp Tm (°F)	Probe Liner Temp (°F)	Filter Oven Temp (°F)	Impinger Outlet Temp (°F)	Pump Vacuum (in. Hg)	Notes
A	1	163	1.45	1.31	349.650	74	250	252	50	3.0	Port Change 7 min
	2	154	1.20	1.10	352.795	74	252	253	51	2.8	
	3	150	1.05	0.97	355.739	74	251	256	52	1.8	
	4	145	1.50	1.40	359.531	76	256	257	54	3.9	
	5	149	1.55	1.41	362.899	76	259	260	54	4.0	
	6	156	1.65	1.53	366.543	78	263	255	57	4.1	
B	1	159	1.10	1.01	369.651	78	260	252	61	3.9	Port Change 11 min
	2	161	1.05	0.97	372.621	78	258	257	59	2.9	
	3	161	1.21	1.12	375.725	79	262	257	60	3.0	
	4	162	1.15	1.06	378.810	79	260	259	60	2.9	
	5	170	1.09	0.99	381.841	79	261	262	62	2.8	
	6	183	1.45	1.30	385.189	81	263	259	61	3.1	
C	1	157	1.19	1.11	388.339	81	260	260	59	3.0	Port Change 11 min
	2	156	1.23	1.15	391.490	81	259	265	56	3.0	
	3	159	1.35	1.25	394.710	81	260	261	58	3.1	
	4	164	1.75	1.15	397.967	81	259	260	58	3.0	
	5	158	1.41	1.32	401.340	81	260	249	58	3.5	
	6	144	1.55	1.48	405.581	81	263	258	59	3.9	
D	1	138	1.21	1.17	408.431	81	259	258	57	3.1	Port Change 3 min
	2	131	1.45	1.42	412.310	81	261	257	55	4.0	
	3	130	1.45	1.42	416.230	81	260	251	57	4.1	
	4	136	1.70	1.65	420.105	81	260	252	59	4.5	
	5	139	1.55	1.49	424.731	81	258	256	58	4.7	
	6	146	1.60	1.52	428.046	81	259	261	59	4.9	
Averages / Totals		152.16		1.26	81.746	78.833					

Trawl Point Number	Stop- watch Time Minutes/ Sample Point	Stack Gas Temp. T _s (°F)	Velocity Head Delta P _s (in. H ₂ O)	Orifice Meter Pressure Differential Delta H (in. H ₂ O)	Dry Gas Meter Sample Volume Vm (Ft ³)		Dry Gas Meter Temp. T _m (°F)	Probe Liner Temp. (°F)	Filter Oven Temp. (°F)	Impinger Outlet Temp. (°F)	Pump Vacuum (in. Hg)	Notes
					Initial Volume							
A	10/24	5	1.51	1.45	428.400		73	255	256	60	3.0	
	1	123	1.45	1.39	432.000		69	258	256	59	3.0	
	2	117	1.45	1.39	435.407		69	258	256	57	3.0	
	3	119	1.31	1.25	438.774		69	263	257	57	3.0	
	4	121	1.75	1.65	442.410		70	262	256	57	3.0	
	5	137	1.65	1.54	446.101		71	261	258	58	3.1	Port Change 2 min
B	30	145	1.35	1.25	449.765		72	255	255	59	2.5	
	33	142	1.12	1.05	452.914		74	255	256	59	2.5	
	45	144	1.23	1.15	456.421		75	257	259	60	2.5	
	45	149	1.15	1.07	459.535		75	260	260	61	2.1	Added Ice
	50	153	1.25	1.16	462.743		76	264	255	62	2.8	
	55	166	1.08	0.98	465.103		76	264	257	59	2.1	Port Change 4 min
C	60	165	1.15	1.05	468.750		77	263	254	55	2.0	
	1:05	149	1.20	1.12	472.103		78	261	254	52	2.9	
	1:10	148	1.39	1.31	475.399		78	262	254	53	3.0	
	1:15	145	1.31	1.24	478.785		78	264	256	53	2.7	
	1:20	151	1.30	1.21	482.134		79	260	254	54	2.3	
	1:25	156	1.25	1.16	485.337		79	254	254	55	2.5	
D	1:30	162	1.25	1.15	488.775		81	255	261	55	2.9	Port Change 10 minutes
	1:35	165	1.45	1.34	491.473		81	256	263	56	3.0	
	1:40	163	1.53	1.46	494.4890		81	258	263	57	3.2	
	1:45	151	1.58	1.49	497.231		82	252	264	57	3.0	
	1:50	145	1.40	1.34	502.713		82	253	262	58	3.0	
	1:55	143	1.35	1.27	506.634		82	253	264	58	3.0	
Averages / Totals	2:00	133	1.47	1.43	510.234		80	260	266	57	3.0	Port Change 4 min
	2:05	131	1.50	1.46	513.891		80	260	266	57	3.0	

Run # 2 Sampling Location EAF Outlet

Client	Project #	Schematic of Stack Cross Section			Ambient Temperature (°F)	Barometric Press. (in. Hg)
Plant	Unit	See Page 1 of 2			Assumed Moisture (%)	Calculated Moisture (%)
Date	Project Site					
Meter Operator				Nozzle #	Probe Length (ft.)	
Probe Operator				Nozzle Diameter (in.)	Probe Liner Material	
				Nozzle Material	Probe Heater Setting (°F)	
				Probe #	Oven Heater Setting (°F)	
Control Unit #	Meter Y (C Factor)	First traverse point all the way	In	Out		
Filter Oven #	Meter Delta H@	Inside Dimension(s)	Port Dimen.	Gas Flow		
Impinger Unit #	Meter K / Orifice Factor	(in.)	(in.)	Direction		
Pitot #	Pitot Cp	Diameter	Dia.	In		
Pitot Leak Check: Initial	Final	L	L	Out	IGS Bag #	IGS Analyzer #
DGM Leak Rate Before:	CFM @	in. Hg	Filter Number(s)		%CO2	%O2
DGM Leak Rate After:	CFM @	in. Hg	Front-half Number(s)		Condensate (ml/g)	Silica Gel (g)
Static Pressure (± in. H2O)			Back-half Number(s)		Total Vlc (ml)	Total Acetone Wash (ml)
					Total 0.1 HNO3 Rinse (ml)	
					Start Time (24 Hour)	Stop Time (24 Hour)

[illegible]

EPA Method 12 (PM) Testing - Field Data Sheet

Run # 3 Sampling Location EAF Outlet

Client SNT Project # 04-T-294
 Plant Pittsborough Unit EAF Outlet
 Date 10/28/04 Project Site Pittsborough, IN
 Meter Operator A. Kendall
 Probe Operator B. Peyton

Schematic of Stack Cross Section

See R-1

Ambient Temperature (°F) 60 Barometric Press. (in. Hg) 29.15
 Assumed Moisture (%) 2 Calculated Moisture (%)

Nozzle # N184 Probe Length (ft.) 5
 Nozzle Diameter (in.) .184 Probe Liner Material SS
 Nozzle Material SS Probe Heater Setting (°F) 255
 Probe # P-5 Oven Heater Setting (°F) 355

Control Unit # 609198 Meter Y (C Factor) 0.996
 Filter Oven # 1011 Meter Delta H @ 1.657
 Impinger Unit # 4547 Meter K / Orifice Factor 2.729
 Pitot # P-5 Pitot Cp .84
 Pitot Leak Check: Initial OK Final OK
 DGM Leak Rate Before: 0.0 CFM @ 15 in. Hg
 DGM Leak Rate After: 0.0 CFM @ 5 in. Hg
 Static Pressure (± in. H₂O) -0.55

First traverse point all the way In Out
 Inside Dimension(s) (in.) Port Dimen. Gas Flow Direction
 Diameter (in.) 165 Dia. 6 In - Out ✓
 L - W - L 6
 Filter Number(s) Quartz Blank 3
 Front-half Number(s)
 Back-half Number(s)

IGS Bag # IGS IRON 3 IGS Analyzer #
 %CO₂ - %O₂
 Condensate (ml/g) Silica Gel (g)
 Total Vlc (ml) Total Acetone Wash (ml)
 Total 0.1 HNO₃ Rinse (ml)
 Start Time (24 Hour) 8:43 Stop Time (24 Hour) 10:56

Traverse Point Number	Stop-watch Time Minutes / Sample Point	Stack Gas Temp Ts (°F)	Velocity Head Delta Ps (in. H ₂ O)	Orifice Meter Pressure Differential Delta H (in. H ₂ O)	Dry Gas Meter Sample Volume Vm (Ft ³) Initial Volume	Dry Gas Meter Temp Tm (°F)	Probe Liner Temp (°F)	Filter Oven Temp (°F)	Impinger Outlet Temp (°F)	Pump Vacuum (in. Hg)	Notes
B1	5	131	1.05	0.95	568.212	62	252	250	44	1.1	
2	10	134	1.10	0.99	571.110	62	254	253	43	1.3	
3	15	135	1.21	1.09	574.395	62	262	252	47	1.8	
4	20	136	1.45	1.31	577.810	63	262	252	49	1.9	
5	25	139	1.28	1.13	581.046	64	263	255	50	1.8	
6	30	143	1.20	1.08	584.137	66	262	262	51	1.7	Port change 4 min
C1	35	133	1.15	1.05	587.225	66	264	265	52	1.5	
2	40	134	1.30	1.19	590.509	66	263	260	52	1.8	
3	45	134	1.35	1.24	593.834	67	264	260	54	1.9	
4	50	148	1.39	1.25	597.121	68	263	261	55	1.9	
5	55	159	1.23	1.09	600.357	68	263	262	56	1.9	
6	60	157	1.55	1.38	603.798	68	262	261	56	2.0	Port change 5 min
D1	1:05	141	1.20	1.09	607.210	68	263	261	55	1.6	
2	1:10	137	1.40	1.29	610.609	68	264	260	56	1.9	
3	1:15	137	1.39	1.28	614.115	68	264	258	57	1.9	
4	1:20	141	1.51	1.38	617.899	68	263	258	58	2.0	
5	1:25	137	1.35	1.24	621.230	68	263	259	60	1.9	
6	1:30	134	1.43	1.32	624.599	68	262	258	61	1.9	Port change 4 min
A1	1:35	144	1.20	1.09	627.946	68	263	261	60	1.8	
2	1:40	162	1.15	1.01	631.295	68	264	261	60	1.8	
3	1:45	178	1.25	1.08	634.403	69	265	263	60	1.8	
4	1:50	184	1.10	0.94	637.204	70	263	260	61	1.8	
5	1:55	186	1.45	1.24	640.573	70	264	260	61	1.8	
6	2:00	171	1.40	1.23	643.629	71	262	261	63	1.8	
Averages / Totals		147.50		1.16	78.336	66.92					

CEMS OPACITY MEASUREMENTS

- 9

COM DATA - RUN NO. 1

Data Summary Report

Company: Steel Dynamics - Bar Products
8000 North County Road 225 east
Pittsboro, IN 46167



Data Group: 1 Min Raw

Report Name: No Title

Start of Report: 10/27/2004 08:43

End of Report: 10/27/2004 13:22

Validation: All Available Data

Group#- Channel# G1-C9

Long Descrip. Opacity 1

Short Descrip. Opacity

Units

Range 0-10

10/27/2004 08:43	0.36
10/27/2004 08:44	0.28
10/27/2004 08:45	0.25
10/27/2004 08:46	0.44
10/27/2004 08:47	0.34
10/27/2004 08:48	0.24
10/27/2004 08:49	0.36
10/27/2004 08:50	0.28
10/27/2004 08:51	0.39
10/27/2004 08:52	0.49
10/27/2004 08:53	0.45
10/27/2004 08:54	0.50
10/27/2004 08:55	0.47
10/27/2004 08:56	0.43
10/27/2004 08:57	0.56
10/27/2004 08:58	0.39
10/27/2004 08:59	0.40
10/27/2004 09:00	0.42
10/27/2004 09:01	0.50
10/27/2004 09:02	0.47
10/27/2004 09:03	0.56
10/27/2004 09:04	0.48
10/27/2004 09:05	0.71
10/27/2004 09:06	0.68
10/27/2004 09:07	0.58
10/27/2004 09:08	0.62
10/27/2004 09:09	0.49
10/27/2004 09:10	0.32
10/27/2004 09:11	0.24
10/27/2004 09:12	0.34
10/27/2004 09:13	0.35
10/27/2004 09:14	0.31
10/27/2004 09:15	0.34
10/27/2004 09:16	0.39
10/27/2004 09:17	0.39
10/27/2004 09:18	0.34
10/27/2004 09:19	0.43
10/27/2004 09:20	0.49
10/27/2004 09:21	0.48

Group#-Channel#		G1-C9
Long Descrip.		Opacity 1
Short Descrip.		Opacity
Units		-
Range		0-10
10/27/2004 09:22		0.51
10/27/2004 09:23		0.73
10/27/2004 09:24		0.60
10/27/2004 09:25		0.54
10/27/2004 09:26		0.56
10/27/2004 09:27		0.55
10/27/2004 09:28		0.50
10/27/2004 09:29		0.42
10/27/2004 09:30		0.48
10/27/2004 09:31		0.49
10/27/2004 09:32		0.39
10/27/2004 09:33		0.38
10/27/2004 09:34		0.56
10/27/2004 09:35		0.48
10/27/2004 09:36		0.44
10/27/2004 09:37		0.47
10/27/2004 09:38		0.52
10/27/2004 09:39		0.38
10/27/2004 09:40		0.31
10/27/2004 09:41		0.31
10/27/2004 09:42		0.62
10/27/2004 09:43		0.43
10/27/2004 09:44		0.32
10/27/2004 09:45		0.33
10/27/2004 09:46		0.27
10/27/2004 09:47		0.22
10/27/2004 09:48		0.28
10/27/2004 09:49		0.37
10/27/2004 09:50		0.34
10/27/2004 09:51		0.40
10/27/2004 09:52		0.54
10/27/2004 09:53		0.38
10/27/2004 09:54		0.27
10/27/2004 09:55		0.25
10/27/2004 09:56		0.33
10/27/2004 09:57		0.28
10/27/2004 09:58		0.32
10/27/2004 09:59		0.33
10/27/2004 10:00		0.35
10/27/2004 10:01		0.24
10/27/2004 10:02		0.24
10/27/2004 10:03		0.20
10/27/2004 10:04		0.22
10/27/2004 10:05		0.19
10/27/2004 10:06		0.20
10/27/2004 10:07		0.21
10/27/2004 10:08		0.25
10/27/2004 10:09		0.31
10/27/2004 10:10		0.42
10/27/2004 10:11		0.37

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	%
Range	0-10
10/27/2004 10:12	0.38
10/27/2004 10:13	0.36
10/27/2004 10:14	0.38
10/27/2004 10:15	0.38
10/27/2004 10:16	0.42
10/27/2004 10:17	0.49
10/27/2004 10:18	0.60
10/27/2004 10:19	0.56
10/27/2004 10:20	0.51
10/27/2004 10:21	0.50
10/27/2004 10:22	0.55
10/27/2004 10:23	0.63
10/27/2004 10:24	0.60
10/27/2004 10:25	0.54
10/27/2004 10:26	0.37
10/27/2004 10:27	0.28
10/27/2004 10:28	0.27
10/27/2004 10:29	0.43
10/27/2004 10:30	0.33
10/27/2004 10:31	0.37
10/27/2004 10:32	0.47
10/27/2004 10:33	0.57
10/27/2004 10:34	0.58
10/27/2004 10:35	0.66
10/27/2004 10:36	0.76
10/27/2004 10:37	0.59
10/27/2004 10:38	0.47
10/27/2004 10:39	0.45
10/27/2004 10:40	0.67
10/27/2004 10:41	0.72
10/27/2004 10:42	0.71
10/27/2004 10:43	0.74
10/27/2004 10:44	0.81
10/27/2004 10:45	0.74
10/27/2004 10:46	0.63
10/27/2004 10:47	0.76
10/27/2004 10:48	0.52
10/27/2004 10:49	0.45
10/27/2004 10:50	0.44
10/27/2004 10:51	0.61
10/27/2004 10:52	0.61
10/27/2004 10:53	0.59
10/27/2004 10:54	0.65
10/27/2004 10:55	0.82
10/27/2004 10:56	0.81
10/27/2004 10:57	0.75
10/27/2004 10:58	0.58
10/27/2004 10:59	0.38
10/27/2004 11:00	0.35
10/27/2004 11:01	0.40

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	%
Range	0-10
10/27/2004 11:02	0.53
10/27/2004 11:03	0.35
10/27/2004 11:04	0.33
10/27/2004 11:05	0.49
10/27/2004 11:06	0.39
10/27/2004 11:07	0.37
10/27/2004 11:08	0.45
10/27/2004 11:09	0.45
10/27/2004 11:10	0.48
10/27/2004 11:11	0.41
10/27/2004 11:12	0.47
10/27/2004 11:13	0.56
10/27/2004 11:14	0.35
10/27/2004 11:15	0.33
10/27/2004 11:16	0.35
10/27/2004 11:17	0.40
10/27/2004 11:18	0.38
10/27/2004 11:19	0.41
10/27/2004 11:20	0.39
10/27/2004 11:21	0.48
10/27/2004 11:22	0.58
10/27/2004 11:23	0.52
10/27/2004 11:24	0.63
10/27/2004 11:25	0.52
10/27/2004 11:26	0.56
10/27/2004 11:27	0.65
10/27/2004 11:28	0.65
10/27/2004 11:29	0.68
10/27/2004 11:30	0.68
10/27/2004 11:31	0.80
10/27/2004 11:32	0.55<
10/27/2004 11:33	0.48
10/27/2004 11:34	0.37
10/27/2004 11:35	0.41
10/27/2004 11:36	0.43
10/27/2004 11:37	0.34
10/27/2004 11:38	0.44
10/27/2004 11:39	0.50
10/27/2004 11:40	0.48
10/27/2004 11:41	0.42
10/27/2004 11:42	0.53
10/27/2004 11:43	0.63
10/27/2004 11:44	0.70
10/27/2004 11:45	0.82
10/27/2004 11:46	1.11
10/27/2004 11:47	1.22
10/27/2004 11:48	1.28
10/27/2004 11:49	1.08
10/27/2004 11:50	0.98
10/27/2004 11:51	0.80

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	
Range	0-10
10/27/2004 11:52	0.75
10/27/2004 11:53	0.67
10/27/2004 11:54	0.70
10/27/2004 11:55	0.64
10/27/2004 11:56	0.63
10/27/2004 11:57	0.66
10/27/2004 11:58	0.70
10/27/2004 11:59	0.64
10/27/2004 12:00	0.79
10/27/2004 12:01	0.62
10/27/2004 12:02	0.53
10/27/2004 12:03	0.39
10/27/2004 12:04	0.70
10/27/2004 12:05	0.50
10/27/2004 12:06	0.40
10/27/2004 12:07	0.41
10/27/2004 12:08	0.82
10/27/2004 12:09	0.60
10/27/2004 12:10	0.51
10/27/2004 12:11	0.45
10/27/2004 12:12	0.45
10/27/2004 12:13	0.45
10/27/2004 12:14	0.49
10/27/2004 12:15	0.51
10/27/2004 12:16	0.36
10/27/2004 12:17	0.33
10/27/2004 12:18	0.48
10/27/2004 12:19	0.41
10/27/2004 12:20	0.37
10/27/2004 12:21	0.38
10/27/2004 12:22	0.45
10/27/2004 12:23	0.40
10/27/2004 12:24	0.42
10/27/2004 12:25	0.44
10/27/2004 12:26	0.54
10/27/2004 12:27	0.56
10/27/2004 12:28	0.54
10/27/2004 12:29	0.50
10/27/2004 12:30	0.53
10/27/2004 12:31	0.55
10/27/2004 12:32	0.64
10/27/2004 12:33	0.67
10/27/2004 12:34	0.56
10/27/2004 12:35	0.34
10/27/2004 12:36	0.39
10/27/2004 12:37	0.38
10/27/2004 12:38	0.31
10/27/2004 12:39	0.32
10/27/2004 12:40	0.38
10/27/2004 12:41	0.31

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	
Range	0-10
10/27/2004 12:42	0.28
10/27/2004 12:43	0.28
10/27/2004 12:44	0.36
10/27/2004 12:45	0.49
10/27/2004 12:46	0.40
10/27/2004 12:47	0.25
10/27/2004 12:48	0.25
10/27/2004 12:49	0.24
10/27/2004 12:50	0.24
10/27/2004 12:51	0.29
10/27/2004 12:52	0.24
10/27/2004 12:53	0.22
10/27/2004 12:54	0.21
10/27/2004 12:55	0.34
10/27/2004 12:56	0.26
10/27/2004 12:57	0.27
10/27/2004 12:58	0.35
10/27/2004 12:59	0.35
10/27/2004 13:00	0.39
10/27/2004 13:01	0.37
10/27/2004 13:02	0.47
10/27/2004 13:03	0.48
10/27/2004 13:04	0.51
10/27/2004 13:05	0.55
10/27/2004 13:06	0.53
10/27/2004 13:07	0.51
10/27/2004 13:08	0.51
10/27/2004 13:09	0.53
10/27/2004 13:10	0.59
10/27/2004 13:11	0.61
10/27/2004 13:12	0.61
10/27/2004 13:13	0.79
10/27/2004 13:14	0.54
10/27/2004 13:15	0.43
10/27/2004 13:16	0.41
10/27/2004 13:17	0.51
10/27/2004 13:18	0.45
10/27/2004 13:19	0.51
10/27/2004 13:20	0.58
10/27/2004 13:21	0.71
10/27/2004 13:22	0.56
Period Average =	0.48
Period Max Value =	1.28
Period Min Value =	0.19
Period Totals =	1.3415E+2
Period % Recovery =	100.0

COM DATA - RUN NO. 2

Data Summary Report

Company: Steel Dynamics - Bar Products
8000 North County Road 225 east
Pittsboro, IN 46167



Data Group: 1 Min Raw
Report Name: No Title
Start of Report: 10/27/2004 14:56
End of Report: 10/27/2004 20:43

Validation: All Available Data

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	-
Range	0-10
10/27/2004 14:56	0.44
10/27/2004 14:57	0.60
10/27/2004 14:58	0.56
10/27/2004 14:59	0.45
10/27/2004 15:00	0.40
10/27/2004 15:01	0.38
10/27/2004 15:02	0.53
10/27/2004 15:03	0.38
10/27/2004 15:04	0.30
10/27/2004 15:05	0.37
10/27/2004 15:06	0.44
10/27/2004 15:07	0.39
10/27/2004 15:08	0.36
10/27/2004 15:09	0.45
10/27/2004 15:10	0.48
10/27/2004 15:11	0.49
10/27/2004 15:12	0.45
10/27/2004 15:13	0.46
10/27/2004 15:14	0.43
10/27/2004 15:15	0.46
10/27/2004 15:16	0.54
10/27/2004 15:17	0.61
10/27/2004 15:18	0.55
10/27/2004 15:19	0.47
10/27/2004 15:20	0.36
10/27/2004 15:21	0.33
10/27/2004 15:22	0.34
10/27/2004 15:23	0.35
10/27/2004 15:24	0.37
10/27/2004 15:25	0.35
10/27/2004 15:26	0.32
10/27/2004 15:27	0.36
10/27/2004 15:28	0.53
10/27/2004 15:29	0.43
10/27/2004 15:30	0.48
10/27/2004 15:31	0.60
10/27/2004 15:32	0.67
10/27/2004 15:33	0.80
10/27/2004 15:34	0.70

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	
Range	0-10

10/27/2004 15:35	0.62
10/27/2004 15:36	0.59
10/27/2004 15:37	0.56
10/27/2004 15:38	0.60
10/27/2004 15:39	0.62
10/27/2004 15:40	0.51
10/27/2004 15:41	0.45
10/27/2004 15:42	0.50
10/27/2004 15:43	0.52
10/27/2004 15:44	0.56
10/27/2004 15:45	0.56
10/27/2004 15:46	0.61
10/27/2004 15:47	0.83
10/27/2004 15:48	0.67
10/27/2004 15:49	0.57
10/27/2004 15:50	0.47
10/27/2004 15:51	0.38
10/27/2004 15:52	0.31
10/27/2004 15:53	0.38
10/27/2004 15:54	0.37
10/27/2004 15:55	0.33
10/27/2004 15:56	0.34
10/27/2004 15:57	0.46
10/27/2004 15:58	0.38
10/27/2004 15:59	0.33
10/27/2004 16:00	0.39
10/27/2004 16:01	0.48
10/27/2004 16:02	0.35
10/27/2004 16:03	0.29
10/27/2004 16:04	0.43
10/27/2004 16:05	0.36
10/27/2004 16:06	0.45
10/27/2004 16:07	0.50
10/27/2004 16:08	0.42
10/27/2004 16:09	0.43
10/27/2004 16:10	0.48
10/27/2004 16:11	0.45
10/27/2004 16:12	0.46
10/27/2004 16:13	0.48
10/27/2004 16:14	0.48
10/27/2004 16:15	0.65
10/27/2004 16:16	0.49
10/27/2004 16:17	0.49
10/27/2004 16:18	0.55
10/27/2004 16:19	0.68
10/27/2004 16:20	0.60
10/27/2004 16:21	0.60
10/27/2004 16:22	0.65
10/27/2004 16:23	0.67
10/27/2004 16:24	0.59

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	μ
Range	0-10
10/27/2004 16:25	0.38
10/27/2004 16:26	0.35
10/27/2004 16:27	0.31
10/27/2004 16:28	0.30
10/27/2004 16:29	0.38
10/27/2004 16:30	0.38
10/27/2004 16:31	0.34
10/27/2004 16:32	0.38
10/27/2004 16:33	0.48
10/27/2004 16:34	0.48
10/27/2004 16:35	0.46
10/27/2004 16:36	0.46
10/27/2004 16:37	0.71
10/27/2004 16:38	0.70
10/27/2004 16:39	0.71
10/27/2004 16:40	0.74
10/27/2004 16:41	0.84
10/27/2004 16:42	0.70
10/27/2004 16:43	0.52
10/27/2004 16:44	0.29
10/27/2004 16:45	0.28
10/27/2004 16:46	0.30
10/27/2004 16:47	0.27
10/27/2004 16:48	0.28
10/27/2004 16:49	0.31
10/27/2004 16:50	0.33
10/27/2004 16:51	0.34
10/27/2004 16:52	0.31
10/27/2004 16:53	0.26
10/27/2004 16:54	0.25
10/27/2004 16:55	0.31
10/27/2004 16:56	0.29
10/27/2004 16:57	0.36
10/27/2004 16:58	0.30
10/27/2004 16:59	0.34
10/27/2004 17:00	0.42
10/27/2004 17:01	0.29
10/27/2004 17:02	0.22
10/27/2004 17:03	0.24
10/27/2004 17:04	0.23
10/27/2004 17:05	0.20
10/27/2004 17:06	0.26
10/27/2004 17:07	0.26
10/27/2004 17:08	0.24
10/27/2004 17:09	0.23
10/27/2004 17:10	0.34
10/27/2004 17:11	0.31
10/27/2004 17:12	0.27
10/27/2004 17:13	0.30
10/27/2004 17:14	0.27

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	
Range	0-10
10/27/2004 17:15	0.24
10/27/2004 17:16	0.21
10/27/2004 17:17	0.31
10/27/2004 17:18	0.26
10/27/2004 17:19	0.24
10/27/2004 17:20	0.23
10/27/2004 17:21	0.24
10/27/2004 17:22	0.20
10/27/2004 17:23	0.20
10/27/2004 17:24	0.27
10/27/2004 17:25	0.34
10/27/2004 17:26	0.30
10/27/2004 17:27	0.26
10/27/2004 17:28	0.31
10/27/2004 17:29	0.29
10/27/2004 17:30	0.29
10/27/2004 17:31	0.27
10/27/2004 17:32	0.27
10/27/2004 17:33	0.23
10/27/2004 17:34	0.24
10/27/2004 17:35	0.31
10/27/2004 17:36	0.31
10/27/2004 17:37	0.27
10/27/2004 17:38	0.28
10/27/2004 17:39	0.26
10/27/2004 17:40	0.22
10/27/2004 17:41	0.21
10/27/2004 17:42	0.23
10/27/2004 17:43	0.27
10/27/2004 17:44	0.23
10/27/2004 17:45	0.21
10/27/2004 17:46	0.27
10/27/2004 17:47	0.23
10/27/2004 17:48	0.22
10/27/2004 17:49	0.23
10/27/2004 17:50	0.28
10/27/2004 17:51	0.22
10/27/2004 17:52	0.26
10/27/2004 17:53	0.25
10/27/2004 17:54	0.26
10/27/2004 17:55	0.20
10/27/2004 17:56	0.24
10/27/2004 17:57	0.22
10/27/2004 17:58	0.24
10/27/2004 17:59	0.23
10/27/2004 18:00	0.22
10/27/2004 18:01	0.22
10/27/2004 18:02	0.24
10/27/2004 18:03	0.25
10/27/2004 18:04	0.27

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	
Range	0-10
10/27/2004 18:05	0.24
10/27/2004 18:06	0.25
10/27/2004 18:07	0.24
10/27/2004 18:08	0.24
10/27/2004 18:09	0.23
10/27/2004 18:10	0.24
10/27/2004 18:11	0.25
10/27/2004 18:12	0.26
10/27/2004 18:13	0.30
10/27/2004 18:14	0.34
10/27/2004 18:15	0.34
10/27/2004 18:16	0.36
10/27/2004 18:17	0.42
10/27/2004 18:18	0.42
10/27/2004 18:19	0.47
10/27/2004 18:20	0.47
10/27/2004 18:21	0.49
10/27/2004 18:22	0.53
10/27/2004 18:23	0.60
10/27/2004 18:24	0.53
10/27/2004 18:25	0.53
10/27/2004 18:26	0.57
10/27/2004 18:27	0.38
10/27/2004 18:28	0.31
10/27/2004 18:29	0.27
10/27/2004 18:30	0.47
10/27/2004 18:31	0.52
10/27/2004 18:32	0.44
10/27/2004 18:33	0.43
10/27/2004 18:34	0.45
10/27/2004 18:35	0.49
10/27/2004 18:36	0.36
10/27/2004 18:37	0.27
10/27/2004 18:38	0.33
10/27/2004 18:39	0.33
10/27/2004 18:40	0.30
10/27/2004 18:41	0.49
10/27/2004 18:42	0.32
10/27/2004 18:43	0.31
10/27/2004 18:44	0.30
10/27/2004 18:45	0.37
10/27/2004 18:46	0.40
10/27/2004 18:47	0.35
10/27/2004 18:48	0.41
10/27/2004 18:49	0.56
10/27/2004 18:50	0.51
10/27/2004 18:51	0.45
10/27/2004 18:52	0.48
10/27/2004 18:53	0.40
10/27/2004 18:54	0.38

Group#-Channel#		G1-C9
Long Descrip.		Opacity 1
Short Descrip.		Opacity
Units		
Range		0-10
10/27/2004 18:55		0.43
10/27/2004 18:56		0.56
10/27/2004 18:57		0.49
10/27/2004 18:58		0.44
10/27/2004 18:59		0.54
10/27/2004 19:00		0.51
10/27/2004 19:01		0.54
10/27/2004 19:02		0.60
10/27/2004 19:03		0.74
10/27/2004 19:04		0.85
10/27/2004 19:05		0.89
10/27/2004 19:06		1.10
10/27/2004 19:07		0.94
10/27/2004 19:08		0.67
10/27/2004 19:09		0.51
10/27/2004 19:10		0.40
10/27/2004 19:11		0.33
10/27/2004 19:12		0.39
10/27/2004 19:13		0.33
10/27/2004 19:14		0.33
10/27/2004 19:15		0.37
10/27/2004 19:16		0.42
10/27/2004 19:17		0.50
10/27/2004 19:18		0.42
10/27/2004 19:19		0.41
10/27/2004 19:20		0.43
10/27/2004 19:21		0.54
10/27/2004 19:22		0.49
10/27/2004 19:23		0.53
10/27/2004 19:24		0.60
10/27/2004 19:25		0.68
10/27/2004 19:26		0.74
10/27/2004 19:27		0.67
10/27/2004 19:28		0.61
10/27/2004 19:29		0.54
10/27/2004 19:30		0.53
10/27/2004 19:31		0.53
10/27/2004 19:32		0.65
10/27/2004 19:33		0.55 <
10/27/2004 19:34		0.52
10/27/2004 19:35		0.55
10/27/2004 19:36		0.61
10/27/2004 19:37		0.53
10/27/2004 19:38		0.47
10/27/2004 19:39		0.46
10/27/2004 19:40		0.38
10/27/2004 19:41		0.38
10/27/2004 19:42		0.32
10/27/2004 19:43		0.53
10/27/2004 19:44		0.34

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	-
Range	0-10
10/27/2004 19:45	0.36
10/27/2004 19:46	0.32
10/27/2004 19:47	0.28
10/27/2004 19:48	0.31
10/27/2004 19:49	0.35
10/27/2004 19:50	0.44
10/27/2004 19:51	0.50
10/27/2004 19:52	0.45
10/27/2004 19:53	0.34
10/27/2004 19:54	0.53
10/27/2004 19:55	0.37
10/27/2004 19:56	0.30
10/27/2004 19:57	0.33
10/27/2004 19:58	0.45
10/27/2004 19:59	0.47
10/27/2004 20:00	0.55
10/27/2004 20:01	0.59
10/27/2004 20:02	0.63
10/27/2004 20:03	0.66
10/27/2004 20:04	0.54
10/27/2004 20:05	0.45
10/27/2004 20:06	0.46
10/27/2004 20:07	0.47
10/27/2004 20:08	0.55
10/27/2004 20:09	0.64
10/27/2004 20:10	0.59
10/27/2004 20:11	0.60
10/27/2004 20:12	0.78
10/27/2004 20:13	0.47
10/27/2004 20:14	0.32
10/27/2004 20:15	0.31
10/27/2004 20:16	0.55
10/27/2004 20:17	0.48
10/27/2004 20:18	0.43
10/27/2004 20:19	0.55
10/27/2004 20:20	0.53
10/27/2004 20:21	0.52
10/27/2004 20:22	0.56
10/27/2004 20:23	0.55
10/27/2004 20:24	0.57
10/27/2004 20:25	0.54
10/27/2004 20:26	0.56
10/27/2004 20:27	0.51
10/27/2004 20:28	0.54
10/27/2004 20:29	0.58
10/27/2004 20:30	0.74
10/27/2004 20:31	0.60
10/27/2004 20:32	0.56
10/27/2004 20:33	0.57
10/27/2004 20:34	0.71

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	-
Range	0-10
10/27/2004 20:35	0.66
10/27/2004 20:36	0.63
10/27/2004 20:37	0.62
10/27/2004 20:38	0.76
10/27/2004 20:39	0.76
10/27/2004 20:40	0.78
10/27/2004 20:41	0.70
10/27/2004 20:42	0.56
10/27/2004 20:43	0.57
Period Average =	0.44
Period Max Value =	1.10
Period Min Value =	0.20
Period Totals =	1.5138E+2
Period % Recovery =	100.0

COM DATA - RUN NO. 3

5 0

0.1

Data Summary Report

Company: Steel Dynamics - Bar Products
8000 North County Road 225 east
Pittsboro, IN 46167



Data Group: 1 Min Raw
Report Name: No Title
Start of Report: 10/28/2004 08:43
End of Report: 10/28/2004 13:22

Validation: All Available Data

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	%
Range	0-10
10/28/2004 08:43	0.36
10/28/2004 08:44	0.37
10/28/2004 08:45	0.35
10/28/2004 08:46	0.61
10/28/2004 08:47	0.39
10/28/2004 08:48	0.36
10/28/2004 08:49	0.52
10/28/2004 08:50	0.48
10/28/2004 08:51	0.43
10/28/2004 08:52	0.37
10/28/2004 08:53	0.36
10/28/2004 08:54	0.34
10/28/2004 08:55	0.33
10/28/2004 08:56	0.36
10/28/2004 08:57	0.52
10/28/2004 08:58	0.41
10/28/2004 08:59	0.39
10/28/2004 09:00	0.57
10/28/2004 09:01	0.52
10/28/2004 09:02	0.49
10/28/2004 09:03	0.50
10/28/2004 09:04	0.60
10/28/2004 09:05	0.42
10/28/2004 09:06	0.30
10/28/2004 09:07	0.27
10/28/2004 09:08	0.48
10/28/2004 09:09	0.30
10/28/2004 09:10	0.26
10/28/2004 09:11	0.29
10/28/2004 09:12	0.29
10/28/2004 09:13	0.29
10/28/2004 09:14	0.43
10/28/2004 09:15	0.42
10/28/2004 09:16	0.56
10/28/2004 09:17	0.51
10/28/2004 09:18	0.54
10/28/2004 09:19	0.64
10/28/2004 09:20	0.55
10/28/2004 09:21	0.58

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	%
Range	0-10
10/28/2004 09:22	0.68
10/28/2004 09:23	0.75 <
10/28/2004 09:24	0.74 <
10/28/2004 09:25	0.78 <
10/28/2004 09:26	0.65
10/28/2004 09:27	0.63
10/28/2004 09:28	0.61
10/28/2004 09:29	0.53
10/28/2004 09:30	0.52
10/28/2004 09:31	0.48
10/28/2004 09:32	0.49
10/28/2004 09:33	0.54
10/28/2004 09:34	0.54
10/28/2004 09:35	0.51
10/28/2004 09:36	0.51
10/28/2004 09:37	0.63
10/28/2004 09:38	0.46
10/28/2004 09:39	0.38
10/28/2004 09:40	0.37
10/28/2004 09:41	0.53
10/28/2004 09:42	0.45
10/28/2004 09:43	0.34
10/28/2004 09:44	0.36
10/28/2004 09:45	0.33
10/28/2004 09:46	0.29
10/28/2004 09:47	0.31
10/28/2004 09:48	0.30
10/28/2004 09:49	0.31
10/28/2004 09:50	0.32
10/28/2004 09:51	0.32
10/28/2004 09:52	0.40
10/28/2004 09:53	0.38
10/28/2004 09:54	0.35
10/28/2004 09:55	0.62
10/28/2004 09:56	0.56
10/28/2004 09:57	0.39
10/28/2004 09:58	0.34
10/28/2004 09:59	0.40
10/28/2004 10:00	0.40
10/28/2004 10:01	0.40
10/28/2004 10:02	0.47
10/28/2004 10:03	0.53
10/28/2004 10:04	0.61
10/28/2004 10:05	0.51
10/28/2004 10:06	0.38
10/28/2004 10:07	0.36
10/28/2004 10:08	0.32
10/28/2004 10:09	0.34
10/28/2004 10:10	0.47
10/28/2004 10:11	0.34

Group#-Channel#		G1-C9
Long Descrip.		Opacity 1
Short Descrip.		Opacity
Units		
Range		0-10
10/28/2004 10:12		0.33<
10/28/2004 10:13		0.45D
10/28/2004 10:14		0.35D
10/28/2004 10:15		0.30D
10/28/2004 10:16		0.33D
10/28/2004 10:17		0.50D
10/28/2004 10:18		0.37D
10/28/2004 10:19		0.45D
10/28/2004 10:20		0.58D
10/28/2004 10:21		0.66D
10/28/2004 10:22		0.63<
10/28/2004 10:23		0.65
10/28/2004 10:24		0.69
10/28/2004 10:25		0.66
10/28/2004 10:26		0.67
10/28/2004 10:27		0.65
10/28/2004 10:28		0.64
10/28/2004 10:29		0.68
10/28/2004 10:30		0.65
10/28/2004 10:31		0.75
10/28/2004 10:32		0.94
10/28/2004 10:33		0.84
10/28/2004 10:34		0.95
10/28/2004 10:35		1.04
10/28/2004 10:36		1.25
10/28/2004 10:37		0.95
10/28/2004 10:38		0.79
10/28/2004 10:39		0.76
10/28/2004 10:40		1.04
10/28/2004 10:41		0.85
10/28/2004 10:42		0.69
10/28/2004 10:43		0.68
10/28/2004 10:44		0.58
10/28/2004 10:45		0.56
10/28/2004 10:46		0.48
10/28/2004 10:47		0.58
10/28/2004 10:48		0.51
10/28/2004 10:49		0.44
10/28/2004 10:50		0.44
10/28/2004 10:51		0.46
10/28/2004 10:52		0.41
10/28/2004 10:53		0.34
10/28/2004 10:54		0.45
10/28/2004 10:55		0.36
10/28/2004 10:56		0.33
10/28/2004 10:57		0.35
10/28/2004 10:58		0.41
10/28/2004 10:59		0.42
10/28/2004 11:00		0.41
10/28/2004 11:01		0.49

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	-
Range	0-10
10/28/2004 11:02	0.52
10/28/2004 11:03	0.50
10/28/2004 11:04	0.45
10/28/2004 11:05	0.38
10/28/2004 11:06	0.36
10/28/2004 11:07	0.30
10/28/2004 11:08	0.39
10/28/2004 11:09	0.43
10/28/2004 11:10	0.36
10/28/2004 11:11	0.30
10/28/2004 11:12	0.32
10/28/2004 11:13	0.29
10/28/2004 11:14	0.29
10/28/2004 11:15	0.27
10/28/2004 11:16	0.34
10/28/2004 11:17	0.42
10/28/2004 11:18	0.29
10/28/2004 11:19	0.27
10/28/2004 11:20	0.28
10/28/2004 11:21	0.22
10/28/2004 11:22	0.31
10/28/2004 11:23	0.68
10/28/2004 11:24	0.66
10/28/2004 11:25	0.65
10/28/2004 11:26	0.60
10/28/2004 11:27	0.50
10/28/2004 11:28	0.40
10/28/2004 11:29	0.36
10/28/2004 11:30	0.48
10/28/2004 11:31	0.53
10/28/2004 11:32	0.51
10/28/2004 11:33	0.59
10/28/2004 11:34	0.67
10/28/2004 11:35	0.52 <
10/28/2004 11:36	0.48
10/28/2004 11:37	0.53
10/28/2004 11:38	0.45
10/28/2004 11:39	0.30
10/28/2004 11:40	0.31
10/28/2004 11:41	0.37
10/28/2004 11:42	0.35
10/28/2004 11:43	0.41
10/28/2004 11:44	0.50
10/28/2004 11:45	0.71
10/28/2004 11:46	0.54
10/28/2004 11:47	0.61
10/28/2004 11:48	0.61
10/28/2004 11:49	0.48
10/28/2004 11:50	0.40
10/28/2004 11:51	0.42

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	
Range	0-10
10/28/2004 11:52	0.49
10/28/2004 11:53	0.58
10/28/2004 11:54	0.55
10/28/2004 11:55	0.51
10/28/2004 11:56	0.53
10/28/2004 11:57	0.50
10/28/2004 11:58	0.54
10/28/2004 11:59	0.63
10/28/2004 12:00	0.59
10/28/2004 12:01	0.61
10/28/2004 12:02	0.55
10/28/2004 12:03	0.64
10/28/2004 12:04	0.56
10/28/2004 12:05	0.56
10/28/2004 12:06	0.66
10/28/2004 12:07	0.65
10/28/2004 12:08	0.51
10/28/2004 12:09	0.54
10/28/2004 12:10	0.65
10/28/2004 12:11	0.52
10/28/2004 12:12	0.36
10/28/2004 12:13	0.32
10/28/2004 12:14	0.31
10/28/2004 12:15	0.37
10/28/2004 12:16	0.34
10/28/2004 12:17	0.29
10/28/2004 12:18	0.29
10/28/2004 12:19	0.38
10/28/2004 12:20	0.37
10/28/2004 12:21	0.42
10/28/2004 12:22	0.42
10/28/2004 12:23	0.42
10/28/2004 12:24	0.43
10/28/2004 12:25	0.59
10/28/2004 12:26	0.57
10/28/2004 12:27	0.56
10/28/2004 12:28	0.54
10/28/2004 12:29	0.62
10/28/2004 12:30	0.67
10/28/2004 12:31	0.60
10/28/2004 12:32	0.54
10/28/2004 12:33	0.53
10/28/2004 12:34	0.46
10/28/2004 12:35	0.51
10/28/2004 12:36	0.66
10/28/2004 12:37	0.65
10/28/2004 12:38	0.71
10/28/2004 12:39	0.59
10/28/2004 12:40	0.49
10/28/2004 12:41	0.41

Group#-Channel#	G1-C9
Long Descrip.	Opacity 1
Short Descrip.	Opacity
Units	
Range	0-10
10/28/2004 12:42	0.42
10/28/2004 12:43	0.57
10/28/2004 12:44	0.42
10/28/2004 12:45	0.38
10/28/2004 12:46	0.52
10/28/2004 12:47	0.68
10/28/2004 12:48	0.50
10/28/2004 12:49	0.50
10/28/2004 12:50	0.55
10/28/2004 12:51	0.57
10/28/2004 12:52	0.56
10/28/2004 12:53	0.53
10/28/2004 12:54	0.57
10/28/2004 12:55	0.71
10/28/2004 12:56	0.73
10/28/2004 12:57	1.02
10/28/2004 12:58	0.99
10/28/2004 12:59	0.88
10/28/2004 13:00	0.80
10/28/2004 13:01	0.88
10/28/2004 13:02	0.64
10/28/2004 13:03	0.69
10/28/2004 13:04	0.66
10/28/2004 13:05	0.79
10/28/2004 13:06	0.90
10/28/2004 13:07	0.67
10/28/2004 13:08	0.67
10/28/2004 13:09	0.69
10/28/2004 13:10	0.61
10/28/2004 13:11	0.56
10/28/2004 13:12	0.53
10/28/2004 13:13	0.45
10/28/2004 13:14	0.38
10/28/2004 13:15	0.35
10/28/2004 13:16	0.43
10/28/2004 13:17	0.35
10/28/2004 13:18	0.33
10/28/2004 13:19	0.43
10/28/2004 13:20	0.45
10/28/2004 13:21	0.44
10/28/2004 13:22	0.42
Period Average =	0.51
Period Max Value =	1.25
Period Min Value =	0.22
Period Totals =	1.4170E+2
Period % Recovery =	100.0

RF Exhaust Stack

USEPA METHODS 3A AND 7E

Test Run 1 Begin. STRATA Version 2.01

Operator: AMIR BEHESHTI

Plant Name: SDI

Location: REHEAT FURNACE

		0 2 %	NOx ppm
10-27-2004	18:52:22	0.184	52.8
10-27-2004	18:53:23	3.461	48.87
10-27-2004	18:54:23	5.414	43.29
10-27-2004	18:55:23	5.541	42.07
10-27-2004	18:56:24	5.585	42.06
10-27-2004	18:57:24	5.692	42.55

Begin calculating run averages

10-27-2004	18:58:49	5.869	42.23
10-27-2004	18:59:49	5.932	42.1
10-27-2004	19:00:50	5.909	42.33
10-27-2004	19:01:50	5.931	41.96
10-27-2004	19:02:50	5.9	41.81
10-27-2004	19:03:51	5.88	41.95
10-27-2004	19:04:51	5.807	42.25
10-27-2004	19:05:52	5.78	42.62
10-27-2004	19:06:52	5.873	42.65
10-27-2004	19:07:52	6.132	44.65
10-27-2004	19:08:53	6.05	45.72
10-27-2004	19:09:53	6.059	45.01
10-27-2004	19:10:54	6.001	44.26
10-27-2004	19:11:54	5.884	43.79
10-27-2004	19:12:54	5.966	44.7
10-27-2004	19:13:49	6.021	45.23
10-27-2004	19:14:49	6.137	46.1
10-27-2004	19:15:50	6.209	45.72
10-27-2004	19:16:50	6.206	45.53
10-27-2004	19:17:50	6.168	43.77
10-27-2004	19:18:51	6.035	42.85
10-27-2004	19:19:51	6.022	41.9
10-27-2004	19:20:51	6.278	40.8
10-27-2004	19:21:52	6.587	39.48
10-27-2004	19:22:52	6.741	37.57
10-27-2004	19:23:53	6.743	35.49
10-27-2004	19:24:53	6.731	33.52
10-27-2004	19:25:53	6.659	31.61
10-27-2004	19:26:54	6.752	30.95
10-27-2004	19:27:54	6.726	31.24
10-27-2004	19:28:49	6.563	31.95
10-27-2004	19:29:49	6.019	31.38
10-27-2004	19:30:49	5.567	30.55
10-27-2004	19:31:50	5.353	29.61
10-27-2004	19:32:50	5.455	29.42
10-27-2004	19:33:51	5.52	29.52
10-27-2004	19:34:51	5.519	28.66
10-27-2004	19:35:51	5.502	28.87
10-27-2004	19:36:52	5.727	28.44
10-27-2004	19:37:52	5.797	28.83
10-27-2004	19:38:53	5.962	30.44

10-27-2004	19:39:53	5.969	31.64
10-27-2004	19:40:53	6.065	31.98
10-27-2004	19:41:54	6.024	31.85
10-27-2004	19:42:54	6.094	31.6
10-27-2004	19:43:49	6.2	31.77
10-27-2004	19:44:49	6.18	32.11
10-27-2004	19:45:49	6.136	32.11
10-27-2004	19:46:50	6.178	31.98
10-27-2004	19:47:50	6.423	32.21
10-27-2004	19:48:51	6.704	32.77
10-27-2004	19:49:51	6.622	32.29
10-27-2004	19:50:51	6.675	32.14
10-27-2004	19:51:52	6.622	31.97
10-27-2004	19:52:52	6.38	31.81
10-27-2004	19:53:53	6.229	31.79
10-27-2004	19:54:53	6.038	31.65
10-27-2004	19:55:53	6.035	31.95
10-27-2004	19:56:54	6.082	33.34
10-27-2004	19:57:54	5.937	33.71
Average of Test Run		0.2	NOx
		%	ppm
10-27-2004	19:57:54	6.109	36.3
Test Run 1 End			

Test Run 2 Begin. STRATA Version 2.01

Operator: AMIR BEHESHTI

Plant Name: SDI

Location: REHEAT FURNACE

		O ₂ %	NO _x ppm
10-27-2004	20:09:12	0.209	52.49
10-27-2004	20:10:12	4.366	46.69
10-27-2004	20:11:13	6.029	39.48
Begin calculating run averages			
10-27-2004	20:13:14	6.244	38.44
10-27-2004	20:14:14	6.046	38.26
10-27-2004	20:15:14	5.917	37.48
10-27-2004	20:16:15	5.83	37.68
10-27-2004	20:17:15	5.593	37.17
10-27-2004	20:18:16	5.426	36.5
10-27-2004	20:19:16	5.344	34.85
10-27-2004	20:20:16	5.352	34.4
10-27-2004	20:21:17	5.321	34.08
10-27-2004	20:22:17	5.27	34.48
10-27-2004	20:23:18	5.412	36.09
10-27-2004	20:24:18	5.404	36.33
10-27-2004	20:25:18	5.482	36.72
10-27-2004	20:26:19	5.763	37.04
10-27-2004	20:27:19	6.005	36.95
10-27-2004	20:28:14	6.071	37.26
10-27-2004	20:29:14	6.214	36.98
10-27-2004	20:30:14	6.302	36.48
10-27-2004	20:31:15	6.344	36.24
10-27-2004	20:32:15	6.365	36.27
10-27-2004	20:33:16	6.503	35.66
10-27-2004	20:34:16	6.418	34.85
10-27-2004	20:35:16	6.326	35.55
10-27-2004	20:36:17	6.222	35.23
10-27-2004	20:37:17	6.051	34.75
10-27-2004	20:38:18	6.064	34.49
10-27-2004	20:39:18	5.897	34.48
10-27-2004	20:40:18	5.972	33.89
10-27-2004	20:41:19	5.956	33.52
10-27-2004	20:42:19	5.896	33.31
10-27-2004	20:43:13	5.848	33.72
10-27-2004	20:44:14	5.979	33.27
10-27-2004	20:45:14	6.071	32.98
10-27-2004	20:46:15	6.005	33.34
10-27-2004	20:47:15	5.813	32.84
10-27-2004	20:48:15	5.759	32.28
10-27-2004	20:49:16	5.706	31.86
10-27-2004	20:50:16	5.796	31.77
10-27-2004	20:51:17	5.769	31.64
10-27-2004	20:52:17	5.6	31.86
10-27-2004	20:53:17	5.784	31.61
10-27-2004	20:54:18	6.012	32.21
10-27-2004	20:55:18	6.116	31.72
10-27-2004	20:56:19	6.418	31.12

10-27-2004	20:57:19	6.591	31
10-27-2004	20:58:13	6.628	31.07
10-27-2004	20:59:14	6.568	30.99
10-27-2004	21:00:14	6.667	31.38
10-27-2004	21:01:15	6.822	31.99
10-27-2004	21:02:15	6.717	33.2
10-27-2004	21:03:15	6.755	34.09
10-27-2004	21:04:16	6.829	33.92
10-27-2004	21:05:16	6.813	34.04
10-27-2004	21:06:17	6.767	34.71
10-27-2004	21:07:17	6.859	35.57
10-27-2004	21:08:17	6.844	36.55
10-27-2004	21:09:18	6.795	38
10-27-2004	21:10:18	6.772	38.73
10-27-2004	21:11:19	6.84	38.42
10-27-2004	21:12:19	6.905	38.57
Average of Test Run	0.2		NOx
	%		ppm
10-27-2004	21:12:19	6.131	34.67
Test Run 2 End			

Test Run 3 Begin. STRATA Version 2.01

Operator: AMIR BEHESHTI

Plant Name: SDI

Location: REHEAT FURNACE

		0 2 %	NOx ppm
10-28-2004	07:30:36	0.202	54.01
10-28-2004	07:31:36	0.156	54.24
10-28-2004	07:32:37	0.181	54.35
10-28-2004	07:33:37	0.178	54.44
10-28-2004	07:34:37	0.121	54.48
10-28-2004	07:35:38	0.174	54.49
10-28-2004	07:36:38	0.162	54.59
10-28-2004	07:37:39	0.171	54.65
10-28-2004	07:38:39	0.212	54.7
10-28-2004	07:39:39	1.205	54.59
10-28-2004	07:40:40	6.413	46.4
10-28-2004	07:41:40	7.026	43.33
10-28-2004	07:42:41	7.123	42.8
Begin calculating run averages			
10-28-2004	07:44:23	7.163	39.64
10-28-2004	07:45:24	7.406	37.72
10-28-2004	07:46:24	7.324	37.08
10-28-2004	07:47:24	7.212	36.53
10-28-2004	07:48:25	7.305	36.99
10-28-2004	07:49:25	7.294	36.72
10-28-2004	07:50:26	7.409	36.48
10-28-2004	07:51:26	7.425	36.22
10-28-2004	07:52:26	7.413	36.09
10-28-2004	07:53:27	7.501	36.87
10-28-2004	07:54:27	7.542	37.18
10-28-2004	07:55:28	7.624	37.87
10-28-2004	07:56:28	7.803	37.63
10-28-2004	07:57:28	7.732	38.43
10-28-2004	07:58:29	7.644	39.69
10-28-2004	07:59:23	7.416	39.31
10-28-2004	08:00:24	7.48	38.04
10-28-2004	08:01:24	7.423	38.41
10-28-2004	08:02:24	7.29	38.64
10-28-2004	08:03:25	7.409	38.9
10-28-2004	08:04:25	7.535	38.11
10-28-2004	08:05:26	7.442	39.42
10-28-2004	08:06:26	7.444	39.58
10-28-2004	08:07:26	7.426	40.21
10-28-2004	08:08:27	7.494	39.56
10-28-2004	08:09:27	7.533	39.22
10-28-2004	08:10:27	7.426	40.22
10-28-2004	08:11:28	7.427	40.49
10-28-2004	08:12:28	7.318	40.36
10-28-2004	08:13:29	7.442	39.78
10-28-2004	08:14:23	7.492	38.74
10-28-2004	08:15:23	7.559	38.08
10-28-2004	08:16:24	7.704	36.47
10-28-2004	08:17:24	7.57	37.03

10-28-2004	08:18:25	7.734	37.89
10-28-2004	08:19:25	7.63	38.34
10-28-2004	08:20:25	7.405	37.72
10-28-2004	08:21:26	7.502	35.97
10-28-2004	08:22:26	7.602	36.11
10-28-2004	08:23:27	7.541	36.49
10-28-2004	08:24:27	7.561	35.58
10-28-2004	08:25:27	7.617	35.46
10-28-2004	08:26:28	7.806	36.02
10-28-2004	08:27:28	7.699	35.67
10-28-2004	08:28:29	7.585	36.11
10-28-2004	08:29:23	7.481	35.72
10-28-2004	08:30:23	7.435	35.44
10-28-2004	08:31:24	7.594	34.88
10-28-2004	08:32:24	7.523	35.31
10-28-2004	08:33:25	7.449	35.57
10-28-2004	08:34:25	7.595	35.22
10-28-2004	08:35:25	7.607	35.61
10-28-2004	08:36:26	7.44	35.92
10-28-2004	08:37:26	7.484	36.72
10-28-2004	08:38:27	7.55	36
10-28-2004	08:39:27	7.536	35.7
10-28-2004	08:40:27	7.41	35.79
10-28-2004	08:41:28	7.519	36.4
10-28-2004	08:42:28	7.672	35.28
10-28-2004	08:43:29	7.525	35.46
Average of Test Run		0.2	NOx
		%	ppm
10-28-2004	08:43:29	7.502	37.3
Test Run 3 End			

APPENDIX B

PROCESS OPERATING DATA

EAF Baghouse Outlet

PROCESS INFORMATION - SUMMARY DATA

**FUME COLLECTION SYSTEM CHECKS
PERFORMED DURING COMPLIANCE TEST**

October 27, 2004

EAF BAGHOUSE

TIME	DAMPER SETTINGS					FAN AMPERAGES			OTHER PARAMETERS		
	EAST	CENTER	WEST	WATER COOLED DUCT		#1	#2	#3	FURNACE STATIC PRESSURE		BAGHOUSE DP
1000	60	30	62	100		168	0	183	0.04		8.6
1030	65	30	63	100		163	0	183	0.04		7.8
1140	57	30	56	100		165	0	178	0.04		9.2
1500	72	30	70	100		175	0	191	0.04		7.7
1527	65	30	63	100		165	0	188	0.04		8.7
1623	62	30	60	100		163	0	178	0.04		7.8
1803	74	30	72	100		176	0	196	0.04		7.8
AVE	-	-	-	-		168	0	185	0.04		8.2

**FUME COLLECTION SYSTEM CHECKS
PERFORMED DURING COMPLIANCE TEST**

October 28,2004

EAF BAGHOUSE

TIME	DAMPER SETTINGS					FAN AMPERAGES				OTHER PARAMETERS		
	EAST	CENTER	WEST	WATER COOLED DUCT		#1	#2	#3		FURNACE STATIC PRESSURE		BAGHOUSE DP
807	66	30	64	99		168	0	186		0.04		9.5
849	68	30	65	99		166	0	191		0.04		8.6
925	66	30	64	99		168	0	188		0.04		9.5
952	67	30	65	99		166	0	183		0.04		8.2
1121	66	30	63	100		165	0	186		0.04		7.6
1151	64	30	62	100		163	0	188		0.04		8.7
1252	65	30	62	100		160	0	178		0.03		8.4
AVE	-	-	-	-		165	0	186		0.04		8.6

PROCESS SUMMARY INFORMATION

PM/PM10 COMPLIANCE TEST

* Heat Sheet Data for the Pb Runs are included with this information.

