12.1

TEST REPORT

EMISSION TEST PROGRAM
ELECTRIC ARC FURNACE #8
BAGHOUSE INLET DUCT

NORTHWESTERN STEEL AND WIRE
STERLING, ILLINOIS

PREPARED FOR:

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ARI PROJECT NO. 654-15
ARI COST PROPOSAL N0.4301R1
NORTHWESTERN STEEL AND WIRE P.O. NO.
H2 01430088
TEST DATES: APRIL 11 AND 12,2001

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SECTIONONE Introduction and Summary

ARI Environmental, Inc. (ARI) was retained by Northwestern Steel and Wire (NWS&W) to conduct a sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO) and total volatile organic compounds (VOC) formal emission test program on the common baghouse inlet duct serving Electric Arc Furnace (EAF) #8 at the NWS&W facility located in Sterling, Illinois. The testing was performed on April 11 and 12, 2001.

The test program was conducted by Mr. Bill Crane, Mr. Steve Flaherty and Mr. Craig James of ARI. Mr. Evan Buskohl and Mr. David Long of NWS&W were present during the test program to monitor process operations and coordinate the test program.

Test methods followed those as specified in the Code of Federal Regulations, 40CFR, Part 60,2000, Appendix A, USEPA Methods 1, 2, 3A, 4, 6C, 7E, 10 and 25A; 40CFR, Part 51, Appendix M, USEPA Method 205; and the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods.

This report summarizes the test procedures and results of this test program. Included, as appendices, are all calculation data, field data, CEM data, process data and calibration data.

The test results of the emission test program conducted on the EAF #8 baghouse inlet are summarized below and further detailed in Section 3.

RUN NO.	1	2	3	
TEST DATE :	4/11/01	4/11/01	4/12/01	
TEST TIME :	1048-1235	1249-1439	1436-1608	Average
SO_2 Emissions				
concentration, ppmv, db	3.0	1.3	3.2	2.5
Emission Rate, lb/hr	22.1	9.2	24.9	18.7
Emission Rate, lb/ton of scrap	0.096	0.037	0.092	0.075
NO_x Emissions				
concentration, ppmv, db	10.2	13.0	20.1	14.4
Emission Rate, lblhr	53.0	65.2	111.9	76.7
Emission Rate, lblton of scrap	0.230	0.265	0.415	0.303
CO Emissions				
Concentration, ppmv, db	73.8	99.1	61.0	78.0
Emission Rate, lblhr	234.5	303.1	207.1	248.2
Emission Rate, lblton of scrap	1.015	1.229	0.768	1.004
Total VOC (as C_1) Emissions				
Concentration, ppmv, db	0.6	0.6	0.3	0.5
Emission Rate, lblhr	0.8	0.8	0.4	0.7
Emission Rate, lblton of scrap	0.004	0.003	0.002	0.003

2.1 OVERVIEW

ARI conducted a SO_2, NO_x, CO and total VOC formal emission test program on the common baghouse inlet duct serving EAF #8 at the NWS&W facility located in Sterling, Illinois. The testing was performed on April 11 and 12, 2001.

For each sampling run, the following gas parameters were determined:

- Temperature - °F
- Velocity - fps
- Volume flow - acfm, scfm, dscfh
- Moisture - % by volume
- CO_2, O_2 and N_2 (by difference) - % by volume
- Sulfur Dioxide
  - Concentration - ppmv db, lb/dscf
  - Emission rate - lb/hr, lb/ton of scrap
- Nitrogen Oxides
  - Concentration - ppmv db, lb/dscf
  - Emission rate - lb/hr, lb/ton of scrap
- Carbon Monoxide
  - Concentration - ppmv db, lb/dscf
  - Emission rate - Iblhr, lb/ton of scrap
- Total VOC (as C_1)
  - Concentration - ppmv db, lb/dscf
  - Emission rate - lb/hr, lb/ton of scrap

2.2 METHODOLOGY

Test methods followed those as specified in the Code of Federal Regulations, 40CFR, Part 60,2000, Appendix A, USEPA Methods 1, 2, 3A, 4, 6C, 7E, 10 and 25A and 40CFR, Part 51, Appendix M, USEPA Method 205 as follows:

USEPA METHODS	DESCRIPTION
1	Sample and Velocity Traverses for Stationary Sources
2	Determination of Stack Gas Velocity and Volumetric Flow Rate
3A	Gas Analysis for Carbon Dioxide, Oxygen, Excess Air and Dry Molecular Weight (Instrumental Analyzer Procedure)
4	Determination of Moisture Content in Stack Gases
6C	Determination of Sulfur Dioxide Emissions from Stationary Sources
7E	Determination of Nitrogen Oxides Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources

USEPA METHODS	DESCRIPTION
25A	Determination of Total Gaseous Organic Concentration using a Flame Ionization Analyzer
205	Validation of Gas Dilution Systems

2.2.1 Sampling and Velocity Traverse Location (USEPA Method 1)

Eight sampling ports are located on the top of the 20' x 20' baghouse inlet duct >2 diameters downstream and >0.5 diameters upstream from the nearest geometry changes. Sampling was conducted at six traverse points in each of the eight sampling ports for a total of 48 points.

2.2.2 Gas Flow and Temperature (USEPA Method 2)

Velocity traverses were made with a type "S" pitot tube in accordance with USEPA Method 2. The velocity head was determined using a Dwyer inclined oil manometer read to the nearest 0.01 in. H_2O. Temperature measurements were determined using a Chromel-Alumel thermocouple connected to a digital read-out potentiometer.

2.2.3 Gas Analysis for CO_2, O_2 and Molecular Weight (USEPA Method 3A)

Continuous oxygen (O_2) and carbon dioxide (CO_2) sampling were conducted in accordance with USEPA Method 3A using ARI's OFC Infrared Industries Model IR-2000 oxygen and Servomex Model 1400 carbon dioxide analyzers. The monitor's outputs were recorded on a strip chart recorder and ARI's datalogger system.

All applicable calibration standards were introduced at the three-way calibration valve located at the end of the sample probe for calibration of the O_2 and CO_2 monitors. The monitor spans were set at 25% (O_2) and 20% (CO_2).

2.2.4 Gas Moisture (USEPA Method 4)

Moisture sampling was conducted following procedures outlined in USEPA Method 4. Stack gas was passed through a series of ice-cooled impingers and upon the completion of each test run the sample train was disassembled. The contents of the impingers were measured both volumetrically and gravimetrically. Percent by volume moisture content was then determined utilizing standard psychrometric calculations published in USEPA Method 4.

2.2.5 Determination of Sulfur Dioxide, Nitrogen Oxides, Carbon Monoxide and Total VOC Emissions from Stationary Sources (USEPA Methods 6C, 7E, 10 and 25A)

SO_2 concentrations were determined in accordance with USEPA Method 6C using a Thermo Environmental Instruments (TECO) Model 43C analyzer.

NO_x concentrations were determined in accordance with USEPA Method 7E using ARI's Thermo Environmental Instruments Model 42H chemiluminescent NO, analyzer.

CO concentrations were determined in accordance with USEPA Method 10 procedures using ARI's Thermo Environmental Instruments, Inc. Model 48H gas filter correlation analyzer. This analyzer has a 10 million to one rejection interference ratio of CO to CO_2; therefore an ascarite scrubber prior to the analyzer is not required.

Total VOC was determined in accordance with USEPA Method 25A using a Pace Model 5000 total hydrocarbon (THC) analyzer. This analyzer utilizes a continuous heated FID to keep the sample gas stream above the dew point. The hourly average total VOC (equivalent propane) concentrations were corrected to an equivalent carbon (C_1) basis in accordance with Method 25A procedures.

The flue gas sample was extracted to the analyzers through a stainless steel probe with a 3-way valve connected to a heated Teflon sample line. The Teflon sample line was connected at ground level to a heated Teflon lined pump with an exhaust manifold with separate intake lines for direct input to ARI's THC analyzer and to ARI's Universal Analyzer Model No. 3082 electronic sample conditioner (to remove moisture). The sample conditioner was equipped with a Teflon lined pump and exhaust sample manifold with intake lines for input to ARI's SO_2, NO, and CO analyzers.

Calibration gases were injected directly into the 3-way valve to determine the measurement system bias relative to direct monitor injection or calibration error.

Calibration gases were diluted from USEPA Protocol 1 standards. Dilution was performed using ARI's Environics Model 4040 Gas Dilution System. The dilution system was verified onsite before the start of the compliance testing following procedures described in 40CFR, Part 51, Appendix M, USEPA Method 205.

Analyzer calibration error tests and measurement system bias tests were performed prior to testing and pre/post calibration drift tests were performed after each test repetition. The average zero and calibration drift values obtained before and after each test repetition were used to correct the raw data for instrument zero and span drift during each test run.

Results from the sample runs were continuously recorded by ARI's data acquisition system consisting of a datalogger and laptop computer for digital data archives and reduction.

2.3 CALCULATION OF HOURLY *EMISSION* RATES

The emission rates of SO_2, NO_x, CO and total VOC were calculated by multiplying the calculated drift corrected average hourly concentration of each pollutant (lb/dscf) by the gas volumetric flow rate obtained at the baghouse inlet duct (dscfh). Emission determination based on Iblton of scrap was calculated by multiplying the tons of scrap melted per hour by the lb/hr pollutant emission rate of each analyte.

SEMIOWTHREE

'est Results

The results of the emission test program are presented in Table 3-1.

All computer printouts, summary calculation data, field data, CEM data, process data and calibration data are included in the appendices as detailed in the Table of Contents.

TABLE 3-1: SUMMARY OF TEST RESULTS

RUN NO.	1	2	3	
TEST DATE :	4/11/01	4/11/01	4/12/01	
TEST TIME :	1048-1235	1249-1439	1436-1608	Average
Stack Gas Parameters				
Temperature, °F	175.7	184.4	160.3	173.5
Velocity, av. ft/sec	38.3	37.6	40.1	38.7
Volumetric flow, acfm	920,392	902,214	962,669	928,425
Volumetric flow, scfm	753,989	729,210	797,347	760,182
Volumetric flow, dscfh	43,718,486	42,078,167	46,729,996	44,175,550
Moisture, av. % vol	3.4	3.8	2.3	3.2
Carbon dioxide, av. % vol	1.2	1.3	1.3	1.3
Oxygen, av. % vol	20.2	20.2	20.6	20.3
Scrap used, tons	412.0	452.0	413.5	425.8
Sulfur Dioxide (SO_2) Emissions				
Concentration				
ppmv, db	3.0	1.3	3.2	2.5
x 10^{-6} lb/dscf	0.505	0.218	0.532	0.418
Emission Rate				
lb/hr	22.065	9.188	24.881	18.711
lb/ton of scrap	0.096	0.037	0.092	0.075
Oxides of Nitrogen (NO_x) Emissions				
Concentration				
ppmv, db	10.2	13.0	20.1	14.4
x 10^{-6} lb/dscf	1.213	1.550	2.394	1.719
Emission Rate				
lb/hr	53.027	65.226	111.888	76.714
lb/ton of scrap	0.230	0.265	0.415	0.303
Carbon Monoxide (CO) Emissions				
Concentration				
ppmv, db	73.8	99.1	61.0	78.0
x 10^{-6} lb/dscf	5.363	7.202	4.431	5.666
Emission Rate				
lb/hr	234.476	303.067	207.067	248.203
lb/ton of scrap	1.015	1.229	0.768	1.004
Total VOC (as C_1) Emissions				
Concentration				
ppmv, db	0.6	0.6	0.3	0.5
x 10^{-6} lb/dscf	0.019	0.019	0.009	0.016
Emission Rate				
lb/hr	0.817	0.786	0.437	0.680
lb/ton of scrap	0.004		[illegible]	0.003

APPENDIX A

Computer Printouts and Summary Calculation D

Summary of Test Results

TABLE	1111
COMPANY	Northwest Steel and Wire
LOCATION	Sterling, Illinois
SOURCE	EAF #8 Baghouse Inlet
TEST DATE	4/11/01

RUN NO	1	2	3	
TEST TIME	1048-1235	1249-1439	1436-1608	Average
Stack Gas Parameters				
Temperature, °F	175.7	184.4	160.3	173.5
Velocity, av. ft/sec	38.3	37.6	40.1	38.7
Volumetric flow, acfm	920,392	902,214	962,669	928,425
Volumetric flow, scfm	753,989	729,210	797,347	760,182
Volumetric flow, dscfh	43,718,486	42,078,167	46,729,996	44,175,550
Moisture, av. % vol	3.4	3.8	2.3	3.2
Carbon Dioxide, av. % vol	1.2	1.3	1.3	1.3
Oxygen, av. % vol	20.2	20.2	20.6	20.3
Scrap Used, tons	412.0	452.0	413.5	425.8
Carbon Monoxide (CO) Emissions				
Concentration				
ppmv, db	73.8	99.1	61.0	78.0
x 10^{-6} lb/dscf	5.363	7.202	4.431	5.666
Emission Rate				
lb/hr	234.476	303.067	207.067	248.203
lb/ton of metal	1.015	1.229	0.768	1.004
Oxides of Nitrogen (Nox) Emissions				
Concentration				
ppmv, db	10.2	13.0	20.1	14.4
x 10'' lbldscf	1.213	1.550	2.394	1.719
Emission Rate				
lb/hr	53.0	65.2	111.9	76.7
lb/ton of metal	0.230	0.265	0.415	0.303
Volatile Organics (as C_1) Emissions				
Concentration				
ppmv, db	0.6	0.6	0.3	0.5
x 10^{-6} lb/dscf	0.019	0.019	0.009	0.016
Emission Rate				
lb/hr	0.817	0.786	0.437	0.680
lb/ton of metal	0.004	0.003	0.002	0.003
Sulfur Dioxide (SO_2) Emissions				
Concentration				
ppmv, db	3.0	1.3	3.2	2.5
x 10'' lb/dscf	0.505	0.218	0.532	0.418
Emission Rate				
lb/hr	22.065	9.188	24.881	18.711
lb/ton of metal	0.096	0.037	0.092	0.075

Method 25-A Total VOC Calculation Summary

Company: Northwest Steel and Wire
Location: Sterling, Illinois
Source: EAF #8 Baghouse Inlet
Test Date: 4/11/01
Run#: 1

INPUT DATA:

Average VOC (as propane) chart value	=	11.0 pp
Average prelpost zero chart value	=	-0.8 pp
Average prelpost cal drift chart value	=	50.0 pp
Propane mid-range cal. gas concentration	=	50.0 pp
Stack gas volumetric flow rate (Qs)	=	43,718,486 DS
Stack gas moisture content (Bws)	=	0.0336 Bw
Tonnage of Scrap Melted	=	412 Tor

CALCULATIONS:

VOC concentration (as propane) in stack gas (ppmv, wb):
Cc = (Avg.VOC - Avg. Zero) / (Avg. cal drift-Avg. Zero drift)*Cal gas Co = 11.7 ppm

VOC concentration (as propane) in stack gas (DRY BASIS):
Cc = ($Cc_{(wet)}$ / (1.0 - Bws)) = 0.2 pprr

VOC concentration (as Carbon) in stack gas:
Csc = Avg. VOC propane x 3 = 0.6 pprr

VOC concentration (as propane) in stack gas:
Cc = ((Avg VOC propane) x 44.08) 1385.26 x 10^6 = 0.023 x 10

VOC concentration (as Carbon) in stack gas:
Ccc (equivelent carbon) = ((Csc (as Carbon) x 12) 1385.26 x 10^6 = 0.019 x 10

VOC Emission Rate (as Propane):
Esc = lb/dscf propane x Qs(dscfh) = 1.0004 lb/h

VOC Emission Rate (as Carbon):
Ecc = lb/dscf carbon x Qs(dscfh) = 0.8170 lb/h

SO_2 lb/ton = [(lb/hr / 60) x test length, min.] / tonnage of scrap per heat = 0.004 lb/to

Sulfur Dioxide (SO_2) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111101
RUN NO: 1

INPUT

SO, Average Chart Reading:	2.5	ppmv
Avg. PrelPost Zero Reading:	-0.6	ppmv
SO, Calibration Gas Concentration:	50.0	ppmv
vg SO, Cal . Gas Pre/Post Test Reading:	50.0	ppmv
Stack Gas Volumetric Flow Rate:	43,718,486	dscfh
Tonnage of Scrap Melted:	412	tons

CALCULATIONS

Average SO_2 chart reading: = 2 5 ppmv

Average SO_2 concentration corrected for calibration drift:

SO_2 ppmv = (avg. SO_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero = 3.0 ppmvdb

Average SO_2 concentration:

SO_2 lb/dscf = (SO_2 ppmv, db)*(64/ 385.26 x 10-6) = 0.505 x 10^{-6} lb/dsc

Average SO, emission rate:

SO_2 Iblhr = (SO_2 lb/dscf) * (Stack flow rate, dscfh) = 22.065 lb/hr

SO_2 Iblton = [(lb/hr 160) x test length, min.] ▮ tonnage of scrap per heat = 0.096 Iblton

Oxides of **Nitrogen (NOx)** Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111/01
RUN NO: 1

INPUT

NOx Average Chart Reading:	11.8	ppmv
Avg. **Pre/Post** Zero Reading:	1.7	ppmv
NOx Calibration Gas Concentration:	500.0	ppmv
Avg **NOx** Cal . Gas **Pre/Post** Test Reading:	499.7	ppmv
Stack Gas Volumetric Flow Rate:	43,718,486	dscfh
Tonnage of Scrap Melted:	412	tons

CALCULATIONS

Average **NOx** chart reading: - 11.8 **ppmv**

Average **NOx** concentration corrected for calibration drift:

NOx ppmv = (avg. NOx - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Drift) = 10.2 ppmv

Average **NOx** concentration:

NOx lb/dscf = (NOx ppmv, db)*(46 1385.26 x 10^{-6}) - 1.213 **x 10^{-6}**

Average **NOx** Emission Rate:

NOx lb/hr = (NOx lb/dscf) * (Stack flow rate, dscfh) - 53.027 lblhr

NOx iblton = [(lb/hr / 60) x test length, min.] ▮ tonnage of scrap per heat - 0.230 **lb/ton**

Carbon Monoxide **(CO)** Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/11/01
RUN NO: 1

INPUT

CO Average Chart Reading:	76.5	ppmv
Avg. **Pre/Post** Zero Reading:	3.3	ppmv
CO Calibration Gas Concentration:	600.0	ppmv
vg CO Cal . Gas **Pre/Post** Test Reading:	597.9	ppmv
Stack Gas Volumetric Flow Rate:	43,718,486	dscfh
Tonnage of Scrap Melted:	412	tons

CALCULATIONS

Average CO chart reading:	=	76.5	ppmv
Average CO concentration corrected for calibration drift:			
CO ppmv = (avg. CO - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Drift	=	73.8	pprnvdb
Average CO concentration:			
CO lb/dscf = (CO ppmv, db)*(28 / 385.26 x 10-6)	=	5.363	x 10^{-6} lb/dscf
Average CO emission rate:			
CO lb/hr = (CO Ibldscf) * (Stack flow rate, dscfh)	=	234.476	lb/hr
CO lb/ton = [(lb/hr / 60) x test length, min.] / tonnage of scrap per heat	=	1.015	lb/ton

Carbon Dioxide (CO_2) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/11101
RUN NO: 1

INPUT

CO_2 Average Chart Reading:	1.2 **%**
Avg. Pre/Post Zero Reading:	0.1 **%**
CO_2 Calibration Gas Concentration:	10.0 **%**
Avg CO_2 Cal . Gas Pre/Post Test Reading:	10.0 **%**

CALCULATIONS

Average CO_2 chart reading: = 1.2 **%**

Average CO_2 concentration corrected for calibration drift:

CO_2 pprnv = (avg. CO_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Dr = **1.2 %dry**

Oxygen (O_2) Calibration Correction

and

Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/11/01
RUN NO: 1

INPUT

O_2 Average Chart Reading:	20.2 **%**
Avg. Pre/Post Zero Reading:	0.0 **%**
O_2 Calibration Gas Concentration:	12.0 **%**
, Cal . Gas Pre/Post Test Reading:	12.0 **%**