RUN #1 OCTOBER 27,2004 0843-1322

ELECTRIC ARC FURNACE

<u>HEAT #</u>	<u>START</u>	<u>END</u>	<u>TONS PRODUCED</u>
A042995	840	940	100
A042996	940	1059	100
A042997	1059	1201	100
A042998	1201	1326	100

LADLE METALLURGICAL FURNACE

<u>HEAT #</u>	<u>START</u>	<u>END</u>
A042993	829	940
A042994	949	1010
A042995	1040	1120
A042996	1146	1421

RUN #2 OCTOBER 27,2004 1456-2043

<u>HEAT #</u>	<u>START</u>	<u>END.</u>	<u>TONS PRODUCED</u>
A042999	1326	1549	100
A043001	1549	1834	100
A043002	1834	1938	105
A043003	1938	2048	100

LADLE METALLURGICAL FURNACE

<u>HEAT #</u>	<u>START</u>	<u>END</u>
A042997	1320	1523
A042998	1531	1625
A042999	1643	1734
A043000	1854	2135

RUN #3 OCTOBER 28.2004 0843-1322

<u>HEAT #</u>	<u>START</u>	<u>END</u>	<u>TONS PRODUCED</u>
A043012	826	937	100
A043013	937	1046	100
A043014	1046	1211	100
A043015	1211	1310	100

LADLE METALLURGICAL FURNACE

<u>HEAT #</u>	<u>START</u>	<u>END</u>
A043010	738	916
A043011	928	1023
A043012	1031	1111
A043013	1122	1211
A043014	1229	1313

EAF HEAT SHEETS - RUN NO. 1

EAF HEAT REPORT

HEAT: A042999
ORDER: _____
GRADE: 10450401

CREW: A B C D
DATE: 10/27/04
MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>140000</u>	<u>8300</u>	<u>3500</u>
<u>56000</u>	<u>—</u>	<u>—</u>

CHARGED BUCKET #1 1454 WT (LBS) 140000 ELECTRODE ADDS A B C
CHARGED BUCKET #2 56000 ELECTRODE BREAKS A B C
CHARGED BUCKET #3 _____

HEATS ON TAPHOLE: 12
HEATSONDELTA: 31
HEATS SINCE PATCH: 1234
GUN LBS USED: _____

KWH	POWER ON TIME
<u>16640</u>	<u>1456</u>
<u>1521</u>	<u>1521</u>

SLAG RATING 3
1-FLUID, 5-THICK FOAM: 1543
MELT IN TIME 2895
FIRST 02 _____
FIRST CARBON _____

TAP DATA

LADLE: 3
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER	
AIM FOR LMF	<u>2/3</u>	<u>60</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01												
E02												
E03												

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1400</u>		<u>55</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1326
TAP TIME: 1549
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: NO 2 pipes
DRAIN HEAT?: NO
TOTAL KWH: 42180
TOTAL SCF 02: _____
TAP CARBON: 04
TAP 02: 686
TAP TEMP: 3067
TAP WEIGHT: 100000
BURNER 02: 137192

BURNERS: INJ:
#1 ✓ #1 _____
#2 ✓ #2 _____
#3 ✓ #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>1334</u>	<u>1454</u>	<u>80</u>	<u>Caster T/A</u>	<u>3 full ladles</u>	
2	<u>1454</u>	<u>1456</u>	<u>2</u>	<u>Charg #1 Bucket</u>		
3	<u>1518</u>	<u>1521</u>	<u>3</u>	<u>Charg #2 Bucket</u>		
4	<u>1549</u>	<u>1602</u>	<u>13</u>	<u>TAP</u>	<u>lance</u>	
5						
6						
7						
8						
9						
10						

TOTAL:

DELAY TOTALS

Refractory repair: _____

Electrode Add/Slip: _____

Scrap Charging: 5

Other: _____

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A043000
ORDER: _____
GRADE: 1045 04-01
CREW: A B C D
DATE: 10/27/04
MELTER: WLX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>140600</u>	<u>8300</u>	<u>3500</u>
<u>49000</u>	<u>—</u>	<u>—</u>

CHARGED BUCKET #1 1602 140600
CHARGED BUCKET #2 1624 49000
CHARGED BUCKET #3 _____

ELECTRODE ADDS
A B C
ELECTRODE BREAKS
A B C

HEATS ON TAPHOLE: 18
HEATS ON DELTA: 32
HEATS SINCE PATCH: 1735
GUN LBS USED: _____

KWH	POWER ON TIME
<u>15560</u>	<u>1605</u>
	<u>1626</u>

SLAG RATING
I-FLUID, 5-THICK FOAM: _____
MELT IN TIME
FIRST TEMP 2889
FIRST 02 569
FIRST CARBON 05

TAP DATA

LADLE: _____
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER	
AIM FOR LMF	<u>43</u>	<u>60</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01												
E02												
E03												

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1400</u>		<u>55</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1549
TAP TIME: 1834
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: _____
DRAIN HEAT?: NO
TOTAL KWH: 38400
TOTAL SCF 02: _____
TAP CARBON: 05
TAP 02: 531
TAP TEMP: 3024
TAP WEIGHT: _____
BURNER 02: _____
BURNERS: INJ:
#1 #1
#2 #2
#3 #3
#4 #4

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>1602</u>	<u>1605</u>	<u>3</u>	<u>Charge #1 Bucket</u>		
2	<u>1624</u>	<u>1626</u>	<u>2</u>	<u>Charge #2 Bucket</u>		
3	<u>1641</u>	<u>1812</u>		<u>Slag Pot Problem</u>	<u>Hatch has not cracked is stuck</u>	
4	<u>1834</u>	<u>1844</u>		<u>TAP</u>		
5						
6						
7						
8						
9						
10						

TOTAL: _____

DELAY TOTALS

Refractory repair: _____

Electrode Add/Slip: _____

Scrap Charging: 5

Other: _____

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A043001 CREW: A B C D
ORDER: _____ DATE: 10/27/04
GRADE: 10450401 MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>140000</u>	<u>8300</u>	<u>3500</u>
<u>33800</u>	<u>—</u>	<u>—</u>

CHARGED BUCKET #1 1844 240000
CHARGED BUCKET #2 1908 53800
CHARGED BUCKET #3 _____

ELECTRODE ADDS
A B C
ELECTRODE BREAKS
A B C

HEATS ON TAPHOLE: 19
HEATS ON DELTA: 33
HEATS SINCE PATCH: 1736
GUN LBS USED: _____

KWH	POWER ON TIME
<u>15180</u>	<u>1848</u>
	<u>1910</u>

SLAG RATING
1-FLUID, 5-THICK FOAM: _____
MELT IN TIME 1931
FIRST TEMP 2888
FIRST O2 80
FIRST CARBON 18

TAP DATA

LADLE: 6
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>4.3</u>	<u>60</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01											
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1400</u>		<u>55</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1823
TAP TIME: 1834
TAP TO TAP TIME: 11
TAP HOLE FREE OPEN: YES
DRAINHEAT?: NO
TOTAL KWH: 40200
TOTAL SCF O2: 09
TAP CARBON: 266
TAP O2: 3061
TAP TEMP: 105 TON'S
TAP WEIGHT: 103362
BURNER 02: _____

BURNERS: INJ:
#1 ✓ # _____
#2 0/6 # _____
#3 ✓ # _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>1844</u>	<u>1848</u>	<u>4</u>	<u>Charge #1 Bucket</u>		
2	<u>1908</u>	<u>1910</u>	<u>2</u>	<u>Charge #2 Bucket</u>		
3	<u>1938</u>	<u>1947</u>	<u>9</u>	<u>TAP</u>		
4						
5						
6						
7						
8						
9						
10						

TOTAL: 15

DELAY TOTALS: _____ Refractory repair: _____ Electrode Add/Slip: _____ Scrap Charging: 6 Other: 9

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A043002
ORDER: _____
GRADE: 1045 04-01

CREW: A B C D
DATE: 10/27/01
MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>140000</u>	<u>8300</u>	<u>3500</u>
<u>68800</u>	—	—

CHARGED BUCKET #1 1947 WT (LBS) 140000 ELECTRODE ADDS A B C
CHARGED BUCKET #2 2012 68800 ELECTRODE BREAKS A B C
CHARGED BUCKET #3 _____

HEATS ON TAPHOLE: 20
HEATS ON DELTA: 34
HEATS SINCE PATCH: 1737
GUN LBS USED: _____

KWH	POWER ON TIME
<u>1476.0</u>	<u>1949</u>
	<u>2015</u>

SLAG RATING 3
1-FLUID, 5-THICK FOAM: 2037
MELT IN TIME 2852
FIRST TEMP 53
FIRST O2 26
FIRST CARBON _____

TAP DATA

LADLE: 7
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>43</u>	<u>60</u>	—	—	<u>25</u>	—	—	—	—	—	—
E01											
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1460</u>		<u>53</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>81500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1938
TAP TIME: 2048
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: YES
DRAIN HEAT?: NO
TOTAL KWH: 44080
TOTAL SCF O2: _____
TAP CARBON: 09
TAP O2: 287
TAP TEMP: 3075
TAP WEIGHT: 100
BURNER 02: 180756

BURNERS: INJ:

#1 ✓ #1 _____
#2 ✓ #2 _____
#3 ✓ #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>1947</u>	<u>1949</u>	<u>2</u>	<u>Charge #1 Bucket</u>		
2	<u>1951</u>	<u>1956</u>	<u>5</u>	<u>SLP #13 @ electrodes</u>		
3	<u>2012</u>	<u>2015</u>	<u>3</u>	<u>Charge #2 Bucket</u>		
4	<u>2048</u>	<u>2056</u>		<u>TAP</u>		
5						
6						
7						
8						
9						
10						

TOTAL: _____

DELAY TOTALS

Refractory repair: _____

Electrode Add/strip: 5

Scrap Charging: 5

Other: _____

NOTES:

MC-F-002

LMF HEAT RECORD

HEAT: A04 2997
GRADE: 104504-01
DATE: 10-27-04
CREW: A B C D - DAYS / NIGHTS

OPERATOR: EVANS TAP TIME: _____
ARRIVAL TIME: _____
MAX. 0 (ppm): 2840 2950 ARRIVE FROM: _____
MAX H (ppm): _____ ACTUAL HOOKS ON TIME: _____

☐ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 6
TARE WT: _____
TAP WT: _____

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: _____
TAP C: _____
TAP 02: _____

LADLE LIP: _____
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	<u>150</u>
LIME	<u>150</u>
SPAR	<u>150</u>
OTHER	<u>150 00/0</u>

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 1120

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	<u>550</u>		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		<u>2931</u>			
SiMn			CaSi		2		<u>2877</u>			
FeSi 75%	<u>225</u>		SULFUR		3		<u>2887</u>			
HCMn 7-C	<u>300</u>				4		<u>2905</u>			
MCMn 1.5 C					5		<u>2916</u>			
HCCr 6.5 C					6		<u>2939</u>			
FeSulfur					7		<u>2915</u>			
Ni	<u>154</u>				8		<u>2935</u>			
FeMo					9		<u>2951</u>			
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1	<u>1:29</u>	<u>1:33</u>	<u>5</u>			
2	<u>1:35</u>	<u>1:45</u>				
3	<u>2:30</u>	<u>2:33</u>				
4	<u>2:36</u>	<u>2:43</u>				
5	<u>2:50</u>	<u>2:55</u>				
6	<u>2:58</u>	<u>3:03</u>				
7	<u>3:21</u>	<u>3:23</u>				
8						
9						

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		<u>.15</u>	<u>.68</u>		<u>.023</u>	<u>.27</u>				<u>.025</u>										
MIN		<u>.43</u>	<u>.60</u>		<u>.018</u>	<u>.20</u>				<u>.02</u>										
MAX		<u>.47</u>	<u>.75</u>	<u>.04</u>	<u>.035</u>	<u>.35</u>	<u>.25</u>	<u>.20</u>	<u>.06</u>	<u>.05</u>	<u>.01</u>		<u>.35</u>							
L01		<u>.242</u>	<u>.55</u>	<u>.008</u>	<u>.014</u>	<u>.225</u>	<u>.073</u>	<u>.079</u>	<u>.029</u>	<u>.001</u>	<u>.001</u>		<u>.28</u>							
L02		<u>.395</u>	<u>.651</u>	<u>.008</u>	<u>.0119</u>	<u>.28</u>	<u>.158</u>	<u>.0787</u>	<u>.028</u>	<u>.001</u>	<u>.001</u>		<u>.294</u>							
L03		<u>.428</u>	<u>.662</u>	<u>.0079</u>	<u>.0126</u>	<u>.27</u>	<u>.155</u>	<u>.0843</u>	<u>.0274</u>	<u>.001</u>	<u>.001</u>		<u>.311</u>							
L04																				
L05																				

2 400
Mn 300
S. 225

Al 150
SPAR 150

LMF HEAT RECORD

HEAT: A042998
GRADE: 104504-01
DATE: 10-27-04
CREW: A B C D - DAYS / NIGHTS

OPERATOR: EMAS
AIM TEMP (F): 2950
MAX. O (ppm):
MAX H (ppm):

TAP TIME:
ARRIVAL TIME:
AIM HOOKS ON TIME:
ACTUAL HOOKS ON TIME:

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 1
TARE WT:
TAP WT:

HEATS ON LADLE:
HEATS ON BLOCK:
HEATS ON SLAG LINE:

TAP TEMP:
TAP C:
TAP 02:

LADLE LIP:
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	<u>150</u>
LIME	<u>200</u>
SPAR	<u>150</u>
OTHER	<u>150 200</u>

SLAG DEPTH:
SLAG COND:
FREEBOARD:
TOTAL MWh: 66

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	<u>550</u>		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		<u>2913</u>			
SiMn			CaSi		2		<u>2954</u>			
FeSi 75%	<u>125</u>		SULFUR		3		<u>2914</u>			
HCMn 7-C	<u>100</u>				4		<u>2945</u>			
MCMn 1.5 C					5		<u>2935</u>			
HCCr 6.5 C					6		<u>2937</u>			
FeSulfur					7					
Ni	<u>132</u>				8					
FeMo					9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP#	START ARGON	STOP ARGON	MIN
1	<u>3:31</u>	<u>3:35</u>	<u>5</u>			
2	<u>3:36</u>	<u>3:40</u>				
3	<u>3:44</u>	<u>3:51</u>				
4	<u>3:59</u>	<u>4:02</u>				
5	<u>4:14</u>	<u>4:19</u>				
6	<u>4:24</u>	<u>4:25</u>				
7						
8						
9						

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		<u>.45</u>	<u>.68</u>		<u>.023</u>	<u>.27</u>				<u>.025</u>										
MIN		<u>.43</u>	<u>.60</u>		<u>.018</u>	<u>.20</u>				<u>.02</u>										
MAX		<u>.47</u>	<u>.75</u>	<u>.04</u>	<u>.035</u>	<u>.35</u>	<u>.25</u>	<u>.20</u>	<u>.06</u>	<u>.05</u>	<u>.07</u>		<u>.35</u>							
L01		<u>.24</u>	<u>.65</u>	<u>.011</u>	<u>.0225</u>	<u>.239</u>	<u>.0775</u>	<u>.0449</u>	<u>.0278</u>	<u>.001</u>	<u>.001</u>		<u>.277</u>							
L02		<u>.429</u>	<u>.714</u>	<u>.0106</u>	<u>.0099</u>	<u>.279</u>	<u>.156</u>	<u>.109</u>	<u>.0282</u>	<u>.002</u>	<u>.001</u>		<u>.287</u>							
L03																				
L04																				
L05																				

C 500.50
Mn 100
Si .125

Al 200
V 150

LMF HEAT RECORD

HEAT: A042999
GRADE: 1045D4-D1
DATE: 10-27-04
CREW: A B C D - DAYS / NIGHTS

OPERATOR: EVALS
TAP TIME: _____
ARRIVAL TIME: _____
AIM HOOKS ON TIME: _____
ACTUAL HOOKS ON TIME: _____

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 7
TARE WT: _____
TAP WT: _____

HEATS ON LADLE: _____ TAP TEMP: _____
HEATS ON BLOCK: _____ TAP C: _____
HEATS ON SLAG LINE: _____ TAP 02: _____

LADLE LIP: _____
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES
150

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 797

SPAR	<u>0.50</u>
OTHER	<u>150 D0/0</u>

BULK PROCESSING

ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	550		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		2892			
SiMn			CaSi		2		2916			
FeSi 75%	265		SULFUR		3		2934			
HCMn 7-C	150				4		2952			
MCMn 1.5 C					5		2952			
HCCr 6.5 C					6					
FeSulfur					7					
Ni					8					
FeMo					9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1	4:36	4:43	5			
2	4:47	4:50				
3	4:56	5:01				
4	5:10	5:15				
5	5:23	5:28				
6	5:29	5:31				
7	5:33	5:34				
8						
9						

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		.45	.68		.023	.027				.025										
MIN					.018	.020				.02										
MAX		.47	.60	.04	.035	.035	.25	.20	.06	.05	.01		.35	.00						
L01		.256	.635	.0075	.0199	.191	.0675	.07	.0246	.002	.001		.248							
L02		.42	.719		.0099	.20	.0683	.073	.024	.001	.001		.236							
L03		.472	.728	.008	.011	.24	.069	.074	.024	.001			.241							
L04																				
L05																				

LMF HEAT RECORD

HEAT: A043000

GRADE: 104504-01

DATE: 10-27-04

CREW: A B C D - DAYS / NIGHTS

OPERATOR: EVANS
AIM TEMP (F): _____
MAX. O (ppm): _____
MAX H (ppm): _____

TAP TIME: _____
ARRIVAL TIME: _____
AIM HOOKS ON TIME: _____
ACTUAL HOOKS ON TIME: _____

ARRIVE FROM: _____
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 1
TARE WT: _____
TAP WT: 1001

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: 3000
TAP C: _____
TAP 02: _____

LADLE LIP: _____
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☒

FLUXES	
CaC	150
LIME	600
SPAR	300
OTHER	150 D.O.

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 157

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	LBS ADDED	SAMPLE LOG						
CARBON	650		CARBON	#	TIME	TEMP	O2	H2	CHEM	
Al			Al	1		2984				
SiMn			CaSi	2		2945				
FeSi 75%	700		SULFUR	3		2854				
HCMn 7-C				4		2976				
MCMn 1.5 C				5						
HCCr 6.5 C				6						
FeSulfur				7						
Ni				8						
FeMo				9						
FePhos				10						
FeV / Nitro V				11						
FeCb				12						
OTHER ()										

	POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1	6:54	6:56	5			
2	6:57	6:58				
3	7:02	7:05				
4	8:04	8:04				
5	8:07	8:12				
6	8:14	8:24				
7	8:46					
8	9:24	9:35				
9						

NOTES/DELAYS:

Missed connection from VTD to Caster brought back

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM			.68		.023	.27				.025										
MIN		.43	.60		.018	.20				.02										
MAX		.47	.75		.035	.35	.25	.20	.06	.05	.01		.35							
L01		2.1		.008	.0289	.25	.118	.072	.033	.007			.21							
L02		404		.009	.0167	.26	.116	.074	.033	.001	.001		.207							
L03		428	.66	.009	.013	.25	.118	.074	.032	.001	.001		.21							
L04		459	.645	.008	.1		.118	.075	.0335	.002	.001		.214							
L05		465	.651	.09				.083	.084	.001	.001		.213							

C 800
Si 150 + 50

Alcal 600 + 500

EAF HEAT SHEETS - RUN NO. 2

EAF HEAT REPORT

HEAT: A042995 CREW: A B C D
ORDER: _____ DATE: 10/27/04
GRADE: 104504-01 MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>139700</u>	<u>8300</u>	<u>3000</u>
<u>49900</u>	<u>—</u>	<u>—</u>

CHARGED BUCKET #1 848 139700
CHARGED BUCKET #2 908 49900
CHARGED BUCKET #3 _____

ELECTRODE ADDS
A B C
ELECTRODE BREAKS
A B C

HEATS ON TAPHOLE: 13
HEATS ON DELTA: 67
HEATS SINCE PATCH: 1730
GUN LBS USED: _____

KWH	POWER ON TIME
<u>14540</u>	<u>847</u> <u>911</u>

SLAG RATING 3
1-FLUID, 5-THICK FOAM: _____
MELT IN TIME 933
FIRST TEMP 2965
FIRST 02 563
FIRST CARBON 05

TAP DATA

LADLE: 7
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>43</u>	<u>60</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01											
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1600</u>		<u>63</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 840
TAP TIME: 940
TAP TO TAP TIME: —
TAP HOLE FREE OPEN: YES
DRAIN HEAT?: NO
TOTAL KWH: 37980
TOTAL SCF 02: —
TAP CARBON: 04
TAP 02: 693
TAP TEMP: 3066
TAP WEIGHT: 100 TONS
BURNER 02: 97815

BURNERS: INJ:
#1 ✓ #1 _____
#2 ✓ #2 _____
#3 ✓ #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>848</u>	<u>849</u>	<u>1</u>	<u>CHARGE #1 BUCKET</u>		
2	<u>908</u>	<u>911</u>	<u>3</u>	<u>Charge #2 Bucket</u>		
3	<u>939</u>	<u>940</u>	<u>1</u>	<u>WAIT ON STACK TEST GUNS</u>		
4	<u>940</u>	<u>948</u>	<u>8</u>	<u>TAP</u>		
5						
6						
7						
8						
9						
10						

TOTAL: 13

DELAY
TOTALS

Refractow
repair: _____

Electrode
Add/Slip: _____

Scrap
Charging: 41

Other: _____

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A042996
ORDER: _____
GRADE: 1045 04-01
CREW: A(B)C D
DATE: 10/27/04
MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>140000</u>	<u>8300</u>	<u>3000</u>
<u>50000</u>	_____	_____
_____	_____	_____
_____	_____	_____

CHARGED BUCKET #1 948 WT (LBS) 140000 ELECTRODE ADDS A B C
CHARGED BUCKET #2 1024 50000 ELECTRODE BREAKS A B C
CHARGED BUCKET #3 _____
HEATS ON TAPHOLE: 14
HEATS ON DELTA: 69
HEATS SINCE PATCH: 1731
GUN LBS USED: _____

KWH	POWER ON TIME
<u>8</u>	<u>950</u>
<u>14846</u>	<u>1027</u>
_____	_____
_____	_____

SLAG RATING 3
1-FLUID, 5-THICK FOAM
MELT IN TIME 1050
FIRST TEMP 79
FIRST 02 233
FIRST CARBON 08

TAP DATA
LADLE. 4
LADLE TARE WT (LBS) _____
TAP WT. ACTUAL (LBS) _____
TAP TIME (MIN) _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER	
AIM FOR LMF	<u>43</u>	<u>60</u>	—	—	—	—	—	—	—	—	—	—
E01												
E02												
E03												

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1400</u>		<u>55</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 940
TAP TIME: 1059
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: YES
DRAIN HEAT?: NO
TOTAL KWH: 41220
TOTAL SCF 02: _____
TAP CARBON: 05
TAP 02: 613
TAP TEMP: 3078
TAP WEIGHT: 10070'S
BURNER 02: 120570

BURNERS: INJ:
#1 / #1 _____
#2 / #2 _____
#3 / #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>948</u>	<u>950</u>	<u>2</u>	<u>Charge #1 Bucket</u>		
2	<u>954</u>	<u>1008</u>	<u>14</u>	<u>Pull #3 Electrode ? slip #1</u>		
3	<u>1024</u>	<u>1027</u>	<u>3</u>	<u>Charge #2 Bucket</u>		
4	<u>1059</u>	<u>1109</u>	<u>10</u>	<u>TAP</u>		<u>/</u>
5						
6						
7						
8						
9						
10						

TOTAL: 7

DELAY TOTALS Refractory repair. _____ Electrode Add/Slip: 14 Scrap Charging: 5 Other: 10

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A042997 CREW: A B C D
ORDER: _____ DATE: 10/27/04
GRADE: 1045 04-01 MELTER: LOIX
OPERATOR: _____

SCRAP	LIME	CARBON
<u>141300</u>	<u>8300</u>	<u>3500</u>
<u>55100</u>	—	—

CHARGED BUCKET #1 TIME 1109 WT (LBS) 141300
CHARGED BUCKET #2 1131 55100
CHARGED BUCKET #3 _____

ELECTRODE ADDS
A B C
ELECTRODEBREAKS
A B C

HEATS ON TAPHOLE: 15
HEATS ON DELTA: 69
HEATS SINCE PATCH: 1732
GUN LBS USED: _____

KWH	POWER ON TIME
<u>15920</u>	<u>1111</u>
	<u>1134</u>

SLAG RATING
1-FLUID, 5-THICK FOAM: 2
MELT IN TIME 54
FIRST TEMP 7898
FIRST 02
FIRST CARBON _____

TAP DATA

LADLE: 6
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER	
AIM FOR LMF	<u>43</u>	<u>60</u>	—	—	<u>25</u>	—	—	—	—	—	—	—
E01												
E02												
E03												

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1400</u>		<u>55</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1059
TAP TIME: 1201
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: YES
DRAIN HEAT?: NO
TOTAL KWH: 41360
TOTAL SCF 02: _____
TAP CARBON: 86
TAP 02: 430
TAP TEMP: 3627
TAP WEIGHT: 100 Ton
BURNER 02: 106364

BURNERS: INJ:
#1 #1 _____
#2 #2 _____
#3 #3 _____
#4 #4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>1109</u>	<u>1111</u>	<u>2</u>	<u>Close #1 Bucket</u>		
2	<u>1131</u>	<u>113</u>	<u>3</u>	<u>Close #2 Bucket</u>		
3	<u>1201</u>	<u>1210</u>	<u>9</u>	<u>TA.</u>		
4						
5						
6						
7						
8						
9						
10						

TOTAL: 14

DELAY TOTALS Refractory repair _____ Electrode Add/Slip _____ scrap Charging 5 _____ Other. 9

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A042999
ORDER: _____
GRADE: 1045 04-01
CREW: A B C D
DATE: 10/27/04
MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>141500</u>	<u>8300</u>	<u>3500</u>
<u>51200</u>		

CHARGED BUCKET #1 1219 141500
CHARGED BUCKET #2 1234 51200
CHARGED BUCKET #3 _____

ELECTRODE ADDS
A B C
ELECTRODE BREAKS
A B C

HEATS ON TAPHOLE: 16
HEATS ON DELTA: 20
HEATS SINCE PATCH: 1733
GUN LBS USED: _____

KWH	POWER ON TIME
<u>14300</u>	<u>1212</u>
	<u>1256</u>

SLAG RATING 3
1-FLUID, 5-THICK FOAM:
MELT IN TIME 1318
FIRST TEMP 2932
FIRST 02 196
FIRST CARBON 1C

TAP DATA

LADLE: 1
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>43</u>	<u>60</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01											
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1400</u>		<u>55</u>
HC Cr 6.5% C			
LC Cr 0.1% C			
Fe Sulfur			
Ni			
FeMo			
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1201
TAP TIME: 1326
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: YES
DRAIN HEAT?: NO
TOTAL KWH: 38360
TOTAL SCF 02: _____
TAP CARBON: _____
TAP 02: _____
TAP TEMP: 3119
TAP WEIGHT: 100 TONS
BURNER 02: 124955

BURNERS: INJ:
#1 ✓ #1 _____
#2 ✓ #2 _____
#3 ✓ #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>1210</u>	<u>1212</u>	<u>2</u>	<u>C #1 Buck</u>		
2	<u>1234</u>	<u>1235</u>	<u>1</u>	<u>LC #2 Buck</u>		
3	<u>1235</u>	<u>1256</u>	<u>21</u>	<u>ON HOLD</u>	<u>STACK TESTING</u>	
4	<u>1326</u>	<u>1334</u>	<u>8</u>	<u>TAP</u>		
5						
6						
7						
8						
9						
10						

TOTAL: 32

DELAY TOTALS

Refractory repair: _____

Electrode Add/Slip: _____

Scrap Charging: 3

Other: 29

NOTES:

MC-F-002

LMF HEAT RECORD

HEAT: 2042993
GRADE: 413704-02
DATE: 10/27/04
CREW: A (B) C D (DAYS) NIGHTS

OPERATOR: Lyon Furns
AIM TEMP (F): _____
MAX. O (ppm): _____
MAX H (ppm): _____

TAP TIME: _____
ARRIVAL TIME: _____
AIM HOOKS ON TIME: _____
ACTUAL HOOKS ON TIME: _____

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☒ CASTER
☐ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 6
TARE WT: _____
TAP WT: 10070-5

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: 3100
TAP C: _____
TAP O2: _____

LADLE LIP: _____
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	<u>140245</u>
LIME	<u>800285</u>
SPAR	<u>200285</u>
OTHER	<u>1502450</u>

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 256

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	<u>150</u>		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		<u>2946</u>			
SiMn			CaSi		2		<u>2954</u>			
FeSi 75%			SULFUR		3					
HCMn 7-C					4					
MCMn 1.5 C					5					
HCCr 6.5 C					6					
FeSulfur					7					
Ni					8					
FeMo	<u>50</u>				9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1	<u>8:29</u>	<u>8:39</u>	<u>5</u>			
2	<u>8:45</u>	<u>8:55</u>				
3	<u>9:06</u>	<u>9:10</u>				
4						
5						
6						
7						
8						
9						

NOTES/DELAYS:

DI 4.14

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		<u>.35</u>	<u>.97</u>		<u>.025</u>	<u>.25</u>		<u>.97</u>	<u>.15</u>	<u>.025</u>										
MIN		<u>.32</u>	<u>.75</u>		<u>.015</u>	<u>.15</u>		<u>.90</u>	<u>.13</u>	<u>.10</u>										
MAX		<u>.38</u>	<u>1.00</u>	<u>.030</u>	<u>.035</u>	<u>.35</u>	<u>.25</u>	<u>1.05</u>	<u>.18</u>	<u>.05</u>			<u>.35</u>							
L01		<u>.27</u>	<u>.785</u>	<u>.007</u>	<u>.028</u>	<u>.287</u>	<u>.079</u>	<u>.943</u>	<u>.136</u>	<u>.001</u>			<u>.190</u>							
L02		<u>.36</u>	<u>.79</u>	<u>.028</u>	<u>.046</u>	<u>.255</u>	<u>.078</u>	<u>.934</u>	<u>.163</u>	<u>.002</u>			<u>.187</u>							
L03																				
L04																				
L05																				

30
1.16

LMF HEAT RECORD

HEAT: A042994
GRADE: 413704-02
DATE: 10-27-07
CREW: A B C D - DAYS / NIGHTS

OPERATOR: EVANS
AIM TEMP (F): 2050
MAX. O (ppm):
MAX H (ppm):

TAP TIME:
ARRIVAL TIME:
AIM HOOKS ON TIME:
ACTUAL HOOKS ON TIME:

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 1
TARE WT:
TAP WT:

HEATS ON LADLE:
HEATS ON BLOCK:
HEATS ON SLAG LINE:

TAP TEMP:
TAP C:
TAP O2:

LADLE LIP:
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES

OTHER 1.50 30.0

SLAG DEPTH:
SLAG COND:
FREEBOARD:
TOTAL MWh: 7.80

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	150		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		2844			
SiMn			CaSi		2		2869			
FeSi 75%	250		SULFUR		3		2902			
HCMn 7-C					4		2936			
MCMn 1.5 C					5		2964			
HCCr 6.5 C					6		2946			
FeSulfur					7		2968			
Ni					8					
FeMo					9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #	ARGON	ARGON
1	9:14	9:22	#5		
2	9:26	9:30			
3	9:32	9:42			
4	9:46	9:51			
5	9:54	10:00			
6	10:07	10:10			
7					
8					
9					

NOTES/DELAYS:

D.I. 4.23

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		35	.87		.025	.25		.97	.15	.025										
MIN		33	.75		.015	.15		.90	.13	.02										
MAX		38	1.0	.03	.035	.35	.25	.95	.18	.05			.35							
L01		276	785	.008	.024	.209	.079	.945	.153	.001			.198							
L02		356	808	.009	.016	.286	.081	.943	.158	.003			.20							
L03																				
L04																				
L05																				

C
S: 250

Al 500
SPR 250

LMF HEAT RECORD

HEAT: A042995
GRADE: 102704/413704-01
DATE: 10-27-04
CREW: A B C D - DAYS/NIGHTS

OPERATOR: EVANS
TAP TIME: _____
ARRIVAL TIME: _____
MAX. O (ppm): 2930
AIM HOOKS ON TIME: _____
MAX H (ppm): _____
ACTUAL HOOKS ON TIME: _____

ARRIVE FROM:
☐ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 7
TARE WT: _____
TAP WT: _____

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: _____
TAP C: _____
TAP 02: _____

LADLE LIP: _____
CLEAN ☐
SMALLSKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	200
LIME	1000
SPAR	400
OTHER	150 D200

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 963

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	120		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		2890			
SiMn			CaSi		2		2928			
FeSi 75%	250		SULFUR		3		2975			
HCMn 7-C	700				4		2925			
MCMn 1.5 C					5					
HCCr 6.5 C	3450				6					
FeSulfur					7					
Ni					8					
FeMo	625				9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP#	START ARGON	STOP ARGON	MIN
1	10:40	10:45	5			
2	10:46	10:52				
3	10:56	11:03				
4	11:05	11:12				
5	11:15	11:20				
6						
7						
8						
9						

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		38	92			.25		1.08	.30											
MIN		.35	.85			.15		1.00	.25	.02										
MAX		.40	1.0	.025	.01	.35	.25	1.20	.35	.05			.35							
L01		.218	.878	.008	.031	.213	.081	.08	.034	.001			.23							
L02		.301	.866	.008	.022	.292	.08	.77	.27	.002			.22							
L03		.367	.911	.008	.011	.27	.08	1.04	.28	.001			.22							
L04																				
L05																				

C 100
Mn 550 + 150
1 - 2500 + 150

Mo 625 (25)

Ni 250 + 150 + 1000 + 200



LMF HEAT RECORD

HEAT: A0429906

GRADE: 104504-01

DATE: 10-27-04

CREW: A B C D - DAYS / NIGHTS

2863
3464

OPERATOR: EVANS
AIM TEMP (F): 3000 2980
MAX. O (ppm): _____
MAX H (ppm): _____

TAP TIME: _____
ARRIVAL TIME: _____
AIM HOOKS ON TIME: _____
ACTUAL HOOKS ON TIME: _____

ARRIVE FROM:
☐ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 4
TARE WT: _____
TAP WT: _____

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: _____
TAP C: _____
TAP 02: _____

LADLE LIP:
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	150
LIME	400
SPAR	250
OTHER	150 DD/D

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 1161

109

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	550		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		2952			
SiMn			CaSi		2		2899			
FeSi 75%	250		SULFUR		3		2944			
HCMn 7-C	100				4		2980			
MCMn 1.5 C					5		2988			
HCCr 6.5 C					6		2981			
FeSulfur					7					
Ni	132				8					
FeMo					9					
FePhos					10					
FeV Nitro V					11					
FeCh					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #
1	10:40	10:45	5
2	11:46	11:56	
3	12:00	12:05	
4	12:18	12:27	
5	1:51	1:55	
6	1:58	2:04	
7	2:05	2:09	
8	2:11	2:15	
9	2:20	2:21	

START ARGON	STOP ARGON	MIN

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		.45	.68		.023	.27				.025										
MIN		.43	.60		.018	.20				.02										
MAX		.47	.75	.04	.035	.35	.25	.20	.06	.05	.01		.35							
L01		.236	.632	.008	.024	.215	.0768	.091	.0276	.001	.001		.29							
L02		.32	.686	.008	.0149	.264	.075	.097	.028	.001	.001		.28							
L03		.384	.676	.008	.013	.25	.148	.0956	.0273	.001	.001		.294							
L04		.433	.678	.008	.013	.243	.147	.094	.0269	.001	.001		.296							
L05																				

C 240050 + 250 + 50
MR 100

EAF HEAT SHEETS - RUN NO. 3

EAF HEAT REPORT

HEAT: A043012
ORDER: _____
GRADE: 8620 04-01
CREW: A B C D
DATE: 10/28/04
MELTER: WEX
OPERATOR: WATERLS

SCRAP	LIME	CARBON
<u>140600</u>	<u>8300</u>	<u>3000</u>
<u>39200</u>	<u>—</u>	<u>—</u>

CHARGED BUCKET #1 843 WT (LBS) 140600 ELECTRODE ADDS B HEATS ON TAPHOLE: 30
CHARGED BUCKET #2 904 39200 ELECTRODE BREAKS B HEATS ON DELTA: 44
CHARGED BUCKET #3 — — — HEATS SINCE PATCH: 1747
GUN LBS USED: _____

KWH	POWER ON TIME
<u>14340</u>	<u>844</u>
	<u>9060</u>

SLAG RATING 3
1-FLUID, 5-THICK FOAM: 929
MELT IN TIME 2532
FIRST TEMP 468
FIRST O2 05
FIRST CARBON _____

TAP DATA

LADLE: 6
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>18</u>	<u>70</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>40</u>	<u>40</u>	<u>15</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01	<u>08</u>	<u>10</u>	<u>066</u>	<u>03</u>	<u>0</u>	<u>06</u>	<u>66</u>	<u>04</u>	<u>21</u>	<u>—</u>	<u>—</u>
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1700</u>		<u>67</u>
HC Cr 6.5% C	<u>900</u>		<u>29</u>
LC Cr 0.1% C			
Fe Sulfur			
Ni	<u>400</u>		<u>40</u>
FeMo	<u>250</u>		<u>10</u>
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 826
TAP TIME: 937
TAP TO TAP TIME: —
TAP HOLE FREE OPEN: YES
DRAIN HEAT?: NO
TOTAL KWH: 41720
TOTAL SCF O2: —
TAP CARBON: 04
TAP O2: 860
TAP TEMP: 3159
TAP WEIGHT: 100 TONS
BURNER 02: 112434

BURNERS: INJ:
#1 ✓ #1 _____
#2 ✓ #2 _____
#3 ✓ #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>833</u>	<u>843</u>	<u>10</u>	<u>CHANGE #2 ELECTRODE + gun (BREAST)</u>		
2	<u>843</u>	<u>844</u>	<u>1</u>	<u>CHANGE #1</u>		
3	<u>904</u>	<u>906</u>	<u>2</u>	<u>Chrg #2 Buck</u>		
4	<u>437</u>	<u>945</u>	<u>8</u>	<u>TAP</u>		
5						
6						
7						
8						
9						
10						

TOTAL: 21

DELAY TOTALS

Refractory repair: _____

Electrode Add/Slip: 10

Scrap Charging: 3

Other: J

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A043013
ORDER: _____
GRADE: 862004-01

CREW: A B C D
DATE: 10/28/04
MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>140000</u>	<u>8300</u>	<u>3000</u>
<u>56600</u>	<u>—</u>	<u>—</u>

CHARGED BUCKET #1 945 TIME 140000 WT (LBS)
CHARGED BUCKET #2 1004
CHARGED BUCKET #3 1041 56600

ELECTRODE ADDS
A B C
ELECTRODE BREAKS
A B C

HEATS ON TAPHOLE: 3031
HEATS ON DELTA: 75
HEATS SINCE PATCH: 1748
GUN LBS USED: _____

KWH	POWER ON TIME
<u>0</u>	<u>950</u>
<u>10600</u>	<u>1067</u>

SLAG RATING
I-FLUID, 5-THICK FOAM: 3
MELT IN TIME 1031
FIRST TEMP 2912
FIRST O2 40
FIRST CARBON 34

TAP DATA

LADLE: 1
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>18</u>	<u>70</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>40</u>	<u>40</u>	<u>15</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01											
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1200</u>		<u>67</u>
HC Cr 6.5% C	<u>900</u>		<u>29</u>
LC Cr 0.1% C			
Fe Sulfur			
Ni	<u>400</u>		<u>40</u>
FeMo	<u>250</u>		<u>10</u>
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 937
TAP TIME: 1046
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: 1.765
DRAIN HEAT?: NO
TOTAL KWH: 39480
TOTAL SCF O2: _____
TAP CARBON: 07
TAP O2: 372
TAP TEMP: 3096
TAP WEIGHT: 10070WS
BURNER 02: 125116

BURNERS: INJ:
#1 ✓ #1 _____
#2 ✓ #2 _____
#3 ✓ #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1	<u>945</u>	<u>950</u>	<u>5</u>	<u>Charge #1 Bunch</u>	<u>swing lock faulted</u>	
2	<u>1004</u>	<u>1007</u>	<u>3</u>	<u>Charge #2 Bunch</u>		
3	<u>1041</u>	<u>1046</u>	<u>5</u>	<u>Decarb</u>		
4	<u>1046</u>	<u>1054</u>	<u>8</u>	<u>TAP</u>		
5						
6						
7						
8						
9						
10						

TOTAL: _____

DELAY TOTALS

Refractory repair: _____

Electrode Add/Slip: _____

Scrap Charging: 8

Other: _____

NOTES: _____

EAF HEAT REPORT

HEAT: A043014
 ORDER: _____
 GRADE: 862004-01
 CREW: A B C D
 DATE: 10/28/04
 MELTER: WIX
 OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>140500</u>	<u>8300</u>	<u>3300</u>
<u>53500</u>	<u>✓</u>	<u>✓</u>

CHARGED BUCKET #1 TIME 1058
 CHARGED BUCKET #2 WT (LBS) 140500
 CHARGED BUCKET #3 1137
53500

ELECTRODE ADDS
 A B C
 ELECTRODE BREAKS
 A B C

HEATS ON TAPHOLE: 32
 HEATS ON DELTA: 46
 HEATS SINCE PATCH: 1249
 GUN LBS USED: _____

KWH	POWER ON TIME
<u>0</u>	<u>1059</u>
<u>14660</u>	<u>1140</u>

SLAG RATING 3
 1-FLUID, 5-THICK FOAM: _____
 MELT IN TIME 1205
 FIRST TEMP 2892
 FIRST O2 387
 FIRST CARBON 06

TAP DATA

LADLE: 7
 LADLE TARE WT (LBS): _____
 TAP WT. ACTUAL (LBS): _____
 TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>18</u>	<u>70</u>	<u>-</u>	<u>-</u>	<u>25</u>	<u>40</u>	<u>40</u>	<u>15</u>	<u>-</u>	<u>-</u>	<u>-</u>
E01											
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1200</u>		<u>67</u>
HC Cr 6.5% C	<u>900</u>		<u>29</u>
LC Cr 0.1% C			
Fe Sulfur			
Ni	<u>400</u>		<u>40</u>
FeMo	<u>250</u>		<u>13</u>
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1046
 TAP TIME: 1211
 TAP TO TAP TIME: _____
 TAP HOLE FREE OPEN: YES
 DRAIN HEAT?: NO
 TOTAL KWH: 40320
 TOTAL SCF O2: _____
 TAP CARBON: 04
 TAP O2: 799
 TAP TEMP: 3128
 TAP WEIGHT: 10070N
 BURNER O2: 124360

BURNERS: INJ:

#1 ✓ #1 _____
 #2 ✓ #2 _____
 #3 _____ #3 _____
 #4 _____ #4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-UP NEEDED
1		<u>1058</u>	<u>4</u>	<u>Steel test</u>		
2	<u>1058</u>	<u>1059</u>	<u>11</u>	<u>Close #1 Bulk</u>		
3	<u>1104</u>	<u>1122</u>	<u>18</u>	<u>Pull #3 Electrode</u>	<u>#1 Electrode</u>	
4	<u>1137</u>	<u>1140</u>	<u>3</u>	<u>Close #2 Bulk</u>		
5	<u>2</u>	<u>1218</u>	<u>7</u>	<u>TAP</u>		
6						
7						
8						
9						
10						

TOTAL: 33

DELAY TOTALS

Refractory repair _____

Electrode Add/Slip 18

Scrap Charging: 4

Other: 11

NOTES:

MC-F-002

EAF HEAT REPORT

HEAT: A043015
ORDER: _____
GRADE: 8620 04-01

CREW: A B C D
DATE: 10/28/01
MELTER: WIX
OPERATOR: WATERS

SCRAP	LIME	CARBON
<u>139800</u>	<u>8300</u>	<u>3000</u>
<u>52100</u>	<u>—</u>	<u>—</u>

CHARGED BUCKET #1 1218 139800
CHARGED BUCKET #2 1238 52100
CHARGED BUCKET #3 _____

ELECTRODE ADDS
A B C
ELECTRODE BREAKS
A B C

HEATS ON TAPHOLE: 33
HEATS ON DELTA: 87
HEATS SINCE PATCH: 1750
GUN LBS USED: _____

KWH	POWER ON TIME
<u>0</u>	<u>1220</u>
<u>14620</u>	<u>1241</u>

SLAG RATING 3
1-FLUID, 5-THICK FOAM
MELT IN TIME 1303
FIRST TEMP 2839
FIRST O2 658
FIRST CARBON 04

TAP DATA

LADLE: 8
LADLE TARE WT (LBS): _____
TAP WT. ACTUAL (LBS): _____
TAP TIME (MIN): _____

CHEMISTRY

MELT CHEM	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	N	OTHER
AIM FOR LMF	<u>18</u>	<u>70</u>	<u>—</u>	<u>—</u>	<u>25</u>	<u>40</u>	<u>40</u>	<u>15</u>	<u>—</u>	<u>—</u>	<u>—</u>
E01											
E02											
E03											

LADLE ADDITIONS

ALLOYS AT TAP	LBS	LBS/POINT	PTS ADDED
CARBON			
SiMn			
FeSi 75%	<u>800</u>		<u>30</u>
HC Mn 7% C	<u>1200</u>		<u>67</u>
HC Cr 6.5% C	<u>400</u>		<u>27</u>
LC Cr 0.1% C			
Fe Sulfur			
Ni	<u>400</u>		<u>40</u>
FeMo	<u>250</u>		<u>13</u>
Phos			
Lime	<u>1500</u>		
Dolo Lime			

HEAT DATA

PREVIOUS TAP TIME: 1211
TAP TIME: 1310
TAP TO TAP TIME: _____
TAP HOLE FREE OPEN: YES
DRAIN HEAT?: NO
TOTAL KWH: 41506
TOTAL SCF O2: _____
TAP CARBON: 03
TAP O2: 933
TAP TEMP: 3060
TAP WEIGHT: 100TONS
BURNER O2: 1069841

BURNERS: INJ:

#1 ✓ #1 _____
#2 ✓ #2 _____
#3 ✓ #3 _____
#4 _____

DELAYS

ITEM	TIME STOP	TIME START	DELAY (MIN)	REASON (Electrodes, Refractory repair, Charging, other)	COMMENTS	FOLLOW-NEEDED
<u>1</u>	<u>1218</u>	<u>1220</u>	<u>2</u>	<u>Charge #1 Bulk</u>		
<u>2</u>	<u>1238</u>	<u>1241</u>	<u>3</u>	<u>Charge #2 Bulk</u>		
<u>3</u>	<u>1310</u>	<u>1318</u>	<u>8</u>	<u>TAP</u>		
4						
5						
6						
7						
8						
9						
10						

TOTAL: 13

DELAY TOTALS

Refractory repair: _____

Electrode Add/Slip: _____

scrap Charging: 5

Other: 8

NOTES:

MC-F-002

LMF HEAT RECORD

HEAT: 2043010
GRADE: 862004-02
DATE: 10-28-04
CREW: A B C D - DAYS/NIGHTS

OPERATOR: L70~
AIM TEMP (F): 3000
MAX. O (ppm): _____
MAX H (ppm): _____

TAP TIME: _____
ARRIVAL TIME: _____
AIM HOOKS ON TIME: _____
ACTUAL HOOKS ON TIME: _____

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☒ CASTER
☐ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 4
TARE WT: _____
TAP WT: _____

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: 3100
TAP C: _____
TAP O2: _____

LADLE LIP: _____
CLEAN ☐
SMALLSKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	<u>125 LBS</u>
LIME	<u>350 LBS</u>
SPAR	
OTHER	<u>150 LBS Devo</u>

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 1152

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON			CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		<u>2971</u>			
SiMn			CaSi		2		<u>2981</u>			
FeSi 75%	<u>1/50</u>		SULFUR		3		<u>3050</u>			
HCMn 7-C	<u>200 LBS</u>				4		<u>3007</u>			
MCMn 1.5 C					5		<u>3008</u>			
HCCr 6.5 C	<u>350 LBS</u>				6		<u>3020</u>			
FeSulfur					7					
Ni	<u>798 LBS</u>				8					
FeMo	<u>100 LBS</u>				9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1	<u>7:38</u>	<u>7:45</u>	<u>5</u>			
2	<u>7:59</u>	<u>8:05</u>				
3	<u>8:15</u>	<u>8:27</u>				
4	<u>8:55</u>	<u>9:05</u>				
5	<u>9:12</u>	<u>9:16</u>				
6						
7						
8						
9						

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		<u>.20</u>	<u>.80</u>		<u>.030</u>	<u>.25</u>	<u>.155</u>	<u>.50</u>	<u>.120</u>	<u>.025</u>										
MIN		<u>.18</u>	<u>.70</u>		<u>.025</u>	<u>.15</u>	<u>.40</u>	<u>.40</u>	<u>.15</u>	<u>.020</u>										
MAX		<u>.22</u>	<u>.90</u>		<u>.035</u>	<u>.30</u>	<u>.70</u>	<u>.60</u>	<u>.25</u>	<u>.050</u>	<u>.010</u>		<u>.35</u>							
L01		<u>.127</u>	<u>.733</u>	<u>.007</u>	<u>.027</u>	<u>.168</u>	<u>.309</u>	<u>.357</u>	<u>.140</u>	<u>.000</u>	<u>.000</u>		<u>.200</u>							
L02		<u>.184</u>	<u>.832</u>	<u>.005</u>	<u>.017</u>	<u>.162</u>	<u>.44</u>	<u>.473</u>	<u>.203</u>	<u>.001</u>	<u>.001</u>		<u>.194</u>							
L03		<u>.203</u>	<u>.826</u>	<u>.008</u>	<u>.044</u>	<u>.17</u>	<u>.525</u>	<u>.455</u>	<u>.201</u>	<u>.001</u>	<u>.001</u>		<u>.205</u>							
L04																				
L05																				

350 LBS S:

LMF HEAT RECORD

HEAT: ADY 3011
GRADE: 862004-02
DATE: 10-28-04
CREW: A (B) C D - DAYS / NIGHTS

OPERATOR: EJATS
AIM TEMP (F): 3000
MAX. O (ppm):
MAX H (ppm):

TAP TIME:
ARRIVAL TIME:
AIM HOOKS ON TIME:
ACTUAL HOOKS ON TIME:

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 8
TARE WT:
TAP WT:

HEATS ON LADLE:
HEATS ON BLOCK:
HEATS ON SLAG LINE:

TAP TEMP:
TAP C:
TAP 02:

LADLE LIP:
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES
LIME 900
SPAR
OTHER UNLADLED

SLAG DEPTH:
SLAG COND:
FREEBOARD:
TOTAL MWh: 912

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	100		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		2881			
SiMn			CaSi		2		2901			
FeSi 75%	450		SULFUR		3		2952			
HCMn 7-C	150				4		3019			
MCMn 1.5 C					5		2996			
HCCr 6.5 C	450				6		3022			
FeSulfur					7					
Ni	330				8					
FeMo	200				9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1	9:28	9:33	5			
2	9:34	9:44				
3	9:52	10:00				
4	10:02	10:12				
5	10:18	10:23				
6						
7						
8						
9						

NOTES/DELAYS:

New ladle needs extra temp 40 UTD!

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		.20	.50		.03	.25	.55	.50	.20	.025										
MIN		.18	.70		.02	.15	.40	.40	.16	.02										
MAX		.22	.90	.035	.04	.30	.70	.60	.25	.05	.01		.35							
L01		.129	.739	.0117	.0277	.132	.79	.34	.145	.021	.001		.197							
L02		.194	.83	.012	.0197	.279	.463	.485	.192	.002	.002		.195							
L03																				
L04																				
L05																				

*L 100
Mn 150*

*Ni (.15) 330
Al 100 200*



LMF HEAT RECORD

HEAT: A043012
GRADE: 862004-1
DATE: 10-28-04
CREW: A B C D - DAYS / NIGHTS

2880

OPERATOR: ELIAS
AIM TEMP (F): 2880 2990
MAX. O (ppm):
MAX H (ppm):

TAP TIME:
ARRIVAL TIME:
AIM HOOKS ON TIME:
ACTUAL HOOKS ON TIME:

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 6
TARE WT:
TAP WT:

HEATS ON LADLE:
HEATS ON BLOCK:
HEATS ON SLAG LINE:

TAP TEMP:
TAP C:
TAP 02:

LADLE LIP:
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES

SPAR 30
OTHER 150 500

SLAG DEPTH:
SLAG COND:
FREEBOARD:
TOTAL MWh: 567

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	100		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		2972			
SiMn			CaSi		2		2953			
FeSi 75%	125		SULFUR		3		2961			
HCMn 7-C	100				4		2996			
MCMn 1.5 C					5		2989			
HCCr 6.5 C	450				6					
FeSulfur					7					
Ni	330				8					
FeMo	200				9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1 10:31	10:36	5			
2 10:38	10:40				
3 10:45	10:51				
4 11:00	11:03				
5 11:06	11:11				
6					
7					
8					
9					

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		2.0	80		.02	.25	.55	.50	2.0	.025										
MIN		.18	.70		.01	.15	.40	.40	.15	.02										
MAX		.23	.90		.025	.30	.70	.80	.25	.05	.01		.35							
L01		.138	.75	.007	.0196	.22	.309	.356	.152	.001	.001		.207							
L02		2.0	80	.007	.0118	.272	.485	.562	.197	.001	.001		.289							
L03																				
L04																				
L05																				

C 100
Mn 100
Cr 450

Ni 330 (15)
Mo 200 (11)

Al 300
Si 150

LMF HEAT RECORD

HEAT: A043013

GRADE: 86200-1-01

DATE: 10-28-04

CREW: A (B) C D - DAYS / NIGHTS

OPERATOR: EMAS
AIM TEMP (F): 2980
MAX. O (ppm): _____
MAX H (ppm): _____

TAP TIME: _____
ARRIVAL TIME: _____
AIM HOOKS ON TIME: _____
ACTUAL HOOKS ON TIME: _____

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 1
TARE WT: _____
TAP WT: _____

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: _____
TAP C: _____
TAP 02: _____

LADLE LIP: _____
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	<u>150</u>
LIME	<u>—</u>
SPAR	<u>300</u>
OTHER	<u>150 D0/A</u>

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 847

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON			CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		<u>2893</u>			
SiMn			CaSi		2		<u>2916</u>			
FeSi 75%			SULFUR		3		<u>2939</u>			
HCMn 7-C					4		<u>2956</u>			
MCMn 1.5 C					5					
HCCr 6.5 C	<u>375</u>				6					
FeSulfur					7					
Ni	<u>330</u>				8					
FeMo	<u>200</u>				9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP#	START ARGON	STOP ARGON	MIN
1	<u>11:22</u>	<u>11:26</u>	<u>5</u>			
2	<u>11:30</u>	<u>11:35</u>				
3	<u>11:39</u>	<u>11:45</u>				
4	<u>11:56</u>	<u>12:01</u>				
5	<u>12:03</u>	<u>12:11</u>				
6						
7						
8						
9						

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		<u>.20</u>	<u>.80</u>		<u>.02</u>	<u>.25</u>	<u>.55</u>	<u>.50</u>	<u>.20</u>	<u>.025</u>										
MIN		<u>.18</u>	<u>.70</u>		<u>.01</u>	<u>.15</u>	<u>.40</u>	<u>.40</u>	<u>.15</u>	<u>.02</u>										
MAX		<u>.23</u>	<u>.90</u>		<u>.025</u>	<u>.30</u>	<u>.70</u>	<u>.60</u>	<u>.25</u>	<u>.05</u>	<u>.01</u>		<u>.35</u>							
L01		<u>.207</u>	<u>.819</u>	<u>.0145</u>	<u>.0185</u>	<u>.282</u>	<u>.296</u>	<u>.378</u>	<u>.14</u>	<u>.002</u>	<u>.001</u>		<u>.176</u>							
L02		<u>.229</u>	<u>.826</u>	<u>.015</u>	<u>.0079</u>	<u>.239</u>	<u>.478</u>	<u>.496</u>	<u>.188</u>	<u>.001</u>	<u>.001</u>		<u>.182</u>							
L03																				
L04																				
L05																				

C 375
Ni 115 330

SPAR 300

LMF HEAT RECORD

HEAT: A843014
GRADE: 862004-01
DATE: 10-28-04
CREW: A B C D - DAYS/NIGHTS

OPERATOR: EDMS TAP TIME: _____
AIM TEMP (F): 2995 ARRIVAL TIME: _____
MAX. O (ppm): _____ AIM HOOKS ON TIME: _____
MAX H (ppm): _____ ACTUAL HOOKS ON TIME: _____

ARRIVE FROM:
☒ EAF
☐ VTD
☐ CASTER

DESTINATION
☐ CASTER
☒ VTD

ELECTRODE ADD
A B C

LADLE

LADLE#: 7
TARE WT: _____
TAP WT: _____

HEATS ON LADLE: _____
HEATS ON BLOCK: _____
HEATS ON SLAG LINE: _____

TAP TEMP: _____
TAP C: _____
TAP 02: _____

LADLE LIP: _____
CLEAN ☐
SMALL SKULL ☐
CLEANED LIP ☐
RELADLED ☐

FLUXES	
CaC	150
LIME	150
SPAR	200
OTHER	150 D/D

SLAG DEPTH: _____
SLAG COND: _____
FREEBOARD: _____
TOTAL MWh: 661

PROCESSING

BULK ALLOYS ADDED	LBS ADDED	TIME	WIRE	LBS ADDED	SAMPLE LOG					
CARBON	100		CARBON		#	TIME	TEMP	O2	H2	CHEM
Al			Al		1		2928			
SiMn			CaSi		2		2923			
FeSi 75%	250		SULFUR		3		2962			
HCMn 7-C	150				4		2987			
MCMn 1.5 C					5					
HCCr 6.5 C	450				6					
FeSulfur					7					
Ni	330				8					
FeMo	200				9					
FePhos					10					
FeV / Nitro V					11					
FeCb					12					
OTHER ()										

	POWER ON	POWER OFF	TAP #	START ARGON	STOP ARGON	MIN
1	12:29	12:33	5			
2	12:37	12:41				
3	12:47	12:55				
4	1:01	1:06				
5	1:08	1:13				
6						
7						
8						
9						

NOTES/DELAYS:

CHEMISTRY

SAMPLE	TIME	C	Mn	P	S	Si	Ni	Cr	Mo	Al	V	Cb	Cu	Sn	N	Ca	Pb	CE	Mn/S	LIQ.
AIM		.20	.80		.02	.25	.55	.50	.20	.025										
MIN		.18	.70		.01	.15	.40	.40	.15	.02										
MAX		.23	.90	.025	.025	.30	.80	.80	.25	.05	.01		.35							
L01		.132	.737	.008	.02	.147	.29	.335	.138	.001	.001		.201							
L02		.20	.80	.009	.014	.265	.46	.47	.18	.002	.001		.203							
L03																				
L04																				
L05																				

C 100
Mn 150
Cr 450

Ni 330 (15)
Mo 200 (4)

Spur 200

RF Exhaust Stack

**NATURAL GAS CONSUMPTION
RECORDED DURING COMPLIANCE TEST**

REHEAT FURNACE

October 27-28, 2004

RUN #1 - October 27, 2004 1857 – 1957

Meter End	
Meter Initial	305514 (x 100 cu. Ft.)
Volume Gas Consumed	304378 (x 100 cu. Ft.)
Heat Input	1136 (x 100 cu. Ft.)
	117 MMBTU

RUN #2 - October 27, 2004 2012 – 2112

Meter End	
Meter Initial	306751 (x 100 cu. Ft.)
Volume Gas Consumed	305694 (x 100 cu. Ft.)
Heat Input	1057 (x 100 cu. Ft.)
	109 MMBTU

RUN #3 - October 28 2004 743 – 843

Meter End	
Meter Initial	318318 (x 100 cu. Ft.)
Volume Gas Consumed	316959 (x 100 cu. Ft.)
Heat Input	1359 (x 100 cu. Ft.)
	140 MMBTU

Assume 1030 BTU/CF of Natural Gas

APPENDIX C

LABORATORY ANALYSIS AND IAP ANALYTICAL DATA

EAF Baghouse Outlet

1.0

PM/CPM ANALYSIS

PM GRAVIMETRIC ANALYSIS DATA SHEET

Client SDI PinsboroProject No. G/SA 04-T-294Source Tested EAF StackSource Sampling Location EAF BAGHOUSE OUTLET

Run No. 1
 Filter No. 4128
 Acetone No. 201
 Amount of Liquid Lost During Transport, ml 0
 Acetone Blank Volume, ml 100
 Acetone Wash Volume, ml 100
 Acetone Blank Concen., mg/lmg (Eq. 5-4)** 3.8E-006
 Acetone Wash Blank, mg (Eq. 5-5)** 0.30

Container Number	Weight of Particulate Collected, g		Weight Gain
	Final Weight	Tare Weight	
1	0.2564	0.2542	0.0022
2	84.7260	84.7234	0.0026
Total			0.0048
Less Acetone Blank			0.0003
Weight of Particulate Matter			0.0045

	Volume of Liquid Water Collected	
	Impinger Volume, ml/g	Silica Gel Weight, g
Final	333.3	252.3
Initial	300.0	220.0
Liquid Collected	33.3	32.3
Total Volume Collected	65.61 g*	ml

Run No. 2
 Filter No. 4129
 Acetone No. 202
 Amount of Liquid Lost During Transport, ml 0
 Acetone Blank Volume, ml 100
 Acetone Wash Volume, ml 100
 Acetone Blank Concen., mg/lmg (Eq. 5-4)** 3.8E-006
 Acetone Wash Blank, mg (Eq. 5-5)** 0.30

Container Number	Weight of Particulate Collected, g		Weight Gain
	Final Weight	Tare Weight	
1	0.2546	0.2530	0.0016
2	86.5919	86.5895	0.0024
Total			0.0040
Less Acetone Blank			0.0003
Weight of Particulate Matter			0.0037

	Volume of Liquid Water Collected	
	Impinger Volume, ml/g	Silica Gel Weight, g
Final	319.1	256.0
Initial	300.0	220.0
Liquid Collected	19.1	36.0
Total Volume Collected	55.1 g*	ml

Run No. 3
 Filter No. 4130
 Acetone No. 205
 Amount of Liquid Lost During Transport, ml 0
 Acetone Blank Volume, ml 100
 Acetone Wash Volume, ml 100
 Acetone Blank Concen., mg/lmg (Eq. 5-4)** 3.8E-006
 Acetone Wash Blank, mg (Eq. 5-5)** 0.30

Container Number	Weight of Particulate Collected, g		Weight Gain
	Final Weight	Tare Weight	
1	0.2555	0.2532	0.0023
2	86.8504	86.8491	0.0013
Total			0.0036
Less Acetone Blank			0.0003
Weight of Particulate Matter			0.0033

	Volume of Liquid Water Collected	
	Impinger Volume, ml/g	Silica Gel Weight, g
Final	323.3	250.6
Initial	300.0	220.0
Liquid Collected	23.3	30.6
Total Volume Collected	53.9 g*	ml

Acetone Blank

Run No.(s) 1,2,3
 Acetone Blank No. 211
 Amount of Liquid Lost During Transport, ml 0
 Acetone Blank Volume, ml 100
 Acetone Blank Concen., mg/lmg (Eq. 5-4)** 3.8E-006

Container Number	Weight of Acetone Residue, g		Weight Gain
	Final Weight	Tare Weight	
211	90.6691	90.6688	0.0003

*Convert weight of water to volume by dividing total weight increase by density of water (1 g/ml)

Increase, g = Volume Water, ml
 1 g/ml

**See Federal Register, Method 5, Sections 6.6 & 6.7

Analyst Brandon PeytonDate November 06.04

CPM GRAVIMETRIC ANALYSIS DATA SHEET

Client SDI PittsboroProject No. G/SA 04-T-294Source Tested EAF STACKSource Sampling Location EAF BAGHOUSE OUTLET

Run No. 1
 Volume of Impinger Contents, ml 365.6
 Volume of Aliquot Taken for IC Analysis, ml 0
 D.I. Water No. 604
 Amount of Liquid Lost During Transport, ml 0
 D.I. Water Rinse Volume, ml 200
 Methylene Chloride No. 109
 Amount of Liquid Lost During Transport, ml 0
 Methylene Chloride Rinse Volume, ml 250

Container No. 4	Weight of Inorganic Fraction, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	182.6554	182.6537	
2nd Weighing	182.6554	182.6537	
3rd Weighing	182.6554	182.6537	
Constant Wt.	182.6554	182.6537	0.0017
Less D.I. Water Blank			0.0002
Weight of Inorganic Matter			0.0015

Container No. 5	Weight of Organic Fraction, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	106.0898	106.0869	
2nd Weighing	106.0895	106.0869	
3rd Weighing	106.0895	106.0869	
Constant Wt.	106.0895	106.0869	0.0026
Less Methylene Chloride Blank			0.0004
Weight of Organic Matter			0.0022

Run No. 2
 Volume of Impinger Contents, ml 355.2
 Volume of Aliquot Taken for IC Analysis, ml 0
 D.I. Water No. 605
 Amount of Liquid Lost During Transport, ml 0
 D.I. Water Rinse Volume, ml 200
 Methylene Chloride No. 114
 Amount of Liquid Lost During Transport, ml 0
 Methylene Chloride Rinse Volume, ml 250

Container No. 4	Weight of Inorganic Fraction, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	181.0249	181.0228	
2nd Weighing	181.0249	181.0228	
3rd Weighing	181.0249	181.0228	
Constant Wt.	181.0249	181.0228	0.0021
Less D.I. Water Blank			0.0002
Weight of Inorganic Matter			0.0019

Container No. 5	Weight of Organic Fraction, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	102.5885	102.5842	
2nd Weighing	102.5890	102.5842	
3rd Weighing	102.5880	102.5842	
Constant Wt.	102.5880	102.5842	0.0038
Less Methylene Chloride Blank			0.0004
Weight of Organic Matter			0.0034

Run No. 3
 Volume of Impinger Contents, ml 353.9
 Volume of Aliquot Taken for IC Analysis, ml 0
 D.I. Water No. 613
 Amount of Liquid Lost During Transport, ml 0
 D.I. Water Rinse Volume, ml 200
 Methylene Chloride No. 119
 Amount of Liquid Lost During Transport, ml 0
 Methylene Chloride Rinse Volume, ml 250

Container No. 4	Weight of Inorganic Fraction, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	182.8610	182.8600	
2nd Weighing	182.8610	182.8600	
3rd Weighing	182.8610	182.8600	
Constant Wts.	182.8610	182.8600	0.0010
Less D.I. Water Blank			0.0002
Weight of Inorganic Matter			0.0008

Container No. 5	Weight of Organic Fraction, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	101.0819	101.0779	
2nd Weighing	101.0818	101.0779	
3rd Weighing	101.0815	101.0779	
Constant Wts.	101.08151	101.07791	0.0036
Less Methylene Chloride Blank			0.0004
Weight of Organic Matter			0.0032

D.I. Water Blank

D.I. Water Blank No. 614
 Amount of Liquid Lost During Transport, ml 0
 D.I. Water Blank Volume, ml 500

Container No. 6	Weight of D.I. Water Residue, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	182.3278	182.3276	
2nd Weighing	182.3280	182.3276	
3rd Weighing	182.3280	182.3276	
Constant Wts.	182.3278	182.3276	0.0002

Methylene Chloride Blank

Methylene Chloride Blank No. 138
 Amount of Liquid Lost During Transport, ml 0
 Methylene Chloride Blank Volume, ml 250

Container No. 7	Weight of Methylene Chloride Residue, g		Weight Gain
	Final Weight	Tare Weight	
1st Weighing	99.2329	99.2325	
2nd Weighing	99.2329	99.2325	
3rd Weighing	99.2330	99.2325	
Constant Wts.	99.2329	99.2325	0.0004

Analyst Brandon PeytonDate 06-Nov-04 thru 11-Nov-04

LEAD ANALYSIS

-- 0



TEST REPORT
Page 1 of 2
11/17/04

Submitted To: Michelle LaLiberty
SAMI
7314 Egypt Rd.
Medina, OH 44256

Reference Data:	Lead
Client Sample No.:	R-1 through F Blank
P.O. No.:	04-T-294
Sample Location:	GISA 04-T-294
Sample Type:	Liquid/Filter
Method Reference:	EPA Method 12/6010B
DCL Set ID No.:	04-S-5710
DCL Sample ID No.:	04-32006A through 04-32009B
Sample Receipt Date:	11/5/2004
Preparation Date:	11/10/04 through 11/12/04
Analysis Date:	11/16/04

The samples were prepared in accordance with EPA method 12. Sample condition was acceptable upon receipt except where noted. The samples were then analyzed in accordance with EPA method 6010B using a Thermo Jarrell Ash Trace (ICP) purged spectrometer.

The results are provided in the enclosed data table. Results relate only to the items tested and are not blank corrected unless indicated in the data table.

This report shall not be reproduced except in full, without the written approval of the laboratory.

A handwritten signature in black ink, appearing to be "CB", written over a horizontal line.

Chris Baugues
Analyst

CINCINNATI OFFICE
4365 GLENDALE WILFORD ROAD
CINCINNATI, OHIO 45242-3708
513 733-5336, FAX 513 733-5347

A handwritten signature in black ink, appearing to be "CJL", written over a horizontal line.

Reviewer

WEST COAST OFFICE
11 SANTA YVONIA COURT
NOVATO, CALIFORNIA 94945
800 280-8071, FAX 415 893-8469

TEST REPORT
Page 2 of 2
04-S-5710

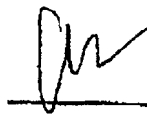
Container Volumes

Client #	DCL #	Liters
R-1	04-32006A	0.400
R-2	04-32007A	0.405
R-3	04-32008A	0.400
Blank	04-32009A	0.400

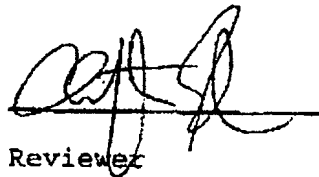
Results Lead

Client #	DCL #	µg/sample
R-1/FR-1	04-32006A/B	50.
R-2/FR-2	04-32007A/B	ND
R-3/FR-3	04-32008A/B	25.
Blank/F Blank	04-32009A/B	ND
	Prep Blank	ND
% Recovery	LCS 1	96.
% Recovery	LCS 2	92.
RPL		10.

ND = not detected at or above the reporting limit (RPL).
LCS = laboratory control sample.



Chris Bauguea
Analyst



Reviewer

EAF Baghouse Outlet

- 6

CO₂, O₂, NO_x, AND VOC CORRECTED VALUES

10-28-2004	18:26:48	20.212	0.64	2.91
10-28-2004	18:27:49	20.159	0.66	2.98
10-28-2004	18:28:50	20.204	0.74	2.93
10-28-2004	18:29:50	20.148	0.74	2.95
10-28-2004	18:30:51	20.151	0.88	2.95
10-28-2004	18:31:51	20.164	0.96	2.97
10-28-2004	18:32:52	20.155	1.43	2.89
10-28-2004	18:33:53	20.115	1.86	2.88
10-28-2004	18:34:53	20.115	2.04	2.93
10-28-2004	18:35:54	20.071	1.98	2.95
10-28-2004	18:36:48	20.05	1.83	2.99
10-28-2004	18:37:49	20.093	1.69	2.92

Test Run 1 End

	O ₂ %	NO _x ppm	THC ppm
Averages	20.397	3.790	3.613
Average	20.40	3.79	
Average Zero	0.3	0.17	
Span Value	10.94	54.7	
Span Average	10.3	51.45	
Bias Corrected	21.99	3.86	

10-28-2004	19:53:04	20.433	2.19	2.6
10-28-2004	19:54:05	20.269	1.23	2.47
10-28-2004	19:55:05	20.12	1.49	2.81
10-28-2004	19:56:06	20.094	2.16	3.2
10-28-2004	19:57:07	20.086	2.31	3.04
10-28-2004	19:58:07	20.069	1.87	2.81
10-28-2004	19:59:08	20.124	2.31	2.44
10-28-2004	20:00:08	20.152	2.82	2.35
10-28-2004	20:01:09	20.186	3.17	2.23
10-28-2004	20:02:03	20.196	3.3	2.09
10-28-2004	20:03:04	20.297	9.87	2.09
10-28-2004	20:04:05	20.531	35.4	2.36

Test Run 2 End

Averages		20.380	8.646	4.023
----------	--	--------	-------	-------

0 2	NOx	THC
%	ppm	ppm

Average	20.38	8.65
---------	-------	------

Average Zero	0.2	0.28
--------------	-----	------

Span Value	10.94	54.7
------------	-------	------

Span Average	10.25	51.3
--------------	-------	------

Bias Corrected	21.97	8.97
----------------	-------	------

10-28-2004	21:15:08	20.276	0.59	1.53
10-28-2004	21:16:08	20.258	1.18	1.59
10-28-2004	21:17:09	20.216	1.62	1.51
10-28-2004	21:18:09	20.099	2.2	1.43
10-28-2004	21:19:10	20.052	2.63	1.34
10-28-2004	21:20:05	20.056	2.82	1.39
10-28-2004	21:21:05	20.048	2.87	1.57
10-28-2004	21:22:06	19.888	3.31	1.41
10-28-2004	21:23:06	19.807	3.85	1.36
10-28-2004	21:24:07	19.912	3.54	1.34
10-28-2004	21:25:07	20.009	3.22	1.34
10-28-2004	21:26:08	20.127	3.46	1.46
Test Run 3 End				
Averages		20.34	8.00	3.37
	0 2		NOx	THC
	%		ppm	ppm
Average		20.34	8.00	
Average Zero		0.1	0.28	
Span Value		10.94	54.7	
Span Average		10.3	51.45	
Bias Corrected		21.71	8.25	

RF Exhaust Stack

O₂ AND NO_x CORRECTED VALUES

RESULTS.TXT

Run averages corrected for bias

Operator: AMIR BEHESHTI

Plant Name: SDI

Location: REHEAT FURNACE

Run	02 %	NOx ppm
1	6.212	37.59
2	6.207	35.84
3	7.602	37.93

APPENDIX D

REAGENT CERTIFICATIONS AND MATERIAL SAFETY DATA

ACETONE

..

..



Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300

MATERIAL SAFETY DATA SHEETS

SECTION I

PRODUCT AND COMPANY IDENTIFICATION

Product: Acetone

This MSDS is valid for all grades and catalog #s

Synonyms: Dimethyl Ketone, 2-Propanone, Dimethyl Ketal
Formula: CH₃COCH₃

Manufacturer: Pharmco Products Inc.
58 Vale Road
Brookfield, Connecticut 06804, US.4
Phone (203) 740-3471
Fax (203) 740-3481

Emergency Contact:
CHEMTREC 1-800-423-9300

SECTION II

COMPOSITION / INFORMATION ON INGREDIENTS

%wt	Material	CAS	Exposure Limits
100%	Acetone	67-64-1	750ppm TWA; 1000 ppm STEL

SECTION III

HAZARDS IDENTIFICATION

Routes of Exposure:

Swallowing: May cause headache, nausea, vomiting, dizziness or drowsiness

Skin Absorption: No **harmful** effects with normal skin.

Inhalation: High vapor concentration may cause burning sensation in nose and throat and stinging and watering in the eyes. At concentrations which cause **irritation**, dizziness, faintness, drowsiness, nausea and vomiting may also occur.

Skin Contact: No evidence of harmful effects from available information.

Eye Contact: May cause irritation including stinging, tearing, and redness

Effects of Repeated Overexposure: No adverse effects anticipated from available information.

Other Health Hazards: None currently known

Medical Conditions Aggravated by Overexposure:

Skin contact may aggravate an existing **dermatitis**.

SECTION IV FIRST AID

Obtain medical attention for all cases of over-exposure.

Swallowing: If patient is fully conscious, give two glasses of water. Do not induce vomiting. Obtain medical attention.

Skin: Wash skin with soap and water for at least 15 minutes

Inhalation: Remove to fresh air; Give artificial respiration if not breathing;

If breathing is difficult oxygen may be given by qualified personnel;

Obtain medical assistance if discomfort persists.

Eye Contact: Flush eyes with water for at least 15 minutes. **DO NOT** remove contact lenses, if worn. Obtain medical attention.

Note to Physician: Aspirated acetone may cause severe lung damage.

Stomach contents should be evacuated quickly in a manner which avoids aspiration.

SECTION V FIRE FIGHTING MEASURES

Fire/Explosive Properties

Flash Point: OF (-18C) Tag Closed Cup

Flammable Limits in Air: 2.15 - 13.0% (by volume)

Flammability Classification: 3 (NFPA)

1993 Emergency Response Guidebook: Guide 26

1996 North American Emergency Response Guidebook:
Guide 127

Extinguishing Media: Apply alcohol-type or all-purpose foam by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

Special Fire Fighting Procedures: Use water spray to cool fire-exposed containers and structures; Use water spray to disperse vapors - re-ignition is possible; Use self-contained breathing apparatus and protective clothing.

Unusual Fire and Explosion Hazards:

Vapors may travel to source of ignition and flash back.

- Vapors may settle in low or confined spaces.
- May produce a floating fire hazard.
- Static ignition hazard can result from handling and use.

SECTION VI

SPILL/ACCIDENTAL RELEASE MEASURES

Small spills can be flushed with large amounts of water.

Large spills: Eliminate all ignition sources; ground all equipment; do not walk through spill; stop spill if possible; prevent entry into sewers, confined spaces, etc.; use a vapor suppressing foam to reduce vapors; absorb spill with non-combustible matter and transfer to containers; use non-sparking tools to collect absorbed material.

SECTION VII HANDLING AND STORAGE

- Flammable material - keep away from heat, sparks, and flame; sudden releases of hot organic vapors or mists from process equipment operating at elevated temperature may result in ignitions without the presence of obvious ignition sources.
- Avoid contact with eyes.
- Keep container closed.
- Use with adequate ventilation.
- Ground container when transferring product.
- Vapors may collect in containers; treat empty containers as hazardous.
- Wash thoroughly after handling
- Vapors may **settle** in low or confined areas

SECTION VIII EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Special, local ventilation is needed where vapors escape to the workplace air

Respiratory Protection: Use self-contained breathing apparatus in high vapor concentration

Personal Protective Equipment: gloves, lab coat or **uniform**, safety glasses, eye wash, safety shower

SECTION IX PHYSICAL AND CHEMICAL PROPERTIES

Appearance: clear, colorless liquid

Odor: characteristic

Vapor pressure @ 20C: 184 mm Hg

Vapor density: 2.0 (air =1)

Boiling point @ 760mm Hg: 56.29C (133.3F)

Freezing Point: -96.54C (-141.77F)

Solubility in Water: 100% @ 20C

Specific Gravity : .792 @ 20/20C

Density @ 20C 6.6lbs/gal

Evaporation Rate: 14.4 (butyl acetate = 1)

Percent Volatiles: 100%

SECTION X STABILITY/REACTIVITY INFORMATION

Stability: Stable

Conditions to avoid: None known

Incompatibility/Materials to avoid: strong oxidizing agents; strong inorganic acids; alkalis

Hazardous Combustion/Decomposition Products:

Carbon monoxide **and/or** carbon dioxide

Hazardous Polymerization: Will not occur

SECTION XI DISPOSAL CONSIDERATIONS

Vapors may collect in empty containers. Treat empty containers as hazardous.

Dispose of spill-clean up and other wastes in accordance with Federal, State, and local regulations.

SECTION XII TRANSPORTATION INFORMATION

Proper Shipping Name: Acetone

Hazard Class: 3

UN Number: 1090

IMO Information: Acetone

Label of Class: 3

Packing Group **II**

Low flashpoint group

SECTION XIII REGULATORY INFORMATION

Federal EPA

Comprehensive Environmental Response Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release quantities of Hazardous Substances equal to or greater than the reportable quantities (**RQs**) in CFR. Components present in this product at a level which could require reporting under this statute are:

Chemical	CAS Number	Upper Bound Conc. %
Acetone	67-64-1	100%
Methanol	67-56-1	.0200
Ethylene Glycol	107-21-1	500ppm
Benzene	71-43-2	30ppm
Propionaldehyde	123-38-6	20 ppm

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title **III** requires emergency planning based on threshold planning quantities and release reporting based on reportable quantities in 40 CFR 355 (used for SARA 302, **304**, 311, and 312). Components present in this product at a level which could require **reporting** under this statute are: none

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title **III** requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all **MSDS's** that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are: none.

Toxic Substances Control Act (TSCA) Status:

The ingredients of this product are on the TSCA inventory.

State **Right to Know**

California - The product may contain trace levels of benzene, formaldehyde, and acetaldehyde known to the State of California to cause cancer.

Massachusetts

Extraordinarily Hazardous Substances (**=>.0001%**)

Benzene (CAS 71-43-2) upper bound conc. **30ppm**

Formaldehyde (CAS 50-00-0) upper bound conc. **20ppm**

Acetaldehyde (CAS 75-07-0) upper bound conc. **20ppm**

Hazardous Substances (**=>1%**)

Acetone (CAS 67-64-1) upper bound conc. 100%

Pennsylvania

Hazardous Substances (**=>1%**)

Acetone (CAS 67-64-1) upper bound conc. **100%**

California SCAQMD Rule 443.1 **VOC's**:

VOC 790 g/l; Vapor pressure **184mm Hg @ 20C**

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the user's obligation to determine the conditions of safe use of the product

D.I. WATER

H₂O

F.W.18.0

Specifications

Ultraviolet Absorbance of

Largest Eluted peak (*) 0.001

Residue after Evaporation 1ppm

Certificate of Actual Lot Analysis
Available Upon Request

LOT NO. 981909

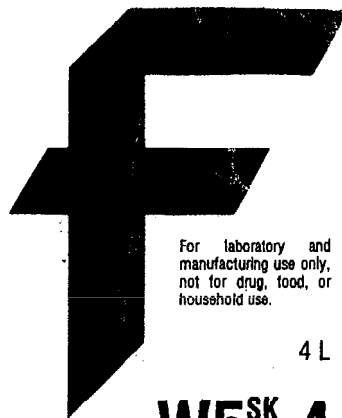
Date Rec'd / / CAS 7732-18-5

This special product is packaged under conditions of extreme cleanliness. Because both chemical and bacteriological contamination can occur through normal handling and use, it is recommended that the user observe extreme care in all opening, transfer, and closing operations.

* Determined using a Waters Associates Model ALC 204 LC Model 440 UV-VIS detector at 254 nm, 0.02 a.u.s, 25 cm x 4.6 mm I.d. Zorbax ODS column: mobile phase, linear gradient from 100% water to 100% acetonitrile at a rate of 5% per minute; flow rate, 2.0 ml per minute.

FILTERED THROUGH A
0.1 MICRON FILTER

Fair Lawn, New Jersey 07410
Made in U.S.A. (201)796-7100



For laboratory and
manufacturing use only,
not for drug, food, or
household use.

4 L

W5^{SK}-4
SaleCote®

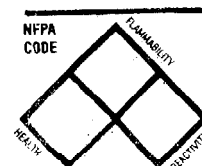
FL-05-0588

DO NOT TRANSFER TO AN UNMARKED CONTAINER

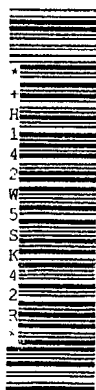
Water
HPLC GRADE

Fisher
ChemAlert®
Guide G

SAFETY CODE



NO NFPA LISTING

H₂O

F.W.18.0

Specifications

Ultraviolet Absorbance of

Largest Eluted peak (*) 0.001

Residue after Evaporation 1ppm

Certificate of Actual Lot Analysis
Available Upon Request

LOT NO. 994256'

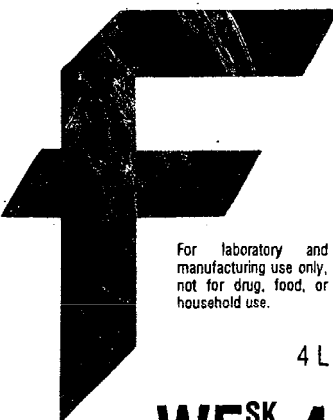
Date Rec'd / / CAS 7732-18-5

This special product is packaged under conditions of extreme cleanliness. Because both chemical and bacteriological contamination can occur through normal handling and use, it is recommended that the user observe extreme care in all opening, transfer, and closing operations.

* Determined using a Waters Associates Model ALC 204 LC Model 440 UV-VIS detector at 254 nm, 0.02 a.u.s, 25 cm x 4.6 mm I.d. Zorbax ODS column: mobile phase, linear gradient from 100% water to 100% acetonitrile at a rate of 5% per minute; flow rate, 2.0 ml per minute.

FILTERED THROUGH A
0.1 MICRON FILTER

Fair Lawn, New Jersey 07410
Made in U.S.A. (201)796-7100



For laboratory and
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4 L

W5^{SK}-4
SaleCote®

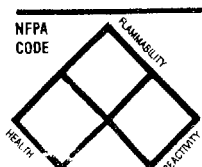
FL-05-0588

DO NOT TRANSFER TO AN UNMARKED CONTAINER

Water
HPLC GRADE

Fisher
ChemAlert®
Guide G

SAFETY CODE



NO NFPA LISTING

METHYLENE CHLORIDE
(DICHLOROMETHANE)



Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300 or 202-483-7616

MATERIAL SAFETY DATA SHEETS

Part Number/Trade Name: DICHLOROMETHANE, METHYLENE CHLORIDE
This MSDS is valid for all grades and catalog numbers

General Information

Company's Name: PHARMCO PRODUCTS, INC.
Company's Street: 58 VALE RD.
Company's City: BROOKFIELD
Company's State: CT
Company's Zip Code: 06804
Company's Emerg Ph #: (203) 740-3471
Company's Info Ph #: (203) 740-3471

Dare MSDS Revised: Nishant-8/23/99
Safety Data Review Date: 8/23/99
Preparer's Company: PHARMCO PRODUCTS, INC.
Preparer's St Or P. O. Box: 58 VALE RD.
Preparer's City: BROOKFIELD
Preparer's State: CT
Preparer's Zip Code: 06804

Ingredients/Identity Information

Proprietary: NO
Ingredient: METHYLENE CHLORIDE (SARA III)
Ingredient Sequence Number: 01
Percent: 99.5

NIOSH (RTECS) Number: PA8050000
CAS Number: 75-09-2
OSHA PEL: 500 PPM/C, 1000; 22
ACGIH TLV: 50 PPM, A2; 9192

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS LIQUID
Boiling Point: 104F/39.8C
Vapor Pressure (MM Hg/70 F): 340
Vapor Density (Air=1): 2.93

Specific Gravity: 1.320
Solubility In Water: 2.0G/100G
Percent Volatiles By Volume: 100

Fire and Explosion Hazard Data

Flash Point: NONE
Lower Explosive Limit: 13.0
Upper Explosive Limit: 23.0
Extinguishing Media: WATER FOG Special Fire Fighting Proc: WEAR POSITIVE PRESSURE

NIOSH APPROVED SCBA.
Unusual Fire And Expi Hazards: FORMS FLAMMABLE VAPOR-AIR MIXTURES AT TEMPERATURES ABOVE AMBIENT.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): SEE JOURN. OF
CHEM & EN6.DATA 17(1)89-93 1972.
Materials To Avoid: AL,NA,K & MG.

Hazardous Decomp Products:
HCL,PHOSGEN,CHLORINE WHEN
EXPOSED TO ELEC
ARCS/FLAMES
Hazardous Poly Occur: NO

Health Hazard Data

Signs/Symptoms Of Overexp: EYE:IRRITATION AND SLIGHT CORNEAL INJURY.
SKIN:IRRITATION OR BURNS.INHAL:IRRIT TO RESPIRAT.TRACT.
Emergency/First Aid Proc: EYES/SKIN-FLUSH WITH PLENTY WATER.SEE DOCTOR IF
IRRITATION DEVELOPS.INHALATION-REMOVE TO FRESH AIR.KEEP QUIET/WARM.SEE
DOCTOR.ARTIFICIAL RESPIRATION AS NEEDED.INGESTION-INDUCE VOMITING.CALL
DOCTOR.DO NOT GIVE ALCOHOL.SEE SUPPLEMENTAL DATA SECTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: SMALL SPILLS-MOP UP, ABSORB IMMEDIATELY.MOVE
OUTSIDE.LARGE SPILLS-EVACUATE AREA,CONTAIN LIQUID,TRANSFER TO CLOSED
METAL
CONTAINERS.KEEP OUT OF WATER SUPPLY.
Waste Disposal Method: SEND SOLVENT TO A RECLAIMER. IN SOME CASES,SMALL
AMOUNTS MAY BE TRANSPORTED TO AN AREA WHERE IT CAN BE PLACED ON THE
GROUND
& ALLOWED TO EVAPORATE SAFELY IF LOCAL, STATE, AND FEDERAL REGULATIONS
PERMIT.
Precautions-Handling/Storing: STORE IN COOL DRY AREA,AVOID BREATHING
VAPORS EXERCISE REASONABLE CARE AND CAUTION
Other Precautions: EPINEPHRINES PRECIPITATE ARRHYTHMIAS.EXPOSURE TO
METHYLENE CHLORIDE PRODUCES CARBOXYHEMOGLOBIN WHICH MAY PERSIST SOME
WHAT
LONGER THAN THAT DUE TO CARBON MONOXIDE EXPOSURE.

Control Measures

Respiratory Protection: ABOVE 2% SELF CONTAINED,BELOW 2%,LESS THAN 1/2 HR-
ORGANIC CANISTER. IN CONFINED OR POORLY VENTILATED AREAS, USE AN APPROVED
POSITIVE-PRESSURE SUPPLIED AIR RESPIRATOR.
Ventilation: LIMIT CONCENTRATION IN AIR TO TLV
Protective Gloves: AS NEEDED
Eye Protection: SAFETY GLASSES
Other Protective Equipment: EYE WASH STATIONS,SAFETY SHOWERS
Suppl. Safety & Health Data: NOTE TO DOCTOR-OVEREXPOSURE,IF ACCOMPANIED BY
ANOXIA, MAY TEMPORARILY INCREASE CARDIAC IRRITABILITY.GIVE OXYGEN TO
RECOVERY.AVOID SYMPATOMIMETIC AMINES SUCH AS EPINEPHRINE.SEE
OTH.PREC.SECT.

Transportation Data

Trans Data Review Date: 86147
DOT PSN Code: EUP
DOT Proper Shipping Name:
DICHLOROMETHANE
DOT Class: 6.1
DOT ID Number: UN1593
DOT Pack Group: III
DOT Label: KEEP AWAY FROM FOOD
IMO PSN Code: FLF
IMO Proper Shipping Name:
DICHLOROMETHANE
IMO Regulations Page Number: 6127
IMO UN Number: 1593
IMO UN Class: 6.1
IMO Subsidiary Risk Label: -

IATA PSN Code: IYW
IATA UN ID Number: 1593
IATA Proper Shipping Name:
DICHLOROMETHANE
IATA UN Class: 6.1
IATA Label: TOXIC *
AFI PSN Code: IYW
AFI Prop. Shipping Name:
DICHLOROMETHANE
AFI Class: 6.1
AFI ID Number: UN1593
AFI Pack Group: III
AFI Label: KEEP AWAY FROM FOOD
AFI Special Prov: N36
AFI Basic Pac Ref: 10-10

Disposal Data

Landfill Ban Item: YES
Disposal Supplemental Data: NOTE TO
DOCTOR-OVEREXPOSURE, IF
ACCOMPANIED BY
ANOXIA, MAY TEMPORARILY INCREASE
CARDIAC IRRITABILITY. GIVE OXYGEN
TO RECOVERY. AVOID SYMPATOMIMETIC
AMINES SUCH AS EPINEPHRINE. SEE
OTH. PREC. SECT.

IN CASE OF ACCIDENTAL EXPOSURE OR
DISCHARGE, CONSULT HEALTH AND
SAFETY FILE
FOR PRECAUTIONS.
1st EPA Haz Wst Code New: U000
1st EPA Haz Wst Name New: METHYLENE
CHLORIDE; DICHLOROMETHANE
1st EPA Haz Wst Char New: TOXIC (T)
1st EPA Acute Hazard New: NO

Label Data

Label Required: YES
Special Hazard Precautions: VAPORS MAY CAUSE DIZZINESS OR SUFFOCATION.
EXPOSURE IN AN ENCLOSED AREA MAY BE VERY HARMFUL. CONTACT MAY IRRITATE
OR
BURN SKIN AND EYES. FIRE MAY PRODUCE IRRITATING OR POISONOUS GASES. RUNOFF
FROM FIRE CONTROL OR DILUTION WATER MAY CAUSE POLLUTION.

The information contained herein is based on data considered to be accurate. However, no warranty is
expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the
user's obligation to determine the conditions of safe use of the product.

--Rev 2.0 12/18/01 JC

0.1 N NITRIC ACID

DATE 06/16/03 ACCT: 489428002 PAGE: 1
INDEX A31646602 CAT NO. A200212 PO NBR: 03-10326

*** MATERIAL SAFETY DATA SHEET ***

Nitric Acid
50

*** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ***

Product Name: Nitric Acid

Product Numbers:

S71972, S71972MF, S75623-2, S75623-3, S76523, A198C-212, A198C4X-212, A200-212, A200-500, A200-512GAL, A200C-212, A200C4X-212, A200C4X2001, A200C4X212, A200C4X212L, A200J500, A200S-212, A200S-500, A200S4X-212, A200S4X212L, A200S1-212, A206C-212, A206C4X-212, A467-1, A467-2, A467-250, A467-500, A483-212, A509-212, A509-500, A509SK-212, S719721, S719721MF, S71972SC

Synonyms:

Azotic Acid; Engraver's Nitrate; Hydrogen Nitrate.

Company Identification: Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

For information, call: 201-736-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

*** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ***

CAS#	Chemical Name	%	BIINECS#
7697-37-2	Nitric acid	69-71	231-714-2
7732-18-5	Water	29-31	231-791-2

Hazard Symbols: O C

Risk Phrases: 35 R

*** SECTION 3 - HAZARDS IDENTIFICATION ***

EMERGENCY OVERVIEW

Appearance: clear to yellow liquid.
Hazard: Strong oxidizer. Contact with other material may cause a fire. Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. Check internal container upon receipt. Bottles should be vented periodically to relieve pressure.
Target Organs: Eyes, skin, mucous membranes

Potential Health Effects

Eyes:

Causes severe eye burns. May cause irreversible eye injury. May cause chemical conjunctivitis and corneal damage.

Skin:

Causes skin burns. May cause deep, penetrating ulcers of the skin. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.

Ingestion:

May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. May cause systemic effects.

Inhalation:

Effects may be delayed. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause acute pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema.

Chronic:

Repeated inhalation may cause chronic bronchitis. Repeated exposure may cause erosion at teeth. Effects may be delayed.

*** SECTION 4 - FIRST AID MEASURES ***

Eyes:

Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

Skin:

Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

Ingestion:

Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupsful of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation:

2,703

DATE 06/16/03 ACCT: 489428002 PAGE: 2
INDEX A31646682 CAT NO: A200212 PO NBR: 03-10326

Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician:

Treat symptomatically and supportively.

*** SECTION 5 - FIRE FIGHTING MEASURES ***

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with combustible materials may cause a fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Substance is noncombustible. Use water with caution and in flooding amounts immediately.

Extinguishing Media:

Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. Contact professional fire-fighters immediately.

Autoignition Temperature: Not Available

Flash Point: Not available.

Explosion Limits, lower: Not available.

Explosion Limits, upper: Not available.

NFPA Rating: (estimated) Health: 4; Flammability: 0; Instability: 0; Special:

*** SECTION 6 - ACCIDENTAL RELEASE MEASURES ***

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spill with inert material (e.g., vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Neutralize spill with sodium bicarbonate. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

*** SECTION 7 - HANDLING and STORAGE ***

Handling:

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Do not breathe dust, vapor, mist, or gas. Keep container tightly closed. Avoid contact with clothing and other combustible materials. Do not get on skin or in eyes. Avoid ingestion and inhalation. Discard contaminated shoes.

Storage:

Keep away from heat, sparks, and flame. Do not store near combustible materials. Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Bottles should be vented periodically in order to overcome pressure buildup.

*** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ***

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA Final PELs
Nitric acid	2 ppm; 4 ppm STEL	2 ppm TWA; 5 mg/m3 TWA 25 ppm IDLH	2 ppm TWA; 5 mg/m3 TWA
Water	none listed	none listed	none listed

OSHA Vacated PELs:

Nitric acid:

2 ppm TWA; 5 mg/m3 TWA

Water:

No OSHA Vacated PELs are listed for this chemical

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

DATE: 06/16/03

ACCT: 489428002

INDEX: A31646682

PO NBR: 03-10326

CAT NO: A200212

ACCT: 489428002

INDEX: A31646682

PO NBR: 03-10326

CAT NO: A200212

ACCT: 489428002

INDEX: A31646682

PO NBR: 03-10326

CAT NO: A200212

DATE: 06/16/03 ACCT: 489428002 PO NBR: 03-10326
INDEX: A31646682 CAT NO: A200212

Clothing: Wear appropriate gloves to prevent skin exposure.
Wear a chemical apron. Wear appropriate clothing to prevent skin exposure.

Respirators: Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State: Liquid
Color: Clear to yellow
Odor: Strong odor - acrid odor
Boiling Point: 6.8 mm Hg
Freezing Point: Not available
Solubility in water: Not available
Specific Gravity/Density: 1.0
Molecular Weight: 63.0119

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability: Stable. Decomposes when in contact with air, light, or organic matter to avoid:
High temperatures, incompatible materials, ignition sources, moisture, combustible materials, reducing agents.
Incompatibilities with: Oxidizing materials, strong bases, alcohols, aldehydes, cyanides, metals, incompatible with many substances.
Hazardous Decomposition Products: None reported.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS# 7697-37-2: QUS775000 QUS900000
CAS# 7732-18-5: 2C0110000
LD50/LC50: Inhalation, rat: LC50 = 67 ppm(NO2)/4H.
CAS# 7697-37-2: Inhalation, rat: LC50 = 67 ppm(NO2)/4H.
CAS# 7732-18-5: Inhalation, rat: LC50 = 67 ppm(NO2)/4H.
Carcinogenicity: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No information found.
Teratogenicity: No information found.
Reproductive Effects: No information found.
Neurotoxicity: No information found.
Mutagenicity: No information found.
Other Studies: See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Other: For more information, see "HANDBOOK OF ENVIRONMENTAL FATE AND EXPOSURE DATA."

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste for transportation determination are listed in US CFR parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.

**** SECTION 14 - TRANSPORT INFORMATION ****

US DOT

2.705

DATE: 06/16/03

ACCT: 489428002

INDEX: A31646682

PO NBR: 03-10326

CAT NO: A200212

ACCT: 489428002

INDEX: A31646682

PO NBR: 03-10326

CAT NO: A200212

ACCT: 489428002

INDEX: A31646682

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

Canadian TDG

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Shipping Name: NITRIC ACID

Hazard Class: 8

UN Number: UN2031

Packing Group: II

DATE: 06/16/03 ACCT: 48942R002 PAGE: 5
INDEX: A316466R2 CAT NO: A200212 FO NBR: 03-10126

OEL-CZECHOSLOVAKIA:TWA 2.5 mg/m3;STEL 5 mg/m3
OEL-DENMARK:TWA 2 ppm (5 mg/m3)
OEL-FINLAND:TWA 2 ppm (5 mg/m3);STEL 5 ppm (13 mg/m3);Skin
OEL-FRANCE:TWA 2 ppm (5 mg/m3);STEL 4 ppm (10 mg/m3)
OEL-GERMANY:TWA 10 ppm (25 mg/m3)
OEL-GREECE:STEL 5 mg/m3
OEL-JAPAN:TWA 2 ppm (5 mg/m3)
OEL-THE PHILIPPINES:TWA 2 ppm (5 mg/m3)
OEL-POLAND:TWA 10 mg/m3
OEL-RUSSIA:TWA 2 ppm;STEL 2 mg/m3;Skin
OEL-SWEDEN:TWA 2 ppm (5 mg/m3);STEL 5 ppm (13 mg/m3)
OEL-SWITZERLAND:TWA 2 ppm (5 mg/m3);STEL 4 ppm (1 mg/m3)
OEL-THAILAND:TWA 2 ppm (5 mg/m3)
OEL-TURKEY:TWA 2 ppm (5 mg/m3)
OEL-UNITED KINGDOM:TWA 2 ppm (5 mg/m3);STEL 4 ppm (10 mg/m3)
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

*** SECTION 15 -- ADDITIONAL INFORMATION ***

MSDS Creation Date: 9/10/1998 Revision #9 Date: 12/06/2001

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, damages or losses of any kind, including lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

CALIBRATION GAS CERTIFICATIONS

•



Scott Specialty Gases

Shipped
From:

1290 COMBERMERE STREET
TROY MI 48083
Phone: 248-589-2950

Fax: 248-589-2134

C E R T I F I C A T E O F A N A L Y S I S

WAREHOUSE/STOCK
WAREHOUSE/STOCK/
CHICAGO WAREHOUSE
868 SIVERT
WOOD DALE

IL 60191

PROJECT #: 05-22625-001
PO#: GENERAL STOCK
ITEM #: 0501024 AL
DATE: 02Sep2004

CYLINDER #: ALM032471
FILL PRESSURE: 02000 PSIG

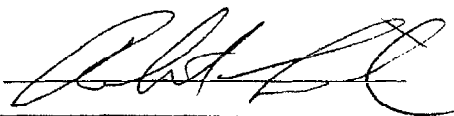
PURE MATERIAL: AIR

CAS# 132259-10-0

GRADE: ZERO AIR

PURITY: -

<u>IMPURITY</u>	<u>MAXIMUM CONCENTRATIONS</u>
THC	1 PPM
O2	20 TO 21%

ANALYST: 

Certificate of Analysis

EPA Protocol

Performed according to EPA-600/R-97/121, Procedure G1

Notice: This Cylinder is not to be used when pressure is under 150 psig.

Manufactured and certified at:

Linde Gas LLC
Maumee Specialty Gas Plant
6421 Monclova Road
MAUMEE OH 43537
419-893-7226

Produced for customer:

LINDE DECATUR INTERBRANCH
3150 N WOODFORD ST
DECATUR IL 62526-2834
USA
217-875-2000

Material:	6599	Blend Tolerance:	5 % Relative
EPA NO/N2 50-499 PPM	A31	Blend Type:	Dynamic Mass Flow
Production #:	100089667	Cyl. Pressure:	2000 psig
Lot #:	02499J4240SC	Balance Gas:	Nitrogen
Cylinder #:	CC54822	CGA:	660
Expiration Date:	10/5/2006	Analytical Accuracy:	1.00 % Relative
Shelf Life:	24 months	Confidence:	95 %

CAS #	Certified Component	Requested Concentration	Concentration and Uncertainty	Date of Certification
10102-43-9	Nitric Oxide	55	54.7 +/- 0.5 ppm	10/05/2004
7727-37-9	Nitrogen		Balance	10/05/2004
CAS #	Analyzed (For Ref Use Only)		Concentration	Analysis Date
N/A	NOx		54.7 ppm	10/05/2004
CAS #	Reference Standard	Cylinder/Standard #	Concentration	Expire Date
10102-43-9	Nitric Oxide	CAL013528 , SRM 1683B	48.74 ppm	03/30/2005
Instrument	Serial #	Analytical Principle	Calibration Date	
Thermo Nicolet AEM	AET0100218	FTIR	09/17/2004	

All analyses are performed under controlled environmental conditions. This product is manufactured using equipment which has been calibrated with NIST traceable, or equivalent, standards, weights, or equipment.

Analytical report approved by Jennifer Carney

Jennifer Carney



Certificate of Analysis

EPA Protocol

Performed according to EPA-600IR-971121, Procedure G1

Notice: This Cylinder is not to be used when pressure is under 150 psig

Manufactured and certified at:

Linde Gas LLC
 Maumee Specialty Gas Plant
 6421 Monclova Road
 MAUMEE OH 43537
 419-893-7226

Produced for customer:

LINDE HAMMOND INTERBRANCH
 3930 MICHIGAN ST
 HAMMOND IN 46323-1203
 USA
 219-989-9030

Material:	14635		Blend Tolerance:	5 % Relative
EPA 80-90 PPM NO/N2		A31	Blend Type:	EPA Protocol
Production #:	100087411		Cyl. Pressure:	2000 psig
Lot #:	02499H4030EB1		Balance Gas:	Nitrogen
Cylinder #:	CC30358		CGA:	660
Expiration Date:	8118/2006		Analytical Accuracy:	100 % Relative
Shelf Life:	24 months		Confidence:	95 %

CAS #	Certified Component	Requested Concentration	Concentration and Uncertainty	Date of Certification
10102-43-9	Nitric Oxide	80 to 90	85.0 +/- 0.9 ppm	08/18/2004
7727-37-9	Nitrogen		Balance	08/18/2004

CAS #	Analyzed (For Ref Use Only)	Concentration	Analysis Date
N/A	NOx	85.0 ppm	08/18/2004

CAS #	Reference Standard	Cylinder/Standard #	Concentration	Expire Date
10102-43-9	Nitric Oxide	CAL013225 , SRM 1684B	98.0 ppm	11/01/2006

Instrument	Serial #	Analytical Principle	Calibration Date
Thermo Nicolet AEM	AET0100218	FTIR	07/13/2004

This product is manufactured using equipment which has been calibrated with NIST traceable, or equivalent, standards, weights, or equipment.

Analytical report approved by Roy Yoder

Roy Yoder



RATA CLASS



Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 53525-71-65000
Project No.: 05-21329-023

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM013580 Certification Date: 17Aug2004 Exp. Date: 17Aug2006
Cylinder Pressure***: 1900 PSIG

COMPONENT

SULFUR DIOXIDE *
NITROGEN

CERTIFIED CONCENTRATION (Moles)

47.40 PPM
BALANCE

ANALYTICAL

ACCURACY**

+/- 1%

TRACEABILITY

Direct NIST and NMI

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols.

REFERENCE STANDARD

TYPE/SRM NO.

NTRM 1693

EXPIRATION DATE

01Jul2005

CYLINDER NUMBER

AAL12874

CONCENTRATION

51.04 PPM

COMPONENT

SULFUR DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

HORIBA/A1A-210/571325044

DATE LAST CALIBRATED

09Aug2004

ANALYTICAL PRINCIPLE

NDIR

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

SULFUR DIOXIDE *

Oats: 09Aug2004 Response Unit: DVM
Z1 = 0.00000 R1 = 100.5000 T1 = 93.90000
R2 = 100.5000 Z2 = 0.00000 T2 = 93.90000
Z3 = 0.00000 T3 = 93.90000 R3 = 100.5000
Avg. Concentration: 47.42

Dam: 17Aug2004 Response Unit: DVM
Z1 = 0.00000 R1 = 100.8000 T1 = 93.90000
R2 = 100.7000 Z2 = 0.00000 T2 = 94.00000
Z3 = 0.10000 T3 = 94.00000 R3 = 100.5000
Avg. Concentration: 47.37 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = .999998
Constants: A = -.82110953
B = .4762215 C = 1.32E-03
D = -1.90E-05 E = 9.73E-08

APPROVED BY:



Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083

Dual-Analyzed Calibration Standard

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 53287-71-65800

Project No.: 05-18149-006

Customer

CLEAN AIR INSTRUMENT RENTAL
GARY ZAPPEL
500 WEST WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM031749

Certification Date: 28Apr2004

Exp. Date: 27Apr2006

Cylinder Pressure* ** : 1948 PSIG

Prev Certification Date: 16Sep2003

ANALYTICAL

COMPONENT

SULFUR DIOXIDE *
NITROGEN

CERTIFIED CONCENTRATION (Moles)

25.41 PPM
BALANCE

ACCURACY* **

+/- 1%

TRACEABILITY

Direct NIST and NMI

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

* This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols.

REFERENCE STANDARD

TYPE/SRM NO.

NTRM 1694

EXPIRATION DATE

01Sep2007

CYLINDER NUMBER

ALM054875

CONCENTRATION

98.10 PPM

COMPONENT

SULFUR DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

FTIR System/8220/AAB9400262

DATE LAST CALIBRATED

30Mar2004

ANALYTICAL PRINCIPLE

Scott Enhanced FTIR

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

SULFUR DIOXIDE *

Date: 27Apr2004 Response Unit: PPM
Z1 = -0.00600 R1 = 97.96400 T1 = 25.40900
R2 = 98.19800 Z2 = 0.71800 T2 = 26.42900
Z3 = 0.13300 T3 = 26.40700 R3 = 98.13800
Avg. Concentration: 25.41 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999990
Constants: A = 0.000000
B = 1.000000 C = 0.000000
D = 0.000000 E = 0.000000

APPROVED BY: _____

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard



1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 52829-71-65000
Project No.: 05-12027-012

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM049176

Certification Date: 04Nov2003

Exp. Date: 03Nov2006

Cylinder Pressure+**: 1900 PSIG

COMPONENT

CERTIFIED CONCENTRATION (Moles)

ANALYTICAL

ACCURACY**

TRACEABILITY

CARBON DIOXIDE

10.10 %

+/- 1%

Direct NIST and NMI

OXYGEN

10.94 %

+/- 1%

Direct NIST and NMI

NITROGEN

BALANCE

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.

EXPIRATION DATE-

CYLINDER NUMBER

CONCENTRATION

COMPONENT

NTRM 2300

01Jan2004

ALM047640

23.34 %

CARBON DIOXIDE

NTRM 2350

01Feb2004

A1377

23.51 %

OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

DATE LAST CALIBRATED

ANALYTICAL PRINCIPLE

VARIAN/3400/10693

21Oct2003

THERMAL CONDUCTIVITY

ROSEMOUNT/755R/1000430

17Oct2003

PARAMAGNETIC

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

CARBON DIOXIDE

Date: 04Nov2003 Response Unit: AREA
Z1 = 0.00000 R1 = 1207650. T1 = 524268.0
R2 = 1207634. Z2 = 0.00000 T2 = 524411.0
Z3 = 0.00000 T3 = 524168.0 R3 = 1207661.
Avg. Concentration: 10.10 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = .999998
Constants: A = 0.0248831
B = 1.94E-5 C = 0
D = 0 E = 0

OXYGEN

Date: 04Nov2003 Response Unit: %
Z1 = 0.00000 R1 = 23.63000 T1 = 10.99000
R2 = 23.63000 Z2 = 0.00000 T2 = 10.99000
Z3 = 0.00000 T3 = 10.99000 R3 = 23.63000
Avg. Concentration: 10.94 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4

APPROVED BY:

RATA CLASS



Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 53178-71-65000
Project No.: 05-16397-023

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM050787 Certification Date: 24Mar2004 Exp. Date: 24Mar2007
Cylinder Pressure** *: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	20.31 %	+/- 1%	Direct NIST and NMI
OXYGEN	19.98 %	+/- 1%	Direct NIST and NMI
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2300	01Jan2008	ALM049142	23.34 %	CARBON DIOXIDE
NTRM 2350	01Feb2008	A1377	23.51 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/10693	23Mar2004	THERMAL CONDUCTIVITY
ROSEMOUNT/755R/1000430	01Mar2004	PARAMAGNETIC

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

CARBON DIOXIDE

Date: 23Mar2004 Response Unit: AREA

Z1 = 0.00000 R1 = 120209.0 T1 = 104748.0
R2 = 119939.0 Z2 = 0.00000 T2 = 104724.0
Z3 = 0.00000 T3 = 104700.0 R3 = 120263.0

Avg. Concentration:

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$

r = 0.999997

Constants: A = 0.0272963

B = 1.94E-04 C = 0.00

D = 0.00 E = 0.00

OXYGEN

Date: 23Mar2004 Response Unit: MV

Z1 = 0.00000 R1 = 23.51000 T1 = 19.98000
R2 = 23.51000 Z2 = 0.00000 T2 = 19.99000
Z3 = 0.00000 T3 = 19.99000 R3 = 23.51000

Avg. Concentration: 19.98 %

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$

r = 1.000000

Constants: A = 0.00043866

B = 0.9997961 C = 0.00

D = 0.00 E = 0.00

APPROVED BY:

[Signature]

APPENDIX E

CALIBRATION AND CERTIFICATION DATA

EAF Baghouse Outlet

**OFFICE OF AIR QUALITY
FIELD INSPECTION REPORT**

SOURCE: Mittal Steel USA Inc.-Indiana Harbor East
IH2 Basic Oxygen Furnace (BOF)

LOCATION: 3210 Watling Street

CITY: East Chicago

COUNTY: Lake

Thru: JRS

PLANT ID NUMBER: 080-00316
INSPECTED BY: Michael Hall
INSPECTION DATE: 9/27/07
TIME IN: 1030 TIME OUT: 1115
INSPECTION DATE: 9/28/07
TIME IN: 0945 TIME OUT: 1600
REPORTED BY: Michael Hall
REPORT DATE: 10/9/07
ACES ID: 83610, 83611, 83612

AIR QUALITY STATUS: NONATTAINMENT-O₃, PM_{2.5}

COMPLAINT INVESTIGATION: No

COMPLAINT NUMBER: NA

PERMIT TYPE: Part 70

PERMIT NUMBER: T089-23470-00316

CHECK IF APPLICABLE: NSPS___ PSD___ NESHAP X OTHER___ (please identify) _____

PERSONS/TITLE INTERVIEWED: Tom Maicher - Mittal Env. & Gabe Rocha – IH2 BOF Manager

OBJECTIVES:	☐ Compliance Monitoring Strategy	☒ Commitment (Unannounced)
	☐ Multimedia Screening	☐ Surveillance
	☐ Complaint	☐ Other

Were all relevant documents reviewed prior to the inspection: Yes If no, explain.

DESCRIPTION OF SOURCE:

The Basic Oxygen Furnace (BOF) facility converts iron from the blast furnaces into steel. The IH2 BOF is located at Mittal Steel USA Inc.-IHE, an integrated steel mill.

BACKGROUND:

Last commitment inspection: performed on 11/30/05 with no violations observed.

Permit status: Part 70, Title V issued on 9/12/06 and expires on 9/12/11.

Significant Source Modification 089-23470-00316 issued on 1/2/07 and expires on 9/12/11.

The modification consists of the addition of a new emission unit (a slab grinder) to the Part 70

Operating Permit and associated permit terms and conditions. Facility descriptions have also been updated where required. All other conditions of the permit remain unchanged and in effect. The revised Part 70 Operating Permit is being issued for your convenience.

PROCESS DESCRIPTION/FINDINGS/OBSERVATIONS:

A. Permit Section D.5

1. Process Description:

Basic Oxygen Furnace (BOF) facility converts iron from the blast furnaces into steel by blowing in oxygen and adding fluxes such as lime in addition to scrap metal, to remove impurities.

2. Equipment:

The No. 2 Basic Oxygen Furnace (BOF) Shop! comprised of the following facilities, process equipment, and operational practices:

- (1) Raw material handling, truck and ladle hopper loading system having a maximum throughput of 328,000 tons per year of alloy and flus. Emissions from the truck and ladle hopper are controlled by a baghouse, which has a flow rate of 75,000-acfm exhausting through stack 150. Emissions from the alloy and flus storage and handling are controlled by a baghouse, which has a flow rate of 50,000-acfm, exhausting through stack 151. Both baghouses were constructed in 1974.
- (2) One (1) Hot metal station containing charging aisle, reladling, desulfurization, and slag skimming operations having a maximum capacity of 4,029,600 tons of hot metal per year. Captured emissions are controlled by a baghouse having a flow rate of 360,000-acfm exhausting through stack 152. Original construction was 1974 and an upgrade was completed in August 1994 as part of a consent decree.
- (3) Two (2) BOFs, identified as No. 10 and No. 20, and operations including charging, oxygen blowing, tapping, and alloy with a total maximum capacity of 4,543,600 tons of hot metal and scrap per year. Captured emissions controlled by two (2) off-gas scrubber systems with flares having a flow rate of 1,500,000-acfm each, exhausting through flare stacks 147 and 148. Construction commenced on this equipment in 1971. Uncaptured emissions exhausting through roof monitor 153 and charging and miscellaneous furnace emissions exhausting through a secondary ventilation scrubber having a flow rate of 194,000-acfm, exhausting through stack 149. The Off-gas scrubber systems were constructed in 1974 and the Secondary Vent scrubber was upgraded in 2003.
- (4) One (1) ladle metallurgy facility station consisting of alloy addition, electric arc reheat, slag skimming, and raw material handling specifically for the metallurgy station with a maximum throughput of 4,029,600 tons per year of steel. Captured emissions are controlled by a baghouse having a flow rate of 135,000-acfm, exhausting through stack 154. This equipment was constructed in 1985.
- (5) One (1) Continuous casting operations consisting of a slab caster, and two (2) torch cutoff machines. Emissions from the caster exhaust through the caster fume baghouse, which has a flow rate of 171,000 acfm, exhausting through stack 159. Steam from the water spray cooling exhausts through three (3) vents along the caster, identified as stacks 160, 161, and 162. Fugitive emissions from the casthouse exhaust through a roof monitor, identified as 158. This equipment was constructed in 1989. (Bloom caster at this site is permanently shutdown)
- (6) A tundish dump and repair station with emissions controlled by a baghouse, which has a flow rate of 50,000 acfm, exhausting through stack 156. This equipment was constructed in 1989.
- (7) Miscellaneous natural gas combustion used for ladle preheating, exhausting through stack 157, and tundish and ladle shroud preheating, exhausting through No.2 BOF Shop Roof Monitor 155.
- (8) Slag skimming into slag pots.

3. Pollutants Emitted:

PM, PM₁₀, SO₂, CO.