CALCULATIONS

Average O_2 chart reading: = 20.2 **%**

Average O_2 concentration corrected for calibration drift:

O_2 ppmv = (avg. O_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Dr = **20.2 % dry basi**

Monitor Data

COMPANY :	Northwest Steel and Wire
SOURCE :	EAF #8 Baghouse Inlet
REPETITION :	Run #1
TEST DATE :	4/11/01
STARTING **HOUR :**	10
STARTING MINUTE :	48

GAS ANALYZER	OXYGEN (O_2)
SCALE (%):	25
PRETEST CAL DRIFT (%) :	12.08
POSTTEST CAL DRIFT (%):	11.92
PRETEST ZERO DRIFT (%):	-0.11
POSTTEST ZERO DRIFT (%):	0.02
CALIBRATION **GAS :**	PROTOCOL 1 OXYGEN
CALIBRATION % :	12.00
DRIFT CORRECTED AVG.	0.0

GAS ANALYZER	CARBON DIOXIDE (CO_2)
SCALE (%):	20
PRETEST CAL DRIFT (%) :	10.02
POSTTEST CAL DRIFT (%):	9.92
PRETEST ZERO DRIFT (%):	0.16
POSTTEST ZERO DRIFT (%):	0.02
CALIBRATION GAS :	PROTOCOL 1 CARBON DIOXIDE
CALIBRATION % :	10.00
DRIFT CORRECTED AVG.	-0.1

GAS ANALYZER	CARBON MONOXIDE
SCALE wpm):	1000
PRETEST CAL DRIFT (ppm) :	588.76
POSTTEST CAL **DRIFT (ppm):**	597.02
PRETEST ZERO DRIFT (ppm):	2.91
POSTTEST ZERO DRIFT (ppm):	3.75
CALIBRATION GAS :	ROTOCOL 1 CARBON MONOXIDE
CALIBRATION ppm :	80000
DRIFT CORRECTED AVG.	-3.4

GAS ANALYZER	**OXIDES** OF NITROGEN (NO_x)
SCALE (ppm):	1000
PRETEST CAL DRIFT (ppm) :	499.54
POSTTEST CAL DRIFT (ppm):	499.82
PRETEST **ZERO DRIFT (ppm):**	243
POSTTEST ZERO DRIFT wpm):	0.94
CALIBRATION GAS :	PROTOCOL 1 NO_x
CALIBRATION ppm :	500.00
DRIFT **CORRECTED AVG.**	-1.7

GAS ANALYZER	SULFUR **DIOXIDE** (SO_2)
SCALE (ppm):	100
PRETEST **CAL DRIFT (ppm)** :	40.62
POSTTEST CAL DRIFT (ppm):	50.62
PRETEST ZERO DRIFT (ppm):	-16.2
POSTTEST ZERO DRIFT **(ppm):**	0.30
CALIBRATION GAS :	PROTOCOL 1 SULFUR DIOXIDE
CALIBRATION ppm :	50.00
DRIFT CORRECTED AVG.	0.1

GAS ANALYZER	VOLATILE ORGWICS
SCALE (ppm):	100
PRETEST CAL DRIFT (ppm) :	49.96
POSTTEST CAL DRIFT (ppm):	50.01
PRETEST ZERO DRIFT (ppm):	-0.38
POSTTEST ZERO DRIFT (ppm):	-1.32
CALIBRATION GAS :	**PROTOCOL 1 PROPANE**
CALIBRATION ppm :	50.00
DRIFT CORRECTED AVG.	0.8

One-Minute Averaaes (Uncorrected for Drift)

Molytek CEM Data Summary

Clock Time	Elapsed Time	O_2 %	CO_2%	CO ppm	NOx ppm	SO_2 ppm
10 : 48	0					
10 : 49	1	20.7	0.3	30.5	21.2	0.9
10 : 50	2	20.4	0.6	51.0	33.1	1.0
10 : 51	3	20.4	0.7	19.7	16.0	1.0
10 : 52	4	20.4	0.8	34.9	16.0	1.1
10 : 53	5	20.4	0.9	51.8	15.7	1.0
10 : 54	6	20.4	0.9	62.5	17.5	1.0
10 : 55	7	20.4	1.0	39.7	15.7	0.9
10 : 56	8	20.4	1.0	45.9	14.3	0.9
10 : 57	9	20.3	1.0	72.4	14.1	1.0
10 : 58	10	20.3	1.1	103.3	34.9	1.4
10 : 59	11	20.1	1.3	215.6	8.8	1.5
11 : 0	12	20.1	1.4	165.8	18.1	2.0
11 : 1	13	20.0	1.4	179.7	11.2	2.7
11 : 2	14	20.0	1.7	186.1	13.4	2.8
11 : 3	15	20.0	1.7	173.8	18.5	3.5
11 : 4	16	20.0	1.8	196.8	16.6	5.0
11 : 5	17	20.0	1.8	137.1	10.0	6.4
11 : 6	18	20.0	1.7	77.5	7.3	6.2
11 : 7	19	20.0	1.5	52.4	5.7	5.7
11 : 8	20	20.2	1.2	32.1	6.9	4.3
11 : 9	21	20.2	1.2	32.5	7.6	3.4
11 : 10	22	20.2	1.1	28.5	8.4	2.9
11 : 11	23	20.3	1.0	27.0	9.1	2.6
11 : 12	24	20.3	1.0	27.7	10.3	2.6
11 : 13	25	20.5	0.7	15.9	29.8	2.6
11 : 14	26	20.6	0.4	31.7	16.9	2.5
11 : 15	27	20.7	0.4	47.0	7.8	2.6
11 : 16	28	20.8	0.3	58.8	6.8	2.2
11 : 17	29	20.4	0.7	74.2	9.9	2.0
11 : 18	30	19.9	1.2	25.8	8.6	2.4
11 : 19	31	20.0	1.2	21.3	10.2	3.4
11 : 20	32	20.0	1.2	24.3	11.2	3.4
11 : 21	33	20.2	1.3	32.1	10.0	3.0
11 : 22	34	20.2	1.2	59.5	8.3	3.1
11 : 23	35	20.2	1.2	98.2	6.8	3.3
11 : 24	36	20.2	1.2	109.7	8.6	3.0
11 : 25	37	20.1	1.3	114.1	6.8	2.9
11 : 26	38	20.0	1.4	158.7	5.6	2.7
11 : 27	39	20.0	1.4	160.9	5.0	2.7
11 : 28	40	20.0	1.5	170.3	5.8	2.5
11 : 29	41	20.0	1.5	157.4	5.9	2.3
11 : 30	42	20.0	1.5	226.2	5.3	2.2
11 : 31	43	19.9	1.7	286.8	4.8	1.9
11 : 32	44	19.8	2.0	320.0	5.2	1.9
11 : 33	45	19.7	2.1	329.2	5.6	2.0
11 : 34	46	19.6	2.5	437.9	5.9	1.9
11 : 35	47	19.5	2.7	331.9	5.6	2.5
11 : 36	48	19.6	2.4	271.2	5.3	2.7
11 : 37	49	19.5	2.3	551.7	6.0	2.6
11 : 38	50	19.8	1.9	107.3	6.9	3.3
11 : 39	51	19.9	1.7	52.9	7.8	2.6
11 : 40	52	20.0	1.5	49.4	7.2	2.2
11 : 41	53	20.3	1.0	38.3	17.3	2.2
11 : 42	54	20.5	0.6	19.4	35.4	2.0
11 : 43	55	20.6	0.5	24.6	14.0	2.2
11 : 44	56	20.1	1.0	62.1	13.8	2.3
11 : 45	57	20.2	1.1	20.3	14.7	2.3
11 : 46	58	20.3	1.0	18.2	15.1	2.5
11 : 47	59	20.4	1.0	21.3	15.3	2.5
11 : 48	60	20.4	0.9	35.2	12.6	3.5
11 : 49	61	20.4	0.9	52.9	10.7	4.2
11 : 50	62	20.3	1.0	83.4	7.5	4.7
11 : 51	63	20.1	1.2	96.3	6.5	4.7
11 : 52	64	20.1	1.2	77.7	6.3	3.9
11 : 53	65	20.1	1.1	76.2	6.7	3.2
11 : 54	66	20.2	1.1	65.1	6.2	2.9
11 : 55	67	20.2	1.2	44.4	6.1	2.8
11 : 56	68	20.1	1.3	40.3	6.4	2.7
11 : 57	69	20.1	1.4	27.3	6.3	2.7
11 : 58	70	20.0	1.7	26.6	6.5	2.6
11 : 59	71	19.9	1.8	44.6	5.9	2.3
12 : 0	72	19.9	1.9	70.7	5.8	2.2
12 : 1	73	20.0	1.8	39.1	7.4	2.1
12 : 2	74	20.0	1.7	34.2	8.9	2.1
12 : 3	75	19.8	1.9	170.8	8.6	1.9
12 : 4	76	20.0	1.7	40.2	8.4	1.7
12 : 5	77	20.0	1.6	35.6	9.2	1.7
12 : 6	78	20.0	1.6	34.8	8.9	1.6
12 : 7	79	20.1	1.5	22.1	10.8	1.6
12 : 8	80	20.1	1.4	19.2	11.1	1.4
12 : 9	81	20.2	1.4	19.4	11.6	1.4
12 : 10	82	20.2	1.3	19.2	11.6	1.2
12 : 11	83	20.2	1.2	20.3	10.3	1.3
12 : 12	84	20.1	1.3	24.2	8.2	1.2
12 : 13	85	20.1	1.3	28.8	5.8	1.4
12 : 14	86	20.2	1.3	24.1	5.9	1.2
12 : 15	87	20.2	1.2	23.8	5.8	1.3
12 : 16	88	20.2	1.2	26.9	7.5	1.4
12 : 17	89	20.3	1.1	20.5	10.0	1.5
12 : 18	90	20.3	1.0	19.9	8.1	1.5
12 : 19	91	20.2	1.2	36.8	6.8	1.6
12 : 20	92	20.2	1.3	19.6	6.4	1.8
12 : 21	93	20.2	1.2	17.7	7.6	1.6
12 : 22	94	20.3	1.0	16.1	9.6	1.8
12 : 23	95	20.3	1.0	18.2	8.8	2.0
12 : 24	96	20.3	0.9	15.2	9.8	2.6
12 : 25	97	20.2	1.1	17.8	7.8	2.9
12 : 26	98	20.3	1.1	15.6	8.9	3.0
12 : 27	99	20.3	1.0	15.1	10.6	3.2
12 : 28	100	20.6	0.6	11.2	18.8	3.7
12 : 29	101	20.7	0.3	9.8	28.2	3.4
12 : 30	102	20.8	0.3	9.8	29.1	3.0
12 : 31	103	20.8	0.2	9.5	30.1	2.8
12 : 32	104	20.8	0.2	9.4	31.2	2.7
12 : 33	105	20.8	0.2	9.0	30.3	2.5
12 : 34	106	20.8	0.2	8.3	31.1	2.3
12 : 35	107	20.8	0.2	8.1	29.1	2.5
Average:		**20.2**	**1.2**	**76.5**	**11.8**	**2.5**

Volumetric Flow Rate Calculation Summary

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/11/01
RUN NO. 1

CO_2	1.2	%
O_2	20.2	%
CO	0	%
N_2	78.6	%
Bws	0.0336	dimensionless
Stack Temp.	175.7	degrees F
Cp	0.84	dimensionless
Squareroot D	0.6156	inches H_2O
Pbar	29.65	inches Hg
Pstatic	-1.90	inches H_2O

Stack Diamete 240" x 240 in. (Stack Area (sq. f 400.000)

CALCULATIONS:		English Units (29.92 in. Hg, 68° F)
Dry molecular weight of stack gas:		
Md = $0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2+\%CO)$	=	28.994352 lb/lb-mole
Molecular weight of stack gas, wet basis:		
Ms = Md(1-Bws) + 18(Bws)	=	28.625 lb/lb-mole
Pitot tube coefficient:		
Cp (from calibration curve)	=	0.84 dimensionless
Average velocity head of stack gas (sqroot of DP):		
Square root of DP, average	=	0.6156 inches H_2O
Average absolute stack gas temperature:		
Ts = stacktemp 175.7) °F + 460	=	635.7 degrees R
Absolute stack gas pressure:		
Ps = Pbar + (Static Pressure113.6)	=	29.51 inches Hg
Stack gas velocity:		
Vs = 85.49(Cp)(sqroot DP)(sqroot((Ts)/(Ps*Ms)))	=	38.350 feet/second
Stack gas volumetric flow rate:		
ACFM = (As)(Vs)(60)	=	920,392 acfm
Stack gas volumetric flow rate, wet basis:		
Qs(wet) = 3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd))		45,239,364 scfh
Qs(wet) = (3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)))/60		753,989 scfm
Stack gas volumetric flow rate, dry basis:		
Qs(dry) = Qs(wet)(1-Bws)		43,748,486 dscfh

Moisture Calculation Summary

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111101
RUN NO: 1

INPUT

Vm:	80.762	**cubic feet**
Yd:	0.9940	**dimensionless**
Pbar:	29.65	**in. Hg**
DH:	1.80	**in. H_2O**
Tm:	86.1	**degrees F**
Vlc:	57.1	**milliliters**

CALCULATIONS

Volume of sample at standard conditions on dry basis: — **English Uni (29.92 in. Ha, (**

Vmstd = (17.647)(Vm)(Yd)(Pbar+DH/13.6)/(T = 77.259 **dscf**

Volume of water vapor in sample at standard conditions:

Vwstd = (0.04707 cu. ft/ml)(Vlc) = 2.688 **scf**

Fractional moisture content of stack gas:

Bws = Vwstd/(Vmstd+Vwstd) = **0.0336**

Method 25-A Total VOC Calculation Summary

Company: Northwest Steel and Wire
Location: Sterling, Illinois
Source: EAF #8 Baghouse Inlet
Test Date: 4/11101
Run # : 2

INPUT DATA;

Average VOC (as propane) chart value	=	1.3 ppmv, wb
Average prelpost zero chart value	=	-0.3 ppmv
Average prelpost cal drift chart value	=	50.4 ppmv
Propane mid-range cal. gas concentration	=	50.0 ppmv
Stack gas volumetric flow rate (Qs)	=	42,078,167 DSCFH
Stack gas moisture content (Bws)	=	0.0383 Bws
Tonnage of Scrap Melted	=	452 Tons

CALCULATIONS:

VOC concentration (as propane) in stack gas (ppmv, wb):
Cc = (Avg.VOC - Avg. Zero) / (Avg. cal drift-Avg. Zero drift)*Cal gas Co = 1.6 ppmv, wb

VOC concentration (as propane) in stack gas (DRY BASIS):
Cc = ($Cc_{(wet)}$ / (1.0 - Bws)) = 0.2 ppmv

VOC concentration (as Carbon) in stack gas:
Csc = Avg. VOC propane x 3 = 0.6 ppmv

VOC concentration (as propane) in stack gas:
Cc = ((Avg VOC propane) x 44.08) 1385.26 x 10^6 = 0.023 x 10^{-6} lb/dscf

VOC concentration (as Carbon) in stack gas:
Ccc (equivelent carbon) = ((Csc (as Carbon) x 12) 1385.26 x 10^6 = 0.019 x 10^{-6} lbldscf

VOC Emission Rate (as Propane):
Esc = lb/dscf propane x Qs(dscfh) = 0.9629 lblhour

VOC Emission Rate (as Carbon):
Ecc = lb/dscf carbon x Qs(dscfh) = 0.7864 lb/hour

SO_2 lb/ton = [(lb/hr 160) x test length, min.] / tonnage of scrap per heat = 0.003 lblton

Sulfur Dioxide (SO_2) Calibration Correction

Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111/01
RUN NO: 2

INPUT

SO_2 Average Chart Reading:	2.9 ppmv
Avg. Pre/Post Zero Reading:	1.7 ppmv
SO, Calibration Gas Concentration:	50.0 ppmv
vg SO, Cal. Gas Pre/Post Test Reading:	50.3 ppmv
Stack Gas Volumetric Flow Rate:	42,078,167 dscfh
Tonnage of Scrap Melted:	452 tons

CALCULATIONS

Average SO_2 chart reading: = 2.9 ppmv

Average SO, concentration corrected for calibration drift:

SO_2 ppmv = (avg. SO_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero = 1.3 ppmvdb

Average SO_2 concentration:

SO_2 lb/dscf = (SO_2 ppmv, db)*(64/ 385.26 x 10-6) = 0.218 x 10^{-6} lb/dsc

Average SO_2 emission rate:

SO_2 lb/hr = (SO_2 lb/dscf) • (Stack flow rate, dscfh) = 9.188 lb/hr

SO_2 lb/ton = [(lblhr 160) x test length, min.] / tonnage of scrap per heat = 0.037 lb/ton

Oxides of Nitrogen (NOx) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111101
RUN NO: 2

INPUT

NOx Average Chart Reading:	13.6	ppmv
Avg. Pre/Post Zero Reading:	0.7	ppmv
NOx Calibration Gas Concentration:	500.0	ppmv
Avg NOx Cal. Gas PrelPost Test Reading:	497.2	ppmv
Stack Gas Volumetric Flow Rate:	42,078,167	dscfh
Tonnage of Scrap Melted:	452	tons

CALCULATIONS

Average NOx chart reading: = 136 ppmv

Average NOx concentration corrected for calibration drift:

NOx ppmv = (avg. NOx - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Drift) = 13.0 ppmvdb

Average NOx concentration:

NOx lb/dscf = (NOx ppmv, db)*(46 1385.26 x 10^{-6}) = 1.550 x 10^{-6} lb/dscf

Average NOx Emission Rate:

NOx lb/hr = (NOx lb/dscf) * (Stack flow rate, dscfh) = 65.226 lb/hr

NOx lb/ton = [(lb/hr 160) x test length, min.] ÷ tonnage of scrap per heat = 0.265 lb/ton

APPENDIX

Carbon Monoxide (CO) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/11/01
RUN NO: 2

INPUT

CO Average Chart Reading:	100.6	pprnv
Avg. PrelPost Zero Reading:	2.4	ppmv
CO Calibration Gas Concentration:	600.0	pprnv
vg CO Cal . Gas PrelPost Test Reading:	597.0	ppmv
Stack Gas Volumetric Flow Rate:	42,078,167	dscfh
Tonnage of Scrap Melted:	452	tons

CALCULATIONS

Average CO chart reading:	=	100.6	ppmv
Average CO concentration corrected for calibration drift:			
CO ppmv = (avg. CO - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Drift	=	99.1	ppmv db
Average CO concentration:			
CO lbldscf = (CO ppmv, db)*(28 1385.26 x 10-6)	=	7.202	x 10^{-6} lb/d
Average CO emission rate:			
CO lb/hr = (CO lb/dscf) * (Stack flow rate, dscfh)	=	303.067	lblhr
CO lb/ton = [(lb/hr 160) x test length, min.] / tonnage of scrap per heat	=	1.229	lblton

Carbon Dioxide (CO_2) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111101
RUN NO: 2

INPUT

CO_2 Average Chart Reading:	1.5 %
Avg. **Pre/Post** Zero Reading:	0.2 %
CO_2 Calibration Gas Concentration:	10.0 %
Avg CO_2 Cal . Gas **Pre/Post** Test Reading:	10.0 %

CALCULATIONS

Average CO_2 chart reading: = 1.5 %

Average CO_2 concentration corrected for calibration drift:

CO_2 ppmv = (avg. CO_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Dr = 1.3 % dry basis

Oxvaen (O_2) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/11/01
RUN NO: 2

INPUT

O_2 Average Chart Reading:	20.1 %
Avg. Pre/Post Zero Reading:	0.0 %
O_2 Calibration Gas Concentration:	12.0 %
, Cal . Gas Pre/Post Test Reading:	11.9 %

CALCULATIONS

Average O_2 chart reading: = 20.1 %

Average O_2 concentration corrected for calibration drift:

O_2 ppmv = (avg. O_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Dr = **20.2** % **dry basi**

Monitor Data

COMPANY :	Northwest Steel and Wire
SOURCE :	EAF #8 Baghouse Inlet
REPETITION :	Run #2
TEST DATE :	4/11/01
STARTING HOUR :	12
STARTING MINUTE :	49