4. Control Equipment:

Control Equipment/Identification	Exhaust to:
Main Off-Gas Scrubber 110 & 20)	Stacks 147 & 148 to atmosphere
Secondary Ventilation Scrubber	Stack 149 to atmosphere
Truck Hopper Baghouse	Stack 150 to atmosphere
Flux handling Baghouse	Stack 151 to atmosphere
Hot Metal Station Baghouse	Stack 152 to atmosphere
LMF Baghouse	Stack 154 to atmosphere

5. Applicable Rules:

Permit Review Rules [326 IAC 2], Opacity [326 IAC 5-1-21, Nonattainment Area Particulate Limitations [326 IAC 6.8-1-2], Lake County PM Emission Requirements [326 IAC 6.8-2-17], Opacity [326 IAC 6.8-3], Sulfur Dioxide (SO₂) [326 IAC 7-4.1-11], Carbon Monoxide [326 IAC 9-1-2(2)], General Provisions Relating to HAPs [326 IAC 20-1], NESHAP's MACT for Integrated Iron and Steel Manufacturing Facilities [40 CFR 63, Subpart A, Table 4 to 30 CFR 63, Subpart FFFFF].

6. Observations:

9/27/07: Tom Maicher and Gabe Kocha accompanied this inspector during the visual inspection of the facility. The BOF was in operation at time of inspection. Steel was being produced with #10 furnace only while #20 furnace was down for a maintenance outage. A scrap charge, hot metal charge, oxygen blow and tapping of the BOF furnaces were observed. All emission capture hoods were in operation and capturing emissions from the process. I also observed hot metal transfer, desulfuration and the skimming of slag at the hot metal station. Emissions created by this process were being successfully captured by the hot metal station baghouse hoods and sent to the baghouse. I then observed the scrubber stacks and associated baghouses and their stacks for the presence of visible emissions. No emissions were observed from any of these active control devices. Operational parameters were then observed and recorded for the main scrubber, secondary scrubber, hot metal baghouse and the LMF baghouse (Note: the tundish baghouse and the caster fume baghouse are only used when leaded steel is made, and therefore not in operation). Continuous Parametric Monitoring Systems (CPMS) and bag leak detectors were in place and operational as required by the MACT. All operational parameters observed and were within their respective operating ranges when observed and are as follows (see also attached operational screen reports and alarm status reports):

BOF OFF GAS SYSTEM OPERATIONAL PARAMETERS

No. 10 furnace	Actual Reading	RANGE
Waste Gas Flow:	<u>45.0</u> in ³ / sec	<u>35 - 50</u> m ³ / sec is average
Inlet gas temperature:	<u>650.0</u> °C	<u>0 to 1100</u> °C
Outlet gas temperature:	<u>65.0</u> °C	<u>0 to 160</u> °C
Water flow rate to the scrubber:	<u>120.0</u> l/sec	<u>< 110</u> l/sec During Blow
Water flow rate to the scrubber:	<u>56.8</u> l/sec	<u>> 38.0</u> l/sec
Quencher Differential Pressure:	<u>3.9</u> kpa	<u>2 to 5</u> kpa
Venturi Differential Pressure:	<u>13.8</u> kpa	<u>> 12.5</u> kpa
Fan AMPS:	<u>120.0</u> amps	<u>90 to 120</u> amps

SECONDARY VENTILATION SCRUBBER OPERATIONAL PARAMETERS

	Actual Reading	Range
Differential Pressure:	<u>42.5 "w.c.</u>	<u>35.0 45.0 " w.c.</u>
Blow Down Water Flow:	<u>183.8 gpm</u>	<u>50 - 400 gpm</u>
Fan Amps:	<u>437.3 amps</u>	<u>400 - 450 amps</u>
Scrubber Water Flow: (Venturi Sprays)	<u>1258.6 gpm</u>	<u>1000 - 1600 gpm</u>
Venturi Throat Water Flow:	<u>579.0 gpm</u>	<u>> 260 gpm</u>

HOT METAL STATION BAGHOUSE OPERATIONAL PARAMETERS

	Actual Reading	Range
Inlet Temp.	<u>129.6°F</u>	<u><275°F</u>
Fan Amperage:		
No.1	<u>154.0 amps</u>	<u>130 - 170 amps</u>
No.2	<u>156.0 amps</u>	<u>130 - 170 amps</u>
No.3	<u>stand-by</u>	<u>130 - 170 amps</u>
Differential pressure across BH:	<u>9.0"w.c.</u>	<u>3.0 - 10.0" w.c.</u>
Differential pressure across each compartment:		<u>2.0 - 8.0" w.c.</u>
<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>
4.90	6.02	cln
<u>No. 4</u>	<u>No. 5</u>	<u>No. 6</u>
4.67	5.48	4.86
<u>No. 7</u>	<u>No. 8</u>	<u>No. 9</u>
7.19	6.84	5.03
<u>No. 10</u>	<u>No. 11</u>	<u>No. 12</u>
4.50	6.48	3.71
<u>No. 13</u>	<u>No. 14</u>	<u>No. 15</u>
5.26	4.85	6.71
<u>No. 16</u>	<u>No. 17</u>	<u>No. 18</u>
5.04	5.15	6.42

LMF BAGHOUSE OPERATIONAL PARAMETERS

	Actual Reading	Range
Inlet Temperature:	<u>53.4°C</u>	<u><100°C</u>
Fan Amperage: No. 1	<u>53.7 amps</u>	<u>30 to 65 amps</u>
No. 7	<u>34.6 amps</u>	
Differential pressure across BH:	<u>5.0"w.c.</u>	<u>3.0 - 10.0" w.c.</u>
Differential pressure across each Compartment:		<u>3.0 - 15.0" w.c.</u>
<u>No. 1</u>	<u>No. 2</u>	<u>No. 3</u>
5.0	4.9	4.6
<u>No. 4</u>	<u>No. 5</u>	<u>No. 6</u>
4.3	4.3	3.9
<u>No. 7</u>	<u>No. 8</u>	
3.9	3.6	

9/28/07: Visible emissions evaluations were performed from 1000 hours to 1130 hours. During this time, there were no violations of this facility's opacity limit (see attached VEEs sheets). Tom Maicher then accompanied this inspector during inspection of the material handling process of the IM2 BOF. The process was in operation at time of inspection. The scrap metal yard was observed and all scrap was free from excess oil, rubber and plastics. I observed two trucks unloading lime in the truck dump station. 411 emissions were successfully captured by the baghouse. No emissions were observed escaping from the unloading station or the baghouse and stack. I also observed the flux additive baghouse in operation. No emissions were observed from the baghouse or its stack. Operational parameters for the material handling process were observed and found to be in normal operating ranges. The parameters are as listed below. In addition, #20 furnace was in operation while #10 furnace was down for maintenance. A scrap charge, hot metal charge, blow and tap were observed for #20 furnace. During this steel making process, capture hoods were operational and MACT operating parameters were within their respective ranges (see attached MACT screen overview sheets and below for observed parameters). Continuous Compliance Plan (CCP) logs and MACT records for all the active pollution control equipment utilized at the #2 BOF were reviewed. Multiple CCP/MACT required records were not completed, including the quarterly, monthly and weekly maintenance inspection records for the active control equipment.

BOF OFF GAS SYSTEM OPERATIONAL PARAMETERS

No. 20 furnace	Actual Reading	RANGE
Waste Gas Flow:	<u>45.0</u> m ³ / sec	35 - 50 m ³ / sec is average
Inlet gas temperature:	<u>631.0</u> °C	0 to 1100 °C
Outlet gas temperature:	<u>85.0</u> °C	0 to 160 °C
Water flow rate (venturi):	<u>102.0</u> l/sec	≤ 110 l/sec During Blow
Water flow rate (bull nozzle):	<u>67.1</u> l/sec	≥ 38.0 l/sec
Quencher Differential Pressure:	<u>4.0</u> kpa	2 to 5 kpa
Venturi Differential Pressure:	<u>15.8</u> kpa	≥ 12.5 kpa
Fan AMPS:	<u>113.0</u> amps	90 to 120 amps

TRUCK HOPPER BAGHOUSE OPERATIONAL PARAMETERS

	Actual Reading	Range
Fan Amperage:	<u>58.0</u> amps	<u>50 to 70</u> amps
Compartment Differential pressure:	<u>No. 1</u> <u>5.0</u>	<u>No. 2</u> <u>8.0</u>
		<u>3.0 - 6.0" w.c.</u>

FLUX ADDITIVE BAGHOUSE OPERATIONAL PARAMETERS

	Actual Reading	Range
Fan Amperage: East	<u>98.0 amps</u>	<u>90 - 120 amps</u>
West	<u>120.0 amps</u>	
Compartment Differential pressure: No. 1	<u>No. 2</u>	<u>3.0 - 6.0" w.c.</u>
	5.1	5.0

Emission Limit/Standard

D .5.1 Lake County PM Emission Requirements [326 IAC 6.8-2-17]

Pursuant to 326 IAC 6.8-2-17 (formerly 326 IAC 6-1-10.1(d)(19)), Total Suspended Particulates (TSP) emissions from the BOF Shop operations shall not exceed the following:

- (a) TSP emissions from the No. 2 BOF truck and ladle hopper baghouse (150) shall not exceed 0.0052 grains per dry standard cubic foot and 0.800 pounds per hour.
- (b) TSP emissions from the No. 2 BOF alloy and flux storage baghouse (151) shall not exceed 0.0052 grains per dry standard cubic foot and 0.530 pounds per hour.
- (c) TSP emissions from the No. 2 BOF charging aisle reladling and desulfurization baghouse (152) shall not exceed 0.011 grains per dry standard cubic foot and 25.30 pounds per hour.
- (d) TSP emissions from the No. 2 BOF No. 10 off-gas scrubber stack (147) shall not exceed 0.058 pounds per ton and 16.00 pounds per hour.
- (e) TSP emissions from the No. 2 BOF No. 20 off-gas scrubber stack (148) shall not exceed 0.058 pounds per ton and 16.00 pounds per hour.
- (f) TSP emissions from the No. 2 BOF secondary ventilation system scrubber (149) shall not exceed 0.015 grains per dry standard cubic foot and 12.00 pounds per hour.
- (g) TSP emissions from the No. 2 BOF ladle metallurgical station baghouse (154) shall not exceed 0.0052 grains per dry standard cubic foot and 2.00 pounds per hour.
- (h) TSP emissions from the No. 2 BOF caster fume collection baghouse (159) shall not exceed 0.0052 grains per dry standard cubic foot and 2.00 pounds per hour.
- (i) TSP emissions from the No. 2 BOF tundish dump baghouse (156) shall not exceed 0.0052 grains per dry standard cubic foot and 2.200 pounds per hour.

Each emission limit applies to one (1) stack serving one (1) facility unless otherwise noted. The emission limitations apply to one (1) stack serving the multiple units specified when the facility descriptions notes "stack serving", and to each stack of multiple stacks serving multiple facilities when the facility description notes "each stack serving".

D .5.2 Opacity 1326 IAC 6.8-31

Pursuant to 326 IAC 6.8-3 (formerly 326 IAC 6-1-10.1(e)), the following

opacity limits shall be complied with and shall take precedence over those in 326 IAC 5-1-2 with which they conflict. The opacity limits for the BOF operations shall be limited as follows:

- (a) The opacity for the No. 2 BOF truck and ladle hopper baghouse (150) shall not exceed five percent (5%), three (3) minute average.
- (b) The opacity for the No. 2 BOF alloy and flux storage baghouse (151) shall not exceed five percent (5%), three (3) minute average.
- (c) The opacity for the No. 2 BOF charging aisle reladling and desulfurization baghouse (152) shall not exceed five percent (5%), three (3) minute average.
- (d) The opacity for the No. 2 BOF No. 10 off-gas scrubber stack (147) shall not exceed twenty percent (20%), six (6) minute average.
- (e) The opacity for the No. 2 BOF No. 20 off-gas scrubber stack (148) shall not exceed twenty percent (20%), six (6) minute average.
- (f) The opacity for the No. 2 BOF roof monitor (153) shall not exceed twenty percent (20%), three (3) minute average.
- (g) The opacity for the No. 2 BOF secondary ventilation system scrubber (149) shall not exceed twenty percent (20%), six (6) minute average.
- (h) The opacity for the No. 2 BOF ladle metallurgical station baghouse (154) shall not exceed five percent (5%), three (3) minute average.
- (i) The opacity for the No. 2 BOF caster fume collection baghouse (159) shall not exceed five percent (5%), three (3) minute average.
- (j) The opacity for the No. 2 BOF tundish dump baghouse (156) shall not exceed five percent (5%), three (3) minute average.

D.5.3 Nonattainment Area Particulate Limitations [326 IAC 6.8-1-21]

Pursuant to 326 IAC 6.8-1-2 (formerly 326 IAC 6-1-2) (Nonattainment Area Particulate Limitations), the particulate matter emissions from the No.2 BOF Furnace Roof Monitor (153), Continuous casting operations (160, 161, 162), No. 2 BOF Continuous Caster Roof Monitor (158), ladle reheating (157) and No. 2 BOF Shop Roof Monitor (155) shall not exceed 0.03 grains per dry standard cubic foot (gr/dscf).

D.5.4 Sulfur Dioxide (SO₂) [326 IAC 7-4.1-11]

Pursuant to 326 IAC 7-4.1-11(a), the sulfur dioxide emission rate from these units shall not exceed the following:

- (a) SO₂ emissions from the stack serving No. 2 BOF secondary vent (149) shall not exceed 0.014 lbs/ton and 6.440 lbs/hour.
- (b) SO₂ emissions from the stack serving No. 2 BOF charge aisle and HMS baghouse (152) shall not exceed 0.151 lbs/ton and 69.460 lbs/hour.
- (c) SO₂ emissions from the stack serving No. 2 BOF ladle metal baghouse (154) shall not exceed 0.025 lbs/ton and 11.500 lbs/hour.

D.5.5 Carbon Monoxide [326 IAC 9-1-2(2)]

Pursuant to 326 IAC 9-1-2(2), the No. 2 BOF off-gas waste gas stream shall be burned in one of the following: a direct-flame afterburner, boiler or recuperative incinerator. In instances where carbon monoxide destruction is not required, carbon monoxide emissions shall be released at such elevation that the maximum ground level concentration from a single source shall not exceed twenty percent (20%) of the maximum one (1) hour Indiana ambient air quality value for carbon monoxide.

D.5.6 Operation restriction – shutdown of 2 A Blooming Mill and 21 inch

	<u>Bar Mill 1326 IAC 2-31 [326 IAC 2-21</u> (a) Pursuant to Significant Source Modification 089-16966-00316, issued on November 26, 2003, 336 IAC 2-3 and 326 IAC 2-2, the 2A Blooming Mill and 21 inch Bar Mill shall be shutdown permanently before the restart of the No.7 Blast Furnace operation after the completion of the reline project in 2003. In addition within 180 days of restart of the No.7 Blast Furnace operation after the reline project in 2003, these emissions units shall be physically disconnected and permanently removed from service. (b) On and after the date of issuance of this permit, the Permittee shall request the IDEM, OAQ to remove the 2A Blooming Mill and 21 inch Bar Mill and all the associated equipment permanently from the emissions inventory maintained by the State. (c) This condition supersedes all conditions in previous permits that allow the operation of the 2A Blooming Mill and 21 inch Bar Mill and its associated equipment. <u>D.5.7 Preventive Maintenance Plan [326 IAC 2-7-5(13)]</u> A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for this facility and any control devices. <u>G.1.1 General Provisions Relating to HAPs [326 IAC 20-1][40 CFR 63, Subpart A1 [Table 4 to 40 CFR 63, Subpart FFFFF]</u> The Permittee must comply with the following requirements: Subpart FFFFF — National Emission Standards for Hazardous Air Pollutants for Integrated Iron and Steel Manufacturing Facilities
Prev. Maint. Plan	Prepared: Yes Available on Site: Yes Adequate: Yes
Comp. Resp. Plan	NA
Stack Testing Reqmnts	Yes <u>#10 Fce. OG scrubber system:</u> passed Mact/SIP limit on 11/6/06. <u>#20 Fce. OG scrubber system:</u> passed Mact/SIP limit on 11/1/06. <u>Hot Metal/Desulf. baghouse (HMD):</u> passed Mact/SIP limit on 9/12/06. <u>Ladle Metallurgical Fac. (LMF):</u> baghouse passed Mact/SIP limit on 3/28/06. <u>Secondary Emissions Scrubber:</u> passed Mact limit on 11/17/06 but did not meet the SIP limit. Test will be repeated after maintenance of scrubber is completed.
Comp. Monitoring	Yes, <u>D.5.11 Visible Emissions Notations</u> <u>D.5.12 Scrubber Parametric Monitoring</u> <u>D.5.13 Failure Detection</u> <u>D.5.14 Baghouse Parametric Monitoring</u> <u>D.5.15 Broken or Failed Bag Detection</u> <u>D.5.16 No.2 BOF Flare Monitoring</u> <u>D.5.17 Sulfur Dioxide (SO2) Sampling and Analysis</u>
Comp. Determination	Yes, <u>D.5.8 Testing Requirements</u> <u>D.5.9 Particulate Control</u> All active control devices shall be in operation at all times during facility steel producing operations. <u>D.5.10 Particulate Matter (PM) and Carbon Monoxide (CO)</u> No. 2 BOF shop No. 10 BOF off-gas scrubber (147) and No. 20 BOF off-gas scrubber (148) system and the flare equipped with flare igniter

	for carbon monoxide control shall be in operation at all times that respective furnaces are in operation.
Record keeping	Are required records on site? No, CCP & MACT records missing. Type of records checked: CCP/MACT logs, PM logs, VE notation logs, Dates or amount of records checked: 2107 – 9/07. Are records consistent with observations? Yes
Reporting	Have all required reports been submitted in a timely manner? Yes Are reports consistent with observations? Yes

7. Compliance Status:
There were violations of section C.10 - Continuous Compliance Plan [326 IAC 6.8-8] and section G.1 – Records [40 CFR 63.7842(d)] of this company's permit determined at the time of the inspection.
8. Additional Comments:
None.

GENERAL SOURCE ISSUES:

- | | | |
|----|---|----------------|
| 1. | Does the permit accurately represent the emission units observed?
(If no, explain) | Yes |
| 2. | Have violations been documented by photographs? | NA |
| 3. | Were Pollution Prevention opportunities discussed? | Yes |
| 4. | Per the source, are they required to have a Risk Management Plan?
If yes, does the source have a plan?
Have the employees been trained? | No
NA
NA |
| 5. | Has the source submitted an acceptable Annual Compliance Certification for the current applicable year? | Yes |

ADDITIONAL COMMENTS:

None.

CONCLUSION:

There were violations of section C.10 - Continuous Compliance Plan [326 IAC 6.8-8] and section G.1 – Records [40 CFR 63.7842(d)] of this company's permit determined at the time of the inspection.

RECOMMENDATION:

I recommend performing additional surveillance and inspecting this source in FY2009.

EXIT INTERVIEW:

I reviewed my findings, recommendations, and conclusions with Tom Maicher prior to exiting the plant.

Pretest Calibrations

PMICPM INSTRUMENTATION

PRETEST DRY GAS METER CALIBRATION

Client G/SA
 Location CROWN POINT, IN
 Project No. VARIOUS
 Technician A. Perdue

Date Calibrated 07-30-04
 Control Unit ID No. 812047
 Critical Orifice ID No. OM40
 Critical Orifice K' Factor 0.2363

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
			1	2	3
Total Metered Gas Volume					
Final Reading		CF	540.760	542.671	544.566
Initial Reading		CF	539.200	541.100	543.000
Difference (Vm)		CF	1.560	1.571	1.566
Average Meter Temperature					
Initial		°F	80.0	80.0	81.0
Final		°F	80.0	81.0	81.0
Average (Tm)		°F	80.0	80.5	81.0
Run Time (0)		Minutes	5.0	5.0	5.0
DGM Orifice Delta H (dH)		In. H2O	0.29	0.29	0.29
Barometric Pressure (Pbar)		In. Hg	29.09	29.09	29.09
Ambient Temperature (Tamb)		°F	84.0	84.0	84.0
Pump Vacuum		In. Hg	15.5	15.5	15.5

CALCULATIONS

Vm, std = $17.65 \times V_m \times \frac{P_{bar} + (dH/13.6)}{(T_m + 460)}$			1.484	1.493	1.487
Vcr, std = $K' \text{ Factor} \times \frac{P_b \times O}{(T_{amb} + 460)^{1/2}}$		=	1.474	1.474	1.474
Y = $\frac{V_{cr, std}}{V_{m, std}}$		Where: $0.98Y < Y, \text{ avg} < 1.02Y$	=	0.993	0.987
		Trial 1 -	0.97	0.99	1.01
		Trial 2 -	0.97	0.99	1.01
		Trial 3 -	0.97	0.99	1.01
dH@ = $0.0319 \times dH \times \frac{(T_m + 460) \times \phi^2}{P_{bar} \times (Y \times V_m)^2}$		=	1.765	1.763	1.761

RESULTS

Average DGM Y Factor	Unitless	0.990
Average DGM dH@	In. H2O	1.763
Average DGM K Factor	Unitless	3.108

PRETEST DRY GAS METER CALIBRATION

Client G/SA
 Location CROWN POINT, IN
 Project No. VARIOUS
 Technician A. Perdue

Date Calibrated 07-30-04
 Control Unit ID No. 812047
 Critical Orifice ID No. OM48
 Critical Orifice K' Factor 0.3496

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
			1	2	3
Total Metered Gas Volume					
Final Reading		CF	547.220	552.420	554.928
Initial Reading		CF	544.900	550.100	552.600
Difference (Vm)		CF	2.320	2.320	2.328
Average Meter Temperature					
Initial		°F	81.0	82.0	82.0
Final		°F	81.0	82.0	82.0
Average (Tm)		°F	81.0	82.0	82.0
Run Time (O)		Minutes	5.0	5.0	5.0
DGM Orifice Delta H (dH)		In. H2O	0.66	0.66	0.66
Barometric Pressure (Pbar)		In. Hg	29.09	29.09	29.09
Ambient Temperature (Tamb)		°F	72.0	72.0	72.0
Pump Vacuum		In. Hg	15.5	15.5	15.5

CALCULATIONS

Vm, std =	17.65 × Vm ×	$\frac{Pbar + (dH/13.6)}{(Tm + 460)}$	=	<table><tr><td>2.205</td><td>2.201</td><td>2.209</td></tr></table>	2.205	2.201	2.209
2.205	2.201	2.209					
Vcr, std =	K' Factor ×	$\frac{Pb \times O}{(Tamb + 460)^{1/2}}$	=	<table><tr><td>2.205</td><td>2.205</td><td>2.205</td></tr></table>	2.205	2.205	2.205
2.205	2.205	2.205					
Y =	$\frac{Vcr, std}{Vm, std}$	Where: 0.98Y < Y, avg < 1.02Y	-	<table><tr><td>1.000</td><td>1.001</td><td>0.998</td></tr></table>	1.000	1.001	0.998
1.000	1.001	0.998					
			Trial 1 -	<table><tr><td>0.98</td><td>1.00</td><td>1.02</td></tr></table>	0.98	1.00	1.02
0.98	1.00	1.02					
			Trial 2 -	<table><tr><td>0.98</td><td>1.00</td><td>1.02</td></tr></table>	0.98	1.00	1.02
0.98	1.00	1.02					
			Trial 3 -	<table><tr><td>0.98</td><td>1.00</td><td>1.02</td></tr></table>	0.98	1.00	1.02
0.98	1.00	1.02					
dH@ =	0.0319 × dH ×	$\frac{(Tm + 460) \times \varnothing^2}{Pbar \times (Y \times Vm)^2}$	=	<table><tr><td>1.826</td><td>1.822</td><td>1.822</td></tr></table>	1.826	1.822	1.822
1.826	1.822	1.822					

Average DGM Y Factor Unitless
 Average DGM dH@ In. H2O
 Average DGM K Factor Unitless

1.000
1.824
3.325

PRETEST DRY GAS METER CALIBRATION

Client G/SA
 Location CROWN POINT, IN
 Project No. VARIOUS
 Technician A. Perdue

Date Calibrated 07-30-04
 Control Unit ID No. 812047
 Critical Orifice ID No. OM55
 Critical Orifice K' Factor 0.4546

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
			1	2	3
Total Metered Gas Volume					
Final Reading		CF	594.530	597.840	601.448
Initial Reading		CF	591.400	594.800	598.400
Difference (Vm)		CF	3.130	3.040	3.048
Average Meter Temperature					
Initial		°F	85.0	85.0	85.0
Final		°F	85.0	85.0	85.0
Average (Tm)		°F	85.0	85.0	85.0
Run Time (Ø)		Minutes	5.0	5.0	5.0
DGM Orifice Delta H (dH)		In. H2O	1.13	1.13	1.13
Barometric Pressure (Pbar)		In. Hg	29.09	29.09	29.09
Ambient Temperature (Tamb)		°F	75.0	76.0	77.0
Pump Vacuum		In. Hg	15.5	15.5	15.5

CALCULATIONS

$$V_{m, \text{std}} = 17.65 \times V_m \times \frac{P_{\text{bar}} + (dH/13.6)}{(T_m + 460)} = \begin{matrix} 2.957 & 2.872 & 2.880 \end{matrix}$$

$$V_{\text{dcr, std}} = K' \text{ Factor} \times \frac{P_b \times O}{(T_{\text{amb}} + 460)^{1/2}} = \begin{matrix} 2.859 & 2.856 & 2.853 \end{matrix}$$

$$Y = \frac{V_{\text{dcr, std}}}{V_{m, \text{std}}} \quad \text{Where: } 0.98Y < Y, \text{ avg} < 1.02Y$$

	0.967	0.994	0.991
Trial 1 -	0.95	0.98	0.99
Trial 2 -	0.97	0.98	1.01
Trial 3 -	0.97	0.98	1.01

$$dH@ = 0.0319 \times dH \times \frac{(T_m + 460) \times \emptyset^2}{P_{\text{bar}} \times (Y \times V_m)^2} = \begin{matrix} 1.850 & 1.853 & 1.857 \end{matrix}$$

RESULTS

Average DGM Y Factor	Unitless	0.984
Average DGM dH@	In. H2O	1.853
Average DGM K Factor	Unitless	3.435

PRETEST THERMOCOUPLE SYSTEM CALIBRATION AUDIT

Client	Steel Dynamics, Inc.	Control Unit ID No.	812047
Location	Pittsboro, IN	Umbilical ID No.	EU-9
Project No.	04-T-294	Sample Probe ID No.	P5-I
Date	08-30-04	Filter Oven ID No.	1011
Auditor	B. Peyton	Filter Holder OTS ID No	FH-1
Checked By	T. Shackelford	Impinger OTS ID No.	14

AUDIT DEVICES

Reference Thermometer: Type Mercury Range 0 - 180 °F

Thermocouple Simulator:	Series <u>Altek 22</u>	Model <u>K2100F</u>	Type <u>K</u>
	Range <u>0 - 2100</u>	Serial No. <u>10184805</u>	

INPUT DATA

Reference Thermometer (Ambient °F)	Control Unit Selector Switch Settings					
	Stack* (°F)	Probe (°F)	Filter (°F)	Auxiliary* (°F)	Meter (°F)	Exit* (°F)
69	31	66	67	31	69	32

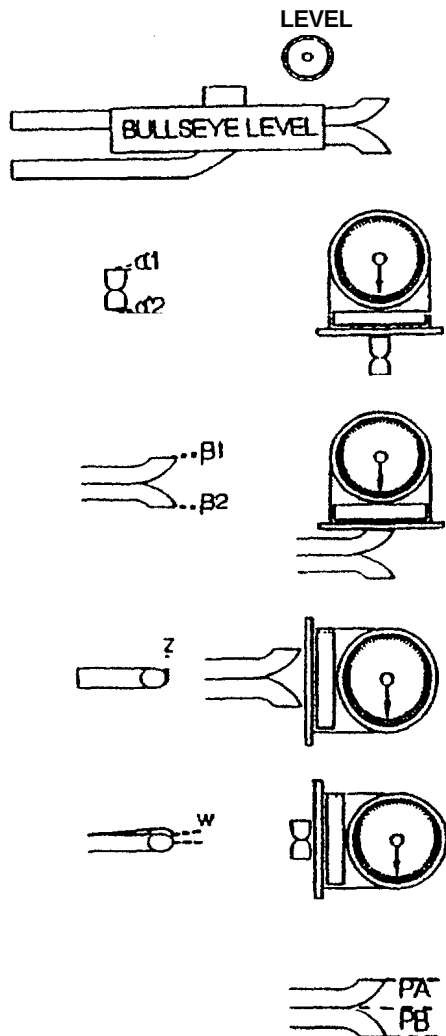
* Ice Bath

Thermocouple Simulator Settings	Control Unit Selector Switch Settings				
	Stack (°F)	Probe (°F)	Filter (°F)	Auxiliary (°F)	Exit (°F)
0 °F	-1	-1	-1	0	0
100 °F	100	96	96	97	97
200 °F	199	199	199	200	
300 °F	298	298	298	299	
400 °F	396	395	395	396	
500 °F	496				
600 °F	598				
700 °F	698				
800 °F	800				
900 °F	898				
1000 °F	999				
1100 °F	1099				
1200 °F	1197				
1300 °F	1298				
1400 °F	1395				
1500 °F	1498				
1600 °F	1599				
1700 °F	1698				
1800 °F	1798				
1900 °F	1900				
2000 °F	1999				
2100 °F	N.A.				

Tolerance Ranges

Stack	±1.5 % Absolute
Probe	±5.4 °F
Filter	±5.4 °F
Auxiliary	±5.4 °F
Meter	±5.4 °F
Exit	±2.0 °F

Pitot Inspection Form



Pretest

Tube Assembly Level?	<i>Yes</i>
Ports Damaged?	<i>No</i>
$-10^\circ < \alpha 1 < +10^\circ$	<i>1^\circ</i>
$-10^\circ < \alpha 2 < +10^\circ$	<i>1^\circ</i>
$-5^\circ < \beta 1 < +5^\circ$	<i>0^\circ</i>
$-5^\circ < \beta 2 < +5^\circ$	<i>1^\circ</i>
$\gamma =$	<i>0^\circ</i>
$\theta =$	<i>1^\circ</i>
$A =$	<i>1.012</i>
$Z = A \sin \gamma \leq \frac{1}{8}$	<i>0</i>
$W = A \sin \theta \leq \frac{1}{32}$	<i>0.018</i>
$PA =$	<i>0.50</i>
$PB =$	<i>0.51</i>
Tube Dis. (D_T) =	<i>0.373</i>
$P_A = P_B \pm (-.063)$	<i>Yes</i>
$1.05 \times D_T \leq P \leq 1.50 \times D_T$	<i>Yes</i>

Note: $P = \frac{(P_A + P_B)}{2}$

I certify that pitot tube/probe number *P-5-1* meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84. See 40 CFR 60, Vol. 42, No. 160, EPA Method 2.

Signature: *J. E. Harshbarger*
Date: *8-30-04*

Pitot Tube Distance to Other Sensors

(Circle Yes or No)

Notes

From Nozzle Opening, $>0.75"$
Gas Line & Stack T/C, $>0.75"$
"Z" Clear, Side to T/C, 2.0"
"W" Clear, Rear to TIC, 2.0"
"Y" Clear to Union, 3.0"

Yes/No
Yes/No
Yes/No
Yes/No
Yes/No

ALTEK

CERTIFICATE OF CALIBRATION

This is to certify that your Altek Unit has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limits of the NIST Calibration Services. Actual records pertaining to these standards are on file and are available for examination.

Certified by: Altek Industries Corp.

Recommend Recalibration: Annually

Model Number K2100F

Factory Calibration Date 9 May 00

Calibration Due _____

Calibration Technician [Signature]



Serial N

10184806

In Service Date

5-10-00



DECLARATION OF CONFORMITY



The above signature for Altek Industries Corp., 35 Vantage Point Drive, Rochester NY 14624 U.S.A.

Declares that the equipment specified complies with standards EN50081-1 and EN50082-1.

The product complies with the essential requirements of the EMC Directive 89/336/EEC

916000-005 REV-A

Field Calibrations

METER ORIFICE CHECK, Yc

Client SDI
 Project No. 04-T-294
 Facility EAF Oiler
 Project Site Pittsboro, IN

Date 10-27-04
 Control Unit ID No. 812047
 Checked By B. Peyton
 Observed By Juried

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
			1	2	3
Total Metered Gas Volume					
Final Reading		CF	817.980		
Initial Reading		CF	810.300		
Difference (Vm)		CF	7.680		
Average Meter Temperature					
Initial		°F	77		
Final		°F	77		
Average (Tm)		°F	77		
Run Time	Minutes		10	10	10
Barometric Pressure (Pbar)	In. Hg		29.06		
DGM Y Factor	Dimensionless		0.995		
DGM Delta H@	In. H2O		1.840		

CALCULATIONS

Trial 1 $Y_c = 10 / V_m [0.0319 (T_m + 460) / P_{bar}]^{1/2}$
 $Y_c = 10 / 7.680 [0.0319 (77 + 460) / 29.06]^{1/2}$
 $Y_c =$

Where: $0.97Y < Y_c < 1.03Y = 0.965 < 1.000 < 1.025$

Trial 2 $Y_c = 10 / V_m [0.0319 (T_m + 460) / P_{bar}]^{1/2}$
 $Y_c = 10 / [0.0319 (+460) /]^{1/2}$
 $Y_c =$

Where: $0.97Y < Y_c < 1.03Y = < <$

Trial 3 $Y_c = 10 / V_m [0.0319 (T_m + 460) / P_{bar}]^{1/2}$
 $Y_c = 10 / [0.0319 (+460) /]^{1/2}$
 $Y_c =$

Where: $0.97Y < Y_c < 1.03Y = < <$

Comments: See Section 4.4.1, Method 5, Appendix A, 40 CFR 60

Post-Test Calibrations

Post-Test Dry Gas Meter Calibration

Client:	STEEL DYNAMICS, INC	Operator	B. Peyton	Calibrated By:	A. Perdue
Project #:	G/SA 04-T-294	DGM #:	812047	DGM C Factor, Y	0.995
Date(s) Used	10/27-28/04	Date Calibrated	07130104	DGM Delta H@:	1.84

Trial #1

O, Total (Minutes):

DGM Sample Volume, Total (Ft³):

DGM Temperature, Average (°F):

Pbar (" Hg):

Delta H, Average (" H₂O):

SGMW, Dry (Lb/Lb-Mole):

DGM Yqa* =

Trial #2

O, Total (Minutes):

DGM Sample Volume, Total (Ft³):

DGM Temperature, Average (°F):

Pbar (" Hg):

Delta H, Average (" H₂O):

SGMW, Dry (Lb/Lb-Mole):

DGM Yqa* =

Trial #3

O, Total (Minutes):

DGM Sample Volume, Total (Ft³):

DGM Temperature, Average (°F):

Pbar (" Hg):

Delta H, Average (" H₂O):

SGMW, Dry (Lb/Lb-Mole):

DGM Yqa* =

DGM Yqa, Average* =

where:	0.95Y	<	Yqa, Avg.	<	1.05Y
therefore:	0.945	<	1.017	<	1.045

*See EMTIC GD-026. Alternative Method 5 Post-Test Calibration

or

where: 0.95Y < Yqa, Avg. < 1.05Y

EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER
GUIDELINE DOCUMENT

ALTERNATIVE METHOD 5 POST-TEST CALIBRATION

INTRODUCTION AND BACKGROUND

EPA Method 5 requires the calibration of the metering *system* after each field use. Because the post-test calibration requires the use of a spirometer or wet test meter, the calibration is often conducted in the laboratory. However, a field calibration procedure is highly desirable for two reasons: (1) it eliminates questions about the possibility of the damage to the metering system occurring during transport and (2) it eliminates travel costs for a retest if the metering system fails the post-test calibration.

The alternative post-test calibration procedure described below is based on the principles of the optional pretest orifice meter coefficient check in Section 4.4.1 of Method 5. Since the orifice meter coefficient check will not detect leakages between the inlet of the metering system and the dry gas meter, the alternative procedure includes two additional steps: (1) a leak check from either the inlet of the sampling train or the inlet of the metering system and (2) a leak check of that portion of the sampling train from the pump to the orifice meter,

PROCEDURE

The alternative to the post-test calibration in Section 5.3.2 of Method 5 is as follows:

After each test run, do the following:

1. Ensure that the metering system has passed the post-test leak-check. If not, conduct a leak-check of the metering system from its inlet.
 2. Conduct the leak-check of that portion of the train from the pump to the orifice meter as described in Section 5.6 of Method 5.
 3. calculate y_{qa} for each test run using the following equation:
-

$$Y_{qa} = \frac{\theta}{V_m} \sqrt{\frac{0.0319 T_m}{\Delta H_e (P_b + \Delta \frac{H_{avg}}{13.6})} \frac{29}{M_d}} (\sqrt{\Delta H})_{avg}$$

where:

- Y_{qa} = dry gas meter calibration check value, dimensionless.
 θ = total run time, min.
 V_m = total sample volume measured by dry gas meter, dcf.
 T_m = absolute average dry gas meter temp., OR,
 P_b = barometric pressure, in. Hg.
 0.0319 = $(29.92/528)(0.75)^2$ (in. Hg/o/R) cfm².
 ΔH_e = average orifice meter differential, in. H₂O.
 ΔH_e = orifice meter calibration coefficient, in. H₂O.
 M_d = dry molecular weight of stack gas, lb/lb-mole.
 29 = dry molecular weight of air, lb/lb-mole.
 13.6 = specific gravity of mercury.

After each test run series, do the following:

4. Average the *three* or more Y_{qa} 's obtained from the test run series and compare this average Y_{qa} with the dry gas meter calibration factor, Y . The average Y_{qa} must be within 5 percent of Y .
5. If the average Y_{qa} does not meet the ± 5 percent criterion, recalibrate the meter over the full range of orifice settings, as detailed in Section 5.3.1 of Method 5. Then follow the procedure in Section 5.3.3 of Method 5.

REFERENCE

1. Roger T. Shigehara, P-G. Royals, and E.W. Steward, "Alternative Method 5 Post-Test calibration", Entropy, Inc, contained in the EMTIC TSAR Library.

POST TEST THERMOCOUPLE SYSTEM CALIBRATION AUDIT

Client Steel Dynamics, Inc.
 Location Pittsboro, IN
 Project No. 04-T-294
 Date 11-29-04
 Auditor B. Peyton
 Checked By T. Shackelford

Control Unit ID No. 812047
 Umbilical ID No. EU-9
 Sample Probe ID No. P5-1
 Filter Oven ID No. 1011
 Filter Holder OTS ID No. FH-1
 Impinger OTS ID No. 14

AUDIT DEVICES

Reference Thermometer: Type Mercury Range 0 - 180 °F

Thermocouple Simulator: Series Altek 22 Model K2100F Type K
 Range 0 - 2100 °F Serial No. 10184805

- INPUT DATA -

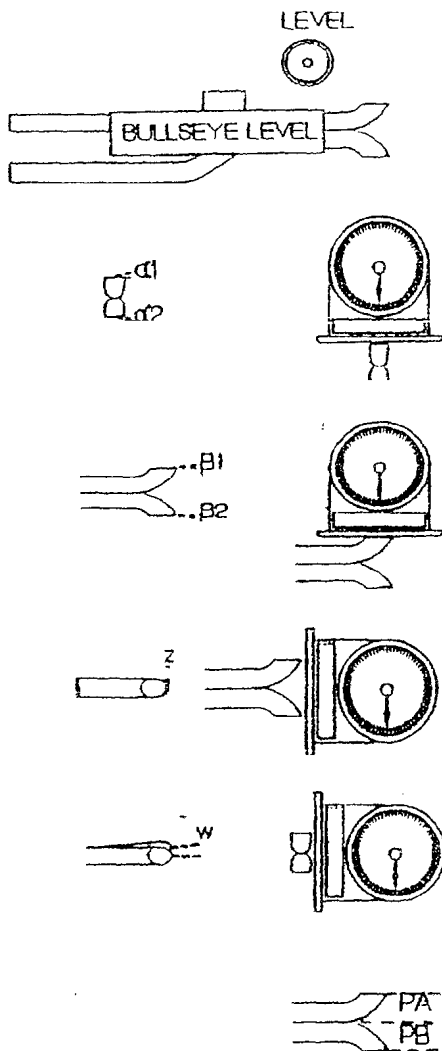
Reference Thermometer (Ambient °F)	Control Unit Selector Switch Settings					
	Stack* (°F)	Probe (°F)	Filter (°F)	Auxiliary* (°F)	Meter (°F)	Exit* (°F)
69	31	66	67	31	69	32

* Ice Bath

Thermocouple Simulator Settings	Control Unit Selector Switch Settings				
	Stack (°F)	Probe (°F)	Filter (°F)	Auxiliary (°F)	Exit (°F)
0 °F	-1	-1	-1	0	0
100 °F	100	96	96	97	97
200 °F	199	199	199	200	
300 °F	298	298	298	299	
400 °F	396	395	395	396	
500 °F	496				
600 °F	598				
700 °F	698				
800 °F	800				
900 °F	898				
1000 °F	999				
1100 °F	1099				
1200 °F	1197				
1300 °F	1298				
1400 °F	1395				
1500 °F	1498				
1600 °F	1599				
1700 °F	1698				
1800 °F	1798				
1900 °F	1900				
2000 °F	1999				
2100 °F	N.A.				

Tolerance Ranges

Stack ±1.5 % Absolute
 Probe ±5.4 °F
 Filter ±5.4 °F
 Auxiliary ±5.4 °F
 Meter ±5.4 °F
 Exit ±2.0 °F



Post-Test

Tube Assembly Level?	<i>Yes</i>
Ports Damaged?	<i>No</i>
$-10^\circ < \alpha_1 < +10^\circ$	<i>0.1^\circ</i>
$-10^\circ < \alpha_2 < +10^\circ$	<i>0^\circ</i>
$-5^\circ < \beta_1 < +5^\circ$	<i>0^\circ</i>
$-5^\circ < \beta_2 < +5^\circ$	<i>0.4^\circ</i>
$\gamma =$	<i>0.9^\circ</i>
$\theta =$	<i>0.5^\circ</i>
$A =$	<i>1.020"</i>
$Z = A \sin \gamma \leq \frac{1}{8}"$	<i>0.016"</i>
$W = A \sin \theta \leq \frac{1}{32}"$	<i>0.031"</i>
$PA =$	<i>0.51"</i>
$PB =$	<i>0.51"</i>
Tube Dia. (D_T) =	<i>0.375"</i>
$P_A = P_B \pm (-.083)$	<i>Yes</i>
$1.05 \times D_T \leq P \leq 1.50 \times D_T$	<i>Yes</i>

Note: $P = \frac{(P_A + P_B)}{2}$

I certify that pitot tube/probe number *PS-1* meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84. See 40 CFR 60, Vol. 42, No. 160, EPA Method 2

Signature: *[Signature]*

Date: *11-29-04*

Pitot Tube Distance to Other Sensors (Circle Yes or No)

Remarks

From Nozzle Opening, $>0.75"$

Gas Line & Stack T/C, $>0.75"$

"Z" Clear, Side to TIC, 2.0"

"W" Clear, Rear to T/C, 2.0"

"V" Clear to Union, 3.0"

Yes / No

Yes / No

Yes / No

Yes / No

Yes / No

0.748"

ALTEK

CERTIFICATE OF CALIBRATION

This is to certify that your Altek Unit has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limits of the NIST Calibration Services. Actual records pertaining to these standards are on file and are available for examination.

Certified by: Altek Industries Corp.

Recommend Recalibration: Annually

Model Number K-2100F

Factory Calibration Date 9 May 00

Calibration Due _____

Calibration Technician [Signature]



Serial N

10184806

In Service Date

5-10-00



DECLARATION OF CONFORM ~



The above signature for Altek Industries Corp., 35 Vantage Point Drive, Rochester NY 14624 USA
Declares that the equipment specified complies with standards EN50081-1 and EN50082-1.
The product complies with the essential requirements of the EMC Directive 89/336/EEC

915000-005 REV A

LEAD INSTRUMENTATION

Pretest Calibrations

APEX INSTRUMENTS METHOD 5 (M5CO-SET) ORIFICE SET CALIBRATION

Calibration Information

Orifice Series	OM 40
Serial Number	0001
Meter Gamma	0.99450

Calibration Conditions			
Date	Time	NOV. 24-03	2:24
Barometric Pressure		747.0	mm Hg
Theoretical Critical Vacuum ¹		952.9	mm Hg
Calibration Technician		LP	

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K ₁	9.386	K/mm Hg

¹The Critical Orifice Coefficient, K', in English units, (ft³*R^{1/2})/(in.Hg*min).

²The Critical Orifice Coefficient, K', in Metric units, (m³*K^{1/2})/(mmHg*min).

The Critical Orifice Coefficient, K', in Metric Units, (m ³ /s) ¹ and in English Units, (ft ³ /min) ²														
Calibration Data											Results			
Run #	Orifice Number	Run Time Elapsed (t)	DGM Orifice AH (P _m) mm H ₂ O	Volume Initial (V _m) m ³	Reference Meter		Outlet Temp Initial (t _m) °C	Outlet Temp Final (t _m) °C	Amb Temp Initial (t _{amb}) °C	Amb Temp Final (t _{amb}) °C	Critical Orifice Actual Vacuum mm Hg	Coefficient Metric Units K see above ¹	Coefficient English Units K' see above ²	%Venation from Avg ($<0.5\%$) %
					Volume Final (V _m) m ³	Volume Total (V _m) m ³								
1	OM 40	10	6.80	330.8731	330.9610	0.0879	22	22	22	22	584	1.963E-04	0.2363	0.00
2	OM 40	10	6.80	330.9610	331.0488	0.0878	22	22	22	22	584	1.961E-04	0.2360	0.11
3	OM 40	10	6.80	331.0488	331.1366	0.0880	22	22	22	22	3584	1.966E-04	0.2366	0.11
Average												1.963E-04	0.2363	
1	OM 48	10	16.00	331.1368	331.2664	0.1296	22	22	22	22	533	2.898E-04	0.3487	-0.26
2	OM 48	10	16.00	331.2664	331.3965	0.1301	22	22	22	22	533	2.909E-04	0.3501	0.13
3	OM 48	10	16.00	331.3965	331.5266	0.1301	22	22	22	22	533	2.909E-04	0.3501	0.13
Average												2.905E-04	0.3496	
1	OM 55	10	30.00	331.5266	331.6952	0.1686	22	22	22	22	495	3.775E-04	0.4543	-0.08
2	OM 55	10	30.00	331.6952	331.8638	0.1686	22	22	22	22	495	3.775E-04	0.4543	-0.08
3	OM 55	10	30.00	331.8638	332.0328	0.1690	22	22	22	22	495	3.784E-04	0.4553	0.16
Average												3.778E-04	0.4546	
1	OM 63	11	46.00	332.0328	332.2691	0.2363	22	22	22	22	445	4.817E-04	0.5797	-0.09
2	OM 63	10	46.00	332.2691	332.4842	0.2151	22	22	22	22	445	4.823E-04	0.5805	0.05
3	OM 63	11	46.00	332.4842	332.7208	0.2366	22	22	22	22	445	4.823E-04	0.5804	0.04
Average												4.821E-04	0.58021	
1	OM 73	10	84.00	332.7208	333.0080	0.2872	22	22	22	22	381	6.464E-04	0.7779	-0.03
2	OM 73	10	84.00	333.0080	333.2958	0.2878	22	23	22	23	361	6.472E-04	0.7789	0.09
3	OM 73	10	84.00	333.2958	333.5834	0.2876	23	23	23	23	381	6.462E-04	0.7777	-0.06
Average												6.466E-04	0.7782	

I certify that the above Orifice Set was calibrated in accordance with USEPA Methods, CFR 40 Part 60, Appendix A, Method 5, Item 7.2.2

Signature L. PERKINS

Date NOV. 24 2003

PRETEST DRY GAS METER CALIBRATION

Client G/SA
 Location Crown Point, IN
 Project No. Various
 Technician T. Shackelford

Date Calibrated 01-08-04
 Control Unit ID No. 609198
 Critical Orifice ID No. OM40
 Critical Orifice K' Factor 0.2363

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
			1	2	3
Total Metered Gas Volume					
Final Reading	CF		153.420	155.225	553.821
Initial Reading	CF		151.900	153.700	552.300
Difference (Vm)	CF		1.520	1.525	1.521
Average Meter Temperature					
Initial	°F		65.0	67.0	68.0
Final	°F		67.0	68.0	70.0
Average (Tm)	°F		66.0	67.5	69.0
Run Time (0)	Minutes		5.0	5.0	5.0
DGM Orifice Delta H (dH)	In. H2O		0.25	0.25	0.25
Barometric Pressure (Pbar)	In. Hg		29.50	29.50	29.50
Ambient Temperature (Tamb)	°F		73.0	70.0	69.0
Pump Vacuum	In. Hg		15.8	15.8	15.8

CALCULATIONS

Vrn, std =	17.65 × Vrn ×	$\frac{Pbar + (dH/13.6)}{(Tm + 460)}$	=	<table><tr><td>1.506</td><td>1.506</td><td>1.498</td></tr></table>	1.506	1.506	1.498												
1.506	1.506	1.498																	
Vcr, std =	K' Factor ×	$\frac{Pb \times O}{(Tamb + 460)^{1/2}}$	=	<table><tr><td>1.510</td><td>1.514</td><td>1.515</td></tr></table>	1.510	1.514	1.515												
1.510	1.514	1.515																	
Y =	$\frac{Vcr, std}{Vm, std}$	Where: 0.98Y < Y, avg < 1.02Y	=	<table><tr><td>1.003</td><td>1.005</td><td>1.012</td></tr><tr><td>Trial 1 -</td><td>0.98</td><td>1.01</td><td>1.02</td></tr><tr><td>Trial 2 -</td><td>0.99</td><td>1.01</td><td>1.03</td></tr><tr><td>Trial 3 -</td><td>0.99</td><td>1.01</td><td>1.03</td></tr></table>	1.003	1.005	1.012	Trial 1 -	0.98	1.01	1.02	Trial 2 -	0.99	1.01	1.03	Trial 3 -	0.99	1.01	1.03
1.003	1.005	1.012																	
Trial 1 -	0.98	1.01	1.02																
Trial 2 -	0.99	1.01	1.03																
Trial 3 -	0.99	1.01	1.03																
dH@ =	0.0319 × dH ×	$\frac{(Tm + 460) \times \varnothing^2}{Pbar \times (Y \times Vm)^2}$	=	<table><tr><td>1.504</td><td>1.492</td><td>1.485</td></tr></table>	1.504	1.492	1.485												
1.504	1.492	1.485																	

RESULTS

Average DGM Y Factor	Unitless	1.007
Average DGM dH@	In. H2O	1.493
Average DGM K Factor	Unitless	2.230

PRETEST DRY GAS METER CALIBRATION

Client	G/SA	Date Calibrated	01-08-04
Location	crown point, IN	Control Unit ID No.	609198
Project No.	Various	Critical Orifice ID No.	OM48
Technician	T. Shackelford	Critical Orifice K' Factor	0.3496

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
Total Metered Gas Volume			1	2	3
Final Reading		CF	160.788	164.185	166.687
Initial Reading		CF	158.500	161.900	164.400
Difference (Vm)		CF	2.288	2.285	2.287
Average Meter Temperature					
Initial		°F	69.0	69.0	70.0
Final		°F	69.0	70.0	70.0
Average (Tm)		°F	69.0	69.5	70.0
Run Time (O)		Minutes	5.0	5.0	5.0
DGM Orifice Delta H (dH)		In. H2O	0.57	0.57	0.57
Barometric Pressure (Pbar)		In. Hg	29.50	29.50	29.50
Ambient Temperature (Tamb)		°F	69.0	69.0	68.0
Pump Vacuum		In. Hg	16.1	16.1	16.1

CALCULATIONS

Vm, std =	17.65 × Vm ×	$\frac{Pbar + (dH/13.6)}{(Tm + 460)}$	=	<table><tr><td>2.255</td><td>2.250</td><td>2.250</td></tr></table>	2.255	2.250	2.250												
2.255	2.250	2.250																	
Vcr, std =	K' Factor ×	$\frac{Pb \times O}{(Tamb + 460)^{1/2}}$	=	<table><tr><td>2.242</td><td>2.242</td><td>2.244</td></tr></table>	2.242	2.242	2.244												
2.242	2.242	2.244																	
Y =	$\frac{Vcr, std}{Vm, std}$	Where: 0.98Y < Y, avg < 1.02Y	=	<table><tr><td>0.994</td><td>0.996</td><td>0.997</td></tr><tr><td>Trial 1 -</td><td>0.97</td><td>1.00</td><td>1.01</td></tr><tr><td>Trial 2 -</td><td>0.98</td><td>1.00</td><td>1.02</td></tr><tr><td>Trial 3 -</td><td>0.98</td><td>1.00</td><td>1.02</td></tr></table>	0.994	0.996	0.997	Trial 1 -	0.97	1.00	1.01	Trial 2 -	0.98	1.00	1.02	Trial 3 -	0.98	1.00	1.02
0.994	0.996	0.997																	
Trial 1 -	0.97	1.00	1.01																
Trial 2 -	0.98	1.00	1.02																
Trial 3 -	0.98	1.00	1.02																
dH@ =	0.0319 × dH ×	$\frac{(Tm + 460) \times \varnothing^2}{Pbar \times (Y \times Vm)^2}$	=	<table><tr><td>1.580</td><td>1.579</td><td>1.574</td></tr></table>	1.580	1.579	1.574												
1.580	1.579	1.574																	

RESULTS

Average DGM Y Factor	Unitless	0.996
Average DGM dH@	In. H2O	1.578
Average DGM K Factor	Unitless	2.490

PRETEST DRY GAS METER CALIBRATION

Client G/SA
 Location Crown Point. IN
 Project No. Various
 Technician T. Shackelford

Date Calibrated 01-08-04
 Control Unit ID No. 609198
 Critical Orifice ID No. OM55
 Critical Orifice K' Factor 0.4546

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
			1	2	3
Total Metered Gas Volume					
Final Reading		CF	170.475	173.755	177.665
Initial Reading		CF	167.500	170.800	174.700
Difference (Vm)		CF	2.975	2.955	2.965
Average Meter Temperature					
Initial		°F	70.0	70.0	71.0
Final		°F	70.0	70.0	72.0
Average (Tm)		°F	70.0	70.0	71.5
Run Time (0)		Minutes	5.0	5.0	5.0
DGM Orifice Delta H (dH)		In. H2O	0.98	0.98	0.98
Barometric Pressure (Pbar)		In. Hg	29.50	29.50	29.50
Ambient Temperature (Tamb)		°F	67.0	69.0	76.0
Pump Vacuum		In. Hg	16.0	16.0	16.0

CALCULATIONS

$$Vm, std = 17.65 \times Vm \times \frac{Pbar + (dH/13.6)}{(Tm + 460)} = \begin{matrix} 2.930 & 2.910 & 2.912 \end{matrix}$$

$$Vcr, std = K' Factor \times \frac{Pb \times O}{(Tamb + 460)^{1/2}} = \begin{matrix} 2.921 & 2.915 & 2.896 \end{matrix}$$

$$Y = \frac{Vcr, std}{Vm, std} \quad \text{Where: } 0.98Y < Y, \text{ avg} < 1.02Y$$

	0.997	1.002	0.995
Trial 1 -	0.98	1.00	1.02
Trial 2 -	0.98	1.00	1.02
Trial 3 -	0.97	1.00	1.01

$$dH@ = 0.0319 \times dH \times \frac{(Tm + 460) \times \phi^2}{Pbar \times (Y \times Vm)^2} = \begin{matrix} 1.601 & 1.607 & 1.624 \end{matrix}$$

RESULTS

Average DGM Y Factor	Unitless	0.998
Average DGM dH@	In. H2O	1.611
Average DGM K Factor	Unitless	2.595

PRETEST DRY GAS METER CALIBRATION

Client G/SA
 Location Crown Point, IN
 Project No. Various
 Technician T. Shackelford

Date Calibrated 01-08-04
 Control Unit ID No 609198
 Critical Orifice ID No. OM63
 Critical Orifice K' Factor 0.5802

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
			1	2	3
Total Metered Gas Volume					
Final Reading		CF	182.690	186.700	190.900
Initial Reading		CF	178.900	182.900	187.100
Difference (Vm)		CF	3.790	3.800	3.800
Average Meter Temperature					
Initial		°F	71.0	72.0	73.0
Final		°F	72.0	73.0	73.0
Average (Tm)		°F	71.5	72.5	73.0
Run Time (0)		Minutes	5.0	5.0	5.0
DGM Orifice Delta H (dH)		In. H2O	1.65	1.65	1.65
Barometric Pressure (Pbar)		In. Hg	29.50	29.50	29.50
Ambient Temperature (Tamb)		°F	72.0	69.0	69.0
Pump Vacuum		In. Hg	16.0	16.0	16.0

CALCULATIONS

$$Vm, std = 17.65 \times Vm \times \frac{Pbar + (dH/13.6)}{(Tm + 460)} = \begin{matrix} 3.728 & 3.731 & 3.727 \end{matrix}$$

$$Vcr, std = K' Factor \times \frac{Pb \times O}{(Tamb + 460)^{1/2}} = \begin{matrix} 3.710 & 3.721 & 3.721 \end{matrix}$$

$$Y = \frac{Vcr, std}{Vm, std} \quad \text{Where: } 0.98Y < Y, \text{ avg} < 1.02Y$$

	0.995	0.997	0.998
Trial 1 -	0.98	1.00	1.02
Trial 2 -	0.98	1.00	1.02
Trial 3 -	0.98	1.00	1.02

$$dH@ = 0.0319 \times dH \times \frac{(Tm + 460) \times \emptyset^2}{Pbar \times (Y \times Vm)^2} = \begin{matrix} 1.672 & 1.659 & 1.657 \end{matrix}$$

RESULTS

Average DGM Y Factor	Unitless	0.997
Average DGM dH@	In. H2O	1.663
Average DGM K Factor	Unitless	2.764

S.A.T., LLC

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Tel/Fax (417) 282-6140

PRETEST THERMOCOUPLE SYSTEM CALIBRATION AUDIT

Client	Steel Dynamics, Inc. _____	Control Unit ID No.	609198 _____
Location	Pittsboro, IN _____	Umbilical ID No.	EU-9 _____
Project No.	04-T-294 _____	Sample Probe ID No.	P5-2 _____
Date	08-30-04 _____	Filter Oven ID No.	1011 _____
Auditor	B. Peyton _____	Filter Holder OTS ID No.	EH-1 _____
Checked By	T. Shackelford _____	Impinger OTS ID No.	1-4 _____

AUDIT DEVICES

Reference Thermometer: Type Mercury _____ Range 0 - 180 _____ °F

Thermocouple Simulator:	Series	Altek 22	Model	K2100F	Type	K
	Range	0 - 2100	°F	Serial No.	10184805	

INPUT DATA

Reference Thermometer (Ambient °F)	Control Unit Selector Switch Settings					
	Stack* (°F)	Probe (°F)	Filter (°F)	Auxiliary* (°F)	Meter (°F)	Exit* (°F)
70	32	77	78	N/A	77	34

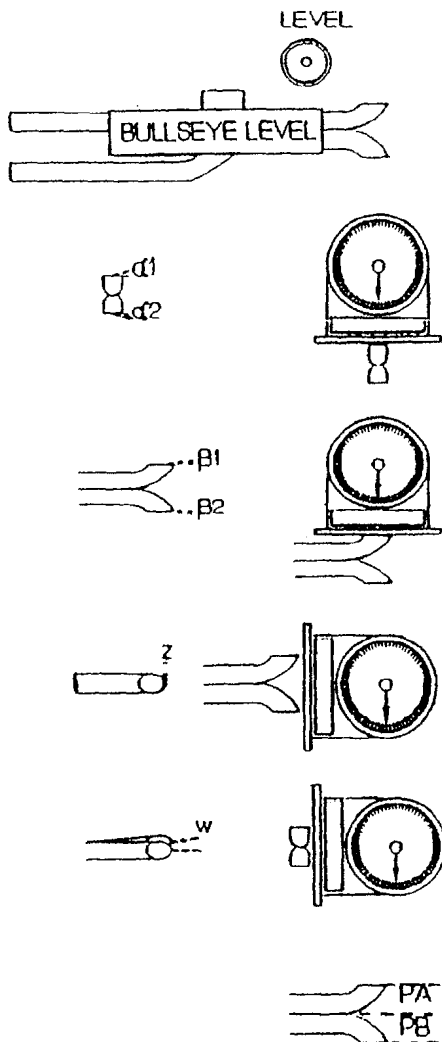
* Ice Bath

Thermocouple Simulator Settings	Control Unit Selector Switch Settings				
	Stack (°F)	Probe (°F)	Filter (°F)	Auxiliary (°F)	Exit (°F)
0 °F	1	0	2	N/A	-1
100 °F	99	97	101	N/A	99
200 °F	202	202	203	N/A	
300 °F	301	298	297	N/A	
400 °F	N/A	N/A	N/A	N/A	
500 °F	N/A				
600 °F	N/A				
700 °F	N/A				
800 °F	N/A				
900 °F	N/A				
1000 °F	N/A				
1100 °F	N/A				
1200 °F	N/A				
1300 °F	N/A				
1400 °F	N/A				
1500 °F	N/A				
1600 °F	N/A				
1700 °F	N/A				
1800 °F	N/A				
1900 °F	N/A				
2000 °F	N/A				
2100 °F	N/A				

___ Tolerance Range ___

Stack	±1.5 % Absolute
Probe	±5.4 °F
Filter	±5.4 °F
Auxiliary	±5.4 °F
Meter	±5.4 °F
Exit.	±2.0 °F

Pitot Inspection Form



Prefest

Tube Assembly Level?	<i>yes</i>
Ports Damaged?	<i>No</i>
$-10^{\circ} < \alpha 1 < +10^{\circ}$	<i>1^{\circ}</i>
$-10^{\circ} < \alpha 2 < +10^{\circ}$	<i>1^{\circ}</i>
$-5^{\circ} < \beta 1 < +5^{\circ}$	<i>0^{\circ}</i>
$-5^{\circ} < \beta 2 < +5^{\circ}$	<i>1^{\circ}</i>
$\gamma =$	<i>0^{\circ}</i>
$\theta =$	<i>1^{\circ}</i>
$A =$	<i>1.010</i>
$Z = A \sin \gamma \leq \frac{1''}{8}$	<i>0</i>
$W = A \sin \theta \leq \frac{1''}{32}$	<i>0.018</i>
PA =	<i>0.550</i>
PB =	<i>0.51</i>
Tube Dia. (D_T) =	<i>0.375</i>
$P_A = P_B \pm (-0.003)$	<i>yes</i>
$1.05 \times D_T \leq P \leq 1.50 \times D_T$	<i>yes</i>

Note: $P = \frac{(P_A + P_B)}{2}$

I certify that pitot tube/probe number P5-2 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84. See 40 CFR 60, Vol. 42, No. 160, EPA Method 2

Signature: *[Signature]*

Date: 8-30-04

Pitot Tube Distance to Other Sensors (Circle Yes or No)

Notes

From Nozzle Opening, >0.75"

Yes / No

Gas Line & Stack T/C, >0.75"

Yes / No

"Z" Clear, Side to T/C, 2.0"

Yes / No

"W" Clear, Rear to T/C, 2.0"

Yes / No

"Y" Clear to Union, 3.0"

Yes / No

ALTEK

CERTIFICATE OF CALIBRATION

This is to certify that your Altek Unit has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limits of the NIST Calibration Services. Actual records pertaining to these standards are on file and are available for examination.