GAS ANALYZER	OXYGEN (O_2)
SCALE (%):	25
PRETEST CAL DRIFT (%) :	11.92
POSTTEST CAL DRIFT (%):	11.95
PRETEST ZERO DRIFT (%):	0.02
POSTTEST ZERO DRIFT (%):	0.03
CALIBRATION GAS :	PROTOCOL 1 OXYGEN
CALIBRATION % :	12.00
DRIFT CORRECTED AVG.	0.0

GAS ANALYZER	CARBON DIOXIDE (CO_2)
SCALE (%):	20
PRETEST CAL DRIFT (%) :	9.92
POSTTEST CAL DRIFT (%):	10.12
PRETEST ZERO DRIFT (%):	0.02
POSTTEST ZERO DRIFT (%):	0.3
CALIBRATION GAS :	PROTOCOL 1 CARBON DIOXIDE
CALIBRATION % :	10.00
DRIFT CORRECTED AVG.	-0.2

GAS ANALYZER	CARBON MONOXIDE
SCALE (ppm):	1000
PRETEST CAL DRIFT (ppm) :	597.02
POSTTEST CAL DRIFT (ppm):	596.90
PRETEST ZERO DRIFT (ppm):	3.75
POSTTEST ZERO DRIFT (ppm):	1.13
CALIBRATION GAS :	ROTOCOL 1 CARBON MONOXIDE
CALIBRATION ppm :	600.00
DRIFT CORRECTED AVG.	-2.5

GAS ANALYZER	OXIDES OF NITROGEN (NO_x)
SCALE (ppm):	1000
PRETEST CAL DRIFT (ppm) :	499.82
POSTTEST CAL DRIFT (ppm):	494.64
PRETEST ZERO DRIFT (ppm):	0.94
POSTTEST ZERO DRIFT (ppm):	0.39
CALIBRATION GAS :	PROTOCOL 1 NO_x
CALIBRATION ppm :	500.00
DRIFT CORRECTED AVG.	-0.7

GAS ANALYZER	SULFUR DIOXIDE (SO_2)
SCALE (ppm):	100
PRETEST CAL DRIFT (ppm) :	50.52
POSTTEST CAL DRIFT (ppm):	50.10
PRETEST ZERO DRIFT (ppm):	0.30
POSTTEST ZERO DRIFT (ppm):	3.01
CALIBRATION GAS :	PROTOCOL 1 SULFUR DIOXIDE
CALIBRATION ppm :	50.00
DRIFT CORRECTED AVG.	-0.2

GAS ANALYZER	VOLATILE ORGANICS
SCALE (ppm):	100
PRETEST CAL DRIFT (ppm) :	50.01
POSTTEST CAL DRIFT (ppm):	50.86
PRETEST ZERO DRIFT (ppm):	-1.32
POSTTEST ZERO DRIFT (ppm):	0.64
CALIBRATION GAS :	PROTOCOL 1 PROPANE
CALIBRATION ppm :	50.00
DRIFT CORRECTED AVG.	0.3

One-Minute Averages (Uncorrected for Drift)

Clock Time	Elapsed Time	O_2 %	CO_2%	CO ppm	NOx ppm	SO_2 ppm	VOC ppm
12 : 49	0						
12 : 50	1	19.9	1.3	177.4	8.1	0.8	13.2
12 : 51	2	19.9	1.3	179.5	8.1	1.0	13.9
12 : 52	3	19.9	1.3	172.8	7.9	0.9	13.4
12 : 53	4	19.9	1.3	185.1	8.0	0.9	13.5
12 : 54	5	19.9	1.3	178.3	8.1	0.9	13.4
12 : 55	6	19.9	1.3	183.5	7.9	0.9	13.5
12 : 56	7	19.9	1.3	177.4	8.1	0.8	13.2
12 : 57	8	19.9	1.3	179.5	8.1	1.0	13.9
12 : 58	9	19.9	1.3	172.8	7.9	0.9	13.4
12 : 59	10	19.9	1.3	178.0	7.9	0.9	13.6
13 : 0	11	19.9	1.4	210.6	7.9	1.1	13.4
13 : 1	12	20.0	1.5	254.2	9.4	1.1	12.5
13 : 2	13	19.9	1.6	244.3	10.5	1.2	12.2
13 : 3	14	19.8	1.7	247.5	10.3	1.1	12.1
13 : 4	15	19.9	1.8	182.9	12.0	1.1	11.9
13 : 5	16	19.9	1.8	112.3	14.8	1.3	11.7
13 : 6	17	19.9	1.8	199.0	16.1	1.6	11.7
13 : 7	18	19.9	2.0	230.8	14.0	1.8	11.8
13 : 8	19	19.9	1.9	146.7	10.2	1.7	11.5
13 : 9	20	20.0	1.5	49.3	10.5	1.5	11.2
13 : 10	21	20.2	1.2	36.1	12.2	1.5	11.1
13 : 11	22	20.2	1.1	33.6	14.2	1.3	11.1
13 : 12	23	20.3	1.0	27.4	15.0	1.2	10.9
13 : 13	24	20.4	0.8	15.0	36.9	1.4	10.7
13 : 14	25	20.5	0.6	31.1	19.4	1.8	12.5
13 : 15	26	20.6	0.5	37.7	14.3	2.1	13.0
13 : 16	27	20.2	1.0	58.7	18.5	1.6	12.7
13 : 17	28	19.9	1.3	28.2	17.1	2.1	12.5
13 : 18	29	19.9	1.3	19.3	15.9	2.4	12.7
13 : 19	30	19.9	1.5	49.7	13.7	2.6	12.6
13 : 20	31	19.9	1.6	121.0	12.3	3.1	11.8
13 : 21	32	20.0	1.5	147.3	15.1	3.5	11.5
13 : 22	33	20.1	1.5	200.5	14.6	3.5	11.3
13 : 23	34	20.0	1.7	206.2	12.3	3.5	10.8
13 : 24	35	19.8	1.8	221.9	10.3	3.9	10.8
13 : 25	36	19.7	1.9	249.1	9.4	4.0	11.0
13 : 26	37	19.8	1.9	261.5	8.0	4.9	11.4
13 : 27	38	19.7	1.9	287.6	7.9	5.8	11.3
13 : 28	39	19.5	2.3	334.0	7.6	6.5	11.4
13 : 29	40	19.5	2.5	304.1	6.7	6.4	11.5
13 : 30	41	19.4	2.9	303.7	7.1	5.4	11.1
13 : 31	42	19.5	2.8	343.6	7.3	5.4	11.1
13 : 32	43	19.5	2.7	342.4	6.9	4.5	10.9
13 : 33	44	19.6	2.7	284.5	6.5	3.7	11.2
13 : 34	45	19.6	2.5	182.2	6.6	3.3	11.4
13 : 35	46	19.8	2.0	52.6	7.0	2.8	10.5
13 : 36	47	20.2	1.3	34.7	24.5	2.4	10.5
13 : 37	48	20.5	0.7	22.7	48.2	2.9	11.0
13 : 38	49	20.5	0.6	27.2	33.1	4.8	11.9
13 : 38	50	20.5	0.8	38.7	13.9	5.3	13.5
13 : 40	51	20.7	0.6	58.8	12.9	3.9	15.2
13 : 41	52	20.6	0.6	81.6	13.6	3.2	17.5
13 : 42	53	20.7	0.5	77.4	13.0	2.8	17.8
13 : 43	54	20.6	0.6	73.9	18.2	2.6	16.8
13 : 44	55	20.2	1.0	160.9	18.9	2.4	16.4
13 : 45	56	20.0	1.2	55.7	12.7	2.6	14.9
13 : 46	57	20.0	1.2	41.0	11.6	2.8	15.3
13 : 47	58	20.1	1.2	49.8	11.5	3.0	14.2
13 : 48	59	20.2	1.2	63.5	11.0	3.4	13.4
13 : 49	60	20.2	1.2	74.6	10.7	4.3	12.8
13 : 50	61	20.3	1.1	104.6	10.2	4.1	12.2
13 : 51	62	20.2	1.2	102.1	9.5	4.2	11.8
13 : 52	63	20.2	1.4	102.3	8.4	4.1	12.0
13 : 53	64	20.1	1.6	152.2	7.4	4.5	11.9
13 : 54	65	20.0	1.9	177.4	8.0	4.4	11.7
13 : 55	66	20.1	1.7	176.0	9.4	4.0	11.7
13 : 56	67	20.1	1.7	125.3	11.8	3.7	11.1
13 : 57	68	20.0	1.8	145.4	9.5	3.9	10.9
13 : 58	69	20.0	1.9	180.4	9.8	4.0	10.6
13 : 59	70	19.9	2.0	126.3	10.0	3.6	10.5
14 : 0	71	19.9	2.1	103.1	9.0	3.9	10.6
14 : 1	72	19.9	2.2	82.7	9.3	4.0	10.6
14 : 2	73	20.0	2.0	41.4	11.3	3.7	10.0
14 : 3	74	20.1	1.6	24.5	12.0	3.1	9.5
14 : 4	75	20.1	1.5	21.1	15.2	2.6	9.2
14 : 5	76	20.2	1.5	20.9	16.7	2.4	9.0
14 : 6	77	20.2	1.3	22.5	19.6	2.3	9.4
14 : 7	78	20.2	1.4	31.8	14.5	2.3	9.3
14 : 8	79	19.8	2.0	78.4	11.0	2.1	9.5
14 : 9	80	20.0	1.7	17.1	13.9	2.0	8.6
14 : 10	81	20.1	1.6	15.6	16.2	2.0	8.5
14 : 11	82	20.2	1.5	22.0	16.3	1.8	8.3
14 : 12	83	20.2	1.5	25.5	13.1	1.6	8.2
14 : 13	84	20.2	1.5	24.2	14.4	1.8	8.3
14 : 14	85	20.2	1.5	23.9	17.1	2.0	8.3
14 : 15	86	20.3	1.3	36.6	16.5	2.2	8.6
14 : 16	87	20.3	1.3	32.2	17.9	2.3	8.5
14 : 17	88	20.4	1.1	30.1	16.3	2.8	8.3
14 : 18	89	20.2	1.4	27.2	12.3	3.1	8.2
14 : 19	90	19.8	1.9	31.6	10.5	3.2	8.0
14 : 20	91	20.1	1.7	19.1	11.8	3.3	7.9
14 : 21	92	20.2	1.5	19.5	9.7	2.9	7.9
14 : 22	93	20.1	1.6	14.2	9.1	2.6	7.9
14 : 23	94	20.1	1.6	13.8	8.8	2.3	7.8
14 : 24	95	20.1	1.6	14.0	9.2	2.1	7.6
14 : 25	96	20.1	1.6	13.5	9.2	2.1	7.9
14 : 26	97	20.2	1.5	15.1	11.2	2.1	7.9
14 : 27	98	20.4	1.1	17.0	14.2	2.2	8.2
14 : 28	99	20.3	1.3	17.9	10.4	2.7	7.9
14 : 29	100	20.3	1.3	15.5	12.1	3.2	8.2
14 : 30	101	20.3	1.2	17.4	12.1	3.5	8.1
14 : 31	102	20.3	1.2	14.1	12.7	6.0	7.9
14 : 32	103	20.2	1.3	15.8	10.4	6.6	8.1
14 : 33	104	20.3	1.4	14.3	12.4	6.0	8.0
14 : 34	105	20.5	0.8	8.3	25.3	5.7	8.4
14 : 35	106	20.8	0.7	7.3	30.9	5.0	8.3
14 : 36	107	20.7	0.6	6.8	32.0	4.3	8.3
14 : 37	108	20.7	0.6	6.9	33.4	4.1	8.2
14 : 38	109	20.8	0.5	6.7	33.4	3.8	8.3
14 : 38	110	20.8	0.5	6.7	33.5	3.3	8.7
Average:		**20.1**	**1.5**	**100.6**	**13.6**	**2.9**	**11.0**

Volumetric Flow Rate Calculation **Summary**

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111/01
RUN NO: 2

INPUT

CO_2	1.3	%
O_2	20.2	%
CO	0	%
N_2	78.5	%
Bws	0 0383	dimensionless
Stack Temp.	184.4	degrees F
Cp	0.84	dimensionless
Squareroot D	0.5991	inches H_2O
Pbar	29.65	inches H_2O
Pstatic	-1.85	inches H_2O

Stack Diamete 240" x 240 in. (Stack Area (sq. f 400.000)

CALCULATIONS: English Units (29.92 in. Ha. 68° F)

Dry molecular weight of stack gas:

Md = 0.44(%CO_2) + 0.32(%O_2) + 0.28(%N_2+%CO) = 29.018612 **lb/lb-mole**

Molecular weight of stack gas, wet basis:

Ms = Md(1-Bws) + 18(Bws) = 28.597 **lb/lb-mole**

Pitot tube coefficient:

Cp (from calibration curve) = 0.84 dimensionless

Average velocity head of stack gas **(sqroot** of DP):

Square root of DP, average = 0.5991 inches H_2O

Average absolute stack gas temperature:

Ts = **stacktemp** 184.4) °F + 460 = 644.4 degrees R

Absolute stack gas pressure:

Ps = Pbar + (Static Pressure113.6) = 29.51 inches Hg

Stack gas velocity:

Vs = 85.49(Cp)(sqroot DP)(sqroot((Ts)/(Ps*Ms))) = 37.592 **feet/second**

Stack gas volumetric flow rate:

ACFM = (As)(Vs)(60) = 902,214 achn

Stack gas volumetric flow rate, wet basis:

Qs(wet) = 3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)) = 43,752,579 **scfh**

Qs(wet) = (3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)))/60 = 729,210 **scfm**

Stack gas volumetric **flow** rate, dry basis:

Qs(dry) = Qs(wet)(1-Bws) = 42,078,167 dscfh

Moisture Calculation Summary

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4111/01
RUN NO: 2

INPUT

Vm:	84.481 cubic feet
Yd:	0.9940 dimensionless
Pbar:	29.65 in. Hg
DH:	1.80 in. H_2O
Tm:	83.1 degrees F
Vlc:	68.7 milliliters

CALCULATIONS

Volume of sample at standard conditions on dry basis:

English Units
129.92 in. Ha. 68° F)

Vmstd = (17.647)(Vm)(Yd)(Pbar+DH/13.6)/(T = 81.263 dscf

Volume of water vapor in sample at standard conditions:

Vwstd = (0.04707 cu. ft/ml)(Vlc) = 3.234 scf

Fractional moisture content of stack gas:

Bws = Vwstd/(Vmstd+Vwstd) = **0.0383**

APPENDIX B

Method 25-A Total VOC Calculation Summary

Company: Northwest Steel and Wire
Location: Sterling, Illinois
Source: EAF #8 Baghouse Inlet
Test Date: 4112/01
Run#: 3

INPUT DATA;

Average VOC (as propane) chart value	=	2.6 ppmv, wb
Average prelpost zero chart value	=	0.5 ppmv
Average prelpost cal drift chart value	=	50.1 ppmv
Propane mid-range **cal.** gas concentration	=	50.0 ppmv
Stack gas volumetric flow rate (Qs)	=	46,729,996 DSCFH
Stack gas moisture content (Bws)	=	0.0232 Bws
Tonnage of Scrap Melted	=	414 Tons

CALCULATIONS:

VOC concentration (as propane) in stack gas (ppmv, wb): Cc = (Avg.VOC - Avg. Zero) / (Avg. cal drift-Avg. Zero drift)*Cal gas Co	=	2.1 ppmv, wb
VOC concentration (as propane) in stack gas (DRY BASIS): Cc = ($Cc_{(wet)}$ / (1.0 - Bws))	=	0.1 ppmv
VOC concentration (as Carbon) in stack gas: Csc = Avg. VOC propane x 3	=	0.3 ppmv
VOC concentration (as propane) in stack gas: Cc = ((Avg VOC propane) x 44.08) / 385.26 x 10^6	=	0.011 **x 10^{-6} lb/dscf**
VOC concentration (as Carbon) in stack gas: Ccc (equivelent carbon) = ((Csc (as Carbon) x 12) / 385.26 x 10^6	=	0.009 **x 10^{-6} lb/dscf**
VOC Emission Rate (as Propane): Esc = lb/dscf propane x Qs(dscfh)	=	0.5347 lblhour
VOC Emission Rate (as Carbon): Ecc = lbldscf carbon x Qs(dscfh)	=	0.4367 lblhour
SO_2 lb/ton = [(lb/hr 160) x test length, min.] / tonnage of scrap per heat	=	0.002 lblton

Sulfur Dioxide (SO) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4112/01
RUN NO: 3

INPUT

SO, Average Chart Reading:	3.4 ppmv
Avg. Pre/Post Zero Reading:	0.2 ppmv
SO, Calibration Gas Concentration:	50.0 ppmv
vg SO, Cal. Gas Pre/Post Test Reading:	50.1 ppmv
Stack Gas Volumetric Flow Rate:	46,729,996 dscfh
Tonnage of Scrap Melted:	414 tons

CALCULATIONS

Average SO, chart reading: = 3.4 ppmv

Average SO_2 concentration corrected for calibration drift:

SO_2 ppmv = (avg. SO_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero = 3.2 ppmv db

Average SO, concentration:

SO_2 lb/dscf = (SO_2 ppmv, db)*(64/ 385.26 x 10-6) = 0.532 x 10^{-6} lb/dsc

Average SO, emisslon rate:

SO_2 lblhr = (SO_2 lb/dscf) * (Stack flow rate, dscfh) = 24.881 lblhr

SO_2 lblton = [(lblhr 160) x test length, min.] / tonnage of scrap per heat = 0.092 lblton

Oxides of Nitroaen (NOx) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/12/01
RUN NO: 3

INPUT

NOx Average Chart Reading:	21.4	ppmv
Avg. PrelPost Zero Reading:	1.5	ppmv
NOx Calibration Gas Concentration:	500.0	ppmv
Avg NOx Cal. Gas Pre/Post Test Reading:	497.2	ppmv
Stack Gas Volumetric Flow Rate:	46,729,996	dscfh
Tonnage of Scrap Melted:	414	tons

CALCULATIONS

Average NOx chart reading: = 21.4 ppmv

Average NOx concentration corrected for calibration drift:

NOx ppmv = (avg. NOx - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Drift) = 20.1 ppmv db

Average NOx concentration:

NOx lb/dscf = (NOx ppmv, db)*(46 1385.26 x 10^{-6}) = 2.394 x 10^{-6} lb/dscf

Average NOx Emission Rate:

NOx lblhr = (NOx lb/dscf) * (Stack flow rate, dscfh) = 111.888 lblhr

NOx lblton = [(lblhr 160) x test length, min.] / tonnage of scrap per heat = 0.415 lblton

Carbon Monoxide (CO) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/12/01
RUN NO: 3

INPUT

CO Average Chart Reading:	60.5	ppmv
Avg. Pre/Post Zero Reading:	0.0	ppmv
CO Calibration Gas Concentration:	600.0	ppmv
vg CO Cal . Gas Pre/Post Test Reading:	595.5	ppmv
Stack Gas Volumetric Flow Rate:	46,729,996	dscfh
Tonnage of Scrap Melted:	414	tons

CALCULATIONS

Average CO chart reading: = 60.5 ppmv

Average CO concentration corrected for calibration drift:

CO ppmv = (avg. CO - avg Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Drift = 61.0 ppmvdb

Average CO concentration:

CO lb/dscf = (CO ppmv, db)*(28 / 385.26 x 10-6) = 4.431 $\times 10^{-6}$ lb/dscf

Average CO emission rate:

CO lb/hr = (CO lb/dscf) * (Stack flow rate, dscfh) = 207.067 lb/hr

CO lb/ton = [(lb/hr / 60) x test length, min.] /tonnage of scrap per heat = 0.768 lb/ton

Carbon Dioxide (CO_2) Calibration Correction
and
Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4/12/01
RUN NO: 3

INPUT

CO_2 Average Chart Reading:	1.3 %
Avg. Pre/Post Zero Reading:	0.0 %
CO_2 Calibration Gas Concentration:	10.0 %
Avg CO_2 Cal . Gas Pre/Post Test Reading:	10.1 %