Certified by: **Altek Industries Corp.**

Recommend Recalibration: **Annually**

Model Number K2100F

Factory Calibration Date 9 May 00

Calibration Due _____

Calibration Technician [Signature]



Serial N

10184806

In Service Date

5-16-00



DECLARATION OF CONFORMITY



The above signature for **Altek Industries Corp., 35 Vantage Point Drive, Rochester NY 14624 U.S.A.**

Declares that the equipment specified complies with standards EN50081-1 and EN50082-1.

The product complies with the essential requirements of the EMC Directive 89/336/EEC

916000-005 REV.A

Field Calibrations

METER ORIFICE CHECK, Yc

Client Steel Dynamics Inc.
 Project No. 04-T-294
 Facility EAF Outlet
 Project Site Pittsburgh, IN

Date 10/27/04
 Control Unit ID No. 609198
 Checked By Andy Kendall
 Observed By Jared

INPUT DATA

Dry Gas Meter Parameters		Units	Trials		
Total Metered Gas Volume			1	2	3
Final Reading		CF	565.151		
Initial Reading		CF	557.500		
Difference (Vm)		CF	7.651		
Average Meter Temperature					
Initial		°F	74		
Final		°F	76		
Average (Tm)		°F	75		
Run Time		Minutes	10	10	10
Barometric Pressure (Pbar)		In. Hg	29.06		
DGM Y Factor		Dimensionless	0.996		
DGM Delta H@		Bt H2O	1.652		

CALCULATIONS

Trial 1 $Y_c = 10 / V_m [0.0319 (T_m + 460) / P_{bar}]^{1/2}$
 $Y_c = 10 / 7.651 [0.0319 (75 + 460) / 29.06]^{1/2}$
 $Y_c = 1.002$
 Where: $0.97Y < Y_c < 1.03Y = 0.972 < 1.002 < 1.032$

Trial 2 $Y_c = 10 / V_m [0.0319 (T_m + 460) / P_{bar}]^{1/2}$
 $Y_c = 10 / [0.0319 (+ 460) /]^{1/2}$
 $Y_c =$
 Where: $0.97Y < Y_c < 1.03Y = < <$

Trial 3 $Y_c = 10 / V_m [0.0319 (T_m + 460) / P_{bar}]^{1/2}$
 $Y_c = 10 / [0.0319 + 460) /]^{1/2}$
 $Y_c =$
 Where: $0.97Y < Y_c < 1.03Y = < <$

Comments: See Section 4.4.1, Method 5, Appendix A, 40 CFR 60

Post-Test Calibrations

Post-Test Dry Gas Meter Calibration

Client: STEEL DYNAMICS, INC.
Project #: G/SA 04-T-294
Date(s) Used: 10/27-28/04

Operator: A. Kendall
DGM #: 609198
Date Calibrated: 01108104

Calibrated By: A. Perdue
DGM C Factor, Y 0.997
DGM Delta H@ 1.617

Trial #1

O₂ Total (Minutes): 120.0

DGM Sample Volume, Total (Ft³): 81.746

DGM Temperature, Average (°F): 78.8

Pbar (" Hg): 29.06

Delta H, Average (" H₂O): 1.263

SGMW, Dry (Lb/Lb-Mole): 28.82

DGM Y_{qa}* = 0.999

Trial #2

O₂ Total (Minutes): 185.0

DGM Sample Volume, Total (Ft³): 128.030

DGM Temperature, Average (°F): 77.4

Pbar (" Hg): 29.06

Delta H, Average (" H₂O): 1.312

SGMW, Dry (Lb/Lb-Mole): 28.82

DGM Y_{qa}* = 1.001

Trial #3

O₂ Total (Minutes): 120.0

DGM Sample Volume, Total (Ft³): 78.336

DGM Temperature, Average (°F): 67.0

Pbar (" Hg): 29.15

Delta H, Average (" H₂O): 1.164

SGMW, Dry (Lb/Lb-Mole): 28.82

DGM Y_{qa}* = 0.989

DGM Y_{qa}, Average' = 0.996

where:	0.95Y	<	Y _{qa} , Avg.	<	1.05Y
therefore:	0.947	<	0.996	<	1.047

**EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER
GUIDELINE DOCUMENT**

ALTERNATIVE METHOD 5 POST-TEST CALIBRATION

INTRODUCTION AND BACKGROUND

EPA Method 5 requires the calibration of the metering system after each field use. Because the post-test calibration requires the use of a spirometer or wet test meter, the calibration is often conducted in the laboratory. However, a field calibration procedure is highly desirable for two reasons: (1) it eliminates questions about the possibility of the damage to the metering system occurring during transport and (2) it eliminates travel costs for a retest if the metering system fails the post-test calibration,

The alternative post-test calibration procedure described below is based on the principles of the optional pretest orifice meter coefficient check in Section 4.4.1 of Method 5. Since the orifice meter coefficient check will not detect leakages between the inlet of the metering system and the dry gas meter, the alternative procedure includes two additional steps: (1) a leak check from either the inlet of the sampling train or the inlet of the metering system and (2) a leak check of that portion of the sampling train from the pump to the orifice meter,

PROCEDURE

The alternative to the post-test calibration in Section 5.3.2 of Method 5 is as follows:

After each test run, do the following:

1. Ensure that the metering system has passed the post-test leak-check. If not, conduct a leak-check of the metering system from its inlet.
2. Conduct the leak-check of that portion of the train from the pump to the orifice meter as described in Section 5.6 of Method 5.
3. calculate y_{qa} for each test run using the following equation:

$$Y_{qa} = \frac{\theta}{V_m} \sqrt{\frac{0.0319 T_m}{\Delta H_e (P_b + \Delta \frac{H_{avg}}{13.6})} \frac{29}{M_d}} (\sqrt{\Delta H})_{avg}$$

where:

- Y_{qa} = dry gas meter calibration check value, dimensionless,
 θ = total run time, min.
 V_m = total sample volume measured by dry gas meter, dcf.
 T_m = absolute average dry gas meter temp., °R.
 P_b = barometric pressure, in. Hg.
 0.0319 = $(29.92/528)(0.75)^2$ (in. Hg/°R) cfm².
 Δh_{avg} = average orifice meter differential, in. H₂O.
 ΔH_e = orifice meter calibration coefficient, in. H₂O.
 M_d = dry molecular weight of stack gas, lb/lb-mole.
 29 = dry molecular weight of air, lb/lb-mole.
 13.6 = specific gravity of mercury.

After each test run series, do the following:

4. Average the three or more Y_{qa} 's obtained from the test run series and compare this average Y_{qa} with the dry gas meter calibration factor, γ . The average Y_{qa} must be within 5 percent of γ .
5. If the average Y_{qa} does not meet the ± 5 percent criterion, recalibrate the meter over the full range of orifice settings, as detailed in Section 5.3. of Method 5. Then follow the procedure in Section 5.3.3 of Method 5.

REFERENCE

1. Roger T. Shigehara, P.G. Royals, and E.W. Steward, "Alternative Method 5 Post-Test Calibration", Entropy, Inc, contained in the EMTIC TSAR Library.

S.A.T. LLC

Rt. 2, Box 2165, Wheatland, MO 65779

Tel/Fax (417) 282-6140

POST TEST THERMOCOUPLE SYSTEM CALIBRATION AUDIT

Client	Steel Dynamics, Inc.	Control Unit ID No	609198
Location	Pittsboro. IN	Umbilical ID No.	U-90
Project No.	04-T-294	Sample Probe ID No.	P5-2
Date	11-29-04	Filter Oven ID No.	1011
Auditor	T. Shackelford	Filter Holder OTS ID No	FH-4
Checked By	F. Guenther	Impinger OTS ID No.	14

AUDIT DEVICESReference Thermometer: Type Mercury Range 0 - 180 °F

Thermocouple Simulator:	Series	Altek 22	Model	K2100F	Type	K
	Range	0 - 2100	°F	Serial No.	10184805	

INPUT DATA

Reference Thermometer (Ambient °F)	Control Unit Selector Switch Settings					
	Stack* (°F)	Probe (°F)	Filter (°F)	Auxiliary* (°F)	Meter (°F)	Exit* (°F)
70	32	72	73	33	72	32

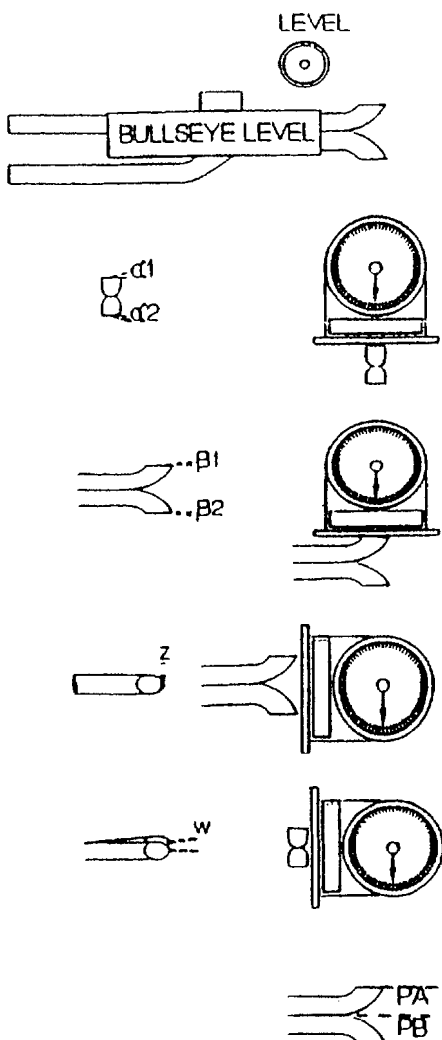
* Ice Bath

Thermocouple Simulator Settings	Control Unit Selector Switch Settings				
	Stack (°F)	Probe (°F)	Filter (°F)	Auxiliary (°F)	Exit (°F)
0 °F	2	3	3	-2	-1
100 °F	101	100	100	95	101
200 °F	203	203	203	198	
300 °F	302	302	302	297	
400 °F	399	400	399	394	
500 °F	500				
600 °F	602				
700 °F	702				
800 °F	803				
900 °F	901				
1000 °F	1002				
1100 °F	1102				
1200 °F	1200				
1300 °F	1301				
1400 °F	1399				
1500 °F	1502				
1600 °F	1603				
1700 °F	1702				
1800 °F	1802				
1900 °F	1903				
2000 °F	2001				
2100 °F	N.A.				

Tolerance Range

Stack	±1.5 % Absolute
Probe	±5.4 °F
Filter.	±5.4 °F
Auxiliary	±5.4 °F
Meter	±5.4 °F
Exit.	±2.0 °F

Pitot Inspection Form



Post-test

Tube Assembly Level?	<i>Yes</i>
Ports Damaged?	<i>No</i>
$-10^\circ < \alpha_1 < +10^\circ$	<i>0.5°</i>
$-10^\circ < \alpha_2 < +10^\circ$	<i>1°</i>
$-5^\circ < \beta_1 < +5^\circ$	<i>0°</i>
$-5^\circ < \beta_2 < +5^\circ$	<i>1°</i>
$\gamma =$	<i>0.5°</i>
$\theta =$	<i>1°</i>
$A =$	<i>1.020</i>
$Z = A \sin \gamma \leq \frac{1''}{8}$	<i>0.009</i>
$W = A \sin \theta \leq \frac{1''}{32}$	<i>0.018</i>
PA =	<i>0.51</i>
PB =	<i>0.51</i>
Tube Dia. (D_T) =	<i>0.376</i>
$P_A = P_B \pm (-0.063)$	<i>Yes</i>
$1.05 \times D_T \leq P \leq 1.50 \times D_T$	<i>Yes</i>

Note: $P = \frac{(P_A + P_B)}{2}$

I certify that pitot tube/probe number *P5-2* meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84. See 40 CFR 60, Vol. 42, No. 160, EPA Method 2

Signature: *T. E. MacKell*

Date: *11-30-04*

Pitot Tube Distance to Other Sensors (Circle Yes or No)

Notes

From Nozzle Opening, >0.75"

Yes / No

Gas Line & Stack T/C, >0.75"

Yes / No

"Z" Clear, Side to T/C, 2.0"

Yes / No

"W" Clear, Rear to T/C, 2.0"

Yes / No

"Y" Clear to Union, 3.0"

Yes / No

ALTEK

CERTIFICATE OF CALIBRATION

This is to certify that your Altek Unit has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology within the limits of the NIST Calibration Services. Actual records pertaining to these standards are on file and are available for examination.

Certified by: Altek Industries Corp.

Recommend Recalibration: Annually

Model Number K2100F

Factory Calibration Date 9 May 00

Calibration Due _____

Calibration Technician [Signature]



Serial N

10184806

In Service Date 5-16-00



DECLARATION OF CONFORMITY



The above signature for Altek Industries Corp., 35 Vantage Point Drive, Rochester NY 14624 U.S.A.
Declares that the equipment specified complies with standards EN50081-1 and EN50082-1.
The product complies with the essential requirements of the EMC Directive 89/336/EEC

916000-005 REV A

IAP INSTRUMENTATION

EAF Baghouse Outlet

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. BEHESHTI

Calibration Data For Sampling Runs: <u>1-3</u> Gas Type: <u>O₂ ✓</u> Span: <u>25</u>	Cylinder Number	Cylinder Value % or PPM	Analyzer Response	Absolute Difference	Difference % of Span
ZERO GAS		0.0	0.1	0.10	0.40
LOW-RANGE GAS					
MID-RANGE GAS "UPSCALE" <u>Cma</u>		10.94 ✓	10.90	-0.04	-0.10
HIGH RANGE GAS		19.98	20.2	0.22	0.88
Calibration Data For Sampling Runs: <u>1-3</u> Gas Type: <u>NOX ✓</u> Span: <u>100</u>	Cylinder Number	Cylinder Value % or PPM	Analyzer Response	Absolute Difference	Difference % of Span
ZERO GAS		0.0	0.0	0.00	0.00
LOW-RANGE GAS					
MID-RANGE GAS "UPSCALE" <u>Cma</u>		54.7 ✓	54.5	-0.20	-0.20
HIGH RANGE GAS		85.0	85.0	0.00	0.00
Calibration Data <u>THROUGH SYSTEM</u> For Sampling Runs: <u>1-3</u> Gas Type: <u>H₂ ✓</u> Span: <u>100</u>	Cylinder Number	Cylinder Value % or PPM	Analyzer Response	Absolute Difference	Difference % of Span
ZERO GAS		0.0	-0.1	-0.10	-0.001
LOW-RANGE GAS		24.789	24.5	-0.289	-1.100
MID-RANGE GAS "UPSCALE"		48.99	48.2	-0.79	-1.613
HIGH RANGE GAS		81.6	81.7	0.10	0.123
Calibration Data For Sampling Runs: _____ Gas Type: _____ Span: _____	Cylinder Number	Cylinder Value % or PPM	Analyzer Response	Absolute Difference	Difference % of Span
ZERO GAS					
LOW-RANGE GAS					
MID-RANGE GAS "UPSCALE"					
HIGH RANGE GAS					

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. BEHESHTI

		INITIAL VALUES		FINAL VALUES			
RUN NO:		ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE:							
SPAN:							
ZERO GAS	0.0	0.1	0.3	0.80	0.3	0.80	0.00
UPSCALE GAS	10.94	10.90	10.4	-2.00	10.2	-2.80	-0.80
CMA = 10.94		CO = 0.30		CM = 10.30			

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. Beheshti

		INITIAL VALUES		FINAL VALUES			
RUN NO:		ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE:							
SPAN:							
ZERO GAS	0.0	0.0	0.120	0.22	0.215	0.22	0.10
UPSCALE	54.7	54.5	51.8	-2.70	51.2	-3.30	-0.60
CMA = 54.7		CO = 0.17		CM = 51.50			

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-F-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. BELLESITI

		INITIAL VALUES		FINAL VALUES			
RUN NO:	<u>2</u>	ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE:	<u>O₂ ✓</u>						
SPAN:	<u>25</u>						
ZERO GAS	<u>0.0</u>	<u>0.1</u>	<u>0.3</u>	<u>0.80</u>	<u>0.1</u>	<u>0.00</u>	<u>-0.80</u>
UPSCALE GAS	<u>10.94</u>	<u>10.90</u>	<u>10.2</u>	<u>-2.80</u>	<u>10.3</u>	<u>-2.40</u>	<u>0.40</u>
CMA = <u>10.94</u>		CO = <u>0.20</u>		CM = <u>10.25</u>			

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-F-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. BELLESITI

		INITIAL VALUES		FINAL VALUES			
RUN NO:	<u>2</u>	ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE:	<u>NOX ✓</u>						
SPAN:	<u>100</u>						
ZERO GAS		<u>0.0</u>	<u>0.215</u>	<u>0.22</u>	<u>0.344</u>	<u>0.34</u>	<u>0.13</u>
UPSCALE			<u>51.2</u>	<u>-</u>	<u>51.4</u>	<u>-3.10</u>	<u>0.20</u>
CMA = <u>54.7</u>		CO = <u>0.28</u>		CM = <u>51.30</u>			

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDL PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. BEHESHTI

INITIAL VALUES			FINAL VALUES			
RUN NO:						
GAS TYPE:		ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN
SPAN:						DRIFT % OF SPAN
ZERO GAS	0.0	0.1	0.1		0.1	0.00
UPSCALE GAS	10.94	10.90	10.3	-2.40	10.3	-2.40
CMA = 10.94			CO = 0.10		CM = 10.30	

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDL PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. Beheshti

INITIAL VALUES			FINAL VALUES			
RUN NO						
GAS TYPE:		ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN
SPAN:						DRIFT % OF SPAN
ZERO GAS	0.0	0.0	0.344	0.34	0.215	0.22
UPSCALE	54.7	51.5	51.4	-3.10	51.5	-3.00
CMA = 54.7			CO = 0.28		CM = 51.45	

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EEF OPERATOR A. BEHESHTI

		INITIAL VALUES		FINAL VALUES			
RUN NO.	<u>1</u>	ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE: SPAN.	<u>HC ✓</u> <u>100</u>						
ZERO GAS	<u>0.0</u>	<u>-0.1</u>	<u>-0.1</u>	<u>0.00</u>	<u>-1.25</u>	<u>-1.15</u>	<u>-1.15</u>
UPSCALE GAS	<u>48.99</u>	<u>48.2</u>	<u>48.2</u>	<u>0.00</u>	<u>45.6</u>	<u>-2.00</u>	<u>-2.00</u>
	CMA	CO=		CM=			

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EEF OPERATOR A. Beheshti

		INITIAL VALUES		FINAL VALUES			
RUN NO:	<u>2</u>	ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE: SPAN:	<u>HC ✓</u> <u>100</u>						
ZERO GAS	<u>0.0</u>	<u>-0.1</u>	<u>-1.25</u>	<u>-1.15</u>	<u>-2.0</u>	<u>-1.90</u>	<u>-0.75</u>
UPSCALE	<u>48.99</u>	<u>48.2</u>	<u>45.6</u>	<u>-2.00</u>	<u>45.4</u>	<u>-2.80</u>	<u>-0.00</u>
	CMA	CO=		CM=			

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SDI PROJECT# 04-T-294 TEST DATE 10/28/04
 SOURCE IDENTIFICATION EAF OPERATOR A. BEHESHTI

INITIAL VALUES			FINAL VALUES				
RUN NO:		ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE:							
SPAN:							
ZERO GAS	0.0	-0.1	-2.0	-1.90	-2.1	-2.00	-0.10
UPSCALE GAS	48.99	48.2	45.4	-2.80	46.7	-1.50	1.30
CMA		CO=		CM=			

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT _____ PROJECT# _____ TEST DATE _____
 SOURCE IDENTIFICATION _____ OPERATOR _____

INITIAL VALUES			FINAL VALUES				
RUN NO:		ANALYZER RESPONSE	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL. BIAS % OF SPAN	DRIFT % OF SPAN
GAS TYPE:							
SPAN:							
ZERO GAS							
UPSCALE							
CMA		CO=		CM=			

RF Exhaust Stack

Final system Bias check for Run 3 . STRATA Version 2.01

	O2 %	NOx ppm	O2 volts	NOx volts		
10-28-2004	08:46:12		1.154	14.54	0.0462	1.454
10-28-2004	08:47:12		0.234	1.83	0.0094	0.183
10-28-2004	08:48:13		0.198	1.02	0.0079	0.102
10-28-2004	08:49:13		0.188	0.77	0.0075	0.077
10-28-2004	08:50:14		4.630	0.58	0.1852	0.058
10-28-2004	08:51:14		10.395	0.46	0.4158	0.046
10-28-2004	08:52:14		10.714	0.35	0.4285	0.035
10-28-2004	08:53:15		10.547	0.26	0.4219	0.026
10-28-2004	08:54:15		2.401	28.42	0.0960	2.842
10-28-2004	08:55:16		0.258	51.09	0.0103	5.109
10-28-2004	08:56:16		0.208	52.58	0.0083	5.258
10-28-2004	08:57:16		0.167	53.00	0.0067	5.300

Final System Bias check for Run 3

operator: AMIR BEHESHTI

Plant Name: SD ■

Location: REHEAT FURNACE

Reference cylinder Numbers

zero span

O2 CC185019 ALM049176

NOX CC185019 CC54822

Date/Time 10-28-2004 08:57:59 PASSED

Analyte O2

units %

zero Ref cyl 0.000 0.00

zero cal 0.174 0.04

zero Avg 0.172 0.93

Zero Bias% 0.0 0.9

zero Drift% -0.2 0.2

span Ref cyl 10.940 54.70

span cal 10.866 55.70

span Avg 10.715 53.13

span Bias% 0.6 2.6

span Drift% 0.0 -0.6

Ini zero Avg 0.220 0.73

Ini Span Avg 10.705 53.71

Run Avg 7.502 37.30

Co 0.196 0.83

Cm 10.710 53.42

Correct Avg 7.602 37.93

IBIAS03.TXT

Initial system Bias check for Run 3 . STRATA Version 2.01

	02 %	NOx ppm	02 volts	NOx volts		
10-28-2004	07:17:18		4.985	49.31	0.1994	4.931
10-28-2004	07:18:18		0.520	11.63	0.0208	1.163
10-28-2004	07:19:19		0.179	1.40	0.0072	0.140
10-28-2004	07:20:19		0.199	0.80	0.0079	0.080
10-28-2004	07:21:20		0.169	0.59	0.0067	0.059
10-28-2004	07:22:20		5.570	0.48	0.2228	0.048
10-28-2004	07:23:20		10.441	0.36	0.4176	0.036
10-28-2004	07:24:21		10.684	0.29	0.4274	0.029
10-28-2004	07:25:21		10.728	0.24	0.4291	0.024
10-28-2004	07:26:22		6.874	7.78	0.2750	0.778
10-28-2004	07:27:22		0.561	47.29	0.0224	4.729
10-28-2004	07:28:23		0.186	53.06	0.0074	5.306
10-28-2004	07:29:23		0.219	53.70	0.0087	5.370

Initial system Bias check for Run 3

Operator: AMIR BEHESHTI
Plant Name: SD
Location: REHEAT FURNACE
Reference Cylinder Numbers
Zero Span
02 CC185019 ALMO49176
NOX CC185019 CC54822

Date/Time	10-28-2004	07:29:35	PASSED
Analyte 02	NOx		
Units %	ppm		
zero Ref cyl	0.000	0.00	
Zero Cal	0.174	0.04	
zero Avg	0.220	0.73	
Zero Bias%	0.2	0.7	
Zero Drift%			
span Ref cyl	10.940	54.70	
Span Cal	10.866	55.70	
span Avg	10.705	53.71	
span Bias%	0.6	2.0	
span Drift%			

CALERR03.TXT
calibration Error Test at Run 3 . STRATA Version 2.01

	O2 %	NOx ppm	O2 volts	NOx volts		
10-28-2004	06:49:04		0.185	0.04	0.0074	0.004
10-28-2004	06:49:59		0.152	0.04	0.0061	0.004
10-28-2004	06:50:59		1.549	0.04	0.0620	0.004
10-28-2004	06:52:00		19.915	0.04	0.7966	0.004
10-28-2004	06:53:00		20.315	0.04	0.8126	0.004
10-28-2004	06:54:00		13.924	0.04	0.5569	0.004
10-28-2004	06:55:01		10.867	0.04	0.4347	0.004
10-28-2004	06:56:01		5.719	15.91	0.2288	1.591
10-28-2004	06:57:02		0.265	86.61	0.0106	8.661
10-28-2004	06:58:02		0.164	87.84	0.0066	8.784
10-28-2004	06:59:02		0.193	87.90	0.0077	8.790
10-28-2004	07:00:03		0.184	87.88	0.0074	8.788
10-28-2004	07:01:03		0.177	87.80	0.0071	8.780
10-28-2004	07:02:04		0.212	14.28	0.0085	1.428
10-28-2004	07:03:04		0.185	0.34	0.0074	0.034
10-28-2004	07:04:04		0.160	0.15	0.0064	0.015
10-28-2004	07:04:59		0.211	0.13	0.0084	0.013
10-28-2004	07:05:59		0.151	0.04	0.0060	0.004
10-28-2004	07:07:00		0.187	0.04	0.0075	0.004
10-28-2004	07:08:00		0.197	0.04	0.0079	0.004
10-28-2004	07:09:00		0.165	0.05	0.0066	0.005
10-28-2004	07:10:01		0.222	74.84	0.0089	7.484
10-28-2004	07:11:01		0.162	87.47	0.0065	8.747
10-28-2004	07:12:02		0.203	63.54	0.0081	6.354
10-28-2004	07:13:02		0.156	55.80	0.0062	5.580

calibration Error Test at Run 3

Operator: AMIR BEHESHTI

Plant Name: SDI

Location: REHEAT FURNACE

	zero	Low-range	Mid-range	High-range
O2	CC185019		ALM049176	ALM050787
NOx	CC185019		CC54822	CC30358

Date/Time	10-28-2004	07:13:56	PASSED
Analyte O2			
units %			
Zero Ref Cyl	0.000	0.00	
zero Avg	0.174	0.04	
Zero Error%	0.7	0.0	
Low Ref Cyl			
Low Avg			
Low Error%			
Mid Ref Cyl	10.940	54.70	
Mid Avg 10.866	55.70		
Mid Error%	0.3	1.0	
High Ref Cyl	19.980	85.00	
High Avg	20.275	86.70	
High Error%	1.2	1.7	

APPENDIX F

SAMPLE CALCULATIONS, NOMENCLATURE AND EQUATIONS

SAMPLE CALCULATIONS

EAF Baghouse Outlet

USEPA Method 5/202

Sample Calculations Worksheet

Entry of a specific test run, source description and testing parameters will yield a package of sample calculations suitable for reference in any report. However, knowledge of this worksheet is necessary if you want to modify the worksheet to accommodate equations other than those already incorporated at this time. Currently, this worksheet is formatted for EPA Method 51202 (PMICPM).

To continue, PAGE DOWN for data entry. Input data will automatically be entered into equations in the cells to the right of this screen (TAB RIGHT). To continue viewing equations from the first page, use PAGE DOWN after TAB RIGHT.

It should be noted that minor round-off differences may be noticed as you compare results from this spreadsheet with results derived from other spreadsheets. However, final result variance is usually insignificant.

Sample Calculations Data Entry Section

Client: STEEL DYNAMICS, INC. Project #: G/SA 04-T-294
 Location: Electric Arc Furnace - BO
 Run #: 1

Total Sampling Time, min (Ø)	260.0
Average Process Rate, TPH (Rp)	N.A.
Stack Area, ft ² (A)	148.5
Barometric Pressure, in. Hg (Pbar)	29.06
Static Pressure, in. H ₂ O (Ps)	-0.60
Pitot Tube Coefficient, dimensionless (Cp)	0.84
Dry Gas Meter Corr. Factor, dimensionless (Y)	0.995
Nozzle Area, ft ² (An)	0.000171
Metered Gas Volume, ft ³ (Vm)	161.614
Average Meter Temperature, °F (Tm)	74.7
Stack Gas Temperature, °F (Ts)	152.9
Meter Orifice Pressure, in. H ₂ O (dH)	1.304
Average Sqrt. of Velocity Head, in. H ₂ O (dP ^{1/2})	1.156
Volume of H ₂ O Collected, ml (Vlc)	65.6
% Carbon Dioxide (%CO ₂)	0.3
% Oxygen (%O ₂)	20.5
% Carbon Monoxide (%CO)	0.0
% Nitrogen, Calculated (%N ₂)	79.2
Particulate Matter Concentration, g (Mn)	0.0082
Fuel Burned, lb/hr (from process data)	NA
Btu/lb of Fuel Burned (Hc from fuel analysis)	NA
Fd Factor (dscf/mmBtu)	NA

To add more
parameters,
PAGE DOWN

EPA Method 5/202 (PM/CPM) Sample Calculations

Page 1 of 3

Location: Electric Arc Furnace - BO

Client: STEEL DYNAMICS, INC.

Run #: 1

Project #: G/SA 04-T-294

Absolute Stack Gas Pressure (In. Hg):

$$P_a = P_{bar} + (\pm P_s \div 13.6)$$

$$P_a = 29.06 + (-0.6 \div 13.6)$$

$$P_a = 29.02$$

Volume of Water Vapor in Sampled Gas, Standard Conditions (SCF):

$$V_{w, std} = 0.04707 \times V_{lc}$$

$$V_{w, std} = 0.04707 \times 65.6$$

$$V_{w, std} = 3.088$$

Volume of Dry Metered Gas, Standard Conditions (DSCF):

$$V_{m, std} = (17.65 \times V_m \times Y \times [P_{bar} + (dH \div 13.6)]) \div (T_m + 460)$$

$$V_{m, std} = \frac{(17.65 \times 161.61 \times 0.995 \times [29.06 + (1.304 \div 13.6)])}{(74.7 + 460)}$$

$$V_{m, std} = 154.761$$

Moisture Fraction (Dimensionless):

$$B_{ws} = V_{w, std} \div (V_{m, std} + V_{w, std})$$

$$B_{ws} = 3.088 \div (154.76 + 3.088)$$

$$B_{ws} = 0.020$$

Molecular Weight of Stack Gas, Dry Basis (Lb/Lb-Mole):

$$M_d = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + [0.28 \times (\%CO + \%N_2)]$$

$$M_d = 0.44 \times 0.3 + 0.32 \times 20.5 + [0.28 \times (0.0 + 79)]$$

$$M_d = 28.87$$

EPA Method 51202 (PM/CPM) Sample Calculations**Page 2 of 3**

Location: Electric Arc Furnace - BO

Client: STEEL DYNAMICS, INC.

Run #: 1

Project #: G/SA 04-T-294

Molecular Weight of Stack Gas, Wet Basis (Lb/Lb-Mole):

$$M_s = 18 \times B_{ws} + [M_d \times (1 - B_{ws})]$$

$$M_s = 18 \times 0.01956 + [28.87 \times (1 - 0.020)]$$

$$M_s = 28.66$$

Velocity of Stack Gas (FPS):

$$V_s = 85.49 \times C_p \times \sqrt{d_P} \times \sqrt{[(T_s + 460) \div (M_s \times P_a)]}$$

$$V_s = 85.49 \times 0.84 \times 1.156 \times \sqrt{\left[\frac{152.9 + 460}{28.66 \times 29.02} \right]}$$

$$V_s = 71.3$$

Volumetric Flow Rate of Stack Gas, Actual Conditions (ACFM):

$$Q_a = A \times V_s \times 60$$

$$Q_a = 148.5 \times 71.3 \times 60$$

$$Q_a = 635,044$$

Volumetric Flow Rate of Stack Gas, Dry Standard Conditions (DSCFM):

$$Q_{std} = [17.65 \times Q_a \times P_a \times (1 - B_{ws})] \div (T_s + 460)$$

$$Q_{std} = \frac{[17.65 \times 635,044 \times 29.02 \times (1 - 0.020)]}{(152.9 + 460)}$$

$$Q_{std} = 520,253$$

Isokinetic Sampling (%):

$$\%I = [0.0945 \times V_{m, std} \times (T_s + 460)] \div [\bar{Q} \times V_s \times P_a \times A_n \times (1 - B_{ws})]$$

$$\%I = \frac{0.0945 \times 154.76 \times (152.9 + 460)}{[260 \times 71.3 \times 29.0 \times 0.0002 \times (1 - 0.020)]}$$

$$\%I = 99.4$$

EPA Method 51202 (PM/CPM) Sample Calculations**Page 3 of 3**

Location: Electric Arc Furnace - BO

Client: STEEL DYNAMICS, INC.

Run #: 1

Project #: G/SA 04-T-294

TPM Emissions Concentration (Gr/DSCF):

$$\text{Gr/DSCF} = 15.435 \times \text{Mn} \div \text{Vm, std}$$

$$\text{Gr/DSCF} = 15.435 \times 0.0082 \div 154.76$$

$$\text{Gr/DSCF} = 0.0008$$

TPM Emissions Concentration (Lb/DSCF):

$$\text{Lb/DSCF} = \text{Gr/DSCF} \div 7000$$

$$\text{Lb/DSCF} = 0.0008 \div 7000$$

$$\text{Lb/DSCF} = 1.17\text{E-}007$$

TPM Emissions Rate (Lb/Hr):

$$\text{Lb/Hr} = \text{Lb/DSCF} \times \text{Qstd} \times 60$$

$$\text{Lb/Hr} = 1.17\text{E-}007 \times 520253 \times 60$$

$$\text{Lb/Hr} = 3.65$$

TPM Emissions Concentration (Lb/TPW):

$$\text{Lb/TPW} = \text{Lb/Hr} \div \text{Rp}$$

$$\text{Lb/TPW} = 3.65 \div \text{N.A.}$$

$$\text{Lb/TPW} = \text{ERR}$$

USEPA Method 7E

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Sample Calculations Worksheet

Entry of a specific test run, source description and testing parameters will yield a package of sample calculations suitable for reference in any report. However, knowledge of this worksheet is necessary if you want to modify the worksheet to accommodate equations other than those already incorporated at this time. Currently, this worksheet is formatted for EPA Method 7E (NO_x-CEM).

To continue, PAGE DOWN for data entry. Input data will automatically be entered into equations in the cells to the right of this screen (TAB RIGHT). To continue viewing equations from the first page, use PAGE DOWN after TAB RIGHT.

It should be noted that minor round-off differences may be noticed as you compare results from this spreadsheet with results derived from other spreadsheets. However, final result variance is usually insignificant.

Sample Calculations Data Entry Section

Client: STEEL DYNAMICS, INC. Project #: G/SA 04-T-294
 Location: Electric Arc Furnace - BO
 Run #: 1

Total Sampling Time, min (Ø)	60.0
Average Process Rate, TPH (Rp)	100.0
Stack Area, ft ² (A)	148.5
Barometric Pressure, in. Hg (Pbar)	29.15
Static Pressure, in. H ₂ O (Ps)	-0.6
Pitot Tube Coefficient, dimensionless (Cp)	0.84
Dry Gas Meter Corr. Factor, dimensionless (Y)	0.995
Nozzle Area, ft ² (An)	NA
Metered Gas Volume, ft ³ (Vm)	26.237
Average Meter Temperature, °F (Tm)	72.6
Stack Gas Temperature, °F (Ts)	153.8
Meter Orifice Pressure, in. H ₂ O (dH)	1.800
Average Sqrt. of Velocity Head, in. H ₂ O (dP½)	1.160
Volume of H ₂ O Collected, ml (Vlc)	9.2
% Carbon Dioxide (%CO ₂)	0.3
% Oxygen (%O ₂)	22.0
% Carbon Monoxide (%CO)	0.0
% Nitrogen, Calculated (%N ₂)	77.7
Analyte Concentration, ppmv (Ca)	3.86
Fuel Burned, lb/hr (from process data)	NA
Btu/lb of Fuel Burned (Hc from fuel analysis)	NA
Fd Factor (dscf/mmBtu)	NA

To add more
parameters,
PAGE DOWN

EPA Method 7E (NOx) Sample Calculations

Page 1 of 3

Location: Electric Arc Furnace - BO
Run #: 1

Client: STEEL DYNAMICS, INC.
Project #: G/SA 04-T-294

Absolute Stack Gas Pressure (in. Hg):

$$P_a = P_{bar} + (\pm P_s \div 13.6)$$

$$P_a = 29.15 + (-0.60 \div 13.6)$$

$$P_a = 29.11$$

Volume of Water Vapor in Sampled Gas, Standard Conditions (SCF):

$$V_{w, std} = 0.04707 \times V_{lc}$$

$$V_{w, std} = 0.04707 \times 9.2$$

$$V_{w, std} = 0.433$$

Volume of Dry Metered Gas, Standard Conditions (DSCF):

$$V_{m, std} = \{17.65 \times V_m \times Y \times [P_{bar} + (dH \div 13.6)]\} \div (T_m + 460)$$

$$V_{m, std} = \frac{\{17.65 \times 26.24 \times 0.995 \times [29.15 + (1.800 \div 13.6)]\}}{(72.6 + 460)}$$

$$V_{m, std} = 25.333$$

Moisture Fraction (Dimensionless):

$$B_{ws} = V_{w, std} \div (V_{m, std} + V_{w, std})$$

$$B_{ws} = 0.433 \div (25.33 + 0.433)$$

$$B_{ws} = 0.017$$

Molecular Weight of Stack Gas, Dry Basis (Lb/Lb-Mole):

$$M_d = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + [0.28 \times (\%CO + \%N_2)]$$

$$M_d = 0.44 \times 0.3 + 0.32 \times 21.97 + [0.28 \times (0.0 + 78)]$$

$$M_d = 28.93$$

EPA Method 7E (NOx) Sample Calculations

Page 2 of 3

Location: Electric Arc Furnace - BO

Client: STEEL DYNAMICS, INC.

Run #: 1

Project #: G/SA 04-T-294

Molecular Weight of Stack Gas, Wet Basis (Lb/Lb-Mole):

$$M_s = 18 \times B_{ws} + [M_d \times (1 - B_{ws})]$$

$$M_s = 18 \times 0.01681 + [28.93 \times (1 - 0.01681)]$$

$$M_s = 28.74$$

Velocity of Stack Gas (FPS):

$$V_s = 85.49 \times C_p \times \sqrt{dP} \times \sqrt{(T_s + 460) \div (M_s \times P_a)}$$

$$V_s = 85.49 \times 0.84 \times \sqrt{1.16 \times \left(\frac{153.8}{28.74} + \frac{460}{29.11} \right)}$$

$$V_s = 71.4$$

Volumetric Flow Rate of Stack Gas, Actual Conditions (ACFM):

$$Q_a = A \times V_s \times 60$$

$$Q_a = 148.5 \times 71.4 \times 60$$

$$Q_a = 635,750$$

Volumetric Flow Rate of Stack Gas, Dry Standard Conditions (DSCFM):

$$Q_{std} = [17.65 \times Q_a \times P_a \times (1 - B_{ws})] \div (T_s + 460)$$

$$Q_{std} = \frac{17.65 \times 635,750 \times 29.11 \times (1 - 0.01681)}{(153.8 + 460)}$$

$$Q_{std} = 523,147$$

EPA Method 7E (NOx) Sample Calculations**Page 3 of 3**

Location, Electric Arc Furnace - BO
Run #: 1

Client: STEEL DYNAMICS, INC.
Project #: G/SA 04-T-294

NOx Emissions Concentration (Gr/DSCF):

$$\text{Gr/DSCF} = \text{Ca} \times 8.358\text{E-}04$$

$$\text{Gr/DSCF} = 3.86 \times 8\text{E-}004$$

$$\text{Gr/DSCF} = 3.23\text{E-}003$$

NOx Emissions Concentration (Lb/DSCF):

$$\text{Lb/DSCF} = \text{Gr/DSCF} \div 7000$$

$$\text{Lb/DSCF} = 0.0032 \div 7000$$

$$\text{Lb/DSCF} = 4.61\text{E-}007$$

NOx Emissions Rate (Lb/Hr):

$$\text{Lb/Hr} = \text{Lb/DSCF} \times \text{Qstd} \times 60$$

$$\text{Lb/Hr} = 4.61\text{E-}007 \times 523147 \times 60$$

$$\text{Lb/Hr} = 14.47$$

NOx Emissions Concentration (Lb/TPW):

$$\text{Lb/TPW} = \text{Lb/Hr} \div \text{Rp}$$

$$\text{Lb/TPW} = 14.47 \div 100.0$$

$$\text{Lb/TPW} = 0.1447$$

USEPA Method 12

Sample Calculations Worksheet

Entry of a specific test run, source description and testing parameters will yield a package of sample calculations suitable for reference in any report. However, knowledge of this worksheet is necessary if you want to modify the worksheet to accommodate equations other than those already incorporated at this time. Currently, this worksheet is formatted for EPA Method 51202 (PM/CPM).

To continue, PAGE DOWN for data entry. Input data will automatically be entered into equations in the cells to the right of this screen (TAB RIGHT). To continue viewing equations from the first page, use PAGE DOWN after TAB RIGHT.

It should be noted that minor round-off differences may be noticed as you compare results from this spreadsheet with results derived from other spreadsheets. However, final result variance is usually insignificant.

Sample Calculations Data Entry Section

Client:	STEEL DYNAMICS, INC.	Project #:	G/SA 04-T-294
Location:	Electric Arc Furnace - BO		
Run #:	1		

Total Sampling Time, min (Ø)	120.0
Average Process Rate, TPH (Rp)	N.A.
Stack Area, ft² (A)	148.5
Barometric Pressure, in. Hg (Pbar)	29.06
Static Pressure, in. H2O (Ps)	-0.55
Pitot Tube Coefficient, dimensionless (Cp)	0.84
Dry Gas Meter Corr. Factor, dimensionless (Y)	0.997
Nozzle Area, ft² (An)	0.000185
Metered Gas Volume, ft³ (Vm)	81.746
Average Meter Temperature, °F (Tm)	78.8
Stack Gas Temperature, °F (Ts)	152.9
Meter Orifice Pressure, in. H2O (dH)	1.263
Average Sqrt. of Velocity Head, in. H2O (dP½)	1.159
Volume of H2O Collected, ml (Vlc)	52.5
% Carbon Dioxide (%CO2)	3.0
% Oxygen (%O2)	20.5
% Carbon Monoxide (%CO)	0.0
% Nitrogen, Calculated (%N2)	76.5
Lead (Pb) Concentration, mg (Mn)	0.050
Fuel Burned, lb/hr (from process data)	NA
Btu/lb of Fuel Burned (Hc from fuel analysis)	NA
Fd Factor (dscf/mmBtu)	NA

To add more
parameters,
PAGE DOWN

EPA Method 12 (Pb) Sample CalculationsPage **1** of 3

Location: Electric Arc Furnace - BO

Client: STEEL DYNAMICS, INC.

Run #: 1

Project #: G/SA 04-T-294

Absolute Stack Gas Pressure (In. Hg):

$$P_a = P_{bar} + (\pm P_s \div 13.6)$$

$$P_a = 29.06 + (-0.55 \div 13.6)$$

$$P_a = 29.02$$

Volume of Water Vapor in Sampled Gas, Standard Conditions (SCF):

$$V_{w, std} = 0.04707 \times V_{lc}$$

$$V_{w, std} = 0.04707 \times 52.5$$

$$V_{w, std} = 2.471$$

Volume of Dry Metered Gas, Standard Conditions (DSCF):

$$V_{m, std} = (17.65 \times V_m \times Y \times [P_{bar} + (dH \div 13.6)]) \div (T_m + 460)$$

$$V_{m, std} = \frac{\{17.65 \times 81.75 \times \frac{0.997}{78.8} \times [29.06 + (1.263 \div 13.6)]\}}{()}$$

$$V_{m, std} = 77.832$$

Moisture Fraction (Dimensionless):

$$B_{ws} = V_{w, std} \div (V_{m, std} + V_{w, std})$$

$$B_{ws} = 2.471 \div (77.83 + 2.471)$$

$$B_{ws} = 0.031$$

Molecular Weight of Stack Gas, Dry Basis (Lb/Lb-Mole):

$$M_d = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + [0.28 \times (\%CO + \%N_2)]$$

$$M_d = 0.44 \times 3 + 0.32 \times 20.5 + [0.28 \times (0.0 + 77)]$$

$$M_d = 29.30$$

EPA Method 12 (Pb) Sample Calculations**Page 2 of 3**

Location: Electric Arc Furnace - BO

Client: STEEL DYNAMICS, INC.

Run #: 1

Project #: G/SA 04-T-294

Molecular Weight of Stack Gas, Wet Basis (Lb/Lb-Mole):

$$M_s = 18 \times B_{ws} + [M_d \times (1 - B_{ws})]$$

$$M_s = 18 \times 0.03077 + [29.30 \times (1 - 0.031)]$$

$$M_s = 28.95$$

Velocity of Stack Gas (FPS):

$$V_s = 85.49 \times C_p \times \sqrt{dP} \times \sqrt{[(T_s + 460) \div (M_s \times P_a)]}$$

$$V_s = 85.49 \times 0.84 \times 1.159 \times \sqrt{\left[\frac{152.9}{28.95} + \frac{460}{29.02} \right]}$$

$$V_s = 71.1$$

Volumetric Flow Rate of Stack Gas, Actual Conditions (ACFM):

$$Q_a = A \times V_s \times 60$$

$$Q_a = 148.49 \times 71.1 \times 60$$

$$Q_a = 633,337$$

Volumetric Flow Rate of Stack Gas, Dry Standard Conditions (DSCFM):

$$Q_{std} = [17.65 \times Q_a \times P_a \times (1 - B_{ws})] \div (T_s + 460)$$

$$Q_{std} = \frac{[17.65 \times 633,337 \times 29.02 \times (1 - 0.031)]}{(152.9 + 460)}$$

$$Q_{std} = 512,987$$

Isokinetic Sampling (%):

$$\%I = [0.0945 \times V_{m, std} \times (T_s + 460)] \div [\emptyset \times V_s \times P_a \times A_n \times (1 - B_{ws})]$$

$$\%I = \frac{0.0945 \times 77.83 \times \left(\frac{152.9}{29.0} + \frac{460}{0.0002} \right)}{\left[120 \times 71.1 \times 29.0 \times (1 - 0.031) \right]}$$

$$\%I = 101.6$$

EPA Method 12 (Pb) Sample Calculations**Page 3 of 3**

Location: Electric Arc Furnace - BO
Run #: 1

Client: STEEL DYNAMICS, INC
Project #: G/SA 04-T-294

TPM Emissions Concentration (Gr/DSCF):

$$\text{Gr/DSCF} = 15.435 \times \text{Mn} \div \text{Vm, std}$$

$$\text{Gr/DSCF} = 0.015435 \times 0.0500 \div 77.83$$

$$\text{Gr/DSCF} = 0.0000$$

TPM Emissions Concentration (Lb/DSCF):

$$\text{Lb/DSCF} = \text{Gr/DSCF} \div 7000$$

$$\text{Lb/DSCF} = 0.000 \div 7000$$

$$\text{Lb/DSCF} = 1.42\text{E-}009$$

TPM Emissions Rate (Lb/Hr):

$$\text{Lb/Hr} = \text{Lb/DSCF} \times \text{Qstd} \times 60$$

$$\text{Lb/Hr} = 1.42\text{E-}009 \times 512987 \times 60$$

$$\text{Lb/Hr} = 0.04$$

TPM Emissions Concentration (lb/TPW):

$$\text{Lb/TPH} = \text{Lb/Hr} \div \text{TPH}$$

$$\text{Lb/TPH} = 1.42\text{E-}009 \div \text{N.A.}$$

$$\text{Lb/TPH} = \text{ERR}$$

USEPA Method 25A

Sample Calculations Worksheet

Entry of a specific test run, source description and testing parameters will yield a package of sample calculations suitable for reference in any report. However, knowledge of this worksheet is necessary if you want to modify the worksheet to accommodate equations other than those already incorporated at this time. Currently, this worksheet is formatted for EPA Method 10 (CO-CEM).

To continue, PAGE DOWN for data entry. Input data will automatically be entered into equations in the cells to the right of this screen (TAB RIGHT). To continue viewing equations from the first page, use PAGE DOWN after TAB RIGHT.

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Sample Calculations Data Entry Section

Client:	STEEL DYNAMICS, INC.	Project #:	G/SA 04-T-294
Location:	EAF Baghouse Outlet		
Run #:	1		

Total Sampling Time, min (Ø)	60.0
Average Process Weight Rate (TPH)	100.0
Stack Area, ft² (A)	148.50
Barometric Pressure, in. Hg (Pbar)	29.15
Static Pressure, in. H2O (Ps)	-0.60
Pitot Tube Coefficient, dimensionless (Cp)	0.84
Dry Gas Meter Corr. Factor, dimensionless (Y)	0.995
Nozzle Area, ft² (An)	NA
Metered Gas Volume, ft³ (Vm)	26.237
Average Meter Temperature, °F (Tm)	72.6
Stack Gas Temperature, °F (Ts)	153.8
Meter Orifice Pressure, in. H2O (dH)	1.800
Average Sqrt. of Velocity Head, in. H2O (dP½)	1.160
Volume of H2O Collected, ml (Vlc)	9.2
% Carbon Dioxide (%CO2)	0.3
% Oxygen (%O2)	22.0
% Carbon Monoxide (%CO)	0.0
% Nitrogen, Calculated (%N2)	77.7
Analyte Concentration, ppmv (Methane)	3.61
Fuel Burned, lb/hr (from process data)	NA
Btu/lb of Fuel Burned (Hc from fuel analysis)	NA
Fd Factor (dscf/mmBtu)	NA
Inlet TGO Emission Rate (Lb/Hr)	744.41

To add more
parameters,
PAGE DOWN

EPA Method 25A (TGO) Sample Calculations

Page 1 of 3

Location: EAF Baghouse Outlet
Run #: 1

Client: STEEL DYNAMICS, INC.
Project #: G/SA 04-T-294

Absolute Stack Gas Pressure (In. Hg):

$$P_a = P_{bar} + (\pm P_s \div 13.6)$$

$$P_a = 29.15 + (-0.6 \div 13.6)$$

$$P_a = 29.11$$

Volume of Water Vapor in Sampled Gas, Standard Conditions (SCF):

$$V_{w, std} = 0.04707 \times V_{lc}$$

$$V_{w, std} = 0.04707 \times 9.2$$

$$V_{w, std} = 0.433$$

Volume of Dry Metered Gas, Standard Conditions (DSCF):

$$V_{m, std} = (17.65 \times V_m \times Y \times [P_{bar} + (dH \div 13.6)]) \div (T_m + 460)$$

$$V_{m, std} = \frac{17.65 \times 26.237 \times 0.995 \times [29.15 + (1.800 \div 13.6)]}{(72.6 + 460)}$$

$$V_{m, std} = 25.333$$

Moisture Fraction (Dimensionless):

$$B_{ws} = V_{w, std} \div (V_{m, std} + V_{w, std})$$

$$B_{ws} = 0.433 \div (25.333 + 0.433)$$

$$B_{ws} = 0.017$$

Molecular Weight of Stack Gas, Dry Basis (Lb/Lb-Mole):

$$M_d = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + [0.28 \times (\%CO + \%N_2)]$$

$$M_d = 0.44 \times 0.3 + 0.32 \times 21.97 + [0.28 \times (0.0 + 78)]$$

$$M_d = 28.93$$

EPA Method 25A (TGO) Sample Calculations**Page 2 of 3**

Location: EAF Baghouse Outlet

Client: STEEL DYNAMICS, INC.