CALCULATIONS

Average CO, chart reading: = 1.3 %

Average CO_2 concentration corrected for calibration drift:

CO_2 ppmv = (avg. CO_2 - avg. Zero Drift) • (Cal gas conc./(avg. Cal. Drift - avg. Zero Dr = **1.3 % dry basis**

Oxygen (O_2) Calibration Correction

and

Sample Calculations

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
RUN NO: 3
TEST DATE: 4/12/01

INPUT

O_2 Average Chart Reading:	20.3 **%**
Avg. Pre/Post Zero Reading:	0.1 **%**
O_2 Calibration Gas Concentration:	12.0 **%**
, Cal . Gas Pre/Post Test Reading:	11.8 **%**

CALCULATIONS

Average O_2 chart reading: = 20.3%

Average O_2 concentration corrected for calibration drift:

O_2 ppmv = (avg. O_2 - avg. Zero Drift) * (Cal gas conc./(avg. Cal. Drift - avg. Zero Dr = 20.6 **% dry basi**

Monitor Data

COMPANY:	Northwest Steel and Wire
SOURCE:	EAF #8 Baghouse Inlet
REPETITION:	Run #3
TEST DATE:	4/12/01
STARTING HOUR:	14
STARTING MINUTE:	36

GAS ANALYZER	OXYGEN (O_2)
SCALE (%):	25
PRETEST CAL DRIFT (%):	11.94
POSTTEST CAL DRIFT (%):	11.74
PRETEST ZERO DRIFT (%):	0.18
POSTTEST ZERO DRIFT (%):	-0.07
CALIBRATION GAS:	PROTOCOL 1 OXYGEN
CALIBRATION %:	12.00
DRIFT CORRECTED AVC.	20.4

GAS ANALYZER	CARBON DIOXIDE (CO_2)
SCALE (%):	20
PRETEST CAL DRIFT (%):	10.02
POSTTEST CAL DRIFT (%):	10.09
PRETEST ZRO DRYT (%):	-0.07
POSTTEST ZERO DRIFT PA):	0.0
CALIBRATION GAS:	PROTOCOL 1 CARBON DIOXIDE
CALIBRATION %:	10.00
DRIFT CORRECTED AVC.	1.3

GAS ANALYZER	CARBON MONOXIDE
SCALE (ppm):	1000
PRETEST CAL DRIFT (ppm):	589.43
POSTTEST CAL DRIFT (ppm):	601.61
PRETEST ZERO DRIFT (ppm):	0.15
POSTTEST ZERO DRIFT (ppm):	-0.23
CALIBRATION GAS:	ROTOCOL 1 CARBON MONOXIDE
CALIBRATION ppm:	600.00
DRIFT CORRECTED AVC.	60.9

GAS ANALYZER	OXIDES OF NITROGEN (NO_x)
SCALE (ppm):	1000
PRETEST CAL DRIFT (ppm):	501.99
POSTTEST CAL DRIFT (ppm):	498.43
PRETEST ZERO DRIFT (ppm):	-0.22
POSTTEST ZRO DRFT (ppm):	3.27
CALIBRATION GAS:	PROTOCOL 1 NO_x
CALIBRATION ppm:	500.00
DRIFT CORRECTED AVC	20.0

GAS ANALYZER	SULFUR DIOXIDE (SO_2)
SCALE (ppm):	100
PRETEST CAL DRVT (ppm):	49.90
POSTTEST CAL DRIFT (ppm):	50.24
PRETEST ZERO DRIFT (ppm):	0.62
POSTTEST ZERO DRIFT (ppm):	-0.28
CALIBRATION GAS:	PROTOCOL 1 SULFUR DIOXIDE
CALIBRATION ppm:	50.00
DRIFT CORRECTED AVC.	3.3

GAS ANALYZER	VOLATILE ORGANICS
SCALE (ppm):	100
PRETEST CAL DRIFT (ppm):	49.95
POSTTEST CAL DRIFT (ppm):	50.29
PRETEST ZERO DRIFT (ppm):	0.27
POSTTEST ZERO DRIFT (ppm):	0.72
CALIBRATION GAS:	PROTOCOL 1 PROPANE
CALIBRATION ppm:	50.00
DRIFT CORRECTED AVC.	0.8

One-Minute Averages (Uncorrected for Drift)

Molytek Summary

Clock Time	Elapsed Time	O_2 %	CO_2 %	CO ppm	NOx ppm	SO_2 ppm	VOC ppm
14 : 36	0						
14 : 37	1	20.9	0.3	3.1	29.7	0.5	1.4
14 : 38	2	20.6	0.6	18.6	23.1	0.4	1.4
14 : 39	3	20.5	0.7	46.2	22.5	0.4	1.4
14 : 40	4	20.2	1.1	73.7	19.9	0.5	1.3
14 : 41	5	20.2	1.2	97.5	20.2	0.4	1.3
14 : 42	6	20.2	1.2	127.5	21.4	0.3	1.4
14 : 43	7	20.2	1.3	111.1	19.8	0.4	1.4
14 : 44	8	20.1	1.3	86.0	19.4	0.5	1.4
14 : 45	9	20.1	1.3	96.5	19.0	0.4	1.3
14 : 46	10	20.1	1.4	107.7	14.3	0.7	1.3
14 : 47	11	20.1	1.4	122.0	13.5	0.7	1.4
14 : 48	12	20.1	1.4	162.2	14.9	0.9	1.4
14 : 49	13	20.2	1.4	186.8	15.0	1.0	1.5
14 : 50	14	20.3	1.4	74.1	15.7	1.0	1.5
14 : 51	15	20.4	1.3	31.8	18.7	1.2	1.5
14 : 52	16	20.4	1.2	29.7	21.5	1.2	1.5
14 : 53	17	20.4	1.4	22.3	24.4	1.4	1.5
14 : 54	18	20.4	1.3	26.4	30.8	1.7	1.5
14 : 55	19	20.5	1.3	23.2	27.8	2.3	1.5
14 : 56	20	20.4	1.1	21.5	20.8	2.7	1.5
14 : 57	21	20.4	1.0	42.6	17.2	2.9	1.5
14 : 58	22	20.4	1.1	26.1	20.3	2.6	1.4
14 : 59	23	20.4	1.1	27.4	23.3	2.4	1.4
15 : 0	24	20.3	1.2	44.9	17.4	2.4	1.4
15 : 1	25	20.3	1.2	38.4	21.6	2.8	1.4
15 : 2	26	20.4	1.2	16.7	26.1	3.9	1.6
15 : 3	27	20.6	0.7	2.6	32.6	4.5	1.6
15 : 4	28	20.4	0.9	25.9	23.0	3.7	1.6
15 : 5	29	20.6	0.8	20.2	19.5	3.7	1.6
15 : 6	30	20.7	0.7	27.7	24.9	3.5	1.6
15 : 7	31	20.7	0.7	35.1	27.0	3.2	1.5
15 : 8	32	20.2	1.2	48.0	20.7	3.0	1.4
15 : 9	33	20.1	1.3	12.3	18.5	3.0	1.4
15 : 10	34	20.1	1.3	9.2	17.0	3.1	1.5
15 : 11	35	20.1	1.4	8.0	16.2	3.0	1.5
15 : 12	36	20.0	1.5	9.0	17.2	3.3	1.4
15 : 13	37	20.0	1.5	38.6	17.3	3.7	1.4
15 : 14	38	20.0	1.6	87.8	15.1	4.0	1.3
15 : 15	39	20.0	1.6	111.1	13.7	4.2	1.3
15 : 16	40	19.9	1.8	161.1	13.8	4.3	1.3
15 : 17	41	19.9	2.0	152.6	13.9	4.0	1.3
15 : 18	42	19.8	2.2	194.9	14.2	4.0	1.3
15 : 19	43	19.9	2.2	164.5	14.4	3.8	1.3
15 : 20	44	19.9	2.2	187.1	14.5	3.5	1.3
15 : 21	45	19.7	2.5	199.5	15.3	3.3	1.3
15 : 22	46	19.6	2.9	202.5	16.2	3.3	1.3
15 : 23	47	19.9	2.3	165.6	14.2	3.6	1.2
15 : 24	48	20.0	2.2	192.2	14.5	4.1	1.2
15 : 25	48	20.1	2.0	181.5	18.0	4.5	1.2
15 : 26	50	20.1	1.8	63.2	17.7	4.9	1.2
15 : 27	51	20.2	1.5	27.2	16.2	4.1	1.2
15 : 28	52	20.2	1.6	65.4	16.4	3.4	1.2
15 : 29	53	19.9	2.0	75.8	18.0	2.9	1.2
15 : 30	54	20.2	1.5	22.0	26.4	2.7	1.1
15 : 31	55	20.5	0.9	14.1	22.7	2.5	1.1
15 : 32	58	20.4	1.1	19.8	18.4	2.6	1.2
15 : 33	57	20.6	0.9	30.8	19.2	2.8	1.2
15 : 34	58	20.7	0.8	33.8	20.1	2.5	1.3
15 : 35	59	20.4	1.0	78.0	22.6	2.6	1.3
15 : 36	60	19.9	1.5	26.9	16.9	2.6	1.2
15 : 37	81	19.9	1.6	26.8	17.5	2.9	1.2
15 : 38	62	19.9	1.6	89.2	18.5	3.0	1.2
15 : 39	83	20.0	1.7	184.5	17.5	3.1	1.3
15 : 40	64	20.0	1.7	203.6	16.1	3.2	1.3
15 : 41	85	20.0	1.7	214.5	15.7	3.4	1.3
15 : 42	66	20.0	1.7	198.7	16.3	3.4	1.3
15 : 43	67	20.0	1.7	128.3	17.2	3.1	1.3
15 : 44	68	20.2	1.7	105.6	16.7	2.8	1.3
15 : 45	69	20.2	1.7	88.5	15.9	2.8	1.3
15 : 46	70	20.2	1.6	98.9	15.8	2.8	1.3
15 : 47	71	20.2	1.6	96.8	15.4	3.1	1.3
15 : 48	72	20.1	1.7	96.2	17.9	3.2	1.2
15 : 49	73	20.2	1.5	32.2	21.4	3.5	1.2
15 : 50	74	20.2	1.6	58.3	18.8	4.0	1.2
15 : 51	75	20.2	1.6	35.7	22.1	4.7	1.2
15 : 52	76	20.3	1.4	34.4	27.5	5.8	1.2
15 : 53	77	20.0	1.7	111.4	14.6	8.8	1.2
15 : 54	78	20.2	1.5	40.2	19.4	6.9	1.3
15 : 55	79	20.4	1.1	18.6	23.1	5.1	1.3
15 : 56	80	20.4	1.0	26.6	20.5	4.1	1.3
15 : 57	81	20.3	1.3	37.9	16.1	3.5	1.3
15 : 58	82	20.2	1.4	21.8	17.1	3.2	1.3
15 : 59	83	20.4	1.2	14.7	22.8	2.9	1.3
16 : 0	84	20.5	1.0	8.6	25.1	2.6	1.3
16 : 1	85	20.5	1.0	7.8	27.0	2.6	1.3
16 : 2	86	20.5	0.9	7.4	22.0	2.8	1.3
16 : 3	87	20.5	1.0	8.3	22.9	2.6	1.4
16 : 4	88	20.5	1.1	11.6	25.7	2.5	1.3
16 : 5	89	20.5	1.1	10.4	26.6	2.3	1.3
16 : 6	90	20.3	1.3	35.2	20.0	2.6	1.3
16 : 7	91	20.2	1.5	28.5	22.0	2.4	[illegible]
16 : 8	92	20.4	1.2	14.3	25.6	2.2	
16 : 9	93	20.5	1.1	9.9	27.2	2.1	
16 : 10	94	20.5	1.1	8.8	29.0	2.0	
16 : 11	95	20.5	1.0	6.5	27.8	1.7	
16 : 12	96	20.6	1.0	5.9	27.2	1.7	
16 : 13	97	20.6	0.9	7.4	27.2	1.6	
16 : 14	98	20.5	0.9	13.2	23.5	2.2	
16 : 15	99	20.4		28.1	25.2	4.0	
16 : 16	100	20.3		38.6	19.9	9.3	
16 : 17	101	20.3		33.5	20.7	10.0	
16 : 18	102	20.3		23.7	19.5	9.9	
16 : 19	103	20.4		19.3	20.9	12.8	
16 : 20	104	20.6		7.3	32.3	11.8	
16 : 21	105	20.7		4.5	36.7	9.1	
16 : 22	106	20.7		4.3	37.4	6.8	
16 : 23	107	20.7		14.1	39.0	5.5	
16 : 24	108	20.6		31.0	39.4	4.7	
16 : 25	109			8.9	39.7	4.4	
16 : 26	110			[illegible]	39.6	4.2	
16 : 27	111				38.9	3.9	
Average:		20.3	13	60.5	21.4	3.4	13

Volumetric Flow Rate Calculation Summary

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4112/01
RUN NO: 3

INPUT

CO_2	1.3	%
O_2	20.6	%
CO	0	%
N_2	78.1	%
Bws	0.0232	dimensionless
Stack Temp.	160.3	degrees F
Cp	0.84	dimensionless
Squareroot D	0.6492	inches H_2O
Pbar	29.25	inches H_2O
Pstatic	-1.85	inches H_2O

Stack Diamete 240" x 240 in. (Stack Area (sq. f 400.000)

CALCULATIONS: English Units (29.92 in. Ha. 68° F)

Dry molecular weight of stack gas:

Md = O.44(%CO_2) + 0.32(%O_2) + 0.28(%N_2+%CO) = 29.037915 lb/lb-mole

Molecular weight of stack gas, wet basis:

Ms = Md(1-Bws) + 18(Bws) = 28.782 lb/lb-mole

Pitot tube coefficient:

Cp (from calibration curve) = 0.84 dimensionless

Average velocity head of stack gas (sqroot of DP):

Square root of DP, average = 0.6492 inches H_2O

Average absolute stack gas temperature:

Ts = stacktemp 160.3) °F + 460 = 620.3 degrees R

Absolute stack gas pressure:

Ps = Pbar + (Static Pressure113.6) = 29.11 inches Hg

Stack gas velocity:

Vs = 85.49(Cp)(sqroot DP)(sqroot((Ts)/(Ps*Ms))) = 40.111 feet/second

Stack gas volumetric flow rate:

ACFM = (As)(Vs)(60) = 962,669 acfm

Stack gas volumetric flow rate, wet basis:

Qs(wet) = 3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)) = 47,840,828 scfh

Qs(wet) = (3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)))/60 = 797.347 scfm

Stack gas volumetric flow rate, dry basis:

Qs(dry) = Qs(wet)(1-Bws) = 46,729,996 dscfh

Moisture Calculation Summary

COMPANY: Northwest Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: EAF #8 Baghouse Inlet
TEST DATE: 4112101
RUN NO: 3

INPUT

Vm:	84.939 cubic feet
Yd:	0.9940 dimensionless
Pbar:	29.25 in. Hg
DH:	1.80 in. H_2O
Tm:	60.2 degrees F
Vlc:	42.5 milliliters

CALCULATIONS

		English Units (29.92 in. Hg, 68° F)
Volume of sample at standard conditions on dry basis:		
Vmstd = (17.647)(Vm)(Yd)(Pbar+DH/13.6)/(T	=	84.155 dscf
Volume of water vapor in sample at standard conditions:		
Vwstd = (0.04707 *cu.* ft/ml)(Vlc)	=	2.000 scf
Fractional moisture content of stack gas:		
Bws = Vwstd/(Vmstd+Vwstd)	=	**0.0232**

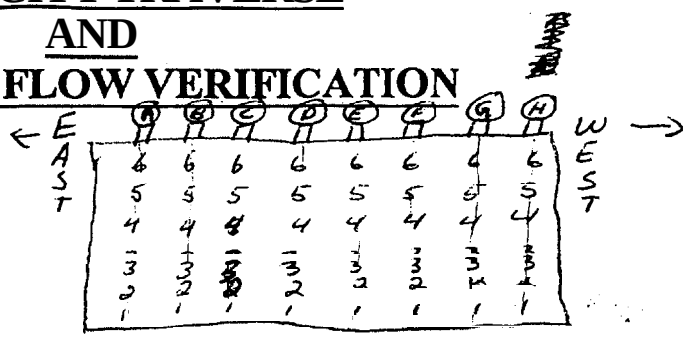
APPENDIX B

Field Data

VELOCITY TRAVERSE
AND
CYCLONIC FLOW VERIFICATION

ENVIRONMENTAL INC.

PLANT: Northwest Steel & Wire
DATE: 04-11-01
LOCATION: Sterling IL
SOURCE: Baghouse Inlet
STACK I.D.:
BAROMETRIC PRESSURE, in. Hg: 29.65
OPERATORS: SMF ; BC ; WC5



SCHEMATIC OF TRAVERSE POINT LAYOUT

RUN NO. 1 STATIC, in. H_2O -1.9

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
A - 1	.35	151	
- 2	.42	154	
- 3	.43	159	
- 4	.42	164	
- 5	.39	169	
- 6	.24	174	
B - 1	.43	167	
- 2	.43	169	
- 3	.45	170	
- 4	.42	179	
- 5	.41	175	
- 6	.23	170	
C - 1	.41	174	
- 2	.42	175	
- 3	.42	177	
- 4	.42	186	
- 5	.39	189	
- 6	.27	188	
D - 1	.41	175	
- 2	.43	175	
- 3	.42	179	
- 4	.40	180	
- 5	.39	192	
- 6	.26	197	
AVERAGE			

RUN NO. 1 (cont.) STATIC, in. H_2O

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
E - 1	.41	164	
- 2	.43	171	
- 3	.40	178	
- 4	.41	184	
- 5	.43	186	
- 6	.27	188	
F - 1	.42	169	
- 2	.43	172	
- 3	.42	173	
- 4	.44	182	
- 5	.39	196	
- 6	.28	200	
G - 1	.42	168	
- 2	.42	171	
- 3	.43	173	
- 4	.40	180	
- 5	.39	185	
- 6	.25	191	
H - 1	.38	159	
- 2	.36	168	
- 3	.40	169	
- 4	.39	170	
- 5	.30	170	
- 6	.21	179	
AVERAGE	0.6156	175.7	

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FIELD DATA

PLANT	NWS+W	AMBIENT TEMPERATURE	70	PROBE HEATER SETTING	NA
DATE	4-11-01	BAROMETRIC PRESSURE	29.65	HEATER BOX SETTING	NA
LOCATION	STERLING, IL	ASSUMED MOISTURE, %		METER $H_@$	1.77
OPERATOR	SF BC	PROBE LENGTH, in.	120"	C_p FACTOR	0.84
STACK NO.	BH INLET	NOZZLE DIAMETER, in.	NA	Y_d FACTOR	0.997
RUN NO.	B2	STACK DIAMETER, in.	20" x 20"		
SAMPLE BOX NO.	APEX	MINUTES PER POINT	NA		
METER BOX NO.	901001	NUMBER OF POINTS	48		
START TIME		NUMBER OF PORTS	8		

A-____ B-____

WEIGHT OF PARTICULATE, mg	
Filter No.	
Sample	
Final wt	
Tare wt	
Wt. gain	
TOTAL	mg

CROSS SECTION

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ) min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s) °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (V_m) ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET ($T_{m_{in}}$) °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET ($T_{m_{out}}$) °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMINGER °F	Pump Vacuum in. Hg
1249		0					1.8		893.766	85		NA	60	4
		5					1.8		897.63	85			53	4
		10					1.8		901.51	84			49	4.5
		15					1.8		905.41	84			48	5
		20					1.8		909.25	83			49	5
		25					1.8		913.11	83			49	5
		30					1.8		916.95	83			49	5
		35					1.8		920.84	83			50	6
		40					1.8		924.62	82			50	6
		45					1.8		928.30	82			50	6
		50					1.8		931.96	82			50	6
		55					1.8		935.91	82			50	6
		60					1.8		939.73	82			50	6
		65					1.8		944.34	83			51	6
		70					1.8		948.00	82			51	6
		75					1.8		751.80	82			51	6
		80					1.8		755.52	83			51	6
		85					1.8		959.90	83			52	6
		90					1.8		963.11	84			52	6
		95					1.8		[illegible]	84			52	6
		100					1.8		[illegible].61				52	6
		105					1.8		1975.42				53	6
		110							978.247					
		115												

VELOCITY TRAVERSE
AND
CYCLONIC FLOW VERIFICATION

PLANT: NASWD
DATE: 4-11-01
LOCATION: STERLING, IL
SOURCE: BAGHOUSE INLET
STACK I.D.: 20' x 20'
BAROMETRIC PRESSURE, in. Hg: 29.65
OPERATORS: BC SF

SCHEMATIC OF TRAVERSE POINT LAYOUT

RUN NO. 3 STATIC, in. H_2O -1.85

TRAVERSE POINT NUMBER		VELOCITY HEAD ($\Delta\rho_s$), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
A	1	.37	145	
	2	.31	156	
	3	.32	166	
	4	.31	180	
	5	.28	196	
	6	.23	198	
G	1	.40	151	
	2	.41	171	
	3	.41	179	
	4	.38	184	
	5	.29	189	
	6	.24	183	
F	1	.28	201	
	2	.36	213	
	3	.38	185	
	4	.39	190	
	5	.38	196	
	6	.40	195	
E	1	.40	168	
	2	.41	182	
	3	.40	185	
	4	.39	191	
	5	.37	190	
	6	.25	183	
AVERAGE				

RUN NO. 3 STATIC, in. H_2O _____

NUMBER		($\Delta\rho_s$), in. H_2O	TEMP. (Ts), °F	ANGLE
D	1	.38	176	
	2	.41	185	
	3	.42	187	
	4	.39	198	
	5	.35	212	
	6	.26	213	
C	1	.40	177	
	2	.41	181	
	3	.40	185	
	4	.42	193	
	5	.40	195	
	6	.30	190	
B	1	.37	182	
	2	.40	186	
	3	.39	186	
	4	.39	191	
	5	.37	198	
	6	.30	197	
A	1	.38	159	
	2	.41	163	
	3	.41	169	
	4	.40	178	
	5	.37	182	
	6	.25	180	
AVERAGE		0.5991	184.4	

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FIELD DATA

PLANT	NWS & W	AMBIENT TEMPERATURE	55°F	PROBE HEATER SETTING	N/A
DATE	4-12-01	BAROMETRIC PRESSURE		HEATER BOX SETTING	N/A
LOCATION	STERLING IL	ASSUMED MOISTURE, %	5	METER $H_@$	1.77
OPERATOR	BC SE	PROBE LENGTH, in.	–	C_p FACTOR	0.84
STACK NO.	BH INLET	NOZZLE DIAMETER, in.	–	Y_d FACTOR	0.994
RUN NO.	33	STACK DIAMETER, in.			
SAMPLE BOX NO.	40	MINUTES PER POINT			
METER BOX NO.	901001	NUMBER OF POINTS	6		
START TIME	1436	NUMBER OF PORTS	8		

WEIGHT OF PARTICULATE, mg	
FILTER NO.	N/A
SOLVENT	
FILTER	
TUBE	
WASH	N/A
TOTAL	mg

A= ____ B= ____

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min	STATIC PRESSURE (in. H2O)	STACK TEMP (°F)	VELOCITY HEAD (Δp) (in. H2O)		DRYING TUBE DIFFERENTIAL GAS METER (in. H2O) ACTUAL	DESIRED	GAS SAMPLE VOLUME, V_m (cu. ft.)	GAS SAMPLE VOLUME, V_m (cu. ft.)	GAS METER TEMP (°F)	PROBE TEMP (°F)	TUBE BOX TEMP (°F)	SORBENT MODULE TEMP (°F)	CLOSE SECTION FIRST IMPINGER OUTLET TEMP (°F)	COMB. VACUUM (in. Hg)
1436		0					1.8		977.320	55					50	4
1441		5					1.8		981.36	57					40	4
1446		10					1.8		985.23	58	Avg.				40	3
1451		15					1.8		989.08	58	given				40	6
		20					1.8		992.91	59					41	6
		25					1.8		996.58	59					41	6
1406		30					1.8		1000.83	59					41	6
		35					1.8		1004.67	60					41	6
		40					1.8		1007.97	60					42	7
1421		45					1.8		1011.64	61					42	8
		50					1.8		1015.44	61					42	8
		55					1.8		1019.25	61					42	7
1536		60					1.8		1023.03	62					42	7
		65					1.8		1026.79	62					42	7
		70					1.8		1030.62	62					43	9
1551		75					1.8		1034.30	62					43	9
		80					1.8		1037.93	62					43	4
		85					1.8		1041.77	62					43	4
		90					1.8		1045.52	61					43	4
		95					1.8		1049.32	61					44	4
		100					1.8		1053.18	61					44	4
1620		105					1.8		1056.96	61					44	4
		110							1060.74							
									1062.259							
TOTAL																
AVERAGE																

112 MINUTES

1.8

84.939 (60.2)

VOLUME OF WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) #1	#2	#3	#4	SILICA GEL WEIGHT
FINAL	114	102	8		227.5

ORSAT DATA	TIME	CO_2	O_2
TRIAL 1			
TRIAL 2			

LEAK CHECK		
SYSTEM PRE:	0.001	CFM@15"Hg
POST:	0.001	CFM@15"Hg

FIELD DATA

A-_____ B-_____

PLANT	NIJS+W	AMBIENT TEMPERATURE	65	PROBE HEATER SETTING	NA
DATE	4-11-01	BAROMETRIC PRESSURE	29.65	HEATER BOX SETTING	NA
LOCATION	STERLING, IL	ASSUMED MOISTURE, %		METER $H_@$	1.77
OPERATOR	BC SF	PROBE LENGTH, in.	120" / 24"	C_p FACTOR	0.84
STACK NO.	BAGHS. INLET	NOZZLE DIAMETER, in.	NA	Y_d FACTOR	0.994
RUN NO.	1	STACK DIAMETER, in.	20' x 20'		
SAMPLE BOX NO.	APEX	MINUTES PER POINT	NA		
METER BOX NO.	901001	NUMBER OF POINTS	6		
START TIME		NUMBER OF PORTS	8		

WEIGHT OF PARTICULATE, mg		
Filter No.		
Sample		
Final wt		
Tare wt		
Wt. gain		
TOTAL		mg

CROSS SECTION

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (Θ) min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s) °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm) ft³	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}) °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}) °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMINGER °F	Pump Vacuum in. Hg
0840	1	0					1.8		722.500	74		NA	64	5
	2	5					1.8		726.36	73			56	5
	3	10					1.8		730.22	75			51	5
	4	15					1.8		734.06	75			50	5
	5	20					1.8		737.92	75			50	5
	6	25					1.8		741.79	76			51	5
	1	30					1.8		745.65	76			51	5
	2	35					1.8		749.50	77			51	5
	3	40					1.8		753.32	77			52	5
	4	45					1.8		757.13	77			52	5
	5	50					1.8		760.89	77			52	5
	6	55					1.8		764.61	77			53	5
	1	60					1.8		768.43	77			53	5
	2	65					1.8		772.18	77			53	5
	3	70					1.8		775.92	78			54	7
	4	75					1.8		779.73	78			55	6
	5	80					1.8		783.54	78			55	6
	6	85					1.8		787.47	79			56	8
	1	90					1.8		791.25	79			56	8
	2	95					1.8		794.47	86			56	8
1019	3	100							797.060					
	4	105												
99 min	5	110												
	6	115							74.56					
TOTAL		120												
AVERAGE							1.8			76.0				

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) #1	#2	#3	#4	SILICA GEL WEIGHT g
FINAL	121	100	3	—	217.7
INITIAL	100	100	0	56	200g
LIQUID COLLECTED	21	0	3		41.7

ORSAT DATA	TIME	CO_2	O_2
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average			

LEAK CHECK		
SYSTEM PRE:	0.001	CFM@15in.Hg
POST:		CFM@15in.Hg
PITOT PRE:	OK/OK	@>3 in. H_2O
POST:		@>3 in. H_2O

APPENDIX C

VELOCITY TRAVERSE

PLANT: NWS&W
DATE: 4-12-01
LOCATION: STERLING IL
SOURCE: Baghouse Inlet
STACK I.D.: 20 x 20
BAROMETRIC PRESSURE, in. Hg: 29.25
OPERATORS: SMF BC

See Run 1

SCHEMATIC OF TRAVERSE POINT LAYOUT

RUN NO. 3 STATIC, in H_2O -1.85

TRAVERSE POINT NUMBER	VELOCITY HEAD ($\Delta\rho_s$), in. H_2O	STACK TEMPERATURE (Ts), °F
A - 1	0.33	150
2	0.38	156
3	0.41	158
4	0.39	158
5	0.36	161
6	0.29	167
B - 1	0.41	153
2	0.44	158
3	0.46	164
4	0.47	162
5	0.44	172
6	0.36	173
C - 1	0.41	158
2	0.46	154
3	0.48	169
4	0.49	162
5	0.41	154
6	0.27	158
D - 1	0.42	230
2	0.44	213
3	0.45	190
4	0.47	177
5	0.45	152
6	0.32	152
AVERAGE		

RUN NO. cat STATIC, in. H_2O

TRAVERSE POINT NUMBER	VELOCITY HEAD ($\Delta\rho_s$), in. H_2O	STACK TEMPERATURE (Ts), °F
E - 1	0.48	147
2	0.54	149
3	0.56	144
4	0.49	143
5	0.47	137
6	0.32	131
F - 1	0.46	154
2	0.50	155
3	0.50	163
4	0.51	161
5	0.47	168
6	0.30	162
G - 1	0.41	162
2	0.51	155
3	0.52	163
4	0.55	161
5	0.53	167
6	0.27	166
H - 1	0.36	148
2	0.39	151
3	0.44	155
4	0.42	151
5	0.32	147
6	0.28	142
AVERAGE	0.6492	160.3

$\sqrt{\Delta P}$

FIELD SAMPLING SILICA GEL MOISTURE SUMMARY

Company: NWS&W

Location: Rock Island, IL

Test Date: 4/11 & 4/12/01

Source	Run No.	Initial Weight (g)	Final Weight (g)	Net Weight Gain (g)
Baghouse Inlet	1	200.0	217.7	17.7
" "	2	200.0	216.1	16.1
" "	3	200.0	220.7	20.7
" "	4	200.0	226.5	26.5

Analyst: ETV

3225

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NORTHWESTERN STEEL & WIRE

SAMPLERS: (Signature) [signature]

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	RUN #	SILICA GEL GRAV.					REMARKS
	11478	4/11		BAGHOUSE INLET	1	1	X					GRAVIMETRIC ANALYSIS
	11474	4/11		" "	1	2	X					" "
	11479	4/11		" "	1	3	X					" "
	11447	4/12		BAGHOUSE INLET	1	4	X					" "

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	4/14/01 12:15				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[signature]	4/16/01 8:30		

REMARKS:

ARI
951 Old Rand Road, Unit 106
Wauconda, IL 60084
Telephone (847) 487-1580

APPENDIX C

CEM Datalogger Data

Client	Northwest Steel and Wire
Location	Sterling, Illinois
Source	EAF #8 Baghouse Inlet
Date	04/11/2001
Run #	Heats 11 and 12
Filter Width	4
Pre Scans	0
Port Suns	5761
Scan Rate	0266666651
TrigEvent	Manual
TrigChan	None
TrigLevel	None
TrigEdge	None
Hysteresis	None

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100		
Units	% db	% db	ppmvdb	ppmv db	ppmv db	ppmv wb		
Time	Oxygen	CO2	CO	NOx	SO2	VOC		
7:12:11	-0.06	-0.04	1.60	1.99	0.16	0.92		
7:12:26	-0.06	-0.04	1.07	1.99	0.08	0.63		
7:12:41	4.06	4.04	1.07	1.64	0.33	0.43	Zero ppm Cal Error:	
7:12:56	4.06	4.04	1.87	0.63	0.01	0.25	4.062	%Oxygen
7:13:11	4.06	4.04	1.60	0.62	4.09	0.02	4.038	% CO2
7:13:26	4.06	4.04	1.33	0.73	0.11	-0.54	1.466	ppm CO
7:13:41	-0.06	-0.04	1.60	0.74	0.06	1.32	0.902	ppm Nox
7:13:56	0.04	-0.04	2.14	0.71	-1.52	1.17	0.088	ppm SO2
7:14:11	7.13	-0.04	1.60	0.68	-1.99	0.92	0.039	ppm VOC
7:14:26	15.51	-0.03	1.07	0.67	-1.82	0.63		
7:14:41	19.03	0.00	1.07	0.76	-2.17	0.43		
7:14:56	20.33	0.01	1.07	0.76	-1.89	0.25		
7:15:11	20.79	0.02	1.60	0.70	-2.12	0.02		
7:15:26	20.96	0.02	1.87	0.73	-1.92	-0.15		
7:15:41	21.03	0.03	0.50	0.77	-2.07	-0.31		
7:15:56	20.98	0.03	0.78	0.72	-1.86	-0.51		
7:16:11	20.87	0.03	1.06	0.78	-1.78	-0.71	20.9% Oxygen Cal Error:	
7:16:26	20.88	0.04	4.08	0.79	-2.12	-1.08	20.886	%Oxygen
7:16:41	20.89	0.04	11.69	13.07	-1.94	-1.27		
7:16:56	20.90	0.04	5.87	1.32	-1.98	0.67		
7:17:11	16.38	0.16	1.60	1.14	-1.67	0.88		
7:17:26	11.53	0.15	1.06	1.05	-1.99	0.61		
7:17:41	11.97	0.05	1.60	1.03	-2.07	0.52		
7:17:56	12.14	0.01	1.07	1.03	-2.02	0.38		
7:18:11	12.24	0.00	1.07	1.01	-2.17	0.18		
7:18:26	12.11	-0.01	1.07	0.95	-2.02	0.15		
7:18:41	11.94	0.01	2.14	0.98	-1.99	0.00		
7:18:56	11.94	-0.01	1.33	0.90	-2.12	0.23	12.0% Oxygen Cal Error:	
7:19:11	11.94	-0.01	0.50	0.96	-2.04	0.36	11.942	%Oxygen
7:19:26	11.94	-0.01	1.07	0.93	-2.02	0.06		
7:19:41	11.94	-0.02	2.14	0.85	-1.92	-0.09		
7:19:56	11.93	-0.02	1.34	0.91	-2.09	-0.16		
7:20:11	9.87	-0.02	1.07	0.96	-1.82	-0.12		
7:20:26	6.87	-0.02	1.87	0.89	-1.84	-0.33		
7:20:41	5.61	-0.02	1.07	0.96	-1.62	-0.43		
7:20:56	5.19	-0.02	1.87	0.94	-1.49	-0.39		
7:21:11	5.05	-0.02	1.07	0.92	-1.75	-0.51		
7:21:26	5.00	0.02	1.07	0.94	-1.76	0.74	5.0% Oxygen Cal Error:	
7:21:41	4.98	-0.02	1.60	0.96	-1.72	-0.88	4.980	% Oxygen
7:21:56	4.97	-0.02	2.81	0.97	1.78	-0.96		
7:22:11	4.96	-0.02	3.61	6.53	-1.77	-1.00		
7:22:26	5.29	-0.02	0.48	1.60	-1.99	-1.02		
7:22:41	11.25	0.75	-2.04	1.24	-1.84	-1.24		
7:22:56	9.09	10.19	-2.04	1.08	-1.19	-1.30		
7:23:11	3.55	15.60	-1.59	1.00	-0.67	-1.31		
7:23:26	1.18	17.11	-2.04	1.01	-0.34	0.43		
7:23:41	0.39	17.73	-2.57	1.02	0.28	1.95		
7:23:56	0.13	18.10	-1.59	0.95	0.18	1.74		
7:24:11	0.05	18.03	-0.07	1.01	0.38	1.67		
7:24:26	0.01	18.01	-0.07	0.99	0.38	1.58		
7:24:41	-0.04	18.03	-0.61	1.01	0.59	1.37		
7:24:56	-0.07	18.04	-0.34	1.00	0.51	1.29		
7:25:11	-0.03	18.06	-0.07	0.96	0.01	1.34		
7:25:26	-0.03	18.07	-0.07	0.99	0.51	1.30	18.0% CO2 Cal Error:	
7:25:41	-0.04	18.07	-0.61	0.97	0.38	1.13	18.080	% C02
7:25:56	-0.04	18.08	0.87	0.97	0.48	1.06		
7:26:11	-0.05	18.09	0.50	0.97	0.55	0.99		
7:26:26	-0.05	15.93	1.07	0.88	0.12	0.87		
7:26:41	-0.06	11.71	-0.07	0.92	0.48	0.73		
7:26:56	-0.06	10.59	0.78	0.93	0.26	0.67		
7:27:11	-0.06	10.17	1.07	0.98	0.48	0.57		
7:27:26	-0.07	10.09	1.07	0.94	0.38	0.50		
7:27:41	-0.07	10.05	0.50	0.97	0.31	0.41		

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
7:27:56	-0.07	10.05	0.79	0.89	0.36	0.36	10.0% CO2 Cal Error:
7:28:11	0.07	10.04	1.07	0.91	0.28	0.30	10.042 % CO2
7:28:26	-0.07	10.04	1.07	0.91	0.13	0.23	
7:28:41	-0.07	10.04	1.07	0.87	0.26	0.82	
7:28:56	-0.07	8.06	0.22	0.90	0.36	1.36	
7:29:11	-0.08	5.84	1.61	0.92	0.16	1.24	
7:29:26	-0.08	5.25	1.07	0.92	0.31	1.14	
7:29:41	-0.08	5.10	2.14	0.91	0.33	1.04	
7:29:56	-0.08	5.05	1.34	0.91	0.43	1.02	
7:30:11	-0.08	5.03	1.07	0.96	0.08	0.91	
7:30:26	-0.08	5.02	1.87	0.91	0.51	0.87	
7:30:41	-0.08	5.02	1.61	0.94	0.13	0.80	
7:30:56	-0.08	5.01	2.14	0.87	0.11	0.72	5.0% CO2 Cal Error:
7:31:11	-0.08	5.01	1.61	0.94	0.13	0.65	5.008 % CO2
7:31:26	-0.08	5.01	3.62	128.72	0.03	0.56	
7:31:41	-0.08	5.01	6.16	217.86	-0.29	0.98	
7:31:56	1.98	3.69	4.62	433.09	-1.06	1.46	
7:32:11	5.29	1.79	3.04	771.96	-0.14	1.40	
7:32:26	2.29	0.63	2.37	841.16	2.23	1.38	
7:32:41	0.82	0.26	3.04	840.74	37.53	1.33	
7:32:56	0.23	0.16	3.84	841.07	72.20	1.32	
7:33:11	0.04	0.13	3.04	845.71	86.94	1.36	
7:33:26	-0.02	0.11	2.36	853.83	93.39	1.38	
7:33:41	-0.05	0.10	3.04	856.13	96.66	1.43	
7:33:56	-0.05	0.10	3.04	855.28	98.63	1.71	850 ppm Nox Cal Error:
7:34:11	-0.06	0.09	3.04	852.34	99.98	1.79	853.398 ppm Nox
7:34:26	-0.06	0.08	3.04	851.78	99.98	1.79	
7:34:41	-0.06	0.08	3.04	854.20	99.98	1.72	
7:34:56	-0.07	0.07	3.84	708.08	99.98	1.70	
7:35:11	-0.07	0.07	4.11	512.24	99.98	1.73	
7:35:26	-0.07	0.07	3.30	509.06	97.98	1.66	
7:35:41	-0.07	0.07	3.04	507.39	79.80	1.62	500 ppm Nox Cal Error:
7:35:56	-0.07	0.07	3.04	506.19	71.97	1.61	501.666 ppm Nox
7:36:11	-0.08	0.06	3.04	495.98	69.82	1.54	
7:36:26	-0.08	0.06	3.04	497.10	68.88	1.53	
7:36:41	-0.08	0.06	3.04	381.86	69.00	1.54	
7:36:56	-0.08	0.06	3.04	257.54	69.68	1.58	
7:37:11	-0.08	0.06	3.57	255.60	64.63	1.70	
7:37:26	-0.08	0.06	3.31	255.51	45.55	1.72	
7:37:41	-0.08	0.05	3.04	254.23	39.49	1.78	250 ppm Nox Cal Error:
7:37:56	-0.08	0.05	3.04	253.25	37.71	1.83	253.083 ppm Nox
7:38:11	-0.08	0.05	3.04	252.19	37.51	1.93	
7:38:26	-0.09	0.05	3.04	252.67	37.89	1.89	
7:38:41	-0.09	0.05	40.77	100.66	37.97	1.95	
7:38:56	-0.09	0.05	309.15	249.36	35.94	1.87	
7:39:11	0.51	0.05	782.25	15.60	1.86	1.86	
7:39:26	7.21	0.05	889.71	12.60	2.83	1.92	
7:39:41	4.25	0.05	904.83	11.55	2.26	1.88	
7:39:56	1.38	0.05	904.61	10.52	1.53	1.83	900 ppm CO Cal Error:
7:40:11	0.36	0.05	905.86	9.63	1.28	1.84	904.100 ppm CO
7:40:26	0.05	0.05	905.85	9.47	0.91	1.71	
7:40:41	-0.05	0.05	900.08	8.82	0.76	1.67	
7:40:56	-0.09	0.04	814.75	7.52	0.66	1.64	
7:41:11	-0.10	0.03	649.21	7.68	0.56	1.59	
7:41:26	-0.11	0.03	610.85	7.19	0.66	1.51	
7:41:41	-0.11	0.03	606.71	7.22	0.31	1.50	
7:41:56	-0.11	0.03	605.05	6.96	0.33	1.45	600 ppm CO Cal Error:
7:42:11	-0.11	0.03	604.59	6.51	0.15	1.48	605.205 ppm CO
7:42:26	-0.11	0.03	605.57	6.39	0.46	1.39	
7:42:41	-0.12	0.03	605.61	6.27	0.23	1.34	
7:42:56	-0.12	0.03	554.86	5.65	0.18	1.33	
7:43:11	-0.12	0.03	381.68	5.05	0.18	1.33	
7:43:26	-0.12	0.03	317.10	5.33	0.11	1.32	
7:43:41	-0.11	0.03	305.46	5.42	-0.04	1.31	
7:43:56	-0.12	0.03	305.69	5.18	0.23	1.41	300 ppm CO Cal Error:
7:44:11	-0.11	0.03	305.91	4.99	0.21	1.39	305.439 ppm CO
7:44:26	-0.11	0.03	305.24	4.96	0.21	1.42	
7:44:41	-0.11	0.03	304.93	4.74	0.03	1.43	
7:44:56	-0.11	0.03	280.83	4.40	0.06	1.47	
7:45:11	-0.11	0.03	249.86	6.73	0.18	1.46	
7:45:26	-0.11	0.03	226.47	25.74	-0.87	1.49	
7:45:41	2.11	0.03	87.84	9.21	-1.74	1.37	
7:45:56	3.52	0.03	23.58	11.51	33.27	1.27	
7:46:11	1.29	0.03	9.19	10.51	99.98	1.24	
7:46:26	0.35	0.03	9.19	7.10	94.46	1.20	
7:46:41	0.04	0.03	7.59	5.60	65.88	1.25	
7:46:56	-0.05	0.03	7.05	4.95	66.03	1.18	
7:47:11	-0.08	0.03	6.60	4.53	72.92	1.28	