Run #: 1

Project #: G/SA 04-T-294

Molecular Weight of Stack Gas, Wet Basis (Lb/Lb-Mole):

$$M_s = 18 \times B_{ws} + [M_d \times (1 - B_{ws})]$$

$$M_s = 18 \times 0.0168067652 + [28.93 \times (0.017)]$$

$$M_s = 28.74$$

Velocity of Stack Gas (FPS):

$$V_s = 85.49 \times C_p \times \sqrt{dP} \times \sqrt{[(T_s + 460) \div (M_s \times P_a)]}$$

$$V_s = 85.49 \times 0.84 \times 1.16 \times \sqrt{\left[\frac{153.8 + 460}{28.74 \times 29.11} \right]}$$

$$V_s = 71.4$$

Volumetric Flow Rate of Stack Gas, Actual Conditions (ACFM):

$$Q_a = A \times V_s \times 60$$

$$Q_a = 148.5 \times 71.4 \times 60$$

$$Q_a = 635,750$$

Volumetric Flow Rate of Stack Gas, Standard Conditions (SCFM):

$$Q_{std} = [17.65 \times Q_a \times P_a \times] \div (T_s + 460)$$

$$Q_{std} = \frac{17.65 \times 635750 \times 29.11}{(153.8 + 460)}$$

$$Q_{std} = 532,090$$

EPA Method 25A (TGO) Sample Calculations**Page 3 of 3**

Location	EAF Baghouse Outlet	Client	STEEL DYNAMICS, INC
Run #:	1	Project #:	G/SA 04-T-294

TGO Emissions Concentration (Lb/DSCF):

$$\text{Lb/SCF} = \text{Pr} \times 4.1526\text{E-}008$$

$$\text{Lb/SCF} = 3.61 \times 4.1526\text{E-}008$$

$$\text{Lb/SCF} = 1.50\text{E-}007$$

TGO Emissions Concentration (Lb/Hr):

$$\text{Lb/Hr} = \text{Lb/SCF} \times \text{Qstd} \times 60$$

$$\text{Lb/Hr} = 1.50\text{E-}007 \times 532090 \times 60$$

$$\text{Lb/Hr} = 4.79$$

TGO Emissions Concentration (Lb/Hr):

$$\text{Lb/Ton} = (\text{Lb/Hr}) \div \text{TPH}$$

$$\text{Lb/Ton} = 4.79 \div 100.0$$

$$\text{Lb/Ton} = 0.0479$$

NOMENCLATURE

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 concentration 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 meters
%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 ₂ O)
ΔH _@	= orifice meter calibration factor (in. H ₂ O)

NOMENCLATURE, Continued

%H	= percent hydrogen by weight, dry basis
%I	= percent of isokinetic sampling
in. Hg	= inches of mercury
in. H ₂ O	= 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)
Mg	= megagrams
Mg C	= megagram of charge
Mg P	= megagram of pour
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
pg	= picograms
PW	= process weight
ppmC	= parts per million concentration equivalent
ppmv	= parts per million by volume
P _i	= particulate loading per heat input in lb/mmBtu per F _d constant
P _i	= 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 ₂ O)
ΔP	= stack gas velocity head (in. H ₂ O)
√ΔP	= average square root of stack gas velocity head (in. H ₂ O)
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)

NOMENCLATURE, Continued

R_{ho} = stack gas density (lbft³)
 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)
TC = ton of charge
TEQ = toxicity equivalent
TGNMO = total gaseous nonmethane organic
TP = ton of pour
TPH = tons per hour
TPW = ton of 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)

EQUATIONS

EQUATIONS

- 1) Absolute Stack Gas Pressure (in. Hg):

$$P_a = P_{bar} + (\pm P_s \div 13.6)$$

- 2) Volume of Water Vapor in Sampled Gas, Standard Conditions (scf):

$$V_{w, std} = 0.04707 \times V_s$$

- 3) Volume of Dry Metered Gas, Standard Conditions (scf):

$$V_{m, std} = \{17.65 \times V_m \times Y \times [P_{bar} + (AH \div 13.6)]\} \div (T_m + 460)$$

- 4) Moisture Fraction (unitless):

$$B_{ws} = V_{w, std} \div (V_{m, std} + V_{w, std})$$

- 5) Molecular Weight of Stack Gas, Dry Basis (lbilb-mole):

$$M_d = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + [0.28 \times (\%CO + \%N_2)]$$

- 6) Molecular Weight of Stack Gas, Wet Basis (lbilb-mole):

$$M_s = 18 \times B_{ws} + [M_d \times (1 - B_{ws})]$$

- 7) Velocity of Stack Gas (fps):

$$V_s = 85.49 \times C_p \times \sqrt{\Delta P} \times \sqrt{(T_s + 460) \div (M_s \times P_a)}$$

- 8) Volumetric Stack Gas Flow Rate, Actual Conditions (acfm):

$$Q_a = A \times V_s \times 60$$

- 9) Volumetric Stack Gas Flow Rate, Dry Standard Conditions (dscfm):

$$Q_{std} = [17.65 \times Q_a \times P_a \times (1 - B_{ws})] \div (T_s + 460)$$

- 10) Isokinetic Sampling (%):

$$\%I = [0.0945 \times V_{m, std} \times (T_s + 460)] \div [\theta \times V_s \times P_a \times A_n \times (1 - B_{ws})]$$

EQUATIONS, Continued

11) PM Concentrations:

$$gr/dscf = 15.435 \times M_{,,} \div V_{m, std}$$

$$lb/dscf = gr/dscf \div 7000$$

$$lb/hr = lb/dscf \times Q_{std} \times 60$$

$$lb/mm scf = lb/hr \div (R_{gu} \times 1E-03)$$

$$lb/tpw = lb/hr \div R_p$$

$$\mu g/Mg pw = lb/tpw \times 5.0E+08$$

$$lb/mmBtu = 20.9 \times lb/dscf \times F_d \div (20.9 - \%O_2)$$

12) Flue Gas Density (lb/ft³):

$$R_{ho} = 0.0458 \times M_s \times P_a \div (T_s + 460)$$

13) Gas Mass Flow Rate (lb/hr):

$$G_{mfr} = R_{ho} \times acfm \times 60$$

14) Excess Combustion Air Per Raw Gas Analysis (%):

$$\%EA = \frac{[\%O_2 - (0.5 \times \%CO)]}{\{0.264 \times \%N_2 - [\%O_2 - (0.5 \times \%CO)]\}} \times 100$$

15) Ash Moisture Content (%):

$$\%AM = (net\ loss\ after\ heating) \times 100 \div (net\ loss\ after\ drying)$$

16) Target Analyte Concentrations:

$$lb/dscf = mg \times 2.205E-06 \div V_{m, std}$$

$$" = \mu g \times 2.205E-09 \div V_{m, std}$$

$$" = ng \times 2.205E-12 \div V_{m, std}$$

$$" = pg \times 2.205E-15 \div V_{m, std}$$

EQUATIONS, Continued

$$" = ppmC \times V_{soln} \times 2.205E-09 \div V_{m, std}$$

$$lb/hr = lb/dscf \times Q_{std} \times 60$$

17) TGNMO Concentrations:

$$lb/dscf = mg\ C/dsm^3 \times 6.243E-08$$

$$lb/hr = lb/dscf \times Q_{std} \times 60$$

18) TGNMO Concentration Correction for 1 Trap and 2 Tanks:

$$C_{(1+2)} = \frac{[conc. (1) \times vol. sampled (1)] + [conc. (2) \times vol. sampled (2)]}{[vol. sampled (1) + vol. sampled (2)]}$$

19) Collection Vessel/CEM Gaseous Analyte Concentrations:

$$lb/dscf = ppmv \times \frac{\text{Molecular Weight of Analyte, lb/lb-mole}}{385.3\ dscf/lb-mole \times 10^6}$$

$$lb/hr = lb/dscf \times Q_{std} \times 60$$

20) Sample Concentration Corrections:

12% CO₂ (lb/ft³) -

$$C_{s12} = C_s \times 12 \div \%CO_2$$

7% O₂ (lb/ft³) -

$$C_{s7} = C_s \times (20.9 - 7) \div (20.9 - \%O_2)$$

50% excess air (lb/ft³) -

$$C_{s50} = C_s \times (100 + \%EA) \div 150$$

50% excess air per raw gas analysis (lb/ft³) -

$$C_{s50/rga} = C_s \div \{1 - [(1.5 \times \%CO_2) - (0.13 \times \%N_2) - (0.75 \times \%CO)] \div 20.9\}$$

EQUATIONS, Continued

21) Weighted Analyte Concentrations Per Two Ducts:

$$lb/dscf_{avg} = (lb/dscf, \text{ duct 1} + lb/dscf, \text{ duct 2}) \div 2$$

$$lb/hr_{total} = lb/hr, \text{ duct 1} + lb/hr, \text{ duct 2}$$

$$lb/mmbtu_{avg} = (lb/mmbtu, \text{ duct 1} + lb/mmbtu, \text{ duct 2}) \div 2$$

APPENDIX G

CORRESPONDENCE

EMISSIONS TEST PROTOCOL

G/SA

GUENTHER / SHACKELFORD ASSOCIATES
ENVIRONMENTAL CONSULTANTS & TESTING CONTRACTORS

fax

t r a n s m i t t a l

to:	David Cline
organization:	Indiana Department of Environmental Management
fax/phone:	(317) 233-5967 / (317) 232-8443
from:	Fred Guenther
date/time:	Tuesday, October 11, 2004
subject:	Revised Test Protocol - Steel Dynamics, Inc. -Pittsboro - Revised
pages:	4 PAGES INCLUDING THIS PAGE
status:	☒ URGENT ☒ CONFIDENTIAL ☐ PLEASE REPLY ASAP
comments:	Following discussion with Jarrod Fisher of your staff, we have prepared revised Emissions Test Protocols for the testing of the EAF, Reheat Furnace and RATA testing at Steel Dynamics, Inc.'s plant in Pittsboro, Indiana. The testing remains scheduled for the period October 20-22, 2004. Should you have any comments or questions, please feel free to contact us.

If there is any difficulty with this transmission, please call the number below.

P.O. Box 807 • Crown Point, IN 46308-0807

TEL: (219) 661-9900
FAX: (219) 661-9902

**GUENTHER / SHACKELFORD
ASSOCIATES**

**ENVIRONMENTAL CONSULTANTS
& TESTING CONTRACTORS**

P. O. Box 807 * Crown Point, Indiana 46307 * (219) 661-9900 / FAX (219) 661-9902

August 4, 2004

Mr. David Cline
Compliance Data Section
Compliance Branch
Office of Air Management
Indiana Department of Environmental Management
100 North Senate Avenue
Indianapolis, IN 46206

RE: **TRANSMITTAL OF EMISSIONS AND RATA TEST PROTOCOL**
Steel Dynamics, Inc.
Pittsboro, IN

Dear Mr. Cline:

On behalf of Steel Dynamics, Inc., we are providing a Emissions Test Prootocol and RATA Test Protocol for the emissions testing of the baghouse outlet and the Continuous Emissions Monitoring System on the Electric Arc Furnace (EAF) located in Pittsboro, Indiana. We are requesting that the testing be scheduled for the period September 8-10, 2004.

Please note the following regarding the RATA testing. The RATA testing is proposed to be performed on one capacity condition, i.e., maximum capacity since this emissions facility is not expected to be regularly operated under any kind of reduced capacity conditions.

Should you have any questions pertaining to the attached protocol, please feel free to contact me at (219) 661-9902.

Sincerely,
Guenther/Shackelford Associates

Fred H. Guenther

Attachments: Emission Test Protocol - One Page
RATA Notification Protocol One Page

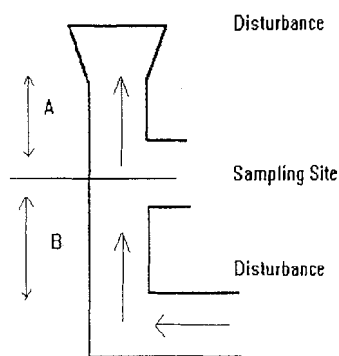
cc: Mr. Mike Brooks
Steel Dynamics: Inc.
8000 County Road 225 E
Pittsboro, IN 46167

Compliance Test Protocol
Indiana Department of Environmental Management
Office of Air Management/Compliance Data Section
100 N Senate, POB 6015
Indianapolis, IN 46206-6015
Phone: 317/232-8338 Fax: 317/233-6865

Date Prepared: 8/02/04 **Proposed Test Date:** 10120104 - 10122104 **Plant Address:** 8000 County Road 225 E. **Plant Location:** Pittsboro City, IN 46167

1. Source Info	ID. No.: _____ Permit No.: _____	Check applicable program:	AGENCY USE ONLY
Company: Steel Dynamics, Inc.		FESOP: _____ Title V: _____ SSOA: _____	Date Received: _____
Mail Address: 8000. County Rd. 225 E	Mail City: Pittsboro, IN 46167	Other: Construction Permit	Inspector: _____ Reviewer: _____ Approval Date: _____
Company Contact: Mike Brooks	Phone: (317) 892-7104		Other permit conditions: (use back if needed)

2. Tester Information	5. a. Describe any deviations from standard test method. _____ Nonr
Name: Guenther/Shackelford Associates	b. Describe method used to determine operating level. _____ Furnace Charge
Address: P.O. Box 807, Crown Point, IN 46308	6. SAMPLE SITE LOCATION
Contact: Fred H. Guenther	Does Sample pon location meet 40 CFR 60, Appx. A, Method 1, Sec 1.2 requirements- Y_x_ N ____ If no, explain.
Phone: (219) 661-9900	Number of sample point? for M5: 24

3. Process Information (List each piece of equipment to be tested on separate form.)	Diameter at sample site: 8 height: 135 Ft.	Appx. Stack gas flow (ACFM): N.A.
Unit to Test: Reheat Furnace	To Re Determined  Distance A _____ Distance B _____	Appx. Stack gas temp (deg F) N.A.
Max. Rated Capacity: 100 MMBtu Mr.		Appx. Stack gas moisture (%) N.A.
Proposed Operating Speed Maximum Capacity		
Low NOx Burner (NOx)		
Process Description: The Reheat furnace for steel production		
Fuel Type: Natural Gas		Reason for Test
		Operating Permit: Yes No X
		Construction Permit: Yes X No
		State Agreed Order: Yes No X
		Compliance w/326 IAC NSPS 40 CFR 60 Subpart __AAa__ Other
		Title V: Yes No
		Other (i.e. EPA, CD, State, 114): _____

4. Test Information: (Use back if needed)	No. Runs	Time/Run
Method 1-4:	F Factor	
Method 5 / 202		
Method 6 & 7	3	1 Hr
Method 10 :		
Method 12		
Other M 25A		

326 IAC 3-2.1 requires this completed form to be submitted 35 days prior to proposed test date to above address. **326 IAC 2-1-7 (a)(b)** requires any test fee to be submitted with the protocol. (FEE NOT APPLICABLE IF PROGRAM IS FESOP, TITLE V OR TESTING VE'S ONLY.)

Compliance Test Protocol
Indiana Department of Environmental Management
Office of Air Management/Compliance Data Section
100 N Senate, POB 6015
Indianapolis, IN 46206-6015
Phone: 3171232-8338 Fax: 317/233-6865

Date Prepared: 8/02/04

Proposed Test Date: 10/20/04 - 10/22/04

Plant Address: 8000 County Road 225 E.

Plant Location: Pittsboro City, IN 46167

1. Source Info

ID. No.:

Permit No.:

Company: Steel Dynamics, Inc.

Mail Address: 8000 County Rd. 225 E

Mail City: Pittsboro, IN 46167

Company Contact: Mike Brooks

Phone: (317) 892-7104

Check applicable program:

FESOP: _____ Title V: _____ SSOA: _____

Other: Construction Permit

AGENCY USE ONLY

Date Received: _____

Inspector: _____ Reviewer: _____ Approval Date: _____

Other permit conditions: (use back if needed)

2. Tester Information

Name: Guenther/Shackelford Associates

Address: P.O. Box 807, Crown Point, IN 46308

Contact: Fred H. Guenther

Phone: (219) 661-9900

5. a. Describe any deviations from standard test method. _____ None

b. Describe method used to determine operating level. _____ Furnace Charge

6. SAMPLE SITE LOCATION

Number of sample points for M5: 24

Diameter at sample site: 13

height: 135 Ft.

Does Sample port location meet 40 CFR 60, Appx A, Method 1, Src. 1 2 requirements Y__X__ N__ If no, explain

Appx. Stack gas flow (ACFM):

650,000

Appx. Stack gas temp (deg. F):

200

Appx. Stack gas moisture (%):

~2%

3. Process Information (List each piece of equipment to be tested on separate form)

Unit to Test: Electric Arc Furnace

Max. Rated Capacity: 125 T/Hr.

Proposed Operating Speed _____ Maximum Capacity

Poll. Control Equipment: Baghouse (PM), DSE (CO) Low NOx Burner (NOx)

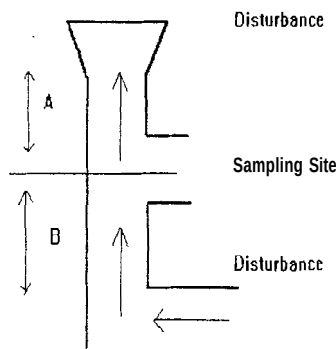
Process Description: The EAF is composed of one twin shell furnaces with a

combined rated capacity of 400 tons per hour. The furnaces produce molten

metal using scrap metal and an electric arc.

Fuel Type: N/A

To Be Determined



Distance A _____

Distance B _____

Reason for Test

Operating Permit: Yes No X

Construction Permit: Yes X No

State Agreed Order: Yes No X

Compliance w/326 IAC NSPS 40 CFR 60 Subpart AAa Other:

Title V: Yes No

Other (i.e. EPA, CD, Stare. 114):

4. Test Information:
(Use back if needed)

No. Runs

Time/Run

Method 1-4:

3

4 Hr.

Method 5 / 202

3

4 Hr.

Method 6 & 7

3

1 Hr.

Method 10:

Method 12:

3

1 Hr.

Other: M 25A

326 IAC 3-2.1 requires this completed form to be submitted 35 days prior to proposed test date to above address. 326 IAC 2-1-7 (a)(b) requires any test fee to be submitted with the protocol. (FEE NOT APPLICABLE IF PROGRAM IS FESOP. TITLE V OR TESTING VE'S ONLY.)

Prevention of Significant Deterioration Part 70 Significant Source Modification

OFFICE OF AIR QUALITY

**Steel Dynamics, Inc. (SDI) - Bar Products Division
8000 North County Road 225 East
Pittsboro, IN 46167**

(herein known as the Permittee) is hereby authorized to construct and operate subject to the conditions contained herein, the emission units ~~described~~ in Section A (Source Summary) of this approval.

This approval is issued in accordance with **326** IAC **2** and **40** CFR Part **70** Appendix A and contains the conditions and provisions specified in **326** IAC **2-7** as required by **42** U.S.C. **7401**, et. **seq.** (Clean Air Act as amended by the **1990** Clean Air Act Amendments), **40** CFR Part **70.6**, IC **13-15** and IC 13-17.

This permit is also issued under the provisions of **326** IAC **2-2** (Prevention of Significant Deterioration).

PSD Source Modification No.: **063-16628-00037**

Issued by: Original signed by Paul Dubenetzky

Paul Dubenetzky, Branch Chief
Office of Air Quality

Issuance Date: August **29, 2003**

Summary of significant changes to the draft permit for SDI, Hendricks County in the final permit issued on August 29, 2003

	<i>Draft Permit</i>	<i>Final Permit</i>
Emissions from the Electric Arc Furnace	0.13 pounds of Volatile Organic Compounds (VOC) emitted per ton of metal produced	0.09 pounds of Volatile Organic Compounds (VOC) emitted per ton of metal produced
Emissions from the Electric Arc Furnace	Sulfur scrap monitoring	Continuous Emissions Monitoring System (CEMS) required for Sulfur Dioxide (SO ₂) Authority to reopen and re-evaluate the required Best Available Control Technology
Monitoring Systems – entire source	3 Monitors for a minimum of 3 years	2 monitors for a minimum of 3 years Elementary School monitor for minimum of 5 years
Baghouse in Electric Arc Furnace	Pressure drop readings and inspections	Bag Leak Detection System
Reheat Furnace	0.04 lbs of NOx emitted per million Btu 0.08 lbs of Carbon Monoxide (CO) emitted per million Btu	0.035 lbs of NOx emitted per million Btu 0.061 lbs of Carbon Monoxide (CO) emitted per million Btu
VDT Boiler	0.04 lbs of NOx emitted per million Btu	0.0035 lbs of NOx emitted per million Btu
Scrap Management Plan and Fugitive Dust Plan	Part of application	Attached as part of final permit
Preventative Maintenance Plan and Compliance Response Plan	To be implemented within 90 days of start up	To be implemented upon start up
Slag Production	Annual limit of 2,628,000 tons per year based on maximum capacity slag processing equipment	Annual limit of 876,000 tons per year based on more realistic estimate slag generated by the furnaces No off-site slag to be processed by SDI or their contractor

SECTION D.3

FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]

One (1) Reheat Furnace, with nominal capacity of 185 MMBTU/hour and equipped with natural gas fueled low NO_x burners.

(The information describing the process contained in this facility description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)] [326 IAC 2-2-3(a)(3)]

D.3.1 Reheat Furnace PSD BACT 1326 IAC 2-21

Pursuant to 326 IAC 2-2 (PSD), the Permittee shall comply with the following:

- (a) The NO_x emissions from the Reheat Furnace shall not exceed 0.08 lb/MMBTU.
- (b) The SO₂ emissions from the Reheat Furnace shall not exceed 0.0006 lb/MMBTU.
- (c) The CO emissions from the Reheat Furnace shall not exceed 0.084 lb/MMBTU.
- (d) The VOC emissions from the Reheat Furnace shall not exceed 0.0055 lb/MMBTU.
- (e) The PM (filterable) emissions from the Reheat Furnace shall not exceed 0.0019 lb/MMBTU.
- (f) The PM₁₀ (filterable and condensable) emissions from the Reheat Furnace shall not exceed 0.0076 lb/MMBTU.
- (g) The visible emission from the Reheat Furnace shall not exceed 3% opacity, based on a 6-minute average as determined in 326 IAC 5-1-4.

D.3.2 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section C - Preventive Maintenance Plan. of this permit, is required for this unit.

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.3.3 Low NO_x Burners [326 IAC 2-21]

Pursuant to 326 IAC 2-2 (PSD), the Permittee shall comply with the following:

- (a) The Reheat Furnace shall be equipped and operated with natural gas fueled low NO_x burners.
- (b) Proper combustion operation shall be followed.

D.3.4 Natural Gas Fuel [326 IAC 2-21]

The Permittee shall use pipeline natural gas that is naturally occurring fluid mixture of hydrocarbons (e.g., methane, ethane, or propane) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and

pressure under ordinary conditions, and which is provided by supplier through a pipeline. Pipeline natural gas contains 0.5 grains or less of total sulfur per 100 standard cubic feet. Additionally, pipeline natural gas must either be composed of at least 70 percent methane by volume or have a gross calorific value between 950 and 1100 BTU per standard cubic foot.

Natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.

D.3.5 Testing Requirements [326 IAC 2-7-6(1),(6)]

- (a) Within 60 days after achieving maximum production but no later than 180 days after startup, the Permittee shall perform NO_x testing on the Reheat Furnace.
- (b) These tests shall be performed using methods as approved by the Commissioner.
- (c) These tests shall be repeated at least once every five (5) years from the date of this valid compliance demonstration.
- (d) Testing shall be conducted in accordance with Section C - Performance Testing

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

None

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

None

SECTION D.I FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]

- (1) One (1) batch mode EAF, with a nominal capacity of 125 tons of steel per hour, utilizing capture system on a fourth hole duct or direct shell evacuation (DSE) system venting to a **baghouse** (EAF Baghouse) and a canopy **hood** for overhead roof exhaust. The EAF is equipped with natural gas fired **oxy-fuel** burners and uses low sulfur charge carbon. The EAF **Baghouse** has a flow rate of 675,000 **acf/min**.
- (2) One (1) Ladle Metallurgy station (LMS), rated at 125 **tons/hour**, and exhausting to its own **baghouse** (LMS Baghouse). The LMS **Baghouse** has a flow rate of 85,000 **acf/min**.
- Both the EAF **Baghouse** and LMS **Baghouse** exhaust to the same common stack. The **meltshop** does not have roof monitor.

The EAF dust is conveyed to a dust storage silo, identified as EAF Dust Handling System

- (3) (The information describing the process contained in this facility description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)] [326 IAC 2-2-3(a)(3)]

D.I.I EAF and LMS PSD BACT [326 IAC 2-21

Pursuant to 326 IAC 2-2, the Permittee shall **comply** with the following BACT requirements:

- (a) Steel production shall not exceed a maximum production rate of 1,095,000 tons per 12-consecutive month period with compliance demonstrated at the end of each month.
- (b) Sulfur dioxide (SO₂) emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed the following rates with compliance demonstrated at the end of each month:

Table 1	
Series	Production (tons/year)
Low Sulfur Grade Bar	no limitation*
1100 SBQ	219,000
1200 SBQ	164,250

- * Low Sulfur Grade Bar has no production restriction because it can be manufactured at any rate as long as the aggregate of the 3 different product series does not exceed the maximum annual steel production specified in Condition D.1.1(a).

- (c) The EAF **Baghouse** and LMS **Baghouse** shall exhaust to a common stack.
- (d) Sulfur dioxide (SO₂) emissions from the EAF **Baghouse**/LMS **Baghouse** stack shall not exceed the following rates:

Table 2		
Series	SO ₂ BACT Limit (lb/ton)	SO ₂ BACT Limit (lb/24-hour period)
Low Sulfur Grade Bar	0.25	31.25
1100 SBQ	1.5	187.5
1200 SBQ	1.8	225.0 1

- (i) If the stack test required under Condition D.1.9 and the SO₂ CEMS show that the SO₂ actual emission rates are lower than the SO₂ limits specified for the 1100 SBQ and 1200 SBQ indicated in Table 2, the IDEM may reopen and modify the permit to re-evaluate and adjust the SO₂ limits.

IDEM will use the authority under IC 13-15-7-2 and 326 IAC 2-7-9 to re-open and revise the SO₂ limits to more closely reflect the actual stack test results and CEMS data.

- (ii) If the stack test required under Condition D.1.9 and the SO₂ CEMS show that the SO₂ actual emission rates are higher than the SO₂ limits specified for the 1100 SBQ and 1200 SBQ indicated in Table 2, the Permittee may apply for a permit modification to modify the permit to re-evaluate and adjust the SO₂ limits.
- (iii) IDEM will provide an opportunity for public notice and comment prior to finalizing any permit modification, under the significant permit modification provisions of 326 IAC 2-7-12(d).
- (iv) IC 13-15-7-3 (Revocation Modification of a Permit: Appeal to Board) shall apply to this permit condition.

- (e) Nitrogen oxide (NO_x) emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed 0.35 pounds per ton of steel produced and 43.75 pounds of NO_x per hour.
- (f) Carbon monoxide (CO) emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed 2 pounds per ton of steel produced and 250 pounds of CO per hour, based on a 3-hour block average.
- (g) Volatile organic compound (VOC) emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed 0.09 pounds per ton of steel produced and 11.5 pounds of VOC per hour. This VOC limit also satisfies the requirements under 326 IAC 8-1-6.
- (h) Filterable particulate matter (PM) emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed 0.0018 grains per dry standard cubic foot (gr/dscf).
- (i) Filterable and condensable PM₁₀ emissions from the EAF Baghouse shall not exceed 0.0052 gr/dscf.
- (j) Visible emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed 3% opacity, based on a 6-minute average (24 readings taken in accordance with 40 CFR Part 60, Appendix A, Method 9).

- (k) Visible emissions from the EAF Dust Handling system shall not exceed 3% opacity, based on a 6-minute average as determined in 326 IAC 5-1-4.
- (l) Fugitive emissions generated at each EAF during each complete cycle from tap to tap shall not exceed 3% opacity when emitted from any roof monitor or building opening, based on a 6-minute average as determined in 326 IAC 5-1-4.

0.1.2 General Provisions Relating to NSPS [326 IAC 12-1][40 CFR Part 60, Subpart A]

The provisions of 40 CFR Part 60, Subpart A (General Provisions), which are incorporated by reference in 326 IAC 12-1, apply to the EAF and dust handling system, except when otherwise specified in 40 CFR Part 60, Subpart AAa.

D.1.3 PM and Opacity [40 CFR 60.272a]

- (a) Pursuant to 40 CFR 60.272a(a)(1), the particulate matter (PM) emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed 0.0052 gr/dscf.
- (b) Pursuant to 40 CFR 60.272a(a)(2), the visible emissions from the EAF Baghouse/LMS Baghouse stack shall not exceed 3% opacity, based on a 6-minute average
- (c) Pursuant to 40 CFR 60.272a(a)(3), the visible emissions from the Meltshop operations shall not exceed 6% opacity, based on a 6-minute average.
- (d) Pursuant to 40 CFR 60.272a(b), the visible emissions from the EAF Dust Handling System shall not exceed 10% opacity, based on a 6-minute average.

0.1.4 PSD Minor Pollutants [326 IAC 2-21]

The Permittee shall emit less than the following emission rates from the EAF Baghouse:

Table 3		
Pollutant	Emission Rate (lb/hr)	PSD Significant Level (tons/year)
Lead	0.134	0.6
Beryllium	5.75×10^{-5}	0.0004
Fluorides	0.68	3.0
Mercury	0.023	0.1

Compliance by the Permittee with these limitations makes the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) not applicable.

D.1.5 Hazardous Air Pollutants (HAPs) [326 IAC 2-4.1-1]

The Permittee shall emit less than 10 tons/year of any single HAP and 25 tons/year of any combination of HAPs. Compliance with these limits makes 326 IAC 2-4.1-1 and Section 112(j) of the CAA not applicable.

D.1.6 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP), in accordance with Section C - Preventive Maintenance Plan, of this permit, is required for these units and control devices.

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.1.7 Particulate Matter Control [326 IAC 2-2]

- (a) Pursuant to 326 IAC 2-2, the EAF **Baghouse** for particulate control shall be in operation and control emissions at all times that the **EAF** is in operation.
- (b) Pursuant to 326 IAC 2-2, the LMS **Baghouse** for particulate control shall be in operation and control emissions at all times that the LMS is in operation.
- (c) Pursuant to 326 IAC 2-2, fugitive emissions generated during EAF operations shall be captured by the roof canopies or contained and collected within the EAF building.
- (d) There shall be no roof monitor in the **Meltshop**

D.1.8 PSD BACT Control and Work Practices [326 IAC 2-21]

Pursuant to 326 IAC 2-2, the Permittee shall comply with the following:

- (a) The **EAF** shall be equipped and operated with **oxy** fuel burners.
- (b) The **EAF** shall be controlled by a direct shell evacuation (DSE) system and canopy hood
- (c) VOC emissions shall be controlled through an extensive scrap management program. All grades of scrap shall contain no observable non-ferrous metals, or non-metallics, and shall be free of excessive dirt, oil, grease, and tin plate. Heavily oiled scrap shall not be used.

The Permittee shall implement the scrap management plan (SMP) attached to this permit (Attachment A - SMP).
- (d) Good working practices shall be observed.

D.1.9 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11]

[326 IAC 2-2][40 CFR 60.275a]

- (a) Pursuant to 326 IAC 2-2, and 40 CFR **60.270a** (Subpart **AAa**), within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up of the modified EAF, the Permittee shall **perform** testing on the common EAF **Baghouse/LMS Baghouse** stack for the following:
 - (i) Filterable PM,
 - (ii) Filterable and condensable **PM₁₀**,
 - (iii) **SO₂**,
 - (iv) **NO_x**,
 - (v) Lead and
 - (vi) VOC
- (b) Within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up of the modified EAF, the Permittee shall perform opacity testing on the EAF dust handling system.
- (c) The *baghouse* EAF dust shall be sampled and analyzed for Lead content on a monthly basis according to the procedures specified in the EPA publication SW-846-6010B, entitled Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

- (d) With the submission of the test protocol, at a minimum, the Permittee shall include the information of sulfur content of ~~injection~~ carbon, charge carbon and **sulfurizing** agent to be used in testing.
- (e) The PM and **PM₁₀** testings shall utilized 40 CFR Part 60, Appendix A, Method 5, Method 201 or **201A**, Method 202 or other methods as approved by the Commissioner.
- (f) Any stack which has multiple processes ~~which~~ exhaust to the same stack shall operate all of the processes simultaneously in accordance with 326 IAC 3-6 (Source Sampling Procedures) and 40 CFR **60.274a(b)**.
- (g) These tests shall be performed using methods as approved by the Commissioner
- (h) The PM, **PM₁₀**, **SO_x**, **NO_x**, and Lead tests shall be repeated at least once every 2.5 years from the date of a valid compliance demonstration.
- (i) Testing shall be conducted in accordance with Section C - Performance Testing.

D.I.10 CO and SO₂ Continuous Emission Rate Monitoring Requirement [326 IAC 2-21][326 IAC 3-51

- (a) Pursuant to 326 IAC 2-2 and 326 IAC **3-5-1(d)**, the Permittee shall install, calibrate, certify, operate, and maintain continuous emission monitoring **system(s)** (CEMS) and related equipment for measuring CO and **SO₂** emissions rates in pounds per hour from the common EAF **Baghouse/LMS Baghouse** stack in accordance with 326 IAC 3-5-2 and 326 IAC **3-5-3**.
- (b) The Permittee shall submit to IDEM, OAQ, upon initial start up, a complete written continuous monitoring standard operating procedure (CMSOP), in accordance with the requirements of 326 IAC **3-5-4**.
- (c) The Permittee shall record the output of the continuous monitoring **system(s)** and shall perform the required record keeping and reporting, pursuant to 326 IAC **3-5-6** and 326 IAC **3-5-7**.

D.I.11 Continuous Opacity Monitoring (COM) [326 IAC 2-21][326 IAC 3-51][40 CFR 60.273a]

- (a) Pursuant to 326 IAC **2-2**, 326 IAC **3-5**, and 40 CFR **60.273a**, the Permittee shall install, calibrate, certify, operate, and maintain a continuous monitoring system and related equipment to measure opacity from the common EAF **Baghouse/LMS Baghouse** stack in accordance with 326 IAC 3-5-2 and 326 IAC **3-5-3**.
- (b) The Permittee shall submit to IDEM, OAQ, upon initial start up, a complete written continuous monitoring standard operating procedure (CMSOP), in accordance with the requirements of 326 IAC **3-5-4**.
- (c) The Permittee shall record the output of the continuous monitoring **system(s)** and shall **perform** the required record keeping and reporting, pursuant to 326 IAC **3-5-6** and 326 IAC **3-5-7**.

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

D.I.12 Total Hydrocarbon Continuous Emission Rate Monitoring Requirement

- (a) Pursuant to 326 IAC 2-2 (PSD, 326 IAC 2-7-5(3), and 326 IAC 3-5-1(d), the Permittee shall install, calibrate, certify, operate, and maintain a continuous emissions monitoring system (CEMS) for measuring total hydrocarbons emissions rates in pounds per hour from the EAF Baghouse/LMS Baghouse stack, in accordance with 326 IAC 3-5-2 and 326 IAC 3-5-3.
- (b) The Permittee shall submit to IDEM, OAQ, within ninety (90) days after monitor installation, a complete written continuous monitoring standard operating procedure (CMSOP), in accordance with the requirements of 326 IAC 3-5-4.
- (c) The Permittee shall record the output of the system and shall perform the required record keeping and reporting, pursuant to 326 IAC 3-5-6 and 326 IAC 3-5-7.
- (d) Unless operated under conditions for which the Compliance Response Plan specifies otherwise, the pound per hour rate of the total hydrocarbons, based on a 3-hour block shall be maintained at or below the maximum concentration established during the latest stack test. The Compliance Response Plan for this unit shall contain troubleshooting contingency and response steps for when the ppm reading is outside of the above mentioned range for any one reading. Failure to take response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records and Reports, shall be considered a violation of this permit.

D.1.13 Maintenance of CEMS [326 IAC 2-7-5(3)(A)(iii)]

- (a) **In the event that a breakdown of the CO or SO₂ continuous emission monitoring system (CEMS) occurs, a record shall be made of the times and reasons of the breakdown and efforts made to correct the problem.**
- (b) Whenever the CO CEMS is malfunctioning or will be down for calibration, maintenance, or repairs for a period of four (4) hours or more, the Permittee shall perform once per shift operational status inspections of the equipment that is important to the performance of the DSE, canopy hood and total capture system (i.e., pressure sensors, dampers, and damper switches). This inspection shall include observations of the physical appearance of the equipment (e.g., presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in ductwork, and fan erosion). Any deficiencies shall be noted and proper maintenance performed. This requirement does not replace the routine monthly inspections of the same equipment.
- (c) Whenever the SO₂ CEMS is malfunctioning or will be down for calibration, maintenance, or repairs for a period of four (4) hours or more, the Permittee shall monitor the sulfur content of the scrap, charge carbon and injection carbon added to the EAF. Vendor certifications or analyses shall verify the sulfur content of raw materials.
- (d) A calibrated backup CO or SO₂ CEMS shall be brought online no later than seventy-two (72) hours of shutdown of the primary CEMS, and shall be operated until such time as the primary CEMS is back in operation.
- (e) **Nothing in this permit shall excuse the Permittee from complying with the requirements to operate a continuous emission monitoring system pursuant to 326 IAC 2-2 and 40 CFR 60, Subpart AAa.**

D.1.14 Maintenance of COM [326 IAC 2-7-5(3)(A)(iii)]

- (a) All COM systems shall meet the performance specifications of **40** CFR 60, Appendix B, Performance Specification No. 1, and are subject to monitor system certification requirements pursuant to 326 IAC **3-5**.
- (b) In the event that a breakdown of a COM system occurs, a **record** shall be made of the time and reason of the breakdown and efforts made to correct the problem.
- (c) Whenever a COM is malfunctioning or will be down for calibration, maintenance, or repairs for a period of one (1) hour or more during **EAF** operation, compliance with the applicable opacity limits shall be demonstrated by the following:
 - (i) Visible emission (VE) notations shall be performed once per hour during daylight operations following the shutdown or malfunction of the primary COM. A trained employee shall record whether emissions are normal or abnormal for the state of operation of **the EAF** at the time of the reading.
 - (A) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.
 - (B) If abnormal emissions are noted during two consecutive emission notations, the Permittee shall begin Method 9 opacity observations within daylight four (4) hours of the second abnormal notation.
 - (C) VE notations may be discontinued once a COM is online or formal Method 9 readings have been implemented.
 - (ii) If a COM is not online within twenty-four (24) hours of shutdown or malfunction of the primary COM, the Permittee shall provide certified opacity **reader(s)**, who may be employees of the Permittee or independent contractors, to self-monitor the emissions from the EAF stack.
 - (A) Visible emission readings shall be performed in accordance with 40 CFR 60, Appendix A, Method 9, for a minimum of five (5) consecutive six (6) minute averaging periods beginning not more than twenty-four (24) hours after the start of the malfunction or down time.
 - (B) Method 9 opacity readings shall be repeated for a minimum of five (5) consecutive six (6) minute averaging periods at least once every four (4) hours during daylight operations, until such time that a COM is in operation.
 - (C) Method 9 readings may be discontinued once a COM is online.
 - (iii) If abnormal emissions are observed, the Permittee shall take reasonable response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records, and Reports. Observation of abnormal emissions **that** do not violate an applicable opacity limit is not a deviation from this permit. Failure to take response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records, and Reports, shall be considered a violation of this permit.

- (iv) All of the opacity readings during this period shall be reported with the Quarterly Opacity Exceedances Reports.
- (d) Nothing in this permit shall excuse the Permittee from complying with the requirements to operate a COM system pursuant to 326 IAC 2-2, 326 IAC 3-5, and 40 CFR 60.273a.

D.1.15 Bag Leak Detection System (BLDS)

- (a) The Permittee shall install and operate a continuous bag leak detection system (BLDS).
- (b) The BLDS shall meet the following requirements:
 - (i) The bag leak detection system must be certified by the manufacturer to be capable of detecting particulate matter emissions at concentrations of 0.0018 grains per actual cubic foot or less.
 - (ii) The bag leak detection system sensor must provide output of relative particulate matter loading.
 - (iii) The bag leak detection system must be equipped with an alarm system that will alarm when an increase in relative particulate loading is detected over a preset level established or verified during a stack test.
 - (iv) The bag leak detection system shall be installed and operated in a manner consistent with available written guidance from the U.S. Environmental Protection Agency or, in the absence of such written guidance, the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system.
 - (v) The initial adjustment of the system shall, at a minimum, consist of establishing the baseline output by adjusting the sensitivity (range) and the averaging period of the device, and establishing the alarm set points and the alarm delay time.
 - (vi) In no event shall the sensitivity be increased by more than 100 percent or decreased by more than 50 percent over a 365 day period unless such adjustment follows a complete baghouse inspection, which demonstrates the baghouse, is in good operating condition.
 - (vii) The bag detector must be installed downstream of the baghouse
- (c) In the event that bag failure has been observed:
 - (i) For **multi-compartment** units, the affected compartments will be shut down immediately until the failed units have been repaired or replaced. No later than six (6) business hours of the determination of failure, response steps according to the timetable described in the Compliance Response Plan shall be initiated. For any failure with corresponding response steps and **timetable** not **described** in the Compliance Response Plan, response steps shall be devised no later than six **(6)** business hours of discovery of the failure and shall include a timetable for completion. Failure to take response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records and Reports, shall be considered a violation of this permit.

- (ii) For single compartment baghouses, failed units and the associated process will be shut down immediately until the failed units have been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section C - Emergency Provisions).

D.1.16 Monitoring of Operations [40 CFR 60.274a]

Pursuant to 40 CFR **60.274a**, the Permittee shall comply with the following monitoring requirements:

- (a) Pursuant to 40 CFR **60.274a(b)**, the Permittee shall check and record on a once-per-shift basis the furnace static pressure and either:
 - (i) Check and record the control system fan motor amperes and damper positions on a once-per-shift basis; or
 - (ii) Install, calibrate, and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood; or
 - (iii) Install, calibrate, and maintain a monitoring device that continuously records the volumetric flow rate at the control device inlet and records damper **positions** on a once-per-shift basis.

The monitoring **device(s)** may be installed in any appropriate location in the exhaust duct such that reproducible flow rate monitoring will result. The flow rate monitoring **device(s)** shall have an accuracy of • 10 percent over its normal operating range and shall be calibrated according to the manufacturer's **instructions**. The IDEM, OAQ, or the US EPA may require the Permittee to demonstrate the accuracy of the monitoring **device(s)** relative to Methods 1 and 2 of **40 CFR** Part 60, Appendix A.

- (b) Pursuant to 40 CFR **60.274a(c)**, when the Permittee is required to demonstrate compliance with the opacity standard and at any other time IDEM, OAQ, or the US EPA may require, that either the control system fan motor amperes and all damper positions or the volumetric flow rate through each separately ducted hood shall be determined during all periods in which a hood is operated for the purpose of capturing emissions from the EAF.
- (c) Pursuant to 40 CFR **60.274a(d)**, the Permittee shall perform monthly operational status inspections of the equipment that is important to the performance of the total capture system (i.e., pressure sensors, dampers, and damper switches). This inspection shall include observations of the physical appearance of the equipment (e.g., presence of holes in **ductwork** or hoods, flow constrictions caused by dents or accumulated dust in **ductwork**, and fan erosion). Any deficiencies shall be noted and proper maintenance performed.

D.1.17 EAF Baghouse

The Permittee shall convey the collected materials from the EAF **Baghouse** in an enclosed loading area.

Record Keeping and Reporting Requirement [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.1.18 Record Keeping Requirements

- (a) The Permittee shall maintain records required under 326 IAC 3-5-6 at the source in a manner that they may be inspected by the IDEM, OAQ, or the US EPA, if so requested or required.
- (b) The Permittee shall maintain records of the amount and percentage of steel produced.
- (c) The Permittee shall maintain records of the readings of the CO, SO₂, and total hydrocarbons CEMS.
- (d) The Permittee shall maintain records of the readings of the COM.
- (e) The Permittee shall maintain records of the verification of sulfur content of charge carbon, and injection carbon added into the EAF and make available upon request to IDEM, OAQ, and the US EPA.
- (f) The Permittee shall maintain records of the following:
 - (i) Records of the once-per-shift furnace static pressure and either
 - (ii) Records of the once-per-shift control system fan motor amperes and records of the once per shift damper positions, or
 - (iii) Records of the volumetric flow rate through each separately ducted hood, or
 - (iv) Records the volumetric flow rate at the control device inlet and records of the once per shift damper positions.
- (g) The Permittee shall maintain records of the monthly operational status inspections of the equipment that is important to the performance of the total capture system under 40 CFR 60.274a(d) and make available upon request to IDEM, OAQ, and the US EPA.
- (h) The **Permittee** shall maintain records of any additional inspections prescribed by the Preventive Maintenance Plan and make available upon request to IDEM, OAQ, and the US EPA.
- (i) Pursuant to 40 CFR 60.276a, records of the measurements required in 40 CFR 60.274a, must be retained for at least 5 years following the date of the measurement.
- (j) All records shall **be** maintained in accordance with Section C - General Record Keeping Requirements of this permit.
- (k) Records necessary to demonstrate compliance shall be available within 30 days of the end of each compliance period.

D.I. 19 Reporting Requirements [326 IAC 2-1.1-11] [40 CFR 60.276a]

- (a) The Permittee shall submit a quarterly report of the actual amount of steel produced and the specific allocations of the bars, using the Quarterly Production Report, or equivalent.
- (b) The Permittee shall submit a quarterly report of excess emissions, using the Quarterly Deviation and Compliance Monitoring Report or equivalent, of the following:
 - (i) CO, SO₂ and total hydrocarbons readings from the CEMS,

- (ii) Opacity readings from the COM,
 - (iii) Furnace static pressure and either
 - (iv) Values of control system fan motor amperes that exceed 15 percent of the value established under 40 CFR 60.274a(c), and position of the damper during the exceedance or
 - (v) Values of volumetric flow rates through each separate ducted hood or
 - (vi) Values of volumetric flow rates at the control device inlet, lower than those established under 40 CFR 60.274a(c) and the position of the damper during this flow rate.
- (c) These reports shall be submitted no later than thirty (30) calendar days following the end of each calendar quarter and in accordance with Section C - General Reporting Requirements of this permit.
- (d) These reports do require the certification by the responsible official, as defined by 326 IAC 2-7-1(34).
- (e) Pursuant to 40 CFR 60.276a, the Permittee shall furnish to IDEM, OAQ, a written report of the results of the compliance emission tests. This report shall include, at a minimum, the following information:
 - (1) Facility name and address;
 - (2) Plant representative;
 - (3) Make and model of process, control device, and continuous monitoring equipment;
 - (4) Flow diagram of process and emissions capture equipment including other equipment or process(es) ducted to the same control device;
 - (5) Rated (design) capacity of process equipment;
 - (6) The following operating conditions:
 - (i) List of charge and tap weights and materials;
 - (ii) Heat times and process log;
 - (iii) Control device operation log; and
 - (iv) Continuous monitor or Reference Method 9 data.
 - (7) Test dates and test times;
 - (8) Test company;
 - (9) Test company representative;
 - (10) Test observers from outside agency;

- (11) Description of test methodology used, **including** any deviation from standard reference methods;
- (12) Schematic of sampling location;
- (13) Number of sampling points;
- (14) Description of sampling equipment;
- (15) Listing of sampling equipment calibrations and procedures;
- (16) Field and Laboratory data sheets;
- (17) Description of sample recovery procedures;
- (18) Sampling equipment leak check results;
- (19) Description of quality assurance procedures;
- (20) Description of analytical procedures;
- (21) Notation of sample blank corrections; and
- (22) Sample emission calculations.

Indiana Air Permit Compliance Testing

Steel Dynamics Inc.
Bar Products Division
Pittsboro, Indiana

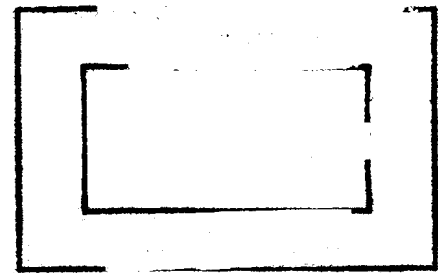
Report on:
Nitrogen Oxides
Particulate and Condensable Emissions

Performed by:

ΔAir Analysis, Inc.
Project Number: 471 and 473
April 5, 19, and 20, 2007

ΔAir Analysis, Inc.

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Certification Page

Air Analysis, Inc. represents that the information provided in this report is true and accurate. We at Air Analysis, Inc. strive to remain true to our mission, that the people involved are people of integrity, the data accurate, and the reporting timely.

Sincerely,



Michael M. Dican, President
Air Analysis, Inc.

Date: _____

5-2-07

TABLE OF CONTENTS

1. Executive Summary (Section 1)
Test Summary, Table 1.0
2. Results (Section 2)
Table 2 – April 5, 2007 Test Conditions
Table 3 – April 19-20, 2007 Test Conditions
3. Description of Source Processes and Field Notes (Section 3)
4. Methodology (EPA Methods 1-4, 5/202, 7E, 12) (Section 4)

APPENDIX

SAMPLE CALCULATIONS	I
AIR ANALYSIS FIELD DATA	II
SPREADSHEET CALCULATIONS	III
LABORATORY DATA	IV
CHAIN OF CUSTODY	V
CALIBRATION DATA	VI
PROTOCOL	VII
PRODUCTION DATA	VIII

SECTION 1: EXECUTIVE SUMMARY

Air Analysis, Inc. was contracted by Steel Dynamics, Inc. to perform Lead, Nitrogen Oxides and Particulate/Condensables of their Electric Arc Furnace (EAF) in Pittsboro, Indiana on April 5, 19-20, 2007. The objective of the test program was to determine the compliance to State of Indiana air permit conditions. The following personnel were involved with the testing program:

Air Analysis, Inc.	Michael Dicen
Air Analysis, Inc.	Marcus Allen
Air Analysis, Inc.	James Thorpe
Steel Dynamics, Inc.	Mike Brooks
IDEM	Jarrold Fisher

Three one hour sample periods were performed for lead and nitrogen oxides on April 5, 2007. Runs 2 and 3 for lead were Runs 1 and 2 for NO_x due to a delay in the NO_x test. There was an initial NO_x analyzer problem which was eventually rectified.

Three four hour sample periods were performed for Particulate and Condensable emissions on April 19, 2007. Four hour sample periods were required by federal requirements.

RESULTS SUMMARY

Table 1.

Date	Pollutant	Concentration	Mass Emission Rate
4/5/07	Lead	0.000006 gr/dscf	0.027 lbs/hr
4/5/07	NO _x	7.9 ppm	30.3 lbs/hr
4/19/07	Particulate	0.0004 gr/dscf	1.54 lbs/hr
	Particulate & Condensables	0.0011 gr/dscf	4.6 lbs/hr

RESULTS

Lead and NOx TEST CONDITIONS

Table 2

April 5, 2007

Gas Conditions		1	2	3	4	Avg.
Ts	Stack Temperature	106.5	109.1	104.3	93	103.2
Bwo	Moisture (volume %)	2.2	3.0	2.5	2	2.2
O ₂	Oxygen (dry volume %)	21	21	21	21	21
CO ₂	Carbon Dioxide (dry volume %)	0	0	0	0	0
Volumetric Flow Rate						
Qa	Actual Conditions (acfm)	597.899	622.247	562, 591	573, 886	589, 156
Qstd	Standard Conditions (dscfm)	549.569	546.977	517, 732	541, 173	538, 863
Pollutant Results						
Ec	Concentration. (gr/dscf) Lead	0.000005	0.000005	0.000007	NA	0.000006
E(me)	Emission Rate. (lbs/hr) Lead	0.0241	0.0248	0.032	NA	0.027
	Concentration. (ppm) NOx	NA	6.2	9.7	7.7	7.9
	Emission Rate. (lbs/hr) NOx	NA	25.1	35.98	29.9	30.3

Particulate/ Condensible TEST CONDITIONS

Table 3

April 19-20, 2007

Gas Conditions		1	2	3	Avg
Ts	Stack Temperature	100.2	101.3	103.3	101.6
Bn-o	Moisture (volume %)	1.46	0.77	1.3	1.1
O ₂	Oxygen (dry volume %)	21	21	21	21
CO ₂	Carbon Dioxide (dry volume %)	0	0	0	0
Volumetric Flow Rate					
Qa	Actual Conditions (acfm)	561, 950	572, 802	590, 825	575, 192
Qstd	Standard Conditions (dscfm)	497, 992	500, 182	512, 037	503, 404
Pollutant Results					
Ec	Emission Rate. (gr/dscf) PM PM10	0.0006	0.0007	0.0019	0.0011
E(me)	Emission Rate. (lbs/hr) PM PM10	2.5	2.98	8.4	4.6
	Emission Rate. (gr/dscf) PM only	0.0002	0.0004	0.0005	0.0004
	Emission Rate. (lbs/hr) PM	...	1.6	2.0	1.5

SECTION 3: DESCRIPTION OF SOURCE PROCESSES AND FIELD NOTES

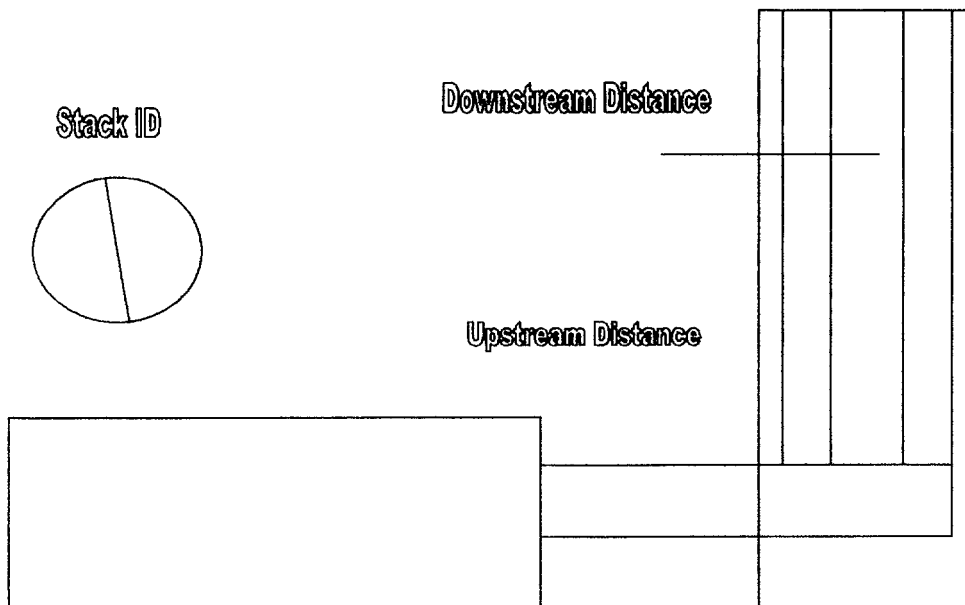
Steel Dynamics operates a steel manufacturing facility in Pittsboro, Indiana which consists of

A batch mode EAF, with a nominal capacity of 125 tons of steel per hour, utilizing a capture system on a fourth hole duct or direct shell evacuation (**DSE**) system venting to a **baghouse** (EAF Baghouse) and a canopy hood for overhead roof exhaust. The EAF is equipped with natural gas fired **oxy-fuel** burners and uses low sulfur charge carbon.

A Ladle Metallurgy Station (LMS), rated at 125 tons/hour and exhausting to its own **baghouse** (LMS Baghouse). The LMS baghouse has a flow rate of 85,000 acf/min. Both the EAF Baghouse and LMS Baghouse exhaust to the same common stack. The **meltshop** does not have a roof monitor.

- The EAF dust is conveyed to a dust storage silo, identified as EAF Dust Handling System.

Testing was performed on a platform approximately 110 feet above ground.



Stack Inner Diameter	165"
Downstream Distance	1/2 diameters
Upstream Distance	> 2 diameters
Stack testing platform	110 feet above ground

SECTION 4: METHODOLOGY

The sampling procedures used by Air Analysis, Inc. are as follows:

Title 40 CFR Part 60 Appendix A and B

Method 1 "**Sampling** of Velocity Traverses for Stationary Sources"

Method 2 "Determination of Stack Gas Velocity and Volumetric **Flow Rate**"

Method 3 "Determination of Oxygen and Carbon Dioxide Concentrations-Instrument Method"

Method 4 "Determination of Moisture Content in Stack Gas"

Method 51202 "Determination of **Particulate/ Condensables**"

Method 7E "Determination of Nitrogen Oxides"

Method 12 "Determination of Lead Emissions"

SAMPLE POINT DETERMINATION - 40 CFR 60

SAMPLE POINT DETERMINATION-EPA METHOD 1

Sampling point locations were determined according to EPA Reference Method 1.

Sampling Points				
Locations	Dimensions	Ports	Points Per Port	Total Points
Electric Arc Furnace 1	165" ID	4	6	24

** Exact measure points and distances to disturbances are listed in Appendix- Field Data

VELOCITY AND VOLUMETRIC FLOW RATE – EPA METHOD 2

EPA Method 2 was used to determine the gas velocity and flow rate at the stack. Figure 4-2 includes the components of the EPA Method 2 sampling apparatus. Each set of velocity determinations included the measurement of gas velocity pressure and gas temperature at each of the Method 1 determined traverse points. The velocity pressures were measures with a Type S pitot tube. Gas temperature measurements made with a Type K thermocouple and digital pyrometer.

GAS COMPOSITION AND MOLECULAR WEIGHT – EPA METHOD 3

In order to determine the oxygen and carbon dioxide concentrations, a sample of gas was obtained and analyzed in accordance with EPA Method 3. The gas sample was collected using a Fyrite analyzer. The results were used to determine gas molecular weight.

MOISTURE CONTENT – EPA METHOD 4

The flue gas moisture content at the testing locations was determined in accordance with EPA Method 4. Figure 4-2 includes the Method 4 sampling components. The gas moisture was determined by quantitatively condensing moisture in the chilled impingers and silica absorption. The amount of moisture condensed was determined **gravimetrically**. A **dry** gas meter was used to measure the volume of gas sampled. Moisture content is used to determine stack gas velocity.

A moisture run was performed for every two gas runs. Thus during a 10 set 21 minute gas run, five moisture determinations were performed.

SO₂ DETERMINATION – EPA METHOD 7E

Stack gas is withdrawn from the stack and conditioned (moisture is removed) before being analyzed by infrared detection. NO_x molecules are "excited" by specific wave lengths. Molecular excitement is directly proportional to the concentration of NO_x. Quality assurance of the analyzer is first determined by direct injection of known EPA protocol 1 gas concentrations. A system check of the probe, connection lines and conditioner is also determined prior to and after each sample period to determine drift bias.

PARTICULATE DETERMINATION – EPA METHOD 5/202

Stack gas is withdrawn isokinetically and particulate matter is collected on the nozzle, probe and filter. The probe temperature and filter are maintained at temperatures of 248 degrees F (+/- 25 deg. F). The impinger temperature and exit gas is maintained at temperatures at or below 68 degrees F. The nozzle, probe and glass filter containers are rinsed with acetone and the rinse is captured in a sealed glass container.

Deionized water captures any condensable emissions. Two fractions are gravimetrically analyzed for condensables; organic and inorganic. Organic fraction is extracted by methylene chloride.

LEAD DETERMINATION – EPA METHOD 12

Stack gas is withdrawn isokinetically and particulate matter is collected on the nozzle, probe, and filter. Lead particulate is also captured in the first two impingers; these impingers contain 0.1 N Nitric Acid. A fourth and final impinger contains about 200 grams of silica gel. The probe temperature and filter are maintained at temperatures of 248 degrees F(=/-25 deg. F). The impinger temperature exit gas is maintained at temperatures at or below 68 degrees F.

APPENDIX I

SAMPLE CALCULATIONS

Δ Air Analysis, Inc.

SAMPLE CALCULATIONS

The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

1. Volume of water collected (wscf)

$$V_{wstd} = (0.04707)(V_L)$$

Where:

V_L	total volume of liquid collected in impingers and silica gel (ml)
V_{wstd}	volume of water collected at standard conditions (ft ³)
0.04707	conversion factor (ft ³ /ml)

2. Volume of gas metered, standard conditions.(dscf)

$$V_{std} = \frac{(17.64)(V_m)(P_{baro} + \frac{DH}{13.6})(Y_d)}{(460 + T_m)}$$

Where:

P_{baro}	barometric pressure (in Hg)
T_m	average dry gas meter temperature (°F)
V_m	volume of gas sample through dry gas meter at meter conditions (ft ³)
V_{std}	volume of gas sample through dry gas meter at standard conditions (ft ³)
Y_d	gas meter correction factor (dimensionless)
DH	average pressure drop across meter box orifice (in H ₂ O)
17.64	conversion factor (°R/in Hg)
13.6	conversion factor (in H ₂ O/in Hg)
460	°F to °R conversion constant

3. Sample gas pressure (in Hg)

$$P_s = P_{baro} + (\frac{P_g}{13.6})$$

Where:

P_{baro}	barometric pressure (in Hg)
P_g	sample gas static pressure (in H ₂ O)
P_s	absolute sample gas pressure (in H ₂ O)
13.6	conversion factor (in H ₂ O/in Hg)

Δ Air Analysis, Inc.**4. Actual vapor pressure (in Hg)**

$$P_v = P_s$$

Where:

 P_v vapor **pressure**, actual (in Hg) P_s

absolute sample gas pressure (in Hg)

5. Moisture Content (%)

$$B_{mo} = \frac{V_{wstd}}{V_{std} + V_{wstd}}$$

Where:

 B_{mo} proportion of **water** vapor in the **gas stream** by volume V_{std} **volume** of **gas** sample **through the dry gas meter** at standard conditions (ft³) V_{wstd} volume of water collected at standard conditions (ft³)**6. Saturated moisture content (%)**

$$B_{ws} = \frac{(P_v)}{(P_s)}$$

Where:

 B_{ws} proportion of water vapor in gas stream **by** volume at saturated conditions (%) P_v

vapor pressure, actual (in Hg)

 P_s

absolute sample gas pressure (in Hg)

7. Molecular weight of dry gas stream (lb/lb-mole)

$$M_d = M_{CO_2} \frac{(CO_2)}{(100)} + M_{O_2} \frac{(O_2)}{(100)} + M_{CO+N_2} \frac{(CO+N_2)}{(100)}$$

Where:

 M_d dry molecular weight of sample **gas** (lb/lb-mole) M_{CO_2} molecular weight of **carbon** dioxide (lb/lb-mole) M_{O_2}

molecular weight of oxygen (lb/lb-mole)

 M_{CO+N_2} molecular weight of **carbon** monoxide and nitrogen (lb/lb-mole) CO_2 proportion of **carbon** dioxide in the gas stream **by** volume (%) O_2 proportion of **oxygen** in the gas stream by volume (%) $CO + N_2$ proportion of carbon monoxide **and nitrogen** in **gas** stream by volume (%)

100

conversion factor. %

Δ Air Analysis, Inc.**8. Molecular weight of sample gas (lb/lb-mole)**

$$M_s = (M_d)(1 - B_{wt}) + (M_{H_2O})(B_{wt})$$

Where:

M_d	dry molecular weight of sample gas (lb/lb-mole)
B_{wt}	proportion of water vapor in the gas stream by volume
M_{H_2O}	molecular weight of water (lb/lb-mole)
M_s	molecular weight of sample gas, wet basis (lb/lb-mole)

9. Velocity of sample gas (ft/sec)

$$V_s = (K_p)(C_p)(\sqrt{\Delta p}) \sqrt{\frac{(t_s + 460)}{(M_s)(P_s)}}$$

Where:

K_p	velocity pressure coefficient (dimensionless)
C_p	pitot tube constant
M_s	molecular weight of sample gas, wet basis (lb/lb-mole)
P_s	absolute sample gas pressure (in. Hg)
t_s	average sample gas temperature (°F)
V_s	average sample gas velocity (ft/sec)
460	°F to °R conversion factor

10. Total flow of sample gas (acfm)

$$Q_s = (60)(A_s)(V_s)$$

Where:

A_s	cross section area of sampling location (ft ²)
Q_s	volumetric flow rate at actual conditions (acfm)
V_s	sample gas velocity (ft/sec)
60	conversion factor, seconds to minutes

Δ Air Analysis, Inc.**11. Total flow of sample gas (dscfm)**

$$Q_{std} = \frac{(Q_a \times P_s \times 17.64 \times (1 - B_{wo}))}{(t_s + 460)}$$

Where:

Bwo	proportion of water vapor in the gas stream by volume
Ps	absolute sample gas pressure (in. Hg)
Qa	volumetric flow rate at actual conditions (acfm)
Qstd	volumetric flow rate at standard conditions (dscfm)
t _s	average sample gas temperature (°F)
17.64	conversion factor, (°R/in.Hg)
460	°F to °R conversion factor

12. Total flow of sample gas (dscfh)

$$Q_{std/hr} = \left[\frac{(Q_a \times P_s \times 17.64 \times (1 - B_{wo}))}{(t_s + 460)} \right] (60)$$

Where:

Bwo	proportion of water vapor in the gas stream by volume
Ps	absolute sample gas pressure (in. Hg)
Qa	volumetric flow rate at actual conditions (acfm)
Qstd/hr	volumetric flow rate at standard conditions (dscfm x 60)
t _s	average sample gas temperature (°F)
17.64	conversion factor, (°R/in.Hg)
460	°F to °R conversion factor

Δ Air Analysis, Inc.

13. Percent Isokinetic (%)

$$I = \frac{(0.09450)(T_s)(V_{std})}{(P_s)(V_s)\left(\frac{(D_n)^2(\pi)}{(144)(4)}\right)(\theta)(1-B_{wo})}$$

Where:

D_n	diameter of nozzle, inches
B_{wo}	proportion of water vapor in the gas stream by volume
I	percent of isokinetic sampling (%)
P_s	absolute sample gas pressure (in. Hg)
T_s	average sample gas temperature (°R)
V_{std}	volume of gas sample through the dry gas meter at standard conditions (ft ³)
V_s	average sample gas velocity (ft/sec)
θ	total sample time, minutes
0.09450	constant

14. Pollutant concentration (gr/dscf)

$$C_{gr/dscf} = \frac{(15.43)(m_p)}{V_{std}}$$

Where:

C_{gr/dscf}	measured concentration in gas stream, gr/dscf
M_p	pollutant collected, corrected for reagent blank, grams
V_{std}	volume of gas sample through the dry gas meter at standard conditions (ft ³)
15.43	conversion factor, grams to grains

15. Pollutant Emissions, Mass Emissions Rate lbs/hr

$$E_{lb/hr} = \frac{(\mu g_{HCl})(2.2046e-9)(Q_{std})(60)}{(V_{std})}$$

Where:

E_{lb/hr}	Mass emissions rate, pounds per hour
μg pollutant	micrograms of pollutant emissions
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
V_{std}	Volume Standard conditions
2.2046e-9	conversion factor, pounds per microgram
60	conversion factor, minutes per hour

**PPMVD TO LB/HR
CONVERSION CALCULATIONS**

$$1. \quad \text{NO}_x \quad \frac{\text{ppm NO}_x}{8.3755 \times 10^6} = \frac{\text{lbs NO}_x}{\text{dscf}} \quad \text{OR} \quad \text{ppm NO}_x \times 1.194 \times 10^{-7} = \frac{\text{lbs/NO}_x}{\text{dscf}}$$

$$\frac{\text{lbs NO}_x}{\text{dscf}} \times \frac{\text{dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} = \frac{\text{lbs NO}_x}{\text{hr}}$$

$$2. \quad \text{SO}_2 \quad \frac{\text{ppm SO}_2}{6.0151 \times 10^6} = \frac{\text{lbs SO}_2}{\text{dscf}} \quad \text{OR} \quad \text{ppm SO}_2 \times 1.660 \times 10^{-7} = \frac{\text{lbs/SO}_2}{\text{dscf}}$$

$$\frac{\text{lbs SO}_2}{\text{dscf}} \times \frac{\text{dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} = \frac{\text{lbs SO}_2}{\text{hr}}$$

$$3. \quad \text{CO} \quad \frac{\text{ppm CO}}{1.3762 \times 10^7} = \frac{\text{lbs CO}}{\text{dscf}}$$

$$\frac{\text{lbs CO}}{\text{dscf}} \times \frac{\text{dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} = \frac{\text{lbs CO}}{\text{hr}}$$

$$4. \quad \text{CH}_4 \quad \frac{\text{ppm CH}_4}{(1 - \text{Bws}) 2.4017 \times 10^7} = \frac{\text{lbs CH}_4}{\text{dscf}}$$

$$\frac{\text{lbs CH}_4}{\text{dscf}} \times \frac{\text{dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} = \frac{\text{lbs CH}_4}{\text{hr}}$$

$$5. \quad \text{C}_3\text{H}_8 \quad \frac{\text{ppm C}_3\text{H}_8}{(1 - \text{Bws}) 8.7573 \times 10^6} = \frac{\text{lbs C}_3\text{H}_8}{\text{dscf}}$$

$$\frac{\text{lbs C}_3\text{H}_8}{\text{dscf}} \times \frac{\text{dscf}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} = \frac{\text{lbs C}_3\text{H}_8}{\text{hr}}$$

APPENDIX II

AAI FIELD DATA PRINTOUTS

VELOCITY TRAVERSE POINT DETERMINATION
(EPA Method 1)

sdl

@

pittsboro

Circular Stack

Taverse Points on Diameter:

Stack Dia. (inches) ?

Points:

	4	6	8	10	12
165					
1	11.06	7.26	5.28	4.29	3.47
2	41.25	24.09	17.33	13.53	11.06
3	123.75	48.84	32.01	24.09	19.47
4	153.95	116.16	53.30	37.29	29.21
5		140.91	111.71	56.43	41.25
6		157.74	132.99	108.57	58.74
7			147.68	127.71	108.26
8			159.72	140.91	123.75
9				151.47	135.80
10				160.71	146.53
11					153.95
12					161.54

APY 1.2 = 1.4

AIR ANALYSIS, INC

EPA METHOD 12, 7E

Lead/NOx

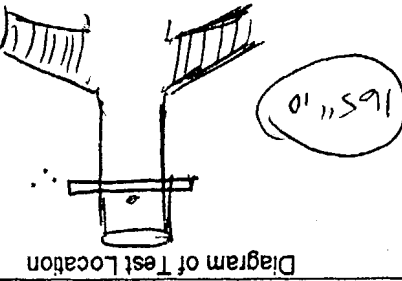
POLLUTANT TESTED

IN NUMBER 1

Start Time: 9:12

End Time: 10:35

Company: SDI
 Cation: PHSBOD
 It Tested: [initials]
 Lab Operator: M. Allen
 Job Operator: M. Allen
 Contact: M. Allen
 Agency Contact: D. V. Mark
 Reader: [initials]
 U Project: 456
 Date: 4-5-03
 Static Pressure: 30.1
 Ambient Temperature: 30



Point	Reverse	Minutes per	Point	Notes
1	2.5	1.5	1.8	5
2	5	1.5	1.9	5
3	7.5	1.6	1.9	5
4	10	1.8	1.9	5
5	12.5	1.8	2.16	5.5
6	15	1.8	2.16	5.5
7	17.5	1.9	1.9	5
8	20	1.9	1.9	5
9	22.5	1.7	2.04	5
10	25	1.9	2.24	5
11	27.5	1.9	2.44	5
12	30	1.9	2.62	5
13	32.5	1.8	2.8	2.5
14	35	1.8	2.96	3
15	37.5	1.7	3.14	3
16	40	1.4	3.3	3
17	42.5	1.4	3.46	3
18	45	1.4	3.6	3
19	47.5	1.4	3.74	3
20	50	1.4	3.88	3
21	52.5	1.4	4.02	3
22	55	1.4	4.16	3
23	57.5	1.4	4.3	3
24	60	1.4	4.44	3
25				
26				
27				
28				
29				
30				

R1 NOx

POLLUTANT TESTED Lead/NOx AIR ANALYSIS, INC. EPA METHOD 12, 7E

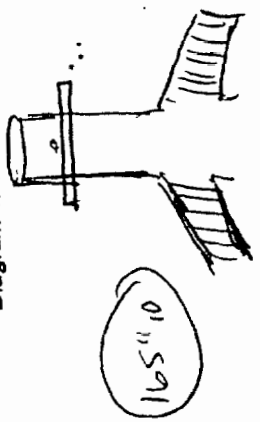
Start Time: 11:05
End Time: 12:15

N NUMBER 2

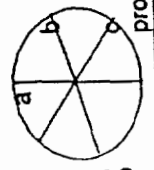
Company: SPI
Location: Pittsboro
Tester: WAC
Operator: M. Allen
Operator: M. Allen
Contact: M. Allen
Contact: M. Allen
Reader: D. V. Mark

Project: 450 Date: 4-5-07
Metric Pressure: 30.1
Temperature: 30

Diagram of Test Location



Point	Time	Δ P	Δ H	Static Pressure			Filter Temp. (F)	CO2		O2		Nozzle size measurement		NOTES
				Stack Temp. (F)	Probe Temp. (F)	Meter Cu. ft.		Impinger Temp. (F)	Pretest Pitot Ch.	Posttest Pitot Ch.	Meter Inlet Temp. (F)	Meter Outlet Temp. (F)	Vacuum (inches)	
1	25	1.1	1.32	120	225	124.9	256	41	0	1	21	41	2	
2	25	1.1	1.32	117	225	130.5	256	41	0	2	21	41	2	
3	7.5	1.0	1.1	112	225	133.7	256	50	0	3	21	41	2	
4	1.0	1.5	1.4	109	225	135.5	256	40	0	Avg.	21	41	2	
5	12.5	1.5	1.4	109	225	137.3	256	40	0	Silica ID	21	41	2	
6	15	1.2	1.1	109	225	139.4	256	40	0	Impingers	21	41	2	
7	17.5	0.99	0.99	109	225	140.1	256	40	0	Moisture Total	21	41	2	
8	20	0.99	0.99	101	225	141.7	256	40	0	Pretest Pitot Ch.	21	41	2	
9	22.5	0.99	1.1	101	225	143.2	256	40	0	Posttest Pitot Ch.	21	41	2	
10	26	1.0	1.32	101	225	144.6	256	40	0	Impinger Outlet Temp. (F)	21	41	2	
11	27.5	1.1	1.32	101	225	146.4	256	40	0	Meter Inlet Temp. (F)	21	41	2	
12	30	1.0	1.2	102	225	149.0	256	40	0	Meter Outlet Temp. (F)	21	41	2	
13	32.5	1.0	1.2	107	225	150.6	256	40	0	Vacuum (inches)	21	41	2	
14	35	1.5	1.8	111	225	152.0	256	40	0		21	41	2	
15	37.5	1.5	1.8	110	225	153.9	256	40	0		21	41	2	
16	40	1.0	2.0	112	225	155.7	256	40	0		21	41	2	
17	42.5	2.0	2.4	111	225	157.8	256	40	0		21	41	2	
18	46	1.5	1.4	110	225	159.7	256	40	0		21	41	2	
19	47.5	1.9	1.7	110	225	161.5	256	40	0		21	41	2	
20	50	2.0	1.9	126	225	163.5	256	40	0		21	41	2	
21	52.5	1.5	1.4	121	225	165.3	256	40	0		21	41	2	
22	55	1.5	1.4	115	225	167.3	256	40	0		21	41	2	
23	57.5	2.0	2.4	109	225	169.5	256	40	0		21	41	2	
24	60	2.0	2.4	107	225	171.6	256	40	0		21	41	2	
25														
26														
27														
28														
29														
30														



nozzle (quartz, glass, SS)
probe (quartz, glass, SS, Ti)

Avg. 0.188

Meter Y
Meter Delta H

Pretest Leak Ch. 0 cfm
Post test Leak Ch. 0 cfm

Filter Number:
Filter preweight:
Filter postweight:
Total:
Beaker ID:
Beaker preweight:
Beaker postweight:
Total:

UN NUMBER 3

POLLUTANT TESTED Lead/Nickel
AIR ANALYSIS, LVC

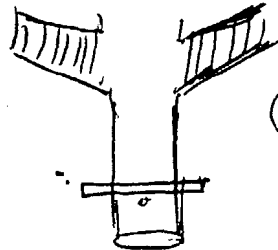
EPA METHOD 12, 15

Start Time: 1:00

End Time: 2:22

Company: SDI
Location: R.H.S. Boro
Unit Tested: LVC
Meter Operator: M. Allen
Probe Operator: M. Allen
Client Contact: M. Brooks
Agency Contact: D. V. Mark
E. Reader:
AI Project: 476 Date: 4-5-02
Ambient Temperature: 30.1
Traverse Minutes per point

Diagram of Test Location



company: SDI		location: Ritz bore		mt tested: [initials]		meter operator: M. Allen		probe operator: M. Allen		client contact: M. Brooks		agency contact: D. V. Mark		E. Reader:		AI Project: 426		atmospheric Pressure: 30.1		Traverse		Point	
																				Minutes per		point	
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																				Temp. (F			

3 RUN NUMBER

POLLUTANT TESTED

AIR ANALYSIS, INC.

EPA METHOD

Start Time:

End Time:

#2:20-PDAx
232-flows, 3u

[illegible]

RUN NUMBER

POLLUTANT TESTED

PM1/PM10

AIR ANALYSIS, INC

EPA METHOD

5/202

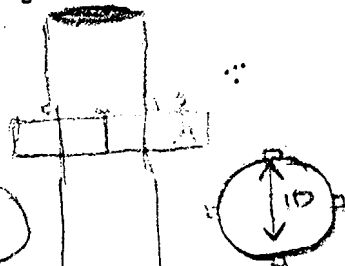
Start Time: 10:10

End Time: 2:20

Company: Steel Dynamics Inc
 Location: Pittsburgh
 Unit Tested: CAF
 Meter Operator: M. Allen
 Probe Operator: J. Thompson
 Client Contact: Mike Perkins
 Agency Contact: J. Fisher
 I.E. Reader: CEM
 Job Project: Date: 4-19-07

Barometric Pressure: 30.0Ambient Temperature: 59

Diagram of Test Location



CO2		O2	
1	0	1	21
2	0	2	21
3	0	3	21
Avg.		Avg.	
Silica ID		4	
Silica wt.		29 grams	
Impingers		20 mls	
Moisture Total		49 mls	
Pretest Pitot Ch.		pass / fail	
Posttest Pitot Ch.		pass / fail	

Nozzle size measurement

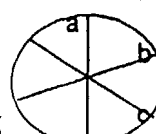
a 0.188

b 0.188

c 0.188

Avg. 0.188

nozzle (quartz, glass, SS)



probe (quartz, glass, SS, Ti)

Meter Y

Meter Delta H

Pretest Leak Ch.

Post test Leak Ch.

Traverse Point	Minutes per point	Δ P	ΔH	Cu. ft. 912.334	Stack Temp. (F)	Probe Temp. (F)	Filter Temp. (F)	Impinger Outlet Temp. (F)	Meter Inlet Temp. (F)	Meter Outlet Temp (F)	Vacuum (inches)	NOTES
1	10	1.1	1.397	918.4	148	220	255	51	60	52	2	K=1.3
2	20	1.2	1.524	925.5	151	228	256	51	60	53	2	
3	30	1.3	1.57	932.5	156	230	255	50	62	54	2	
4	40	1.2	1.65	939.7	144	233	255	49	61	54	2	
5	50	1.2	1.5	946.6	101	231	258	49	61	56	2	
6	60	1.4	1.778	953.711	128	226	258	50	61	56	2	
7	70	0.88	1.01	959.7	112	213	254	51	60	57	2	
8	80	0.83	1.054	965.6	110	224	252	51	62	57	2	
9	90	0.83	1.054	971.2	107	213	255	52	62	57	2	
10	100	0.88	1.18	977.1	105	217	255	53	63	58	2	
11	110	0.95	1.207	983.1	102	209	255	54	61	58	2	
12	120	0.97	1.232	989.488	104	206	257	54	62	58	2	
13	130	0.85	1.165	998.0	118	220	257	52	61	58	2	
14	140	0.82	1.0	1001.4	121	227	256	52	63	58	2	
15	150	0.90	1.17	1007.3	117	236	256	52	63	58	2	
16	160	0.85	1.1	1013.3	121	233	254	57	64	58	2	
17	170	0.85	1.1	1019.4	140	239	257	55	65	58	2	
18	180	1.0	1.3	1025.7	149	246	257	58	68	60	2	
19	190	1.5	1.95	1033.4	134	246	256	59	67	61	2	
20	200	1.5	1.95	1041.2	132	253	255	57	69	61	3	Filter Number:
21	210	1.7	2.21	1049.3	134	235	246	59	70	63	3	Filter preweight: 3919
22	220	1.7	2.21	1057.8	138	229	260	60	71	64	3	Filter postweight: 3941
23	230	1.5	1.95	1065.4	157	236	260	60	71	65	3	Total:
24	240	1.5	1.95	1073.861	150	244	258	59	72	65	3	Beaker ID:
25	5 min shy											Beaker preweight: 79.4852
26												Beaker postweight: 79.4853
27												Total: 0.0001
28												
29												
30												

Probe / Filter

223° → 272°

< 68°

79485

D1

55.1908

55.1880

.0028

McCl

56.7633

52.7624

0.0009

RUN NUMBER 2

POLLUTANT TESTED Pm/Pm10

AIR ANALYSIS, INC

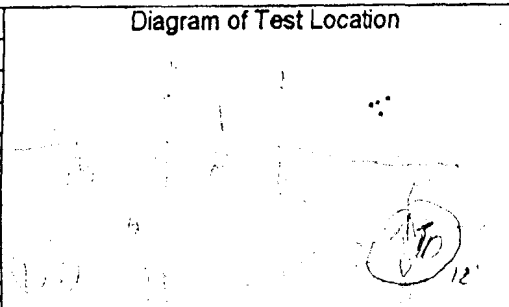
EPA METHOD 5/200

Start Time: 7:15

End Time: 11:53

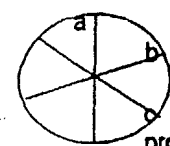
Company: SDF
 Location: Chillicothe
 Init Tested: FAH
 Meter Operator: M. Allen
 Probe Operator: J. Thorpe
 Client Contact: Mike Brooks
 Agency Contact: J. Fisher
 I.E. Reader:

Alt Project: 4/26/01
 Barometric Pressure: 30.2
 Ambient Temperature: 47



CO2
 1 0
 2 0
 3 0
 Avg. 0
 Silica ID
 Silica wt. 28.2 grams
 Impingers 18 mls
 Moisture Total 46.2 mls
 Pretest Pitot Ch. pass/fail
 Posttest Pitot Ch. pass/fail

O2
 1 21
 2 21
 3 21
 Avg. 21
 Nozzle size measurement
 a 0.186
 b 0.188
 c 0.188
 Avg 0.188
 Nozzle (quartz, glass, SS)
 probe (quartz, glass, SS, Ti)
 Meter Y 0.946
 Meter Delta H 1.9
 Pretest Leak Ch. 0 cfm @ 10
 Post test Leak Ch. 0 cfm @ 6



Traverse Point	Minutes per point	Δ P	Δ H	Meter Cu. ft.	Static Pressure Stack Temp. (F)	Probe Temp. (F)	Filter Temp. (F)	Impinger Outlet Temp. (F)	Meter Inlet Temp. (F)	Meter Outlet Temp. (F)	Vacuum (Inches)	NOTES
1	10	1.5	1.95	081.5	151	251	251	54	53	53	4	
2	10	1.7	2.21	085.6	150	246	255	58	60	53	4	
3	10	1.4	1.92	091.1	144	239	256	61	63	55	4	
4	10	1.7	2.21	105.4	168	229	257	63	65	54	4	
5	10	1.8	2.34	114.2	163	230	251	65	65	58	4.5	
6	10	2.1	2.7	123.5	140	223	254	67	64	58	4.5	
7	10	0.8	1.0	129.3	123	233	257	63	61	58	4	
8	10	1.1	1.43	136.1	123	243	251	62	65	58	4	
9	10	0.95	1.2	142.5	136	234	254	56	66	59	3	
10	10	1.0	1.3	149.2	136	245	255	54	69	60	3	
11	10	1.0	1.3	155.4	144	254	252	54	69	61	3	
12	10	1.1	1.4	162.5	161	258	252	54	70	62	3	
13	10	0.75	0.94	168.0	141	240	255	55	68	63	3	
14	10	0.81	1.052	173.9	143	223	254	55	72	64	2	
15	10	0.81	1.053	179.7	138	218	255	55	72	65	2	
16	10	0.81	1.053	185.7	140	236	251	55	73	66	2	
17	10	0.75	0.925	191.5	154	230	252	56	74	66	2	
18	10	0.81	1.053	197.5	169	235	254	56	75	67	2	
19	10	0.88	1.144	203.76	153	242	251	57	76	68	2	
20	10	1.3	1.690	210.6	147	236	256	58	78	69	3	
21	10	1.6	2.080	218.3	146	231	252	57	80	70	3	
22	10	1.2	1.560	225.2	156	235	254	59	81	71	3	
23	10	1.1	1.430	231.8	172	232	254	60	81	72	3	
24	10	1.2	1.560	238.6	166	235	255	60	83	73	3	
25												
26												
27												
28												
29												
30												

Filter Number:
 Filter preweight: 0.3990
 Filter postweight: 0.2919
 Total:
 Beaker ID:
 Beaker preweight: 80.0157
 Beaker postweight: 80.0159
 Total:

DI 53.6815
 53.6801
 Meltz 55.7506
 55.7488

AIR ANALYSIS, INC.

Start Time: 17:50

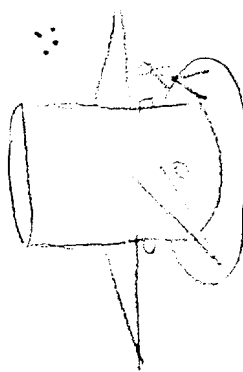
17150

EPA METHOD 5/202

POLLUTANT TESTED:

2
050111

Diagram of Test Location



Company: <u>Fort Hays</u>				Diagram of Test Location				Nozzle size measurement				nozzle (quartz, glass, SS)			
Cation: <u>Fort Hays</u>								a 0.188				b 0.188			
Alt Tested: <u>Fort Hays</u>								c 0.188				Avg 0.188			
Operator: <u>Fort Hays</u>				Meter Cu. ft.				CO2				O2			
Operator: <u>Fort Hays</u>				Static Pressure				Impingers				grams			
Contact: <u>Fort Hays</u>				Stack Temp. (F)				Moisture Total				mis			
Agency Contact: <u>Fort Hays</u>				Probe Temp. (F)				Pretest Pilot Ch.				Pretest Leak Ch.			
Reader: <u>Fort Hays</u>				Filter Temp. (F)				Posttest Pilot Ch.				Posttest Leak Ch.			
Project: <u>Fort Hays</u>				Meter Temp. (F)				Impinger Outlet				Meter Inlet			
Inlet Temperature: <u>Fort Hays</u>				Temp. (F)				Temp. (F)				Temp. (F)			
Outlet Temperature: <u>Fort Hays</u>				Temp. (F)				Temp. (F)				Temp. (F)			
Pressure: <u>Fort Hays</u>				Temp. (F)				Temp. (F)				Temp. (F)			
Flow: <u>Fort Hays</u>				Temp. (F)				Temp. (F)				Temp. (F)			
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Time: <u>Fort Hays</u>				Temp. (F)				Temp. (F)				Temp. (F)			
Date: <u>Fort Hays</u>				Temp. (F)				Temp. (F)				Temp. (F)			
Time															

10 6501.95

Rec 80.1349

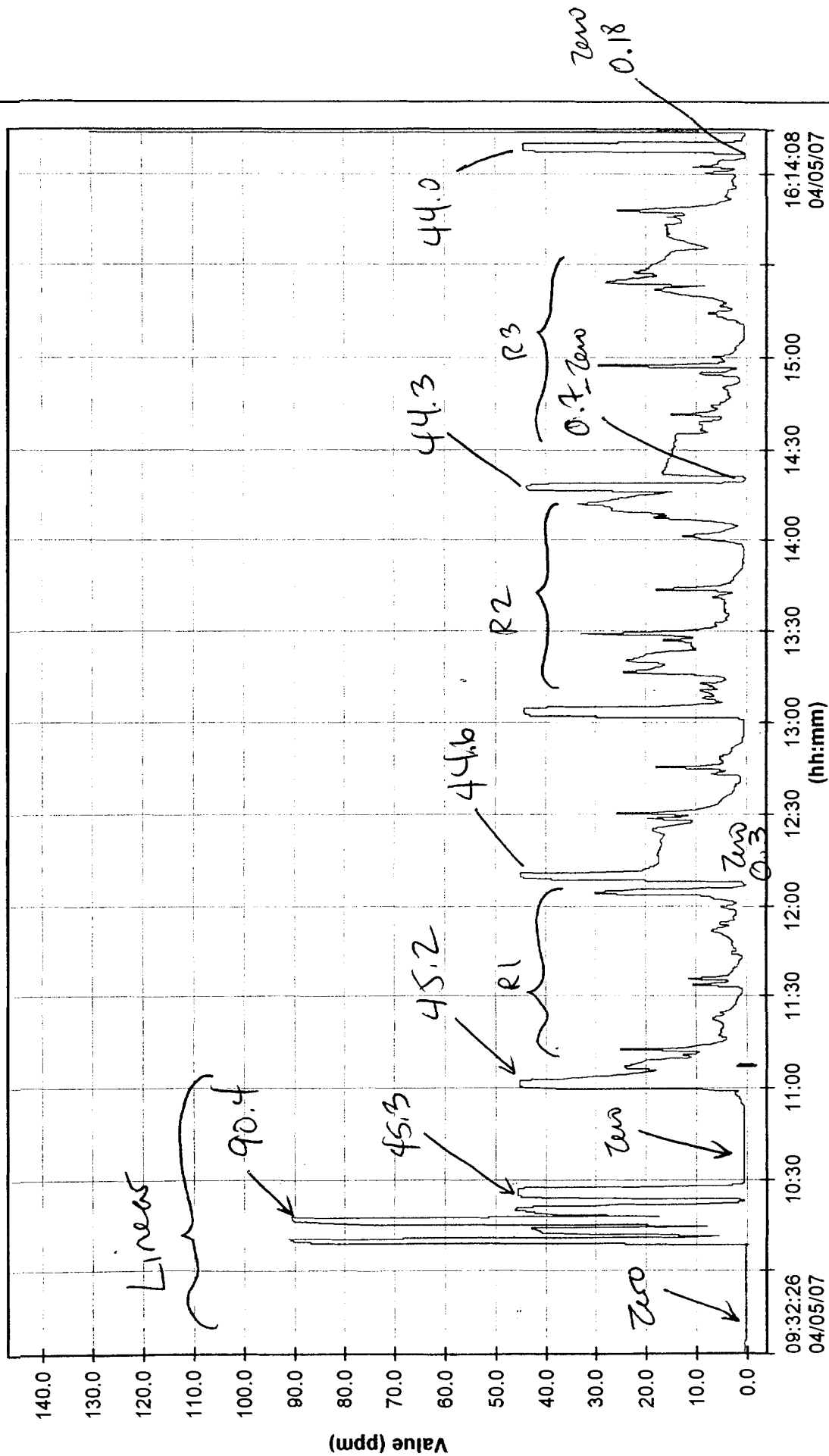
7E
Method 25A Notes

Company Plant: SDI
Source Tested: EAF
Date: 4/5/07

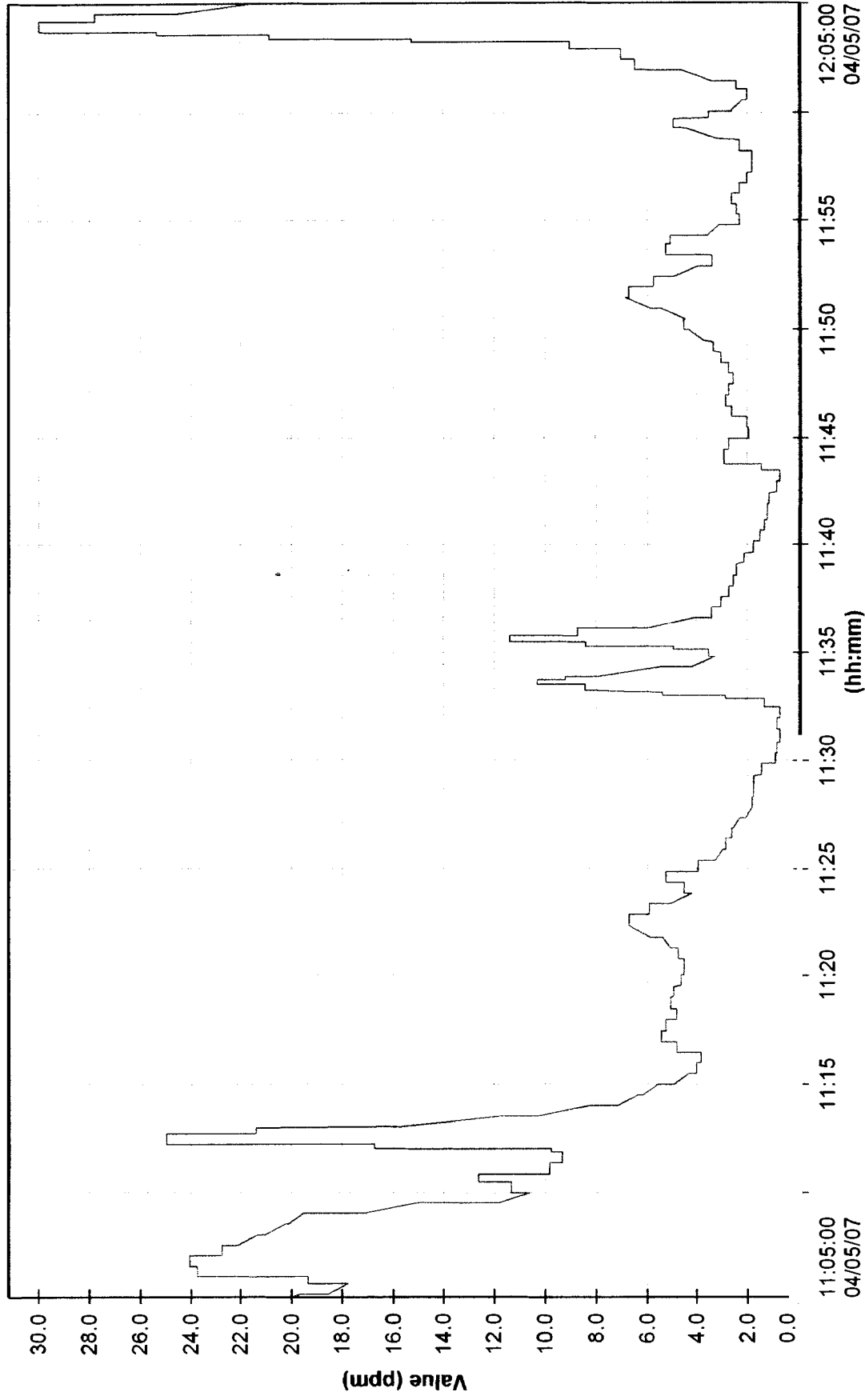
Run: 1-3

Time	FID Reading(ppm)	Calibration Result	Notes
1030 Linen	zero 90.4 gas → 45.8 gas →	0.01 90.4 45.8	
Bias	zero → 45.8 gas →	0.4 45.3	
1058: check R1 1104	→ 45.8 gas →	45.2	
end 1204	zero → 45.8 gas →	0.3 44.6	
1303 check	45.8 gas		
R2 13:18 end 14:18 topping			
	zero = 0.7 45.8 gas →	44.3	
R3 14:30 15:30			
405	zero 45.6 gas	44.0 0.18	

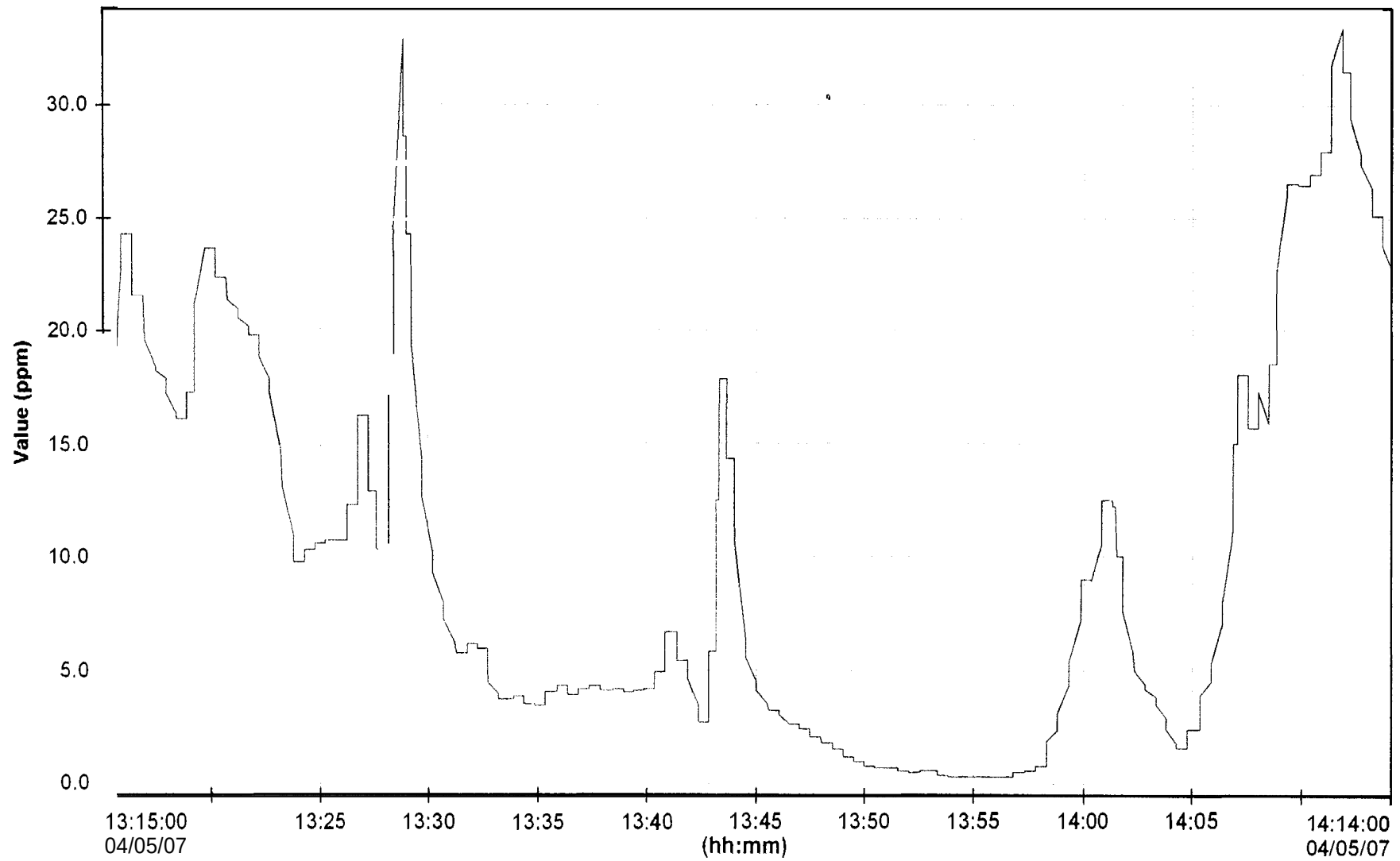
Steel Dynamics Inc. - Pittsboro, IN
NOx Emissions Test



Steel Dynamics Inc. - Pittsboro, IN NOx Emissions Test Run 1



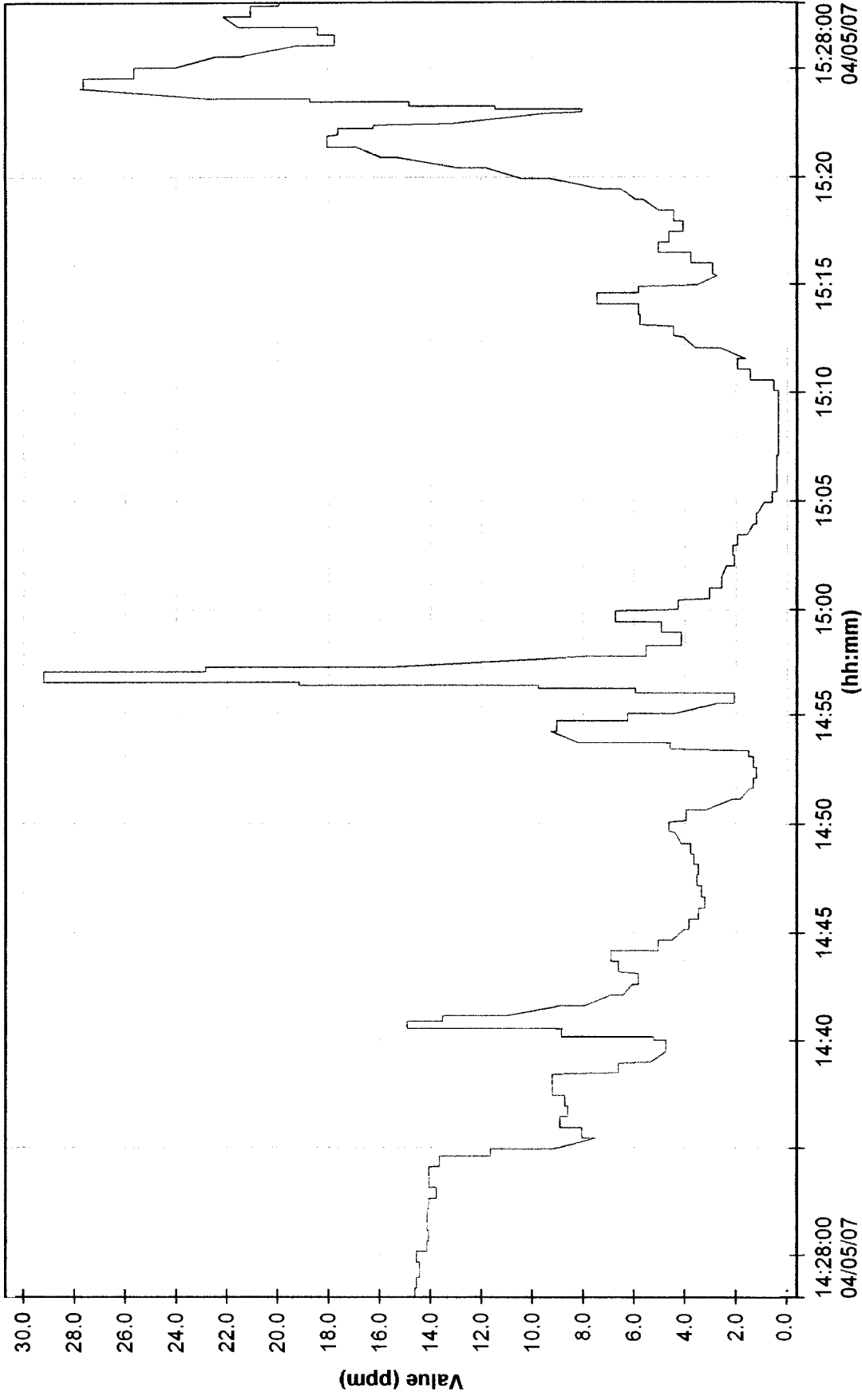
Steel Dynamics Inc. - Pittsboro, IN NOx Emissions Test Run 2



	Maximum	Minimum	Average
--- ppm on Ch 1	33.4	0.3	9.7

ppm NOx

Steel Dynamics Inc. - Pittsboro, IN NOx Emissions Test Run 3



— ppm on Ch 1	Maximum	Minimum	Average
	30.0	0.3	7.7

ppm NOx

APPENDIX III

SPREADSHEET CALCULATIONS

STACK EMISSION SUMMARY

SOURCE TESTED: eaf
COMPANY NAME: sdi
DATE OF TEST: 04/19/07

Pollutant Emissions	Run 1	Run 2	Run 3	Average
PM Filterable (gr/dscf)	0.0002	0.0004	0.0005	0.0004
PM Filterable (lbs/hr)	0.9744	1.6345	2.0152	1.5414
PM10 Condensable (lbs/hr)	1.5676	1.3411	6.3747	3.0945
Filterable + Consensable (lbdhr)	2.5420	2.9756	8.3899	4.6359
Fitterable + Consensable,(gr/dscf)	0.0006	0.0007	0.0019	0.0011

Avg. Stack Vol. Flow Rate

ACFM	561,950.04	572,801.80	590,825.21	575,192.35
OSCFM	497,992.93	500,182.08	512,037.15	503,404.06

Avg. Stack Temp.	130.125	147.083	148.417	141.875
Stack Gas Velocity	63.074	64.292	66.315	64.561
Avg. Velocity Head	1.1239	1.1456	1.2137	1.1611
Avg. Sq. Rt of Delta P	1.0601	1.0703	1.1017	1.0774

ISOKINETIC TESTING SUMMARY

%Isokinetics:	100.24	101.33	103.26	101.61
Allowable isokinetic 90-110%				
% Moisture of Stack Gas	1.46%	0.77%	1.31%	1.18%
Sample Volume	155.480	157.866	164.686	159.344

COMPANY NAME: sdi
 LOCATION: pittsboro
 SOURCE TESTED: eaf
 DATE OF TEST: 04/19/07
 RUN NO.: 1
 Particulate

FIELD DATA

K - Factor = 1.30

Start Time 10 10
 Stop Time 2 20

Molecular Weight of Stack Gas, Dry Basis, Md

%CO2 0
 %O2 21
 Md 28.84

Volume of Water Vapor Collected @ STD. COND., Vwv

Vic 49
 Vw(std) 2.305

Volume of Dry Gas Collected @ STD. COND., Vm(std)

Tm(F) 81.271
 Vm 161.522
 Pb(inches Hg) 30.000
 delta H 1.485
 gamma 0.941
 Vm(std) 155.480

Moisture Content of Stack Gas, Bwo

Bwo 1.46%
 1-Bwo 98.54%

Molecular Weight of Stack Gas, Ms

Ms 28.68

Area of Stack (enter diameter in inches), As

Depth-in 0
 Width-in 0
 diameter 165
 No. of Stacks 1
 As(L*W) 0
 As(dia) 148.4892148

Static Pressure, Ps

Static (0.450)
 Ps 29.97

Stack Gas Velocity, Vs, tps

Cp 0.84
 sqrt(delta p) 1.060
 Ts 130.125
 Vs 63.074

Stack Gas Flowrate, Qs, acfm

As 148.4892148
 Qs 561950

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd

Qstd (dscf/m) = 497992.93
 Qstd (dscf/hr) = 2987957585

Velocity at the Nozzle, Vn

Dia. of Nozzle 0.188 An(nozzle): 0.000193
 Time of Run 240
 Vn 63.22

% Isokinetic, %I

%I 100.24
 % Isokinetic measured from intermediate values
 %I 100.62

Pollutant Mass Emission Rate, PMR, lbs./hr.

Mn (g) = 0.0023 0.0037 0.006
 PMR (lb/hr) = 0.9744 1.5676 2.5420
 PMR (lb/MMBtu) = 6.0667 0.0000 -0.0667
 Filterable Condensible Total

Grains per d

gr/dscf = 0.0002

Grains per dscf

gr/dscf = 0.0002 0.0006

Grains per mg/dscf

mg/dscf = 0.2071 0.2071

Run	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Time	1:10	1:20	1:20	1:30	1:20	1:40	0:88	0:83	0:83	0:88	0:85	0:97	0:85	0:82	0:90	0:85	0:85	1:00	1:50	1:50	1:70	1:70	1:50	1:50
Temp	1.049	1.095	1.095	1.140	1.095	1.183	0.938	0.911	0.911	0.938	0.975	0.985	0.922	0.906	0.949	0.922	0.922	1.000	1.225	1.225	1.304	1.304	1.225	1.225
Pressure	1.430	1.560	1.560	1.690	1.560	1.820	1.144	1.079	1.079	1.144	1.235	1.261	1.105	1.066	1.170	1.105	1.105	1.300	1.950	1.950	2.210	2.210	1.950	1.950
Flow	148	151	156	131	128	128	112	110	107	105	102	104	118	121	117	121	140	149	134	132	134	138	157	180
Velocity	60	60	62	61	61	61	60	62	62	63	61	62	61	63	63	64	65	68	67	69	70	71	71	72
Flowrate	52	53	54	56	56	57	57	57	57	58	58	58	58	58	58	58	58	60	61	61	63	64	65	65

1.142	1.060	161.522	1.485	130.125	61.271
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COMPANY NAME: sdi
 LOCATION: pittsboro
 SOURCE TESTED: eaf
 DATE OF TEST: 04/20/07
 RUN NO: 2
 POLLUTANT: Particulate

Enter Data

Molecular Weight of Stack Gas, Dry Basis, Md
 %CO2 0
 %O2 21
 Md 28.84

Volume of Water Vapor Collected @ STD. COND., Vwv
 Vlc 26.2
 Vw(std) 1.232

Volume of Dry Gas Collected @ STD. COND., Vm(std)
 Tm(F) 86.750
 Vm 164.614
 Pb(inches Hg) 30.200
 delta H 1.526
 gamma 0.941
 Vm(std) 157.866

Moisture Content of Stack Gas, Bwo
 Bwo 0.77%
 1-Bwo 99.23%

Molecular Weight of Stack Gas, Ms
 Ms 28.76

Area of Stack (enter diameter in inches), As
 Depth-in 0
 Width-in 0
 diameter 165
 No. of Stacks 1
 As(L*W) 0
 As(dia.) 148.4802148

Static Pressure, Ps
 Static (0.4501
 Ps 30.17

Stack Gas Velocity, Vs, fps
 Cp 0.84
 sqrt(delta p) 1.070
 Ts 147.083
 Vs 64.292

Stack Gas Flowrate, Qs, acfm
 As 148.4802148
 Qs 572802

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd.
 Qstd 500182.08
 Qstd (dscf/hr) = 30010925.08

Velocity at the Nozzle, Vn
 Dia. of Nozzle 0.188 An(nozzle) 0.000193
 Time of Run 240
 vn 85.15

% Isokinetic, %I
 %I 101.33
 % Isokinetic measured from intermediate values
 %I 101.72

Pollutant Mass Emission Rate, PMR, lbs./hr.
 Mn (g) = 0.0039 0.0032 0.0071
 PMR (lb/hr) = 1.6345 1.3411 2.9756
 PMR (lb/MMBtu) = -0.1113 0.0000 -0.1113
 Filterable Condensable Total

Grains per a d
 gr/acl = 0.0003

Grains per dscf
 gr/dscf = 0.0004 0.0007

Grains per mg/dscf
 mg/dscf = 0.3362 0.3362

FIELD DATA

K - Factor = 1.30

Start Time 7:45
 Stop Time 11:53

1	1.500	1.225	1.950	131	53	53
2	1.700	1.304	2.210	130	60	53
3	1.400	1.183	1.820	144	63	55
4	1.700	1.304	2.210	168	65	56
5	1.800	1.342	2.340	163	65	58
6	2.100	1.449	2.730	140	64	58
7	0.800	0.894	1.040	123	61	58
8	1.100	1.049	1.430	127	65	58
9	0.950	0.975	1.235	130	66	59
10	1.000	1.000	1.300	136	60	85
11	1.000	1.000	1.300	149	69	61
12	1.100	1.049	1.430	164	70	62
13	0.750	0.866	0.975	141	68	63
14	0.810	0.900	1.053	143	72	64
15	0.810	0.900	1.053	138	72	65
16	0.810	0.900	1.053	140	73	66
17	0.750	0.866	0.975	154	74	66
18	0.810	0.900	1.053	169	75	67
19	0.880	0.938	1.144	153	76	88
20	1.300	1.140	1.690	147	78	69
21	1.600	1.265	2.080	146	80	70
22	1.200	1.095	1.560	156	81	71
23	1.100	1.049	1.430	172	81	72
24	1.200	1.095	1.560	166	83	73

1.174	1.070	164.614	1.526	147.083	66.750
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COMPANY NAME: sdi
LOCATION: pittsboro
SOURCE TESTED: eaf
DATE OF TEST: 04/20/07
RUN NO: 3
POLLUTANT: Particulate

Enter Data

Molecular Weight of Stack Gas, Dry Basis, Md
 %CO2 0
 %O2 21
Md 28.84

Volume of Water Vapor Collected @ STD. COND., Vwv
 Vlc 46.3
Vw(std) 2.178

Volume of Dry Gas Collected @ STD. COND., Vm(std)
 Tm(F) 86.708
 Vm 178.197
 Pb(inches Hg) 30.200
 delta H 1.607
 gamma 0.941
Vm(std) 164.686

Moisture Content of Stack Gas, Bwo
 Bwo 1.31%
 1-Bwo 98.69%

Molecular Weight of Stack Gas, Ms
 Ms 28.70

Area of Stack (enter diameter in inches), As
 Depth-in 0
 Width-in 0
 diameter 165
 No. of Stacks 1
 As(L*W) 0
 As(dia.) 148.4882148

Static Pressure, Pa
 Static (0.450)
 Ps 30.17

Stack Gas Velocity, Vs, fps
 Cp 0.84
 sqr(delta p) 1.102
 Ts 148.417
 Vs 66.315

Stack Gas Flowrate, Qs, acfm
 As 148.4882148
 Qs 590825

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd
 Qstd 512037.15
 Qstd (dscf/hr) = 30722229.30

Velocity at the Nozzle, Vn
 Dia of Nozzle 0.186
 Time of Run 240
 Vn 53.48
 An(nozzle): 0.000193

% Isokinetic, %I
 %I 103.26
% Isokinetic measured from intermediate values
 %I 103.66

Pollutant Mass Emission Rate, PMR, lbs./hr.
 Mn(g) = 0.0049 0.0155 0.0204
 PMR (lb/hr) = 2.0152 6.3747 8.38990
 PMR (lb/MMBtu) = -0.13406 0.0000 -0.13406
 Filterable Condensable Total

Grains per acf
 = 0.0004

Grains per dscf
 gr/dscf = 0.0005 0.0019

Grains per mg/dscf
 mg/dscf = 0.406188001 0.406188

FIELD DATA

K - Factor = 1.30

Start Time 12:50
Stop Time 5:00

Run	CO2	O2	CO	NOx	SO2	PM10	PM2.5
1	1.100	1.049		1.430	164	75	75
2	1.100	1.049		1.430	150	83	75
3	1.100	1.049		1.430	145	86	76
4	1.300	1.140		1.690	152	87	77
5	1.600	1.265		2.080	167	86	78
6	2.000	1.414		2.600	156	87	79
7	0.900	0.949		1.170	130	81	79
8	0.870	0.933		1.131	127	84	78
9	0.870	0.933		1.131	127	85	79
10	0.880	0.938		1.144	124	86	79
11	1.000	1.000		1.300	121	88	80
12	1.100	1.049		1.430	123	90	80
13	1.000	1.000		1.300	120	90	83
14	1.400	1.183		1.820	129	93	83
15	1.000	1.000		1.300	134	95	84
16	1.000	1.000		1.300	154	96	87
17	0.850	0.922		1.105	161	91	86
18	1.100	1.049		1.430	174	92	86
19	1.200	1.095		1.560	156	92	87
20	1.300	1.140		1.690	154	100	89
21	1.500	1.225		1.950	154	100	90
22	2.000	1.414	417.027	2.600	164	102	91
23	1.700	1.304	238.830	2.210	196	103	93
24	1.800	1.342		2.340	180	102	94

AVG CO2	AVG O2	AVG CO	AVG NOx	AVG SO2	AVG PM10	AVG PM2.5
1.236	1.102	178.197	1.607	148.417		86.708

STACK EMISSION SUMMARY				
SOURCE TESTED: EAF COMPANY NAME: SDI DATE OF TEST: 04/05/07				
Pollutant Emissions	Run 1	Run 2	Run 3	Average
Lead Filterable (gr/dscf)	0.000005	0.000005	0.000007	0.000006
Lead Filterable (lbs/hr)	0.0241	0.0248	0.0321	0.0270
Avg. Stack Vol. Flow Rate				
ACFM	597,899.18	622,246.97	562,591.07	594,245.74
DSCFM	549,569.50	564,976.60	517,732.16	544,092.76
Avg. Stack Temp.	106.458	109.167	104.292	106.639
Stack Gas Velocity	67.109	69.842	63.146	66.699
Avg. Velocity Head	1.3260	1.4254	1.1774	1.3096
Avg. Sq. Rt of Delta P	1.1515	1.1939	1.0851	1.1435
ISOKINETIC TESTING SUMMARY				
%Isokinetics:	95.43	96.06	96.94	96.15
Allowable isokinetic 90-110%				
% Moisture of Stack Gas	2.22%	2.95%	2.48%	2.55%
Sample Volume	40.838	42.262	39.083	40.728
Pollutant Emissions	Run 1	Run 2	Run 3	Average
NOx (ppm)	6.2	9.7	7.7	7.8667
NOX (lbs/hr)	25.09358195	35.97637393	29.85160917	30.3072
DSCFM	564,976.60	517,732.16	541,173.49	541294.0854

COMPANY NAME: SDI
 LOCATION: Pittsboro
 SOURCE TESTED: EAF
 DATE OF TEST: 04105107
 RUN NO.: 1
 Lead
 NOX

FIELD DATA

K - Factor = 1.20

Start Time 9:12
 Stop Time 10:35

Molecular Weight of Stack Gas, Dry Basis, Md
 %CO2 0
 %O2 21
 Md 28.84

Volume of Water Vapor Collected @ STD. COND., Vwv
 Vc 19.7
 Vw(std) 0.927

Volume of Dry Gas Collected @ STD. COND., Vm(std)
 Tm(F) 43.229
 Vm 40.807
 Pb(inches Hg) 30.100
 delta H 1.627
 gamma 0.941
 Vm(std) 40.838

Moisture Content of Stack Gas, Bwo
 Bwo 2.22%
 1-Bwo 97.78%

Molecular Weight of Stack Gas, Ms
 Ms 28.80

Area of Stack (enter diameter in inches), As
 Depth-in 0
 Width-in 0
 diameter 165
 No. of Stacks 1
 As(L*W) 0
 As(dia.) 148.4892148

Static Pressure, Ps
 Static (0.450)
 Ps 30.07

Stack Gas Velocity, Vs, fps
 Cp 0.84
 sq(delta p) 1.152
 Ts 106.458
 Vs 67.109

Stack Gas Flowrate, Qs, acfm
 As 148.4892148
 Qs 597898

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd.
 Qstd (dscfm) = 549569.50
 Qstd (dscf/hr) = 32974170.11

Velocity at the Nozzle, Vn
 Dia. of Nozzle 0.188
 Time of Run 50
 Vn 64.04
 An(nozzle): 0.000193

% Isokinetic, %I
 %I 95.43
 % Isokinetic measured from intermediate values
 %I 95.80

Pollutant Mass Emission Rate, PMR, lbs./hr.
 Mn(g) = 0.00001356 0.0000 1.356E-05
 PMR (lb/hr) = 0.0241 0.0000 0.0241
 PMR (lb/MMBtu) = -0.0015 0.0000 5.0015
 Filterable Condensible Total

Grains per acf
 gr/acf = 0.0000

Grains per dscf
 gr/dscf = 0.0000 0.0000

Grains per mg/dscf
 mg/dscf = 0.0049 0.0049

Run	Delta P	Square Delta P	Volume	Delta G	Stack Temp	DGM	DGM
1	1.500	1.225		1.800	119	41	40
2	1.500	1.225		1.800	98	46	40
3	1.600	1.265		1.920	96	47	41
4	1.500	1.225		1.800	96	48	41
5	1.800	1.342		2.160	96	49	41
6	1.800	1.342		2.160	95	48	41
7	1.500	1.225		1.800	96	47	41
8	1.400	1.183		1.680	100	44	41
9	1.700	1.304		2.040	108	42	41
10	1.900	1.378		2.280	99	41	41
11	1.900	1.378		2.280	98	41	41
12	1.900	1.378		2.280	98	42	41
13	0.800	0.894		0.960	115	42	41
14	0.800	0.894		0.960	125	43	41
15	0.900	0.949		1.080	127	44	41
16	0.800	0.894		0.960	128	46	41
17	0.780	0.883		0.936	123	47	43
18	0.850	0.922		1.020	133	45	42
19	1.000	1.000		1.200	105	46	43
20	1.100	1.049		1.320	102	46	42
21	1.100	1.049		1.320	101	47	42
22	1.500	1.225	128.975	1.800	99	47	43
23	1.400	1.183	88.168	1.680	100	47	43
24	1.500	1.225		1.800	98	48	43

Avg. Cp	Avg. Sq. Dp	Volume	Delta H	Avg. Ts(B)	Avg. Meter T(F)
1.355	1.152	40.807	1.627	106.458	43.229

COMPANY NAME: SDI
 LOCATION: Pittsboro
 SOURCE TESTED: EAF
 DATE OF TEST: 04/05/07
 RUN NO.: 2
 POLLUTANT: Lead
 NOX Enter Data

Molecular Weight of Stack Gas, Dry Basis, Md
 %CO2 0
 %O2 21
 Md 28.84

Volume of Water Vapor Collected @ STD. COND., Vwv
 Vc 27.3
 Vw(std) 1.284

Volume of Dry Gas Collected @ STD. COND., Vm(std)
 Tm(F) 46.896
 Vm 42.525
 Pb(inches Hg) 30.100
 delta H 1.744
 gamma 0.941
 Vm(std) 42.262