Range	0-25%	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
7:47:26	-0.09	0.03	6.16	4.43	77.43	1.34	
7:47:41	-0.09	0.03	5.62	4.20	79.79	1.27	
7:47:56	-0.09	0.03	5.35	4.05	80.25	1.20	
7:48:11	-0.10	0.03	5.62	3.98	81.09	1.14	
7:48:26	-0 10	0.03	5.89	3.80	81.09	1.49	
7:48:41	-0.10	0.03	5.08	3.64	81.34	1.83	
7:48:56	-0.10	0.03	5.08	3.73	81.47	1.64	
7:49:11	-0.10	0.03	5.08	3.50	82.19	1.80	
7:49:26	-0.10	0.03	5.89	3.57	82.29	1.92	
7:49:41	-0.10	0.03	4.59	3.43	82.67	1.42	
7:49:56	-0.10	0.03	4.84	3.38	84.79	1.05	
7:50:11	-0.10	0.03	5.09	3.28	84.49	108	
7:50:26	-0.10	0.03	5.08	3.22	85.07	0.97	85 ppm SO2 Cal Error:
7:50:41	-0.10	0.03	5.09	3.31	85.59	0.93	85.136 ppm SO2
7:50:56	-0.10	0.03	4.35	3.26	84.67	1.15	
7:51:11	0.10	0.03	4.59	3.12	8522	1.17	
7:51:26	-0.10	0.03	4.35	2.84	84.94	1.06	
7:51:41	-0.10	0.03	4.10	2.88	83.69	0.77	
7:51:56	-0 10	0.03	3.30	2.87	65.93	0.65	
7:52:11	-010	0.03	3.57	2.89	54.38	0.52	
7:52:26	-0.10	0.03	4.10	2.85	51.88	0.47	
7:52:41	-0.10	0.03	4.10	2.85	50.92	0.35	
7:52:56	-0.10	0.03	4.10	2.93	50.31	0.92	
7:53:11	-0 10	0 03	4 10	2 90	50 45	1 59	
7:53:26	-0 10	0 03	4 10	2 87	50.13	1.13	50 ppm SO2 Cal Error:
7:53:41	-0 10	0 03	4 10	2 87	50.15	141	50 192 ppm SO2
7:53:56	-0 10	0 03	4 10	2 62	50.23	0 86	
7:54:11	-0.10	0.03	3.57	2.55	50.26	0.41	
7:54:26	-0.10	0.03	3.03	2.64	41.76	0.33	
7:54:41	-0.10	0.03	4.11	2.55	30.19	0.37	
7:54:56	-0.10	0.03	4.10	2.56	26.62	0.25	
7:55:11	-0.10	0.03	3.03	2.53	26.20	0.23	
7:55:26	-0.10	0.03	3.03	2.53	25.85	0.15	
7:55:41	-0.10	0.03	3.57	2.48	25.80	0.11	
7:55:56	-0.10	0.03	3.30	2.55	25.35	0.03	
7:56:11	-0.10	0.03	4.10	2.62	25.80	-0.02	
7:56:26	-0.10	0.03	3.30	2.58	25.50	-0.07	
7:56:41	-0.10	0.03	3.57	2.57	25.45	-0.08	
7:56:56	-0.10	0.03	4.10	2.60	25.27	-0.17	25 ppm SO2 Cal Error:
7:57:11	-0.10	0.03	4.10	2.57	25.25	-0.21	25.287 ppm SO2
7:57:26	-0.13	0.03	3.30	2.59	25.62	-0.25	
7:57:41	-0.11	0.03	4.06	2.65	25.00	-0.25	
7:57:56	-0.10	0.03	5.89	7.13	24.62	18.28	
7:58:11	-0.10	0.10	5.62	2.14	20.17	101.66	
7:58:26	-0.10	0.10	5.08	2.09	73.45	48.56	
7:58:41	-0.10	0.10	4.11	2.19	57.97	8.30	
7:58:56	-0.10	0.10	4.11	2.10	14.69	10.61	
7:59:11	-0.10	0.10	4.10	2.04	2.89	1.42	
7:59:26	-0.10	0.10	4.10	2.05	-0.32	1.22	
7:59:41	-0.10	0.10	3.03	2.10	-1.27	0.91	
7:59:56	6.10	0.09	3.03	212	-1.46	4.41	Zero ppm System Bias:
8:00:11	4.10	0.10	3.03	2.26	-1.44	4.47	4.102 % Oxygen
8:00:26	4.10	0.10	3.03	2.87	1.52	4.47	0.096 % CO2
8:00:41	4.10	010	258	2.46	-1.67	4.16	2.920 ppm CO
8:00:56	-0 10	0.10	213	2 31	-1.37	1.24	2.428 ppm Nox
8:01:11	-0 10	0.10	2 13	2.33	-0.84	0 25	-1.522 ppm SO2
8:01:26	-0.10	0.10	2.13	2.22	-0.12	-0.43	-0.376 ppm VOC
8:01:41	1.14	0.10	2.58	2.26	0.18	-0.44	
8:01:56	0.47	0.10	3.03	2.35	0.26	-0.44	
8:02:11	0.23	0.10	2.13	2.36	0.23	-0.39	
8:02:26	0.13	0.10	2.81	2.25	0.33	-0.01	
8:02:41	0.08	0.10	2.58	2.27	0.33	-0.04	
8:02:56	0.06	0.10	2.80	2.31	0.46	-0.05	
8:03:11	0.03	0.10	2.13	2.30	0.46	-0.04	
8:03:26	0.02	0.10	2.13	2.31	0.41	-0.02	
8:03:41	0.00	0.10	2.58	2.80	0.26	-0.03	
8:03:56	0.00	0.10	3.03	4.68	0.38	-0.04	
8:04:11	-0.01	0.10	2.58	3.99	0.26	3.33	
8:04:26	0.00	0.10	2.13	3.13	0.31	21.21	
8:04:41	0.02	0.10	2.58	2.97	0.83	70.17	
8:04:56	0.03	0.10	3.03	2.91	1.03	84.00	
8:05:11	0.03	0.10	2.13	2.85	1.11	85.69	
8:05:26	0.02	0.10	2.13	2.85	0.81	88.02	
8:05:41	0.00	0.10	2.13	2.91	1.43	90.29	
8:05:56	-0.02	0.10	2.13	2.80	1.23	88.54	
8:06:11	-0.03	0.10	2.58	2.89	0.76	84.36	85 ppm VOC Cal:
8:06:26	-0.03	0.10	2.36	2.88	1.03	84.69	84.626 ppm VOC
8:06:41	0.04	0.10	2.13	2.79	1.06	84.89	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
8:06:56	-0.04	0.10	2.13	2.82	0.78	**84.57**	
8:07:11	-0.27	0.12	2.58	2.80	1.14	83.20	
8:07:26	-0.03	0.13	3.03	2.88	1.01	82.96	
8:07:41	-0.05	0.13	2.13	2.69	1.11	84.35	
8:07:56	-0.05	0.13	2.13	2.79	0.93	85.50	
8:08:11	-0.05	0.13	2.58	2.73	1.15	85.18	
8:08:26	-0.05	0.13	3.03	3.07	1.08	84.84	
8:08:41	-0.05	0.13	2.58	3.79	1.21	85.21	
8:08:56	-0.05	0.13	2.13	3.16	1.14	69.22	
8:09:11	-0.05	0.13	2.13	2.85	5.28	6.56	
8:09:26	-0.05	0.13	2.13	2.79	9.55	26.49	
8:09:41	-0.05	0.13	2.13	2.57	9.10	42.92	
8:09:56	-0.06	0.13	1.33	2.69	7.35	49.48	
8:10:11	-0.05	0.13	2.13	2.68	5.93	49.44	
8:10:26	-0.06	0.13	2.80	2.69	4.80	49.20	
8:10:41	-0.06	0.13	1.59	2.72	4.25	49.37	
8:10:56	-0.05	0.13	2.80	2.64	3.78	49.55	
8:11:11	-0.06	0.13	2.13	2.60	3.51	50.01	
8:11:26	-0.06	0.13	2.13	2.73	3.23	**49.79**	**50 ppm VOC Cal:**
8:11:41	-0.06	0.13	2.58	2.70	3.16	**49.97**	**49.960 ppm VOC**
8:11:56	-0.06	0.13	2.35	2.60	2.63	**50.07**	
8:12:11	-0.06	0.13	1.59	2.51	2.68	**50.01**	
8:12:26	-0.06	0.13	1.86	2.60	2.66	33.19	
8:12:41	-0.06	0.13	2.13	2.63	2.48	26.65	
8:12:56	-0.06	0.13	2.80	2.58	2.28	26.44	
8:13:11	-0.06	0.13	2.13	2.65	2.28	25.01	
8:13:26	-0.06	0.13	2.80	2.69	2.33	23.99	
8:13:41	-0.06	0.13	2.12	2.64	2.11	23.55	
8:13:56	-0.06	0.13	2.13	2.66	1.89	**24.57**	**25 ppm VOC Cal:**
8:14:11	-0.06	0.13	2.57	2.68	2.16	**24.78**	**24.562 ppm VOC**
8:14:26	-0.06	0.13	2.13	2.72	1.86	**24.59**	
8:14:41	-0.06	0.13	1.59	2.70	1.73	**24.31**	
8:14:56	-0.06	0.13	2.12	2.75	1.51	21.42	
8:15:11	-0.06	0.13	2.12	2.74	1.61	22.07	
8:15:26	-0.06	0.13	2.12	2.78	1.69	23.83	
8:15:41	-0.06	0.13	2.12	2.76	1.71	25.92	
8:15:56	-0.06	0.13	2.12	2.70	1.64	25.89	
8:16:11	-0.06	0.13	3.11	9.94	1.33	25.98	
8:16:26	-0.06	0.13	4.09	11.36	0.93	26.19	
8:16:41	1.86	0.13	2.57	9.86	26.59	18.14	
8:16:56	3.07	0.29	2.12	9.91	99.98	77.36	
8:17:11	1.17	0.23	2.57	9.81	99.98	14.56	
8:17:26	0.34	0.17	3.02	9.82	99.98	5.36	
8:17:41	0.07	0.15	2.12	9.77	99.98	3.93	
8:17:56	-0.01	0.14	2.12	9.87	99.98	3.10	
8:18:11	-0.04	0.14	2.57	6.19	99.98	2.45	
8:18:26	-0.05	0.14	2.35	2.94	99.98	2.04	
8:18:41	-0.06	0.14	2.57	3.00	99.98	1.64	
8:18:56	-0.06	0.13	1.32	3.00	99.98	12.51	
8:19:11	-0.06	0.13	1.59	2.95	99.98	19.41	
8:19:26	-0.07	0.13	2.12	2.92	99.98	15.80	
8:19:41	-0.07	0.13	2.57	2.96	99.98	10.05	
8:19:56	-0.07	0.13	2.12	2.99	99.98	5.26	
8:20:11	-0.07	0.13	1.59	2.92	99.98	2.04	
8:20:26	-0.07	0.13	1.86	2.96	96.04	0.11	
8:20:41	-0.07	0.13	2.12	2.96	89.42	-1.00	
8:20:56	-0.07	0.13	2.12	2.93	84.27	-1.55	
8:21:11	-0.07	0.13	2.12	2.93	80.10	-1.87	
8:21:26	-0.07	0.13	1.32	2.99	75.75	-1.99	
8:21:41	-0.07	0.13	3.02	2.93	73.17	-2.24	
8:21:56	-0.07	0.12	2.35	2.91	70.30	-3.39	
8:22:11	-0.07	0.12	2.12	3.00	68.43	-3.86	
8:22:26	-0.07	0.12	2.12	2.92	66.53	-3.21	
8:22:41	-0.07	0.12	2.12	2.98	**49.73**	-2.62	**50 ppm SO2 System Bias:**
8:22:56	-0.07	0.12	2.80	2.84	**49.98**	-0.32	**49.517 ppm SO2**
8:23:11	-0.07	0.12	2.57	2.77	**49.06**	0.53	
8:23:26	-0.06	0.12	2.35	13.07	**49.30**	0.33	
8:23:41	4.09	0.12	2.13	253.74	46.45	0.30	
8:23:56	13.22	0.12	2.12	277.49	46.97	-0.64	
8:24:11	9.32	0.12	2.13	327.43	99.06	33.68	
8:24:26	3.35	0.12	2.12	359.09	70.57	36.36	
8:24:41	-0.01	0.00	-1.78	2.35	48.75	1.63	
8:24:56	0.00	0.00	0.11	2.07	40.75	-0.79	
8:25:11	-0.01	0.00	0.07	2.16	37.98	-1.44	
8:25:26	0.00	0.00	0.06	2.06	36.04	-1.69	
8:25:41	-0.01	0.00	0.04	2.00	33.44	-1.73	
8:25:56	-0.01	0.00	0.04	2.02	32.24	-1.65	
8:26:11	-0.01	0.00	0.03	2.07	31.42	-1.80	

Range	0-25 %	0-2056	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
8:26:26	-0.01	0.00	0.03	2.01	21.15	-1.94	
8:26:41	-0.01	0.00	0.02	2.02	16.68	-1.98	
8:26:56	-0.01	0.00	0.02	2.06	15.38	-2.06	
8:27:11	-0.01	0.00	0.02	2.06	14.31	-2.28	
8:27:26	0.00	0.00	0.02	2.06	13.81	-2.46	
8:27:41	-0.01	0.00	0.01	2.08	12.65	-2.87	
8:27:56	0.00	0.00	0.01	1.93	11.96	-2.91	
8:28:11	4.01	0.00	0.03	277.29	11.61	-2.93	
8:28:26	-0.01	0.00	0.02	491.26	10.93	-3.04	
8:28:41	-0.01	0.00	0.01	496.52	10.40	-3.09	500 ppm Nox System Bias:
8:28:56	0.00	0.00	0.01	501.10	9.80	-3.09	499.541 ppm Nox
8:29:11	0.00	0.00	0.01	502.14	9.18	-3.13	
8:29:26	0.00	0.00	-0.01	498.40	8.84	-3.23	
8:29:41	0.00	0.00	0.01	239.99	8.49	-3.22	
8:29:56	31.28	10.22	768.06	23.52	8.03	-3.26	
8:30:11	38.11	17.94	0.22	3.72	7.96	-3.32	
8:30:26	38.15	2.59	0.16	3.62	7.58	-3.24	
8:30:41	38.18	0.24	0.14	3.52	7.33	-2.58	
8:30:56	38.19	-0.07	0.12	3.58	6.95	-2.16	
8:31:11	38.20	-0.13	7.85	13.98	6.83	-2.00	
8:31:26	36.68	-0.14	2.31	3.47	6.88	-2.23	
8:31:41	24.90	-0.15	84.47	285.09	6.43	-2.40	
8:31:56	22.17	-0.16	312.72	28.49	5.78	-0.53	
8:32:11	21.64	-0.17	553.23	8.34	10.65	1.11	
8:32:26	15.66	-0.18	585.55	7.28	21.45	2.11	
8:32:41	6.65	-0.20	589.39	6.81	17.43	4.30	
8:32:56	2.57	-0.20	592.02	6.49	13.68	1.66	
8:33:11	1.17	-0.21	598.11	6.20	12.00	1.46	600 ppm CO System Bias:
8:33:26	0.66	-0.21	599.70	6.00	10.88	0.77	598.759 ppm CO
8:33:41	0.43	-0.21	598.62	5.89	10.03	0.86	
8:33:56	0.32	-0.12	598.61	5.73	9.43	1.07	
8:34:11	0.24	-0.03	601.11	5.60	9.00	1.06	
8:34:26	0.17	-0.04	528.10	4.92	8.17	0.68	
8:34:41	0.15	-0.04	316.47	33.63	8.11	0.50	
8:34:56	0.11	-0.04	163.57	5.99	7.05	0.95	
8:35:11	2.80	-0.04	28.10	4.27	12.11	0.39	
8:35:26	8.53	-0.04	10.27	3.84	26.03	0.33	
8:35:41	10.32	-0.04	7.22	3.64	19.77	1.42	
8:35:56	12.08	-0.04	6.23	3.52	14.08	0.27	12.0% Oxygen System Bias:
8:36:11	12.04	-0.04	6.68	3.42	11.08	0.13	12.027 % Oxygen
8:36:26	12.08	-0.04	26.34	17.27	9.40	0.15	
8:36:41	11.92	-0.04	29.19	14.63	8.25	0.10	
8:36:56	12.49	-0.04	12.58	5.87	7.40	0.11	
8:37:11	13.02	2.75	4.13	5.26	8.35	1.53	
8:37:26	6.25	7.52	3.10	5.05	8.23	87.84	
8:37:41	2.22	9.03	3.09	4.77	8.10	18.93	
8:37:56	0.81	9.47	3.09	4.82	7.86	21.37	
8:38:11	0.36	9.58	2.19	4.76	7.35	45.93	
8:38:26	0.19	9.62	2.19	4.65	7.00	77.82	
8:38:41	0.12	9.97	2.64	4.60	6.80	70.46	10.0% CO2 System Bias:
8:38:56	0.09	10.02	3.09	6.63	6.23	51.65	10.023 % CO2
8:39:11	0.07	10.04	5.63	25.71	6.08	38.34	
8:39:26	0.05	10.06	8.70	26.87	5.33	34.29	
8:39:41	2.17	7.01	10.31	27.52	3.81	31.13	
8:39:56	12.17	2.21	10.98	27.29	3.56	26.58	
10:14:17	19.97	1.62	72.64	6.84	1.76	6.24	Instrument Re-Cal
10:14:32	19.87	1.69	49.38	7.48	1.85	5.99	
10:14:47	19.84	1.69	32.66	7.94	2.11	5.78	
10:15:02	19.84	1.68	17.84	2.91	1.86	5.70	
10:15:17	19.94	1.54	6.61	1.93	1.98	5.74	
10:15:32	19.47	1.27	3.04	1.92	1.18	5.65	
10:15:47	11.04	0.45	3.04	1.88	0.81	5.93	
10:16:02	3.90	0.15	2.59	1.94	1.23	6.08	
10:16:17	1.29	0.07	2.37	1.87	1.46	6.03	
10:16:32	0.46	0.05	3.04	1.81	1.56	5.84	
10:16:47	0.21	0.03	3.04	1.87	1.71	5.76	
10:17:02	0.10	0.02	3.04	1.87	1.78	5.58	
10:17:17	0.05	0.02	3.04	1.90	1.81	5.74	
10:17:32	0.02	0.01	3.58	1.87	1.68	1.00	
10:17:47	0.00	0.01	4.60	3.36	1.73	3.33	
10:18:02	4.01	0.01	3.12	1.94	1.61	-0.25	
10:18:17	-0.02	0.81	1.59	1.87	1.96	0.63	Zero ppm System Bias:
10:18:32	4.03	6.60	4.07	1.81	1.86	0.62	-0.030 %Oxygen
10:18:47	6.03	9.22	0.79	1.87	1.76	0.55	6.625 % CO2
10:19:02	-0.04	9.87	1.07	1.87	1.73	0.59	0.845 ppm CO
10:19:17	-0.04	10.04	1.61	0.64	1.66	0.51	1.853 ppm Nox
10:19:32	-0.05	10.04	0.50	0.57	1.58	0.45	1.828 ppm SO2
10:19:47	4.05	10.02	0.79	0.59	1.56	0.35	0.597 ppm VOC