Moisture Content of Stack Gas, Bwo
 Bwo 2.95%
 1-Bwo 97.05%

Molecular Weight of Stack Gas, Ms
 Ms 28.52

Area of Stack (enter diameter in inches), As
 Depth-in 0
 Width-in
 diameter 165
 No. of Stacks 1
 As(L*W) 0
 As(dia.) 148.4892148

Static Pressure, Ps
 Static 10.4501
 Ps 30.07

Stack Gas Velocity, Vs, fps
 Cp 0.84
 sqrt(delta p) 1.194
 Ts 109.167
 Vs 69.842

Stack Gas Flowrate, Qs, acfm
 As 148.4892148
 Qs 622247

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd.
 Qstd 564976.60
 Qstd (dscf/hr) = 33898596.07

Velocity at the Nozzle, Vn
 Dia. of Nozzle 0.186
 Time of Run 60
 Vn 67.09
 An(nozzle) 0.000193

% Isokinetic, %I
 %I 96.06
 % Isokinetic measured from intermediate values
 %I 96.43

Pollutant Mass Emission Rate, PMR, lbs./hr.
 Mn(g) = 0.000014 0.0000 0.000014
 PMR (lb/hr) = 0.0248 0.0000 0.0248
 PMR (b/MMBtu) = -0.0015 0.0000 -0.0015
 Filterable Condensible Total

Grains per acf
 g/aacf = 0.0000

Grains per dscf
 g/dscf = 0.0000 0.0000

Grains per mg/dscf
 mg/dscf = 0.0049 0.0049

FIELD DATA

K-Factor = 1.20

Start Time 11:05
 Stop Time 12:15

Run#	Delta P	Square Delta P	Volume	Delta H2	Stack Temp	DCM	PCM
1	1.100	1.049		1.320	120	44	44
2	1.100	1.049		1.320	114	45	44
3	1.000	1.000		1.200	112	45	44
4	1.500	1.225		1.800	109	46	44
5	1.500	1.225		1.800	108	46	44
6	1.500	1.225		1.800	108	47	44
7	0.890	0.943		1.068	108	48	44
8	0.890	0.943		1.068	100	48	44
9	0.990	0.995		1.188	101	48	44
10	1.000	1.000		1.200	101	48	44
11	1.100	1.049		1.320	101	49	44
12	1.000	1.000		1.200	101	49	45
13	2.000	1.414		2.400	101	47	45
14	1.500	1.225		1.800	111	50	45
15	1.500	1.225		1.800	110	50	45
16	1.900	1.378		2.280	112	51	44
17	2.000	1.414		2.400	111	51	44
18	1.900	1.378		2.280	110	52	45
19	2.000	1.414		2.400	114	52	45
20	1.500	1.225		1.800	120	52	45
21	1.500	1.225		1.800	121	52	45
22	1.500	1.225	171.425	1.800	115	54	46
23	2.000	1.414	128.900	2.400	109	54	45
24	2.000	1.414		2.400	103	54	46

Avg. Delta P	Avg. Sq. Delta P	Volume	Delta H2	Avg. Temp	Avg. Moisture
1.453	1.194	42.525	1.744	109.167	46.896

COMPANY NAME: SDI
 LOCATION: Pittsboro
 SOURCE TESTED: EAF
 DATE OF TEST: 04105107
 RUN NO: 3
 POLLUTANT: Lead
 NOX Enter Data

Molecular Weight of Stack Gas, Dry Basis, M_d
 %CO₂ 0
 %O₂ 21
 M_d 28.84

Volume of Water Vapor Collected @ STD. COND., V_{wv}
 V_{wc} 21.1
 $V_{w(std)}$ 0.993

Volume of Dry Gas Collected @ STD. COND., $V_{m(std)}$
 $T_m(F)$ 48.042
 V_m 39.444
 $P_b(\text{inches Hg})$ 30.100
 ΔH 1.450
 γ 0.941
 $V_{m(std)}$ 39.083

Mole fraction Content of Stack Gas, B_{wo}
 B_{wo} 2.48%
 $1-B_{wo}$ 97.52%

Molecular Weight of Stack Gas, M_s
 M_s 28.57

Area of Stack (enter diameter in inches), A_s
 ΔH 3
 W_{std} 0
 $diameter$ 165
 $N.O. \text{ of Stacks}$
 $A_s(L \times W)$ 0
 $A_s(dia)$ 148.4892148

Static Pressure, P_s
 P_{std} (0.450)
 P_s 30.07

Stack Gas Velocity, V_s , fpm
 C_p 0.84
 $sq(\Delta H)$ 1.085
 T_s 104.292
 V_s 63.146

Stack Gas Flowrate, Q_s , acfm
 A_s 148.4892148
 Q_s 562591

Stack Gas Flowrate @ STD. COND., Dry Basis, Q_{std}
 Q_{std} 517732.16
 $Q_{std} (dscf/hr) =$ 31063929.88

Velocity at the Nozzle, V_n
 d_{nozzle} 0.153
 $A_n(nozzle)$ 0.000193
 V_n 61.22

% Isokinetic, %
 %I 96.94
 % Isokinetic measured from intermediate values
 %I 97.32

Pollutant Mass Emission Rate, PMR, lbs./hr.
 $M_n(g) =$ 0.000013 0.183E-05
 $PMR (lb/hr) =$ 0.0321 0.0000 0.03208
 $PMR (lb/MMBtu) =$ -0.00211 0.0000 -0.00211

Grains per a d
 $gr/acf =$ 0.0000

Grains per dscf
 $gr/dscf =$ 0.0000 0.0000

Grains per mg/dscf
 $mg/dscf =$ 0.006954543 0.006955

FIELD DATA

K - Factor = 1.20

Start Time 13:20
 Stop Time 14:23

Run #	Delta P	Square Delta P	Volume	Delta H2	Stack Temp	DCM	DCM
1	1.500	1.225	1.800	92	47	46	
2	2.000	1.414	2.400	106	44	46	
3	1.500	1.225	1.800	102	45	45	
4	1.500	1.225	1.800	98	46	45	
5	1.500	1.225	1.800	95	47	45	
6	2.000	1.414	2.400	95	49	46	
7	1.500	1.225	1.800	95	47	46	
8	1.500	1.225	1.800	95	49	46	
9	1.500	1.225	1.800	95	50	46	
10	1.400	1.183	1.680	95	50	46	
11	1.500	1.225	1.800	107	51	46	
12	1.500	1.225	1.800	106	51	46	
13	0.800	0.694	0.960	107	50	46	
14	0.800	0.694	0.960	108	50	46	
15	0.850	0.922	1.020	107	51	46	
16	0.850	0.922	1.020	108	52	46	
17	0.800	0.694	0.960	110	52	46	
18	0.850	0.922	1.020	112	52	47	
19	0.850	0.922	1.020	112	52	47	
20	0.850	0.922	1.020	111	52	47	
21	0.850	0.922	1.020	116	52	47	
22	0.850	0.922	211.144	116	53	47	
23	0.900	0.949	171.700	116	53	47	
24	0.850	0.922	1.020	99	53	47	

Avg. ΔP	Avg. $Sq. \Delta P$	Volume	Delta H	Avg. $T_s(F)$	Avg. Meter T_s
1.208	1.065	39.444	1.450	104.292	48.042

COMPANY NAME: SDI
 LOCATION: Pittsboro
 SOURCE TESTED: EAF
 DATE OF TEST: 04/05/07
 RUN NO.: 3
 POLLUTANT: NOx

Enter Data

Molecular Weight of Stack Gas, Dry Basis, M_d
 %CO2 21
 M_d 28.84

Volume of Water Vapor Collected @ STD. COND., V_{wv}
 V_c 9.6
 $V_w(std)$ 0.452

Volume of Dry Gas Collected @ STD. COND., $V_m(std)$
 $T_m(F)$ 50.667
 V_m 22.185
 $P_b(inches\ Hg)$ 30.100
 ΔH 1.515
 γ 0.941
 $V_m(std)$ 21.873

Moisture Content of Stack Gas, B_{wv}
 B_{wv} 2.02%
 $1-B_{wv}$ 97.98%

Molecular Weight of Stack Gas, M_s
 M_s 28.62

Area of Stack (enter diameter in inches), A_s
 Depth-in 0
 Width-in 0
 diameter 165
 NO. of Stacks 1
 $A_s(L^2W)$ 0
 $A_s(dia.)$ 148.4892148

Static Pressure, P_s
 Static (0.450)
 P_s 30.07

Stack Gas Velocity, V_s , fps
 C_p 0.84
 $\sqrt{\Delta p}$ 1.119
 T_s 93.250
 V_s 64.414

Stack Gas Flowrate, Q_s , acfm
 A_s 148.4892148
 Q_s 573886

Stack Gas Flowrate @ STD. COND., Dry Basis, Q_{std}
 Q_{std} 541173.49
 $Q_{std}(dscf/hr)$ 3247040942

Velocity at the Nozzle, V_n
 Dia. of Nozzle 60
 Timed Run
 V_n #DIV/0!

% Isokinetic, %
 %I #DIV/0!
 % Isokinetic measured from intermediate values
 %I #DIV/0!

Pollutant Mass Emission Rate, PMR, lbs./hr.
 $M_n(g)$ 0.000018 3 1.83E-05
 $PMR(lb/hr)$ 0.0599 0.0000 0.05992
 $PMR(lb/MMBtu)$ -0.00377 0.0000 -0.00377

Grains per acf
 gr/acf 0.0000

Grains per dscf
 $gr/dscf$ 0.0000 0.0000

Grains per mg/dscf
 $mg/dscf$ 0.012615683 0.012616

FIELD DATA

K - Factor 1.20

Start Time 14:20
 Stop Time 15:20

Run #	Delta P	Mass Flow	Volume	Delta H	Stack Temp	DCM	DCM
1	0.880	0.938	1.056	93	50	47	
2	0.960	0.980	1.152	92	54	48	
3	0.950	0.975	1.140	92	54	48	
4	1.300	1.140	1.560	93	54	48	
5	1.200	1.095	1.440	93	54	48	
6	1.200	1.095	1.440	94	54	49	
7	1.200	1.095	1.440	96			
8	1.300	1.140	1.560	93			
9	1.100	1.049	1.320	93			
10	1.100	1.049	1.320	93			
11	1.000	1.000	1.200	94			
12	1.100	1.049	1.320	93			
13	1.300	1.140	1.560	93			
14	1.200	1.095	1.440	93			
15	1.300	1.140	1.560	94			
16	1.200	1.095	1.440	95			
17	1.100	1.049	1.320	93			
18	1.700	1.304	2.040	93			
19	1.500	1.225	1.800	93			
20	1.300	1.140	1.560	93			
21	1.500	1.225	1.800	93			
22	1.700	1.304	2.040	93			
23	1.700	1.304	2.040	93			
24	1.500	1.225	1.800	93			

Avg. Δp	Avg. Q_s	Volume	Delta H	Avg. $T_s(F)$	Avg. M_n	T(F)
1.262	1.119	22.185	1.515	93.250		50.667

COMPANY NAME: SDI
 LOCATION: Pinstboro
 SOURCE TESTED: EAF
 DATE OF TEST: 04105107
 RUN NO.: 3
 POLLUTANT: NOx

FIELD DATA

K - Factor 1.20

Start Time 14:20
 Stop Time 15:20

Molecular Weight of Stack Gas, Dry Basis, **Mid**

%CO2 0
 %O2 21
 Mid 28.84

Enter Gats

Volume of Water Vapor Collected @ STD. COND. **Vwv**

Vc 9.6
 Vw(std) 0.452

Volume of Dry Gas Collected @ STD. COND. **Vm(std)**

Tm(F) 50.667
 Vm 22.185
 Pib(inches Hg) 30.100
 delta H 1.515
 gamma 0.941
 Vm(std) 21.873

Moisture Content of Stack Gas, **Bwo**

Bwo 202%
 1-Bwo 97.98%

Molecular Weight of Stack Gas, **Ms**

Ms 28.62

Area of Stack (enter diameter in inches), **As**

Depth-in 0
 Width-in 0
 diameter 165
 No. of Stacks 1
 As(L*W) 0
 As(dia.) 148.4892148

Static Pressure, **Ps**

Static (Q 450)
 Ps 30.07

Stack Gas Velocity, **Vs, fps**

Cp 0.84
 sqrt(delta p) 1.119
 Ts 93.250
 Vs 64.414

Stack Gas Flowrate, **Qs, acfm**

As 148.4892148
 Qs 573886

Stack Gas Flowrate @ STD. COND., Dry Basis, **Qstd.**

Qstd 541173.49
 Qstd (dscf/hr) = 324710409.42

Velocity at the Nozzle, **Vn**

Dia. of Nozzle An(nozzle) 0
 Time of Run 60
 Vn #DIV/0!

% Isokinetic, **%I**

%I #DIV/0!
 % Isokinetic measured from intermediate values
 %I #DIV/0!

Pollutant Mass Emission Rate, PMR, lbs./hr.

Mn(g) = 0.000618 0 1.83E-05
 PMR (lb/hr) = 0.0599 0.0000 0.05992
 PMR (lb/MMBtu) = -0.00377 0.0000 -0.00377

Filterable

Condensit. Total

Grains per acf

gr/acf = 0.0000

Grains per dscf

gr/dscf = 0.0000 0.0000

Grains per mg/dscf

mg/dscf = 0.012615683 0.012616

Run	Delta P	Mass Del	Volume	Delta H2	Stack Temp	DCM	DCM
1	0.880	0.938		1.056	93	50	47
2	0.960	0.980		1.152	92	54	48
3	0.950	0.975		1.140	92	54	48
4	1.300	1.140		1.560	93	54	48
5	1.200	1.095		1.440	93	54	48
6	1.200	1.095		1.440	94	54	49
7	1.200	1.095		1.440	96		
8	1.300	1.140		1.560	93		
9	1.100	1.049		1.320	93		
10	1.100	1.049		1.320	93		
11	1.000	1.000		1.200	94		
12	1.100	1.049		1.320	93		
13	1.300	1.140		1.560	93		
14	1.200	1.095		1.440	93		
15	1.300	1.140		1.560	94		
16	1.200	1.095		1.440	95		
17	1.100	1.049		1.320	93		
18	1.700	1.304		2.040	93		
19	1.500	1.225		1.800	93		
20	1.300	1.140		1.560	93		
21	1.500	1.225		1.800	93		
22	1.700	1.304	233.585	2.040	93		
23	1.700	1.304	211.400	2.040	93		
24	1.500	1.225		1.800	93		

Avg. Dp	Avg. Sq. D	Volume	Delta H	Avg. Temp	Avg. Meter	T(F)
1.262	1.119	22.185	1.515	93.250		50.667

APPENDIX IV

LABORATORY DATA

PM10 DETERMINATION

FILTER

Filter ID	Run #	Pre-Weight	Post-Weight	Net Gain
371	1	0.3919	0.3941	0.0022
672	2	0.3890	0.3919	0.0029
673	3	0.3904	0.3931	0.0027

ACETONE

Beaker ID	Run #	Pre-Weight	Post-Weight	Net Gain
U	1	79.4852	79.4853	0.0001
V	2	80.0159	80.0169	0.0010
W	3	55.5421	55.5443	0.0022

Acetone Beaker (50mls)

56.0483

56.0483

0.0000

TOTAL

Run #	Filter Net Gain	Acetone Net Gain	Totals
1	0.0022	0.0001	0.0023
2	0.0029	0.001	0.0039
3	0.0027	0.0022	0.0049

CONDENSIBLE DETERMINATION

H2O

Beaker ID	Run #	Pre-Weight	Post-Weight	Net Gain
1	1	55.1880	55.1908	0.0028
2	2	53.6801	53.6815	0.0014
aa	3	56.0957	56.1099	0.0142
H2O Beaker (50mls)		80.7579	80.7579	0.0000

MeCl2

Beaker ID	Run #	Pre-Weight	Post-Wight	Net Gain
X	1	56.7624	56.7633	0.0009
Y	2	55.7488	55.7506	0.0018
Z	3	80.1336	80.1349	0.0013
MeCl2 Beaker (50mls)		77.3127	77.3127	0.0000

TOTAL

Run #	DI Net Gain	MeCl2 Net Gain	Totals
1	0.0034	0.0013	0.0047
2	0.0014	0.0018	0.0032
3	0.0142	0.0013	0.0155

- CERTIFICATE OF ANALYSIS -

Report Date: 27-Apr-07

Client ID: AIR-ANALYSIS

Air Analysis, Inc.
3904 Clarks Creek Road
Plainfield, Indiana 46168

Attn: Mike Dicen

Phone: (317) 837-8514

FAX: (317) 837-8518

Our Lab # 07004489-001

Your Sample ID: R-1 Filter

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Filter Paper

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/26/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	4.76	ug		4.00	7439-92-1	4/27/07	kfoltz

Our Lab # 07004489-002

Your Sample ID: R-2 Filter

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Filter Paper

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/26/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	4.40	ug		4.00	7439-92-1	4/27/07	kfoltz

Lab # 07004489-002

Sample ID: R-2 Filter

Page 1 of 4

ESG Laboratories

5927 WEST 71ST STREET
INDIANAPOLIS, INDIANA 46278

PHONE (317) 290-1471
FAX (317) 290-1670

Our Lab # 07004489-003

Your Sample ID: R-3 Filter

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Filter Paper

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/26/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	9.59	ug		4.00	7439-92-1	4/27/07	kfoltz

Our Lab # 07004489-004

Your Sample ID: R-1 Bottle HN03

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Water

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/27/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	< 8.80	ug		8.80	7439-92-1	4/27/07	kfoltz

Our Lab # 07004489-005

Your Sample ID: R-2 Bottle HNO3

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Water

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/27/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	< 9.60	ug		9.60	7439-92-1	4/27/07	kfoltz

Lab # 07004489-005

Sample ID: R-2 Bottle HN03

Page 2 of 4

ESG Laboratories

5927 WEST 71ST STREET
INDIANAPOLIS, INDIANA 46278

PHONE (317)290-1471
FAX (317) 290-1670

Our Lab # 07004489-006

Your Sample ID: R-3 Bottle HN03

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Water

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/27/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	< 8.72	ug		8.72	7439-92-1	4/27/07	kfoltz

Our Lab # 07004489-007

Your Sample ID: Filter Blank

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Filter Paper

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/26/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	< 4.00	ug		4.00	7439-92-1	4/27/07	kfoltz

Our Lab # 07004489-008

Your Sample ID: (NO.1) HNO3 Blank

Your Project # 456

Collection Date: 04/05/07

Your Project Name: SDI

Collected By: Client

Sample Type: Water

Receipt Date: 04/25/07 15:00

ICP Pb emissions, ICP-AES

<u>Analytical Method</u>	<u>Prep Method</u>	<u>Prep Date</u>	<u>By</u>
Method 29	Method 29	4/27/07	ameal

Parameter	Result	Units	Qual	Quant. Limit	CAS #	Analysis Date	By
Lead, Pb	< 7.12	ug		7.12	7439-92-1	4/27/07	kfoltz

Lab # 07004489-008

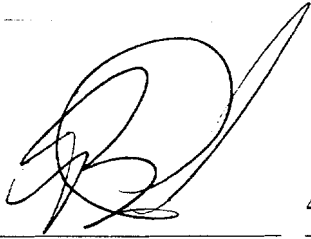
Sample ID: (NO.1) HNO3 Blank

Page 3 of 4

ESG Laboratories

5927 WEST 71ST STREET
INDIANAPOLIS, INDIANA 46278

PHONE (317) 290-1471
FAX (317) 290-1670



4/27/07

Lab Manager

Date

Lab # 07004489-008

Sample ID: (NO.1) HN03 Blank

Page 4 of 4

ESG Laboratories

5927 WEST 71ST STREET
INDIANAPOLIS, INDIANA 46278

PHONE (317) 290-1471
FAX (317) 290-1670

Air Analysis, Inc
3904 Clarks Creek Road
Plainfield, IN 46168
PH: 317-837-8514
FAX: 317-837-8518

Chain of Custody Form

Date:

Job Number:

Invoice to:

Air Analysis, Inc

3904 Clarks Creek Road

Plainfield, N 46168

Report to:

Mike Dicen @ above address

Fax Results to 317-837-8518

Additional Notes

[illegible]

Air Analytical, Inc
3904 Clarks Creek Road
Plainfield, IN 46168
PH: 317-837-8514
FAX: 317-837-8518

Chain of Custody Form

Date: 4-6-07

4-6-07

Job Number: 456

Invoice to: Air Analysis, Inc
3904 Clarks Creek Road
Plainfield, IN 46168

Air Analysis, Inc
3904 Clarks Creek Road
Plainfield, IN 46168

Mike Dicen @ above address
Fax Results to 317-837-8518

total volumes / weights

[illegible]

SAMPLER
DATE: 4-6-57

SHIPMENT METHOD	
-----------------	--

AIRBILL NUMBER

OTHER

RELINQUISHED BY	
Company	
RECEIVED BY	
Company	

Date	
Time	
Date 4/12/07	
Time 3:00	

RELINQUISHED BY	
Company	
RECEIVED BY	
Company	

Date	
Time	
Date	
Time	

COURIER

APPENDIX V

CHAIN OF CUSTODY

Air Analysis, Inc
3904 Clarks Creek Road
Plainfield, IN 46168
PH: 317-837-8514
FAX: 317-837-8518

Chain of Custody Form

Date:

4-19-07
4-20-07

Job Number:

473

Invoice to:

Air Analysis, Inc
3904 Clark6 Creek Road
Plainfield, IN 46168

Report to:

Mike Dican @ above address
Fax Results to 317-837-8518

Additional Notes

Sample ID	Number of Containers	Description	Container P or G	Sample Date	Analysis to perform	
R1	1	FILTER	P	7-15		
R2	1	L	L	4-20	Methion S	
R3	1	L	L	4-20		
R1	1	ACETONE	G	4-19		
R2	1	L	L	4-20		
R3	1	L	L	4-20		
BLANK	1	L	L			
1	1	DI 1		4-19	Methion 202	
2	1	DI 2		4-20		
3	1	DI 3		4-20		
1	1	M.C121		4-19		
2	1	M.C122		4-20		
3	1	M.C123		4-20		

SAMPLER
DATE:

4-20-07

SHIPMENT METHOD

AIRBILL NUMBER

Required Turnaround

24 HR

48 HR

5 BUSINESS DAYS

10 BUSINESS DAYS

OTHER

RELINQUISHED BY

Company

Date

Time

RELINQUISHED-BY

Company

Date

Time

COURIER

RECEIVED BY

Company

Date

Time

RECEIVED BY

Company

Date

Time

Air Analysis, Inc
3904 Clarks Creek Road
Plainfield, IN 46168
PH: 317-837-8514
FAX: 317-837-8518

Chain of Custody Form

Date:

4607

Job Number:

452

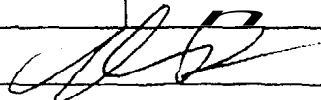
Invoice to:

Air Analysis, Inc
3904 Clarks Creek Road
Plainfield, IN 46168

Report to:

Mike Dicen @ above address
Fax Results to 317-837-8518

Additional Notes

Sample ID	Number of Containers	Description	Container P or G	Sample Date	Analysis to perform	Report to:
						Mike Dicon @ above address Fax Results to 317-837-8518
						Additional Notes
R1	1	(SDI) Filter	4	4-5	Method 12	
R2	1	Filter	P	"	"	
R3	1	Filter	P	"	Lead	Need 1) µg
R1	1	Bottle HNO ₃	P	"	↓	2) µg / liters
R2	1	"	P	"		
R3	1	"	P	"		3) total milliliters
		Filter Blank				
		(NO.1)/HNO ₃ Blank				
SAMPLER DATE:	 4-6-07		SHIPMENT METHOD			AIRBILL NUMBER
Required Turnaround 24 HR 48 HR <u>5 BUSINESS DAYS</u> 10 BUSINESS DAYS OTHER _____						
RELINQUISHED BY		Date	RELINQUISHED-BY		Date	COURIER
Company		Time	Company		Time	
RECEIVED BY		Date	RECEIVED BY		Date	
Company		Time	Company		Time	

ΔAir Analysis, Inc.

Steel Dynamics Inc. – Pittsboro, IN

Project Number: 471 and 473

APPENDIX VI

CALIBRATION DATA

CALIBRATION CHECK

(Post Test) per EMTIC Guideline GD-26
04/05/07

SDI
Pittsboro

Run 1	Run 2	Run 3	Average
0.975	0.973	0.957	0.968

Average result must be within 5% of Y

Result (%) 2.73%

PASS FIRST CAL

Dry Gas Meter Data
ID : S-1
Delta Y : 0.941
Delta H : 1.9

RUN 1	Volume	Delta H	DCM(Inlet)	DCM(Outlet)
1		1.800	41	40
2	SDI	1.800	46	40
3	0405/07	1.800	47	41
4	(Post Test) per EMTIC Guideline GD-26	1.800	48	41
5		2.160	49	41
6		2.160	46	41
7		1.800	47	41
8		1.800	44	41
9		2.040	42	41
10		2.280	41	41
11		2.280	41	41
12		2.280	42	41
13		0.960	42	41
14		0.960	43	41
15		1.080	44	41
16		0.960	45	41
17		0.936	47	43
18		1.020	45	42
19		1.200	46	43
20		1.320	46	42
21		1.320	47	42
22	128.975	1.800	47	43
23	86.168	1.680	47	43
24		1.800	46	43

Volume	Avg. Dh	Avg. Meter T(F)
40.867	1.83	43.23

Barometric Pressure: 30.10 Meter Y: 0.941
Test Time: 60 Delta H: 1.9

Yaa = 0.975

RUN 2	Volume	Delta H	DCM(Inlet)	DCM(Outlet)
1	SDI	1.32	47	46
2	0405/07	1.32	44	46
3	(Post Test) per EMTIC Guideline GD-26	1.20	45	45
4		1.80	46	45
5		1.80	47	45
6		1.80	49	46
7		1.07	47	46
8		1.07	49	46
9		1.19	50	46
10		1.20	50	48
11		1.32	51	46
12		1.20	51	46
13		2.40	50	46
14		1.80	50	46
15		1.80	51	46
16		2.28	52	46
17		2.40	52	46
18		2.28	52	47
19		2.40	52	47
20		1.80	52	47
21	171.425	1.80	52	47
22	128.900	1.80	53	47
23		2.40	53	47
24		2.40	53	47

Volume	Avg. Dh	Avg. Meter T(F)
47.525	1.74	48.04

Barometric Pressure: 30.10 Meter Y: 0.941
Test Time: 60 Delta H: 1.900

Yaa = 0.973

RUN 3	Volume	Delta H	DCM(Inlet)	DCM(Outlet)
1		1.80	47	46
2	SDI	2.40	44	46
3	0405/07	1.80	45	45
4	Pittsboro	1.80	46	45
5		1.80	47	45
6		2.40	49	46
7		1.80	47	46
8		1.80	49	46
9		1.80	50	46
10		1.68	50	46
11		1.80	51	46
12		1.80	51	46
13		0.96	50	46
14		0.96	50	46
15		1.02	51	46
16		1.02	52	46
17		0.96	52	46
18		1.02	52	47
19		1.02	52	47
20		1.02	52	47
21	211.144	1.02	52	47
22	171.700	1.02	53	47
23		1.08	53	47
24		1.02	53	47

Volume	Avg. Dh	Avg. Meter T(F)
39.444	1.45	46.04

Barometric Pressure: 30.10 Meter Y: 0.941
Test Time: 60 Delta H: 1.900

Yaa = 0.957

GRASEBY NUTECH
EPA Method 5
Meter Box Calibration
Post-Test Orifice Method
English Meter **Box** Units, English K' Factor

Filename: A:\meter box#80cal.XLS]3PTCQCAL
Revised: 8/1/97 Version: 1.01

Model #: mst
Serial #: 90680.00

Date: ----->
Barometric Pressure: -----> 29.98 (in. Hg)
Theoretical Critical Vacuum: ----> 15.00 (in. Hg)

|||||

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, $(ft)^3 * (deg R)^{0.5} / ((in.Hg) * (min))$.

|||||

----- DRY GAS METER READINGS -----

-CRITICAL ORIFICE READINGS

Delta H (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Outlet (deg F)	Final Temps. Inlet (deg F)	Outlet (deg F)	Orifice K' Orifice Serial# Coefficient (number) (see above)	Actual Vacuum (in Hg)	Ambient Temperature Initial (deg F)	Final (deg F)	Average (deg F)
2.70	5.00	819.676	824.340	4.664	45.0	44.0	46.0	44.0	4 0.689	15.0	45.0	45.0	45.0
2.70	5.00	824.340	829.120	4.780	46.0	44.0	49.0	44.0	4 0.689	15.0	45.0	47.0	46.0
2.70	5.00	829.120	833.590	4.470	49.0	44.0	50.0	45.0	4 0.689	15.0	45.0	47.0	46.0

***** RESULTS *****

--- DRY GAS METER ---

--- ORIFICE ---

--- DRY GAS METER ---

--- ORIFICE ---

VOLUME CORRECTED	VOLUME CORRECTED
Vm(std) (cu ft)	Vm(std) (liters)
4.919	139.3
5.031	142.5
4.693	132.9

VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL
Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)
4.595	130.1	4.387
4.590	130.0	4.392
4.590	130.0	4.392

Average Y ----->

CALIBRATION FACTOR Y	Value	Variation
(number) (number)	0.934	-0.007
0.912	-0.029	
0.978	0.037	

0.941

CALIBRATION FACTOR Delta H@	Value	Value	Variation
(in H2O) (mm H2O) (in H2O)	1.888	47.95	-0.002
1.892	48.05	0.002	
1.890	48.00	0.000	

1.890 48.00 <----- Average dH@

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the **dry** gas meter, acceptable tolerance of individual values from the average is **+/-0.02**.

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 **cfm** of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values **from** the average is **+/-0.2**.

SIGNED: _____

Date: 01 / 05 / 2007

ΔAir Analysis, Inc.
(317) 837- 8514
(317) 837- 8518 FAX

3904 Clarks Creek Road
Plainfield, Indiana 46168

PITOT TUBE CALIBRATION

Reference: 40 CFR 60, Appendix A, Method 2, Section 2.7

Calibration Date 1/05/2007

Probe Number/ID Six Foot Probe-A

External Tubing Diameter 0.95 in

Base To Opening Plane Distance (Pa) 1.25 cm

Base To Opening Plane Distance (Pb) 1.25 in

	Measured	Allowable
Pb/Dt	1.32cm	$1.05Dt \leq P \leq 1.50Dt$ (0.9975cm – 1.42cm)
P a m	1.32cm	$1.05Dt \leq P \leq 1.50Dt$ (0.9975cm – 1.42cm)
Angle α 1	1 deg	α 1 and α 2 ≤ 10.0 Degrees
Angle a 2	1 deg	a 1 and a 2 ≤ 10.0 Degrees
Angle β 1	0 deg	β 1 and β 2 ≤ 5.0 Degrees
Angle β 2	0 deg	β 1 and β 2 ≤ 5.0 Degrees
z (cm)	0.0	z is less than 0.32cm (1/8 th)
w (cm)	0.0	w is less than 0.08cm (1/32 nd)
	<i>If all criteria are met, Pitot Coefficient is 0.84</i>	Pitot Coefficient: 0.84

Control Factor	Mercury Thermometer °F	Probe Response
ICE	35	34
AMBIENT	55	56
BOILING/HOT H2O	106	107

Test performed by: Morrell Date of Test 1/5/07

CALIBRATION CHECK

id
pillsbury

Y_{avg} = 0.960 0.974 0.924 0.953

Average result must be within 5% of Y

Repeatability (%) -1.18%

PASS POST CAL

ID:	90
Y:	0.941
Delta H:	1.9

RUN #	Volume	Delta H	DGM Inlet	DGM Outlet
1		1.430	90	52
2	50	1.560	90	53
3	04/1907	1.560	92	54
4	(Post Test) per EMTC Guideline GD-26	1.690	91	56
5		1.560	91	56
6		1.820	91	57
7		1.144	90	57
8		1.079	92	57
9		1.079	92	57
10		1.144	93	58
11		1.235	91	58
12		1.261	92	58
13		1.105	91	58
14		1.096	93	58
15		1.170	93	58
16		1.105	94	58
17		1.105	95	58
18		1.300	96	60
19		1.950	97	81
20		1.950	99	81
21		2.210	70	63
22	1073.861	2.210	71	64
23	912.339	1.950	71	65
24		1.950	72	65

Volume	Avg. Dh	Avg. Meter TIF
161.522	1.49	61.27

Barometric Pressure:	30.00	Meter Y:	0.941
Test Time:	240	Delta H:	1.9

Y_{avg} = 0.960

RUN #	Volume	Delta H	DGM Inlet	DGM Outlet
1	50	1.95	75	75
2	04/1907	2.21	83	75
3	(Post Test) per EMTC Guideline GD-26	1.82	86	76
4		2.21	97	77
5		2.34	89	78
6		2.73	97	79
7		1.04	91	79
8		1.43	94	78
9		1.24	95	79
10		1.30	98	79
11		1.30	98	80
12		1.43	90	80
13		0.96	90	83
14		1.05	93	83
15		1.05	95	84
16		1.05	96	87
17		0.98	91	86
18		1.05	92	86
19		1.14	92	87
20		1.92	100	88
21	239.593	2.08	100	90
22	74.079	1.56	102	91
23		1.43	103	93
24		1.56	102	94

Volume	Avg. Dh	Avg. Meter TIF
164.614	1.53	86.71

Barometric Pressure:	30.20	Meter Y:	0.941
Test Time:	240	Delta H:	1.900

Y_{avg} = 0.974

RUN #	Volume	Delta H	DGM Inlet	DGM Outlet
1		1.43	75	75
2	50	1.43	83	75
3	04/1907	1.43	86	76
4	04/05000	1.69	97	77
5		2.08	96	78
6		2.60	97	79
7		1.17	91	79
8		1.13	94	78
9		1.13	95	79
10		1.14	96	79
11		1.30	98	80
12		1.43	90	80
13		1.30	90	83
14		1.82	93	83
15		1.30	95	84
16		1.30	96	87
17		1.11	91	86
18		1.43	92	86
19		1.56	92	87
20		1.08	100	89
21	417.927	1.95	100	90
22	239.830	2.50	102	91
23		2.21	103	93
24		2.34	102	94

Volume	Avg. Dh	Avg. Meter TIF
179.197	1.61	86.71

Barometric Pressure:	30.20	Meter Y:	0.941
Test Time:	240	Delta H:	1.900

Y_{avg} = 0.924

Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

Certificate of Analysis

- EPA PROTOCOL GAS -

~~818465B~~
B18465B

<u>Customer</u>	<u>IE Monitoring Instruments, Inc (Worthington, Ohio)</u>
<u>Date</u>	<u>January 16, 2006</u>
<u>Delivery Receipt</u>	<u>DR-16491</u>
<u>Gas Standard</u>	<u>95.0 ppm Nitric Oxide/Nitrogen - EPA PROTOCOL</u>
<u>Final Analysis Date</u>	<u>January 16, 2006</u>
<u>Expiration Date</u>	<u>January 16, 2008</u>
<u>Component</u>	<u>Nitric Oxide</u>
<u>Balance Gas</u>	<u>Nitrogen</u>

Analytical Data:

DO NOT USE BELOW 150 psig

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Nitric Oxide: 90.4 ppb +/- 0.90 ppb

Nitrogen: Balance

Total Oxides of Nitrogen: 90.4 ppb

**** NOx for Reference Use Only ****

Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-159052	CC-165371
Concentration:	56.42 ppm NO/Nitrogen	91.3 ppm NO/Nitrogen
Expiration Date:	August 26, 2009	March 01, 2009

Certification Instrumentation

Component:	Nitric Oxide
Make/Model:	Nicolet-NEXUS 470
Serial Number:	AEP99000154
Principal of Measurement:	FTIR
Last Calibration:	January 04, 2006

Cylinder Data

Cylinder Serial Number:	CC-233259	Cylinder Outlet:	CGA 660
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70 F
Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.			

Certified by:

Date:

January 16, 2006

Unmatched Excellence

318834B

Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer IE Monitoring Instruments, Inc (Worthington, Ohio)
December 11, 2006
Delivery Receipt DR-18365
Gas Standard 45.0 ppm Nitric Oxide/Nitrogen - EPA PROTOCOL
Final Analysis Date December 05, 2006
Expiration Date December 05, 2008

Component Nitric Oxide
Balance Gas Nitrogen

Analytical Data:

DO NOT USE BELOW 150 psig

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Nitric Oxide: 45.8 ppm +/- 0.45 ppm

Nitrogen: Balance

Total Oxides of Nitrogen: 45.8 ppm

**** NOx for Reference Use Only ****

Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-159073	CC-159052
Concentration:	25.43 ppm NO/Nitrogen	56.42 ppm NO/Nitrogen
Expiration Date:	May 25, 2009	August 26, 2009

Certification Instrumentation

Component: Nitric Oxide
Make/Model: Nicolet-NEXUS 470
Serial Number: AEP99000154
Principal of Measurement: FTIR
Last Calibration: November 01, 2006

Cylinder Data

Cylinder Serial Number: CC-251926 Cylinder Outlet: CGA 660
Cylinder Volume: 140 Cubic Feet Cylinder Pressure: 2000 psig, 70 F
Analytical Uncertainty and NIST Traceability are in compliance with EPA-BOOR-971121.

Certified by:

Date:

Dave Kagnice
December 11, 2006

Unmatched Excellence

APPENDIX VII

SUBMITTED PROTOCOL

COMPLIANCE TEST PROTOCOL
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Date Prepared: January 29, 2007 Proposal Test Date: April 4, 2007

Plant Address and Location: 8000 N CR 225 E, Pittsboro

1. Source Information

AFS: _____ Id Number: _____ Permit Number: 063-16628-00037
Company: Steel Dynamics, Inc.
Mail Address: 8000 N CR 225 E
City: Pittsboro Zip: 46158
Co. Contact: Mike Brooks Phone: 892-7000

Check program if applicable:

FESOP: _____
Title V: X
SSOA: _____

AGENCY USE ONLY Date Rec'd: _____
Inspector: _____ Reviewer: _____ Date Appr: _____

2. Tester Information

Name: Air Analysis, Inc.
Address: 3904 Clarks Creek Rd
Contact: Michael Dicen Phone: 317-837-8514
Pre-Test Inspection Complete? Yes

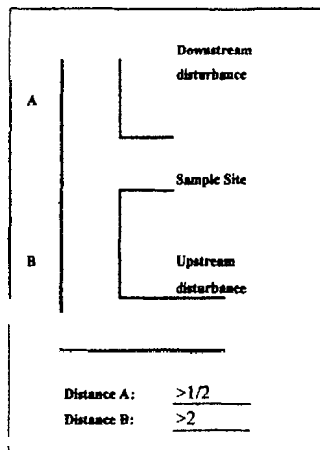
3. Process Information

Unit to Test: Electric Arc Furnace
Max. Rated Capacity: 125 tons/hour
Proposed Operating Speed: 95% load
Pollution Control Equipment: Baghouse
Process Description: Steel manufacturing

Fuel Type: Natural gas oxy-fired

4. Test Information

		# Runs	Time/Run
Methods 1-4	Moisture/Flow	3	60 min
Method 5	PM/PM10	3	60 min
Method 6C			
Method 7E	Nitrogen Oxides	3	60 min
Method 12	Lead	3	60 min
Other Testing:			
Method 202	Condensible	3	60 min



5. Sampling Strategy

a. Describe any deviations from the standard test method. None

b. Describe method used to determine quantity of raw materials
Plant personnel will keep record of production.

6. Sample Site Location

Does sample port location meet 40 CFR 60, Appx A, Method 1
Section 1.2 requirements: Yes/No: YES If No, Explain _____

Number of sample points for M5: 24
Diameter at sample site: 165" Stack height: 135'
Approx. stack gas flow (ACFM): 6,765,000
Approx. gas temp. (deg F): 200
Approx. gas moisture (%): 36%

Reason for test:

State Agreed Order: Yes/No: _____ Operating permit: Yes/No: Yes
Construction Permit: Yes/No: _____ Compliance w 316 _____
NSPS 40 CFR 60 Subpart _____ Other _____
Title V: _____
Other (i.e. EPA, CD, state, 114) _____

326 IAC 3-2.1 requires this completed form and fee to be submitted 35 days prior to proposed test date to:
(FEE NOT APPLICABLE IF FESOP OR TITLE V)

Questions may be directed to 317-232-8338, FAX : 317-233-6865

Compliance Data Section
Office of Air Management
Indiana Department of Environmental Management
100 North Senate
PO BOX 6015
Indianapolis, IN 46206-6015

APPENDIX VIII

PRODUCTION DATA

PRODUCTION SUMMARY
April 6, 2007

Pb COMPLIANCE TEST

ELECTRIC ARC FURNACE

RUN	TIME	HEAT #	START	END	TONS
1	0912-1035	A071602	0916	1009	99.9
		A071603	1012	1104	95.5
2	1105-1215	A071604	1107	1205	98.6
3	1320-1423	A071606	1322	1418	103.8

LADLE METALLURGICAL FURNACE

RUN	TIME	HEAT #	START	END	TOMS
1	0912-1035	A071601	0920	0947	100.0
2	1105-1215	A071802	1039	1120	99.9
		A071603	1141	1224	95.5
3	1320-1420	A071605	1331	1404	105.7

NO_x COMPLIANCE TEST

ELECTRIC ARC FURNACE

RUN	TIME	HEAT#	START	END	TONS
1	1105-1215	A071604	1107	1205	98.6
2	1320-1420	A071606	1322	1418	103.8
3	1420-1520	A071607	1436	1530	95.7

LADLE METALLURGICAL FURNACE

RUN	TIME	HEAT #	START	END	TONS
1	1105-1215	A071602	1039	1120	99.9
		A071603	1141	1224	95.5
2	1320-1420	A071605	1331	1404	105.7
3	1420-1520	A071606	1439	1458	103.8

Note – The Electric Arc Furnace and Ladle Metallurgical Furnaces are rated at a nominal maximum capacity of 125 tons per hour. The production tonnages associated with the furnace operation are typically in the 100 tons per heat range. The production tonnage is a **factor** of the amount of scrap that can be charged to the furnace and the ladle size. Typically, a 10 to 15 ton liquid steel heel is maintained in the furnace, therefore, approximately 110 tons of scrap and fluxes can be charged per **heat**. The ladles are sized to hold 100 to 110 tons of liquid steel.

PRODUCTION SUMMARY
April 19 and 20, 2007

PM COMPLIANCE TEST

Date - April 19

Time - 1010 to 1420

ELECTRIC ARC FURNACE

HEAT #	START	END	TONS
A071835	0939	1035	102.7
A071836	1050	1306	103.6
A071037	1314	1411	107.6

LADLE METALLURGICAL FURNACE

HEAT #	START	END	TONS
A071833	1020	1137	102.9
A071834	1210	1512	108.6
A071835	1306	1626	102.7

Date - April 20

Time - 0745 to 1700

ELECTRIC ARC FURNACE

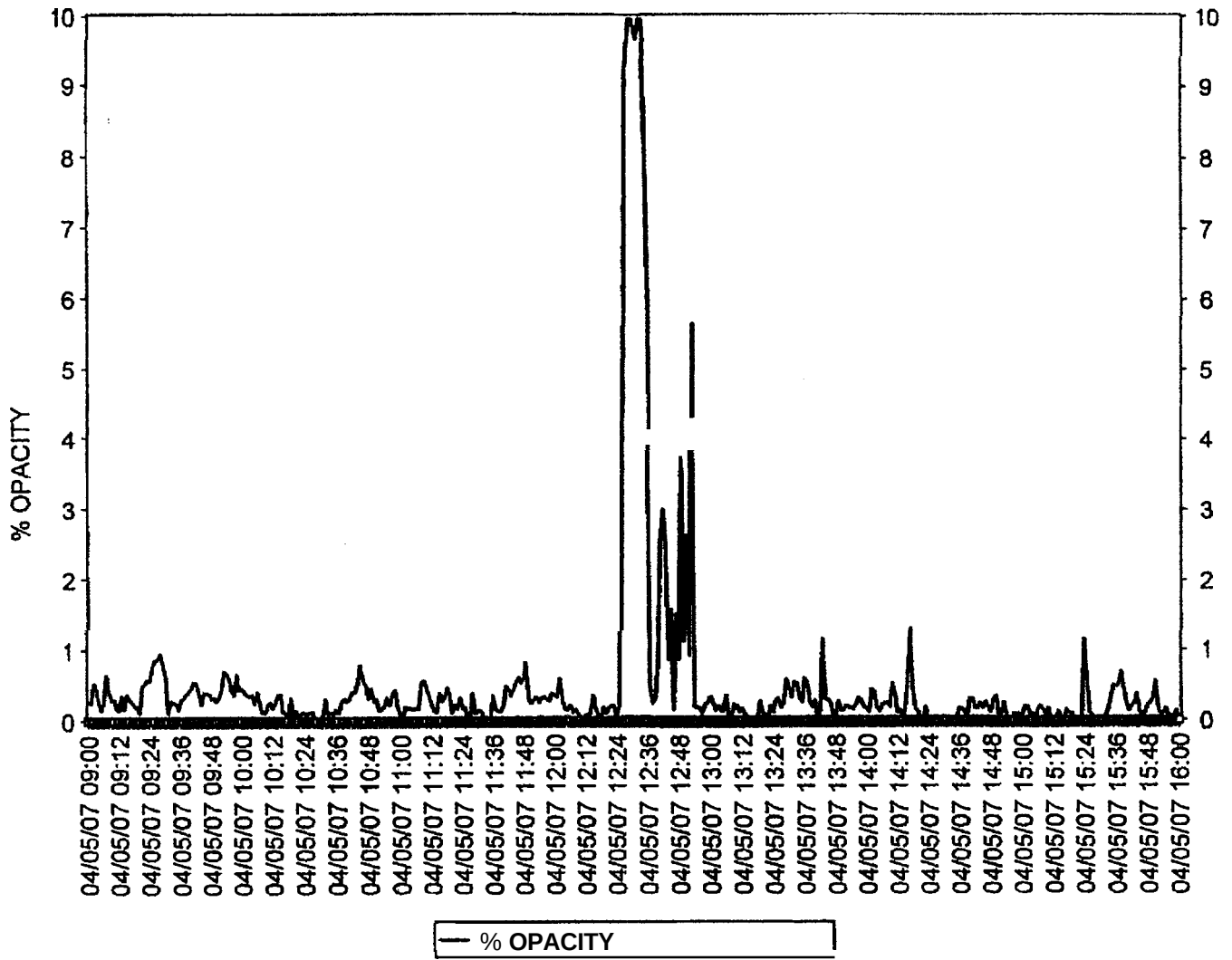
HEAT #	START	END	TONS
A071851	0727	0826	104.8
A071852	0848	0939	107.6
A071853	0943	1042	104.8
A071854	1046	1139	108.4
A071855	1143	1239	107.6
A071856	1241	1335	107.1
A071857	1452	1547	107.0
A071858	1547	1644	108.4
A071859	1646	1735	108.5

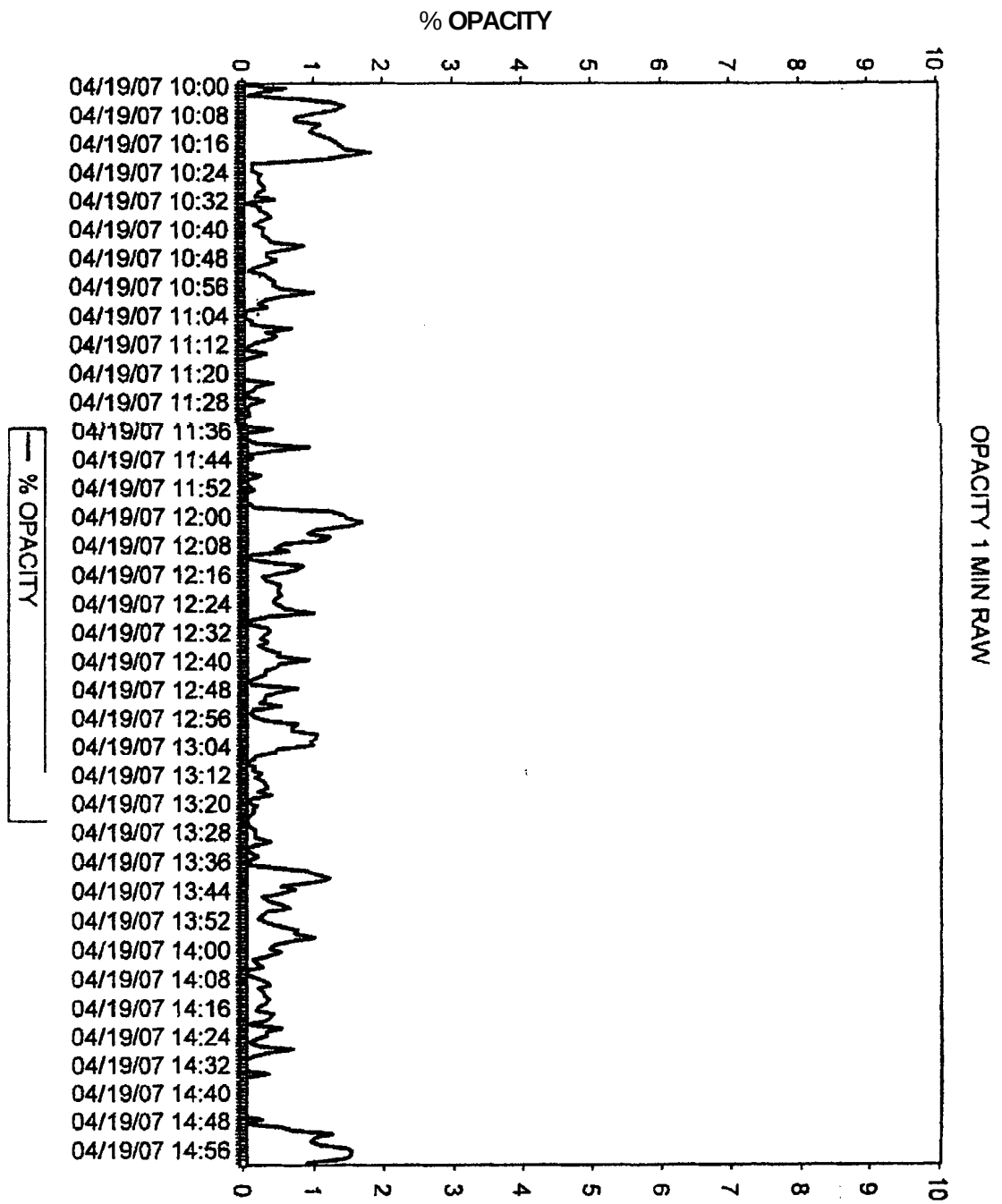
LADLE METALLURGICAL FURNACE

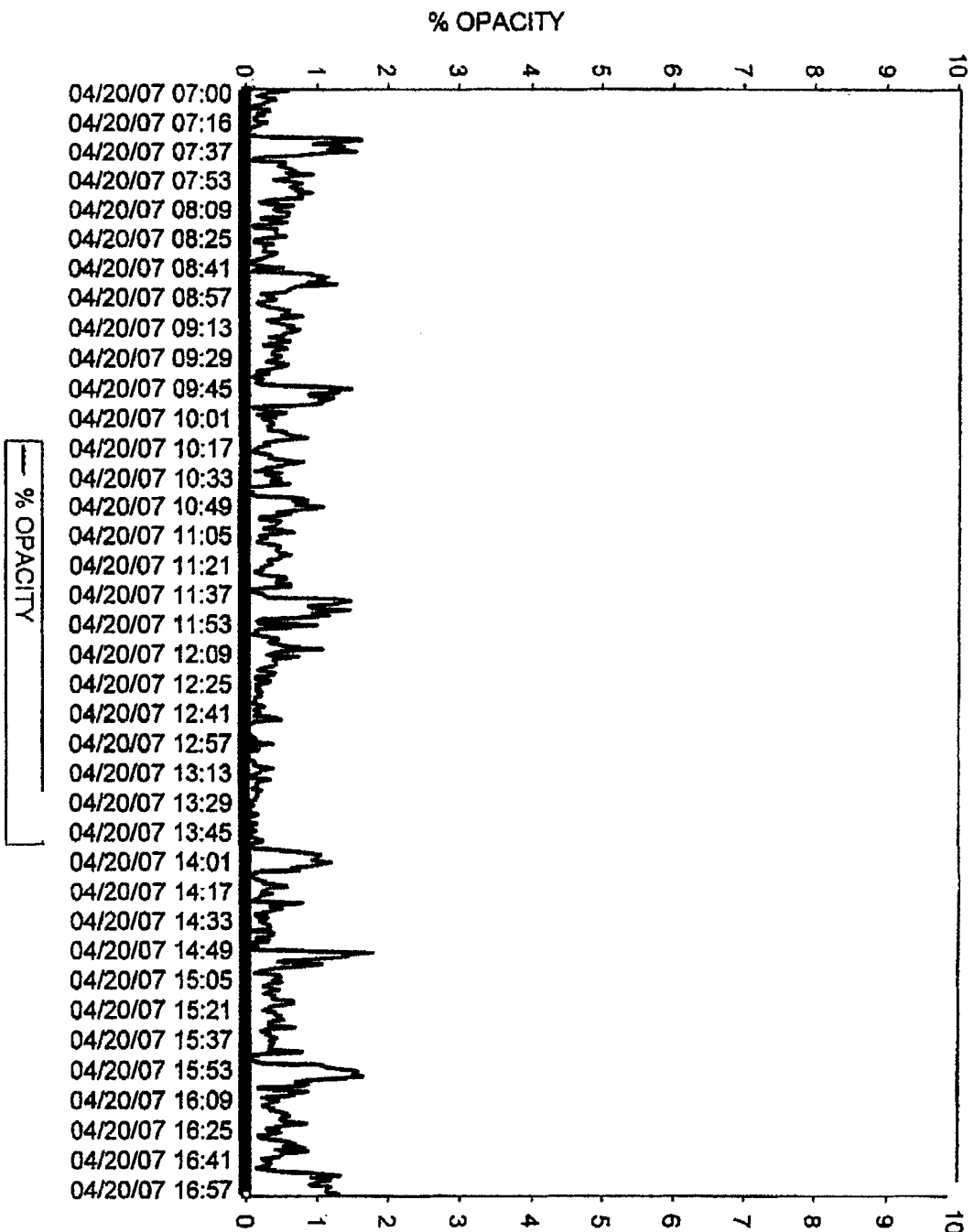
HEAT #	START	END	TONS
A071849	0740	0831	110.3
A071850	0855	0923	108.6
A071851	0955	1022	104.8
A071852	1054	1125	107.6
A071853	1150	1159	104.8
A071854	1405	1440	108.4
A071855	1500	1533	107.6
A071856	1600	1631	107.1

Note – ~~The~~ Electric Arc Furnace and ~~Ladle~~ Metallurgical Furnaces are rated at a nominal maximum capacity of 125 tons per hour. The production tonnages associated with the furnace operation are typically in the ~~100~~ tons per heat range. The production tonnage is a factor of the amount of scrap ~~that~~ can be charged to the furnace and the ladle ~~size~~. Typically, a 10 to ~~15~~ ton liquid steel heel is maintained in the furnace, therefore, approximately ~~110~~ tons of scrap and fluxes can be charged per heat. The ladles are sized to hold 100 to 110 tons of liquid steel.

OPACITY 1 MIN RAW







Run# 1

FUME COLLECTION SYSTEM CHECKS PERFORMED DURING COMPLIANCE TEST

APRIL 19, 2007

EAF BAGHOUSE

TIME	DAMPER SETTINGS				FAN AMPERAGES			OTHER PARAMETERS	
	EAST	CENTER	WEST	WATER COOLED DUCT	#1	#2	#3	FURNACE STATIC PRESSURE	BAGHOUSE DP
1000	83	93	83	100	165	188	0	-1.5	7.5
1030	83	93	83	100	183	203	0	-1.5	7.8
1100	83	93	83	100	193	210	0	-1.5	7.8
1130	83	93	83	100	188	211	0	-1.5	7.0
1200	5	93	5	100	181	203	0	-1.3	8.0
1230	5	93	5	100	183	200	0	-1.6	7.0
1300	83	93	83	100	173	190	0	-1.2	8.6
1330	83	93	83	100	173	195	0	-1.4	7.5
1400	83	93	83	100	163	181	0	-1.9	7.7
1415	83	93	83	100	163	183	0	-1.1	8.3
AVE	-	-	-	-	177	196	0	-1.5	7.7

Run#2

**FUME COLLECTION SYSTEM CHECKS
PERFORMED DURING COMPLIANCE TEST**

APRIL 20, 2007

EAF BAGHOUSE

TIME	DAMPER SETTINGS				FAN AMPERAGES			OTHER PARAMETERS	
	EAST	CENTER	WEST	WATER COOLED DUCT	#1	#2	#3	FURNACE STATIC PRESSURE	BAGHOUSE DP
0700	83	93	83	99	183	198	0	-1.3	8.7
0730	83	93	83	99	188	208	0	-1.5	8.3
0800	83	93	83	99	175	193	0	-1.4	7.5
0830	83	93	83	99	175	193	0	-1.2	7.5
0900	83	93	83	99	175	198	0	-1.4	8.7
0930	83	93	83	99	165	186	0	-1.3	7.9
1000	83	93	83	99	171	191	0	-1.4	6.9
1030	83	93	83	99	180	195	0	-1.5	8.8
1100	83	93	83	99	181	193	0	-1.4	8.4
1130	83	93	83	100	163	185	0	-1.7	8.8
1200	83	93	83	100	175	191	0	-1.4	8.6
AVE	-	-	-	-	-	-	-	-	-

1245 83 93 83 100 171 191 0 -1.4 7.5

12 READINGS — — — — 175 193 0 -1.4 8.1

RUN #3

FUME COLLECTION SYSTEM CHECKS
PERFORMED DURING COMPLIANCE TEST

APRIL 20, 2007

EAF BAGHOUSE

TIME	DAMPER SETTINGS				FAN AMPERAGES			OTHER PARAMETERS	
	EAST	CENTER	WEST	WATER COOLED DUCT	#1	#2	#3	FURNACE STATIC PRESSURE	BAGHOUSE DP
1245	83	93	83	100	171	191	0	-1.4	7.5
1300	83	93	83	100	175	193	0	-1.3	8.5
1330	83	93	83	100	163	183	0	-1.1	9.1
1400	83	93	83	100	181	198	0	-1.3	8.5
1430	83	93	83	100	185	203	0	-1.4	8.0
1500	83	93	83	100	178	200	0	-1.5	6.8
1530	83	93	83	100	173	190	0	-1.5	8.5
1600	83	93	83	100	166	190	0	-1.5	7.0
1630	83	93	83	100	161	185	0	-1.5	9.0
1645	5	93	5	99	160	178	0	-1.2	7.3
AVE	-	-	-	-	171	191	0	-1.4	8.0