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	pprnvdb	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
10:20:02	-0 05	10.03	1 07	0 47	1 6 1	0 33	10.0% CO2 System Bias:
10:20:17	-0 06	10.04	2 10	0 68	1 80	0 32	10.031 % CO2
10:20:32	-0.06	10.05	2.59	0.15	1.58	0.33	
10:20:47	0.09	9.40	2.37	-0.08	0.46	0.33	
10:21:02	4.12	5.22	3.04	-0.11	-0.02	0.31	
10:21:17	8.09	1.87	3.58	-0 21	-0.17	0.28	
10:21:32	8.66	1.61	3.04	-0.20	0.01	0.32	
10:21:47	11.74	0.05	3.04	-0.25	-0.14	0.32	12.0% Oxygen System Bias:
10:22:02	11.94	0.03	2.59	-0.28	-0.19	0.36	11.921 %Oxygen
10:22:17	11.99	0.03	7.16	-0.37	-0.17	0.24	
10:22:32	12.01	0.03	52.54	152.55	-0.17	0.19	
10:22:47	6.98	0.07	74.93	291.08	-0.29	0.13	
10:23:02	1.05	0.05	29.49	333.08	1.08	0.23	
10:23:17	0.44	0.03	7.66	473.75	2.26	0.21	
10:23:32	0.37	0.02	4.60	489.17	4.96	0.17	
10:23:47	0 35	0.02	3 85	496 49	26 85	0 15	
10:24:02	0 34	0 02	3 04	497.17	50 87	0 14	500 ppm Nox System Bias:
10:24:17	0 33	0 02	3 31	496.88	60 61	0 08	497 127 ppm Nox
10:24:32	0 33	0 02	4 11	497.35	64 83	0 04	
10:24:47	0.33	0.02	3.84	497.11	66.88	0.13	
10:25:02	3.25	0.01	11.73	156.89	68.14	0.07	
10:25:17	9.00	0.01	199.65	238.53	62.79	0.11	
10:25:32	2.11	0.01	483.07	11.35	4.82	0.01	
10:25:47	0.47	0.01	589.57	7.58	5.78	0.10	
10:26:02	0.33	0.01	605.03	6.43	4.35	0.07	600 ppm CO System Bias:
10:26:17	0.31	0.00	606.41	5.69	3.36	-0.06	602.286 ppm CO
10:26:32	0.30	0.00	606.12	5.20	2.41	-0.11	
10:26:47	0.29	0.00	591.59	4.68	2.06	-0.10	
10:27:02	0.82	0.00	459.51	2.81	1.86	-0.15	
10:27:17	9.48	0.00	219.83	3.33	1.86	-0.12	
10:27:32	5.84	0.00	69.54	3.66	0.56	-0.16	
10:27:47	0.84	0.00	26.83	4.01	1.33	-0.11	
10:28:02	0.38	0.00	50.05	3.77	17.87	-0.08	
10:28:17	0.33	0.00	106.82	11.53	23.72	-0.03	
10:28:32	0.31	0.00	81.05	5.86	16.90	-0.07	
10:28:47	0.31	0.00	37.83	6.54	10.30	0.05	
10:29:02	0.31	0.00	25.57	7.44	8.25	-0.03	
10:29:17	0.31	0.00	19.36	6.41	10.19	0.01	
10:29:32	0.30	-0.01	11.74	3.43	26.02	-0.05	
10:29:47	0.30	-0.01	7.37	2.58	61.17	-0.01	
10:30:02	0.30	-0.01	6.16	2.26	64.38	-0.13	
10:30:17	0 30	-0 01	6.16	2 11	51 29	-0 19	
10:30:32	0 30	-0 01	5 63	2 05	48.77	-0 19	50 ppm SO2 System Bias:
10:30:47	0 30	-0 01	5 09	1 99	48.09	0 1 7	48.646 ppm SO2
10:31:02	1.22	-0.01	5.09	1.70	48.96	-0.17	
10:31:17	11.02	-0.01	4.36	0.31	48.76	1.12	
10:31:32	19.07	-0.01	3.58	0.18	35.29	1.53	
10:31:47	20.66	-0.01	3.04	0.11	12.60	1.67	
10:32:02	20.90	-0.01	3.58	0.11	4.45	5.47	
10:32:17	20.95	-0.01	3.31	0.13	2.43	23.45	
10:32:32	20.96	-0.01	3.04	0 09	1 96	49.53	
10:32:47	20.96	O 01	2 59	0 05	1 78	52.16	50 ppm VOC Cal:
10:33:02	20 96	-0 01	3 04	0 06	1 73	51.24	50.822 ppm VOC
10:33:17	20.96	-0 01	3.04	0.03	1 78	49.44	
10:33:32	20.97	-0.01	3.05	-0.03	1.76	50.45	
10:33:47	20.93	-0.01	2.82	-0.04	1.69	51.52	
10:34:02	20.95	0.00	2.15	-0.03	1.55	51.27	
10:34:17	20.95	0.00	2.82	-0.04	1.58	25.21	
10:34:32	20.95	0.00	3 04	-0 10	1 1 9	1 33	End Re-cal
10:34:47	2095	0 00	5 61	4 66	1 4 1	6 27	
10:35:02	20 81	0 23	11 20	23 28	1 2 1	7 04	
10:35:17	20 68	0 36	14 24	20 38	1 36	7 00	
10:35:32	20.69	0.36	15.18	21.27	1.33	7.14	
10:35:47	20.69	0.36	14.51	20.59	0.98	7.30	
10:36:02	20.69	0.36	14.73	21.50	1.38	7.54	
10:36:17	20.70	0.36	15.18	22.19	1.43	7.67	
10:36:32	20.71	0.36	15.18	22.25	1.26	7.84	
10:36:47	20.73	0.36	15.99	21.43	1.23	7.84	
10:37:02	20.69	0.40	15.72	16.50	1.23	7.91	
10:37:17	20.66	0.47	15.99	17.74	1.43	7.83	
10:37:32	20.70	0.45	16.83	20.03	1.48	7.82	
10:37:47	20.73	0.40	16.27	22.72	1.21	8.06	
10:38:02	20.74	0.37	15.18	23.83	1.21	8.03	
10:38:17	20.75	0.34	14.51	23.22	1.43	7.79	
10:38:32	20.77	0.32	14.29	24.93	1.41	7.75	
10:38:47	20.77	0.32	14.73	25.13	1.28	8.01	
10:39:02	20.78	0.31	14.28	25.97	1.06	8.11	
10:39:17	20.79	0.30	13.48	26.73	1.33	8.00	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
10:39:32	20.79	0.29	13.21	27.79	1.23	7.85	
10:39:47	20.80	0.28	14.02	29.16	1.17	7.85	
10:40:02	20.89	0.28	14.28	29.94	1.36	7.50	
10:40:17	20.57	0.28	13.24	28.43	1.16	7.42	
10:40:32	20.69	0.27	12.72	28.73	1.21	7.38	
10:40:47	20.79	0.26	12.97	30.30	0.98	7.46	
10:41:02	20.77	0.25	12.72	29.61	1.28	7.57	
10:41:17	20.81	0.25	12.97	30.22	1.53	7.53	
10:41:32	20.82	0.24	12.23	29.61	1.26	7.33	
10:41:47	20.83	0.24	12.23	28.83	1.18	7.38	
10:42:02	20.84	0.23	12.23	28.52	1.21	7.50	
10:42:17	20.85	0.22	11.96	29.34	1.23	7.54	
10:42:32	20.85	0.22	10.71	30.34	1.28	7.36	
10:42:47	20.85	0.22	10.75	33.57	1.18	7.33	
10:43:02	20.85	0.22	12.23	31.20	1.11	7.26	
10:43:17	20.84	0.22	12.23	32.01	1.23	7.17	
10:43:32	20.84	0.22	12.23	31.52	1.26	7.37	
10:43:47	20.85	0.22	11.43	29.82	1.31	7.35	
10:44:02	20.85	0.22	11.16	28.71	1.31	7.22	
10:44:17	20.85	0.21	11.16	28.32	1.21	7.04	
10:44:32	20.86	0.21	11.16	27.86	1.06	6.95	
10:44:47	20.86	0.21	10.49	28.02	1.26	6.93	
10:45:02	20.87	0.20	10.26	27.78	1.04	6.79	
10:45:17	20.87	0.20	10.26	26.89	1.13	6.81	
10:45:32	20.87	0.20	10.26	27.37	1.23	6.80	
10:45:47	20.87	0.20	9.99	27.15	1.13	6.74	
10:46:02	20.87	0.20	9.73	28.21	1.06	6.56	
10:46:17	20.87	0.20	9.73	26.65	1.16	6.42	
10:46:32	20.87	0.19	10.26	27.85	1.13	6.44	
10:46:47	20.87	0.19	10.26	28.59	1.01	6.36	
10:47:02	20.87	0.19	9.73	28.19	1.21	6.35	
10:47:17	20.87	0.19	10.18	24.97	1.16	6.28	
10:47:32	20.88	0.19	9.73	24.90	0.98	6.28	
10:47:47	M.88	0.18	10.26	24.96	0.78	6.36	
10:48:02	20.88	0.18	10.26	24.99	0.93	6.28	
10:48:17	20.88	0.18	10.26	35.60	1.08	6.25	
10:48:32	20.87	0.18	10.26	36.38	1.03	6.68	
10:48:47	20.89		11.71	28.14	0.96	7.43	
10:49:02	20.90		16.37	23.14	1.01	7.97	
10:49:17	20.74	[illegible]	21.43	16.12	0.98	8.69	
10:49:32	20.64	0.39	26.55	13.72	1.11	8.74	Begin Run #1
10:49:47	20.68	0.39	27.90	11.81	1.08	8.50	
10:50:02	20.76	0.32	25.61	9.90	0.73	8.76	
10:50:17	20.79	0.28	32.20	18.93	0.90	8.43	
10:50:32	20.67	0.38	36.36	44.24	0.98	8.18	
10:50:47	20.55	0.53	40.70	70.12	1.01	9.33	
10:51:02	20.43	0.60	66.33	28.76	0.91	8.90	
10:51:17	20.37	0.65	61.63	15.43	1.06	8.28	
10:51:32	20.33	0.69	35.20	18.15	1.21	8.19	
10:51:47	20.37	0.69	22.73	16.39	1.03	8.23	
10:52:02	20.38	0.69	21.41	14.92	0.96	8.31	
10:52:17	20.33	0.70	19.09	16.23	0.91	8.35	
10:52:32	20.33	0.74	15.72	16.34	0.93	8.57	
10:52:47	20.37	0.75	18.34	15.55	1.13	8.45	
10:53:02	20.38	0.78	29.13	17.42	0.91	8.61	
10:53:17	20.38	0.81	45.61	15.42	1.18	8.80	
10:53:32	20.36	0.85	46.38	15.58	1.01	8.78	
10:53:47	20.34	0.92	37.58	16.50	1.03	9.03	
10:54:02	20.38	0.93	34.35	16.50	0.83	9.39	
10:54:17	20.37	0.93	52.01	15.08	1.31	9.64	
10:54:32	20.39	0.93	83.77	14.84	0.91	9.49	
10:54:47	20.41	0.93	87.83	15.48	0.96	9.26	
10:55:02	20.32	0.93	69.86	17.55	0.83	9.52	
10:55:17	20.44	0.93	49.85	17.72	1.17	9.41	
10:55:32	20.45	0.96	42.28	19.34	0.91	9.10	
10:55:47	20.39	0.98	44.79	16.74	0.76	8.93	
10:56:02	20.35	0.99	42.82	14.64	1.08	8.79	
10:56:17	20.32	1.01	37.36	15.80	0.96	8.79	
10:56:32	20.38	1.01	33.78	15.60	0.88	9.06	
10:56:47	20.40	1.01	36.49	15.66	0.98	9.42	
10:57:02	20.42	0.99	41.75	17.60	0.81	9.22	
10:57:17	20.41	0.97	44.06	13.90	1.06	9.31	
10:57:32	20.36	0.97	61.24	10.23	0.86	9.37	
10:57:47	20.32	0.97	82.38	10.02	1.08	9.57	
10:58:02	20.31	0.97	80.10	12.78	0.91	9.97	
10:58:17	20.33	0.97	68.36	13.81	0.88	9.91	
10:58:32	20.29	0.97	58.57	19.67	1.23	9.48	
10:58:47	20.30	0.97	63.19	32.10	1.16	9.08	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
10:59:02	20.34	1.00	90.32	42.92	1.23	8.72
10:59:17	20.32	1.10	110.58	40.56	1.33	8.53
10:59:32	20.29	1.14	149.30	24.08	1.68	8.47
10:59:47	20.20	1.25	196.00	11.12	1.46	8.06
11:00:02	20.08	1.36	217.19	7.19	1.48	7.76
11:00:17	20.02	1.37	228.98	6.38	1.43	7.61
11:00:32	19.98	1.39	220.18	10.63	1.68	7.53
11:00:47	20.01	1.41	195.46	18.10	1.91	7.46
11:01:02	20.08	1.40	165.63	18.40	1.83	7.39
11:01:17	20.08	1.39	153.69	19.54	2.06	7.12
11:01:32	20.08	1.39	148.32	16.34	2.11	6.97
11:01:47	20.07	1.39	148.80	12.86	2.44	6.77
11:02:02	20.06	1.40	176.38	8.82	2.66	6.62
11:02:17	19.99	1.46	196.76	10.63	2.53	6.98
11:02:32	19.95	1.53	196.76	12.56	2.98	7.12
11:02:47	19.95	1.62	198.26	11.64	2.61	7.16
11:03:02	19.94	1.68	185.98	14.70	2.63	7.17
11:03:17	19.97	1.68	178.32	11.15	2.91	7.14
11:03:32	19.95	1.71	181.99	15.95	2.98	7.17
11:03:47	20.00	1.71	166.96	20.33	2.91	7.32
11:04:02	20.00	1.71	154.48	18.71	3.41	724
11:04:17	20.00	1.71	171.81	17.19	3.63	7.09
11:04:32	20.00	1.71	201.93	17.85	4.08	6.91
11:04:47	20.00	1.73	218.72	19.86	4.48	6.91
11:05:02	20.02	1.74	203.81	18.46	4.63	6.80
11:05:17	20.00	1.79	184.47	15.35	5.18	6.74
11:05:32	19.97	1.82	180.34	12.65	5.90	6.65
11:05:47	19.94	1.86	168.95	9.09	5.83	6.57
11:06:02	19.91	1.87	144.75	8.13	6.42	6.52
11:06:17	19.95	1.86	129.12	10.24	6.55	6.48
11:06:32	20.02	1.79	105.77	12.41	6.71	6.15
11:06:47	20.09	1.71	85.75	8.33	6.15	5.95
11:07:02	19.97	1.72	77.48	7.19	6.33	5.95
11:07:17	19.88	1.73	70.88	6.81	6.25	5.91
11:07:32	19.87	1.73	75.97	6.99	6.08	5.80
11:07:47	19.93	1.66	73.44	5.86	5.85	5.67
11:08:02	20.01	1.52	57.06	5.25	6.03	5.70
11:08:17	20.05	1.43	42.82	5.59	5.65	5.66
11:08:32	20.08	1.37	36.36	5.98	5.38	5.70
11:08:47	20.12	1.30	33.79	6.34	4.55	5.69
11:09:02	20.17	1.23	32.13	6.62	4.58	5.80
11:09:17	20.15	1.22	31.38	7.30	4.13	6.00
11:09:32	20.18	1.21	31.15	7.53	3.90	6.10
11:09:47	20.20	1.18	33.75	7.66	3.73	6.04
11:10:02	20.16	1.18	35.33	7.15	3.53	6.01
11:10:17	20.09	1.25	31.93	7.75	3.46	5.95
11:10:32	20.18	1.20	29.14	7.91	3.03	5.79
11:10:47	20.24	1.13	28.65	8.10	3.01	5.73
11:11:02	20.24	1.10	28.65	8.21	2.93	5.66
11:11:17	20.23	1.10	28.65	8.69	2.78	5.66
11:11:32	2027	1.06	28.11	8.78	2.81	5.74
11:11:47	20.29	1.02	27.90	8.73	2.53	5.63
11:12:02	20.28	1.02	26.68	9.25	2.75	5.66
11:12:17	20.30	1.02	26.91	8.57	2.48	5.58
11:12:32	20.29	1.01	26.59	9.67	2.71	5.44
11:12:47	20.31	1.00	25.88	9.70	2.41	5.33
11:13:02	20.30	0.99	27.67	9.79	2.61	5.23
11:13:17	20.27	0.99	29.14	10.09	2.71	5.43
11:13:32	20.31	0.98	28.12	11.65	2.66	5.52
11:13:47	20.40	0.87	21.95	15.50	2.83	5.55
11:14:02	20.50	0.72	15.31	20.00	2.58	5.45
11:14:17	20.54	0.65	13.21	35.43	2.48	5.69
11:14:32	20.53	0.62	13.21	48.11	2.33	6.35
11:14:47	20.61	0.51	16.58	29.24	2.41	8.03
11:15:02	20.71	0.37	35.20	17.85	2.36	9.36
11:15:17	20.61	0.39	42.76	11.44	2.81	7.56
11:15:32	20.61	0.42	3222	9.27	2.83	7.72
11:15:47	20.65	0.42	28.40	8.50	2.63	8.33
11:16:02	20.71	0.40	38.20	7.63	2.66	9.69
11:16:17	20.73	0.38	55.52	7.55	2.46	10.52
11:16:32	20.74	0.37	65.81	7.70	2.71	11.53
11:16:47	20.75	0.36	67.85	7.44	226	11.06
11:17:02	20.77	0.32	63.79	6.70	2.13	9.74
11:17:17	20.78	0.30	51.64	6.33	2.26	9.49
11:17:32	20.79	0.29	51.84	6.58	1.98	10.74
11:17:47	20.75	0.30	69.84	8.94	2.01	9.73
11:18:02	20.60	0.49	91.35	12.07	2.08	8.86
11:18:17	20.26	0.87	82.68	10.36	1%	8.31

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
11:18:32	20.01	1.09	53.05	8.15	2.03	8.12
11:18:47	19.90	1.18	33.71	7.53	1.91	7.98
11:19:02	19.89	1.19	25.56	7.93	2.26	8.02
11:19:17	19.92	1.19	23.16	9.34	2.66	8.07
11:19:32	19.91	1.20	20.92	9.43	2.88	7.88
11:19:47	19.95	1.20	20.17	9.48	3.13	7.92
11:20:02	19.98	1.20	20.39	11.17	3.41	7.94
11:20:17	19.99	1.20	21.69	10.42	3.71	8.16
11:20:32	20.04	1.20	u.94	9.58	3.28	8.30
11:20:47	20.01	1.23	24.19	10.70	3.38	8.04
11:21:02	20.03	1.24	23.92	11.17	3.38	7.76
11:21:17	20.07	1.24	24.19	11.21	3.46	7.75
11:21:32	20.09	1.24	25.04	11.61	3.28	7.81
11:21:47	20.15	1.26	29.68	11.82	2.96	8.00
11:22:02	20.21	1.26	33.82	10.58	3.06	7.80
11:22:17	20.17	1.26	30.95	9.18	3.11	7.56
11:22:32	20.13	1.28	33.78	8.41	2.88	7.25
11:22:47	20.12	1.28	47.18	7.51	3.12	7.15
11:23:02	20.14	1.26	60.72	7.94	3.23	7.06
11:23:17	20.20	1.20	62.96	8.64	2.81	7.09
11:23:32	20.23	1.19	67.28	8.93	3.38	7.25
11:23:47	20.22	1.19	84.48	8.88	3.41	7.38
11:24:02	20.24	1.19	106.31	8.71	3.51	7.19
11:24:17	20.23	1.19	104.21	8.75	3.33	7.18
11:24:32	20.24	1.19	97.97	9.00	3.13	7.18
11:24:47	20.26	1.19	110.39	8.90	3.31	7.32
11:25:02	20.23	1.20	121.16	8.52	2.98	7.25
11:25:17	20.17	1.24	106.50	8.62	2.86	7.03
11:25:32	20.18	1.25	100.55	8.30	3.03	6.96
11:25:47	20.18	1.25	107.63	7.56	2.88	6.79
11:26:02	20.18	1.26	113.50	6.85	2.93	6.88
11:26:17	20.09	1.35	114.05	6.58	2.56	6.79
11:26:32	20.00	1.44	121.25	6.12	3.06	6.86
11:26:47	20.04	1.44	138.56	6.03	2.78	6.98
11:27:02	20.09	1.41	157.02	5.71	2.88	6.91
11:27:17	20.03	1.40	165.81	5.48	2.68	6.94
11:27:32	19.99	1.42	173.30	5.15	2.63	7.03
11:27:47	20.01	1.42	178.27	4.90	2.65	7.01
11:28:02	19.99	1.43	187.53	4.72	2.75	7.18
11:28:17	19.95	1.44	188.58	5.17	2.64	7.00
11:28:32	19.93	1.48	169.21	5.07	2.78	6.84
11:28:47	19.91	1.52	158.01	5.28	2.56	6.83
11:29:02	19.94	1.52	168.67	5.55	2.51	6.74
11:29:17	19.97	1.52	182.69	6.17	2.76	6.94
11:29:32	19.99	1.52	171.83	6.15	2.33	7.16
11:29:47	20.01	1.52	142.73	6.18	2.33	7.07
11:30:02	20.04	1.49	136.56	5.87	2.33	6.92
11:30:17	20.01	1.48	158.32	5.82	2.11	7.06
11:30:32	20.02	1.48	192.17	5.84	2.23	7.18
11:30:47	20.01	1.47	238.69	5.36	2.31	725
11:31:02	19.93	1.54	244.99	5.59	2.11	7.20
11:31:17	19.94	1.56	214.31	5.18	2.13	7.13
11:31:32	19.98	1.56	206.93	5.19	2.06	7.03
11:31:47	20.01	1.56	240.13	4.89	2.03	7.02
11:32:02	19.92	1.62	274.43	4.89	1.93	6.95
11:32:17	19.83	1.80	275.82	4.82	[illegible].66	7.01
11:32:32	19.75	1.98	276.97	4.68	1.93	7.07
11:32:47	19.75	2.02	293.15	5.02	1.73	7.15
11:33:02	19.80	2.03	302.48	5.27	1.85	7.01
11:33:17	19.80	2.03	33028	5.27	2.01	7.13
11:33:32	19.75	2.06	354.02	5.28	2.03	7.11
11:33:47	19.73	2.11	350.73	5A2	2.13	7.15
11:34:02	19.76	2.11	325.35	5.50	1.91	7.14
11:34:17	19.74	2.11	316.65	5.54	2.16	7.19
11:34:32	19.66	2.23	323.88	5.74	1.83	7.07
11:34:47	19.62	2.30	321.63	5.50	1.88	7.00
11:35:02	19.64	2.31	348.06	5.54	1.83	7.04
11:35:17	19.54	2.51	532.59	6.16	1.96	7.11
11:35:32	19.43	2.71	549.42	6.34	1.78	7.04
11:35:47	19.48	2.72	391.86	5.94	1.98	7.05
11:36:02	19.50	2.72	317.22	5.59	2.18	6.99
11:36:17	19.55	2.72	321.85	528	2.83	6.85
11:36:32	19.53	2.72	296.81	5.40	3.01	6.78
11:36:47	19.49	2.71	259.62	5.21	2.58	6.68
11:37:02	19.56	2.49	206.04	5.10	2.81	6.59
11:37:17	19.65	2.25	168.53	5.16	2.71	6.56
11:37:32	19.70	2.13	450.56	5.53	2.61	7.05
11:37:47	19.56	2.23	948.08	5.80	2.76	6.60

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
11:38:02	19.36	2.43	787.00	6.26	2.51	6.35
11:38:17	19.54	2.31	318.15	6.02	2.24	6.03
11:38:32	19.71	2.09	153.41	5.76	2.82	6.06
11:38:47	19.76	2.00	139.65	5.99	3.61	6.00
11:39:02	19.82	1.92	117.15	6.22	3.38	6.13
11:39:17	19.84	1.88	99.35	7.77	3.13	6.25
11:39:32	19.83	1.87	72.98	7.74	3.03	6.26
11:39:47	19.89	1.77	59.35	7.61	2.98	6.20
11:40:02	19.92	1.69	52.46	7.63	2.66	6.35
11:40:17	19.95	1.65	50.44	8.09	2.36	6.23
11:40:32	19.99	1.57	49.38	7.92	2.51	6.29
11:40:47	19.98	1.57	51.43	7.34	2.41	6.19
11:41:02	19.99	1.55	49.92	7.04	2.28	6.02
11:41:17	20.04	1.48	48.01	7.13	2.06	6.03
11:41:32	20.04	1.46	48.28	7.49	2.11	5.89
11:41:47	20.12	1.34	47.07	10.64	2.33	5.87
11:42:02	20.25	1.12	42.84	12.26	2.21	5.91
11:42:17	20.38	0.90	36.38	18.15	2.16	5.90
11:42:32	20.43	0.81	27.04	28.04	2.08	6.05
11:42:47	20.42	0.78	21.44	62.20	1.68	6.25
11:43:02	20.48	0.68	16.83	40.69	2.18	6.45
11:43:17	20.67	0.43	18.58	27.10	2.01	6.56
11:43:32	20.52	0.52	20.92	11.71	2.11	6.55
11:43:47	20.52	0.56	20.43	11.54	2.12	6.50
11:44:02	20.62	0.50	20.43	8.87	2.23	7.15
11:44:17	20.68	0.41	20.43	14.20	2.36	7.06
11:44:32	20.56	0.55	37.21	21.32	2.21	7.11
11:44:47	20.34	0.85	82.64	19.64	2.21	7.15
11:45:02	20.14	1.03	87.87	11.35	2.31	7.17
11:45:17	20.03	1.13	52.49	11.80	2.18	6.96
11:45:32	20.04	1.14	25.57	12.49	2.38	7.21
11:45:47	20.11	1.13	21.68	13.19	2.16	7.58
11:46:02	20.17	1.12	20.43	16.14	2.53	7.61
11:46:17	20.22	1.12	19.63	15.64	2.33	7.69
11:46:32	20.20	1.12	19.36	14.02	2.33	7.77
11:46:47	20.22	1.11	18.69	13.88	2.43	7.79
11:47:02	20.27	1.05	17.35	15.74	2.38	7.79
11:47:17	20.29	1.02	17.91	15.35	2.38	7.80
11:47:32	20.31	1.00	18.91	15.53	2.68	7.82
11:47:47	20.35	0.99	19.36	16.54	2.33	7.55
11:48:02	20.35	0.98	18.46	16.48	2.46	7.46
11:48:17	20.38	0.98	20.68	14.57	2.41	7.61
11:48:32	20.43	0.95	26.60	13.45	2.71	7.50
11:48:47	20.44	0.93	27.58	13.93	3.23	7.29
11:49:02	20.43	0.93	30.66	12.21	3.41	7.33
11:49:17	20.38	0.93	35.81	12.53	3.56	7.20
11:49:32	20.39	0.93	46.84	11.60	3.76	6.96
11:49:47	20.35	0.94	50.76	10.83	3.90	6.97
11:50:02	20.34	0.95	53.48	10.49	4.01	7.07
11:50:17	20.37	0.95	53.97	11.28	4.38	6.93
11:50:32	20.36	0.94	53.48	1035	4.33	6.86
11:50:47	20.35	0.95	57.13	9.41	4.28	6.75
11:51:02	2031	0.95	71.87	8.14	4.65	6.72
11:51:17	20.26	0.95	88.61	6.59	4.68	6.58
11:51:32	20.18	1.01	116.03	5.70	5.15	6.43
11:51:47	20.09	1.14	126.30	5.93	4.75	6.48
11:52:02	20.09	1.17	109.37	6.42	4.90	6.54
11:52:17	20.11	1.17	86.79	6.79	4.63	6.49
11:52:32	20.11	1.16	62.81	6.69	4.50	6.40
11:52:47	20.11	1.16	57.30	6.51	4.13	6.41
11:53:02	20.08	1.16	77.07	6.28	4.11	6.28
11:53:17	20.09	1.16	85.97	6.27	3.53	6.25
11:53:32	20.12	1.15	90.33	6.22	3.66	6.39
11:53:47	20.11	1.14	91.04	6.53	3.53	6.53
11:54:02	20.13	1.14	65.22	6.69	3.17	6.50
11:54:17	20.17	1.13	60.90	6.69	3.18	6.42
11:54:32	20.17	1.11	87.79	6.91	2.91	6.31
11:54:47	20.17	1.10	95.20	6.55	3.23	6.28
11:55:02	20.16	1.10	69.33	6.33	2.88	6.32
11:55:17	20.18	1.10	51.64	6.14	2.83	6.34
11:55:32	20.20	1.10	44.26	5.92	2.83	6.40
11:55:47	20.19	1.11	46.33	5.89	2.68	6.35
11:56:02	20.17	1.15	45.28	6.02	2.93	6.26
11:56:17	20.15	1.19	44.79	6.13	2.93	6.27
11:56:32	20.13	1.24	41.31	6.43	2.71	6.40
11:56:47	20.15	1.26	41.27	6.51	2.73	6.60
11:57:02	20.15	1.29	42.74	6.47	2.73	6.57
11:57:17	20.15	1.31	41.75	6.22	2.71	6.66

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
11:57:32	20.14	1.33	35.26	6.29	2.76	6.55
11:57:47	20.13	1.36	29.66	6.44	2.86	6.55
11:58:02	20.15	1.36	25.57	6.11	2.96	6.30
11:58:17	20.16	1.37	24.45	6.11	2.41	6.42
11:58:32	20.11	1.42	29.59	6.41	2.76	6.48
11:58:47	20.03	1.58	31.61	6.58	2.73	6.62
11:59:02	19.96	1.69	26.02	6.39	2.56	6.73
11:59:17	19.95	1.70	24.46	6.47	2.37	6.65
11:59:32	19.95	1.71	24.46	6.52	2.56	6.87
11:59:47	19.93	1.75	26.13	6.46	2.38	6.81
12:00:02	19.90	1.82	35.69	6.03	2.33	6.58
12:00:17	19.90	1.83	51.72	5.51	2.36	6.54
12:00:32	19.88	1.85	64.82	5.48	2.28	6.64
12:00:47	19.84	1.92	69.39	5.53	2.28	6.71
12:01:02	19.87	1.93	73.96	5.50	2.03	6.82
12:01:17	19.87	1.93	72.22	5.98	2.31	6.74
12:01:32	19.90	1.92	67.28	6.22	2.16	6.67
12:01:47	19.93	1.88	54.30	6.84	1.91	6.62
12:02:02	19.96	1.81	36.81	6.92	2.11	6.59
12:02:17	19.96	1.79	31.49	7.62	2.26	6.70
12:02:32	19.98	1.74	29.68	8.23	2.13	6.37
12:02:47	20.01	1.71	27.85	9.18	2.08	6.13
12:03:02	20.01	1.69	29.63	8.63	2.23	5.95
12:03:17	20.00	1.69	32.76	9.55	2.08	5.90
12:03:32	19.99	1.69	46.44	8.22	2.08	6.36
12:03:47	19.98	1.69	126.23	8.09	1.96	6.26
12:04:02	19.86	1.82	286.24	9.27	1.98	5.73
12:04:17	19.69	2.08	199.04	8.35	1.71	5.65
12:04:32	19.83	1.95	71.86	8.50	1.83	5.55
12:04:47	19.93	1.78	46.55	8.90	1.93	5.47
12:05:02	19.94	1.73	38.37	8.43	1.76	5.43
12:05:17	19.99	1.67	38.90	8.08	1.58	5.37
12:05:32	20.01	1.64	36.80	8.12	1.66	5.27
12:05:47	20.02	1.62	35.77	9.03	1.96	5.14
12:06:02	20.00	1.62	36.84	9.19	1.56	5.07
12:06:17	19.99	1.62	36.84	9.48	1.61	5.06
12:06:32	19.98	1.62	32.79	9.18	1.81	5.14
12:06:47	20.00	1.62	29.16	8.75	1.86	5.06
12:07:02	20.01	1.61	36.23	8.99	1.63	5.02
12:07:17	20.03	1.58	41.53	8.23	1.48	4.90
12:07:32	20.02	1.56	32.22	9.48	1.46	4.85
12:07:47	20.03	1.55	26.37	10.06	1.48	4.89
12:08:02	20.07	1.50	21.94	10.99	1.51	4.96
12:08:17	20.09	1.45	20.67	11.22	1.63	5.04
12:08:32	20.13	1.40	19.35	11.13	1.71	5.10
12:08:47	20.13	1.38	19.36	10.99	1.30	5.16
12:09:02	20.13	1.38	19.35	11.10	1.41	5.20
12:09:17	20.12	1.38	19.36	10.94	1.58	5.23
12:09:32	20.12	1.38	18.90	11.27	1.46	5.23
12:09:47	20.13	1.38	19.35	11.63	1.53	5.12
12:10:02	20.14	1.38	19.35	11.32	1.46	5.08
12:10:17	20.16	1.35	19.35	10.86	1.31	5.03
12:10:32	20.19	1.33	19.35	12.64	1.46	4.88
12:10:47	20.21	1.32	19.35	11.99	1.11	4.80
12:11:02	20.21	1.31	19.35	11.29	1.11	4.71
12:11:17	20.21	1.30	1935	11.25	1.21	4.89
12:11:32	20.22	1.28	18.91	11.68	1.31	4.73
12:11:47	20.23	1.26	19.12	10.77	1.38	4.51
12:12:02	20.23	1.24	19.89	10.58	1.41	4.56
12:12:17	20.21	1.24	20.41	10.20	1.21	4.76
12:12:32	20.20	1.24	21.94	9.51	1.26	4.78
12:12:47	20.18	1.24	23.14	9.18	1.21	4.78
12:13:02	20.10	1.34	21.93	7.94	1.11	4.77
12:13:17	20.09	1.38	23.68	7.84	1.28	4.82
12:13:32	20.13	1.37	28.11	7.71	1.33	4.81
12:13:47	20.11	1.37	28.65	6.50	1A I	4.76
12:14:02	20.12	1.36	28.11	6.00	1.68	4.65
12:14:17	20.16	1.32	29.38	5.40	1.31	4.57
12:14:32	20.15	1.32	29.13	5.38	1.31	4.43
12:14:47	20.15	1.32	2522	5.68	1.23	4.33
12:15:02	20.17	1.29	24.44	5.81	1.31	4.38
12:15:17	20.18	1.27	24.43	6.03	1.01	4.41
12:15:32	20.20	1.24	2247	6.26	1.21	4.51
12:15:47	20.21	1.19	21.67	6.42	1.28	4.73
12:16:02	20.23	1.15	22.38	6.18	1.18	4.72
12:16:17	20.19	1.16	24.17	5.04	1.26	4.59
12:16:32	20.11	1.25	27.12	5.53	1.43	4.54
12:16:47	20.25	1.25	26.90	6.10	1.41	4.53

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
12:17:02	20.22	1.18	28.10	6.04	1.24	4.40	
12:17:17	20.21	1.16	28.64	6.58	1.36	4.74	
12:17:32	20.20	1.16	24.03	11.30	1.41	4.72	
12:17:47	20.24	1.14	21.67	10.89	1.46	4.78	
12:18:02	20.31	1.07	20.41	10.45	1.38	4.77	
12:18:17	20.34	1.03	20.41	9.85	1.53	4.77	
12:18:32	20.31	1.03	19.34	8.85	1.78	A87	
12:18:47	20.31	1.03	19.34	8.34	1.48	4.82	
12:19:02	20.31	1.03	19.34	7.82	1.40	4.81	
12:19:17	20.30	1.03	20.14	7.91	1.46	4.83	
12:19:32	20.27	1.03	20.41	8.14	1.63	4.93	
12:19:47	20.28	1.03	19.61	7.66	1.73	4.83	
12:20:02	20.25	1.03	43.87	7.47	1A3	4.77	
12:20:17	20.21	1.13	53.22	6.24	1.76	4.75	
12:20:32	20.02	1.44	30.63	5.92	1.66	4.62	
12:20:47	20.06	1.46	21.42	6.13	1.71	4.70	
12:21:02	20.17	1.34	18.44	6.47	1.91	4.77	
12:21:17	20.22	1.24	19.11	6.13	1.78	4.72	
12:21:32	20.21	1.21	19.34	6.68	1.94	4.72	
12:21:47	20.23	1.18	18.66	6.65	1.83	4.67	
12:22:02	20.23	1.15	17.37	5.94	1.61	4.73	
12:22:17	20.18	1.16	17.37	7.76	1.53	4.81	
12:22:32	20.23	1.16	17.37	9.86	1.54	5.02	
12:22:47	20.31	1.07	17.37	9.42	1.68	5.08	
12:23:02	20.36	1.02	15.70	10.08	1.76	5.32	
12:23:17	20.35	1.01	15.16	9.35	2.03	5.60	
12:23:32	20.33	1.01	16.23	9.47	1.81	5.96	
12:23:47	20.33	0.98	16.23	8.86	1.73	6.33	
12:24:02	20.31	0.97	16.24	9.17	1.89	6.36	
12:24:17	20.30	0.96	16.23	8.57	1.91	6.20	
12:24:32	20.28	0.95	16.23	8.71	2.39	6.18	
12:24:47	20.27	0.95	16.24	10.64	2.18	6.12	
12:25:02	20.32	0.94	15.16	9.58	2.51	6.31	
12:25:17	20.38	0.90	15.16	9.89	2.71	6.20	
12:25:32	20.42	0.86	14.17	8.92	2.88	6.09	
12:25:47	20.35	0.86	16.82	10.29	2.97	5.93	
12:26:02	20.26	0.93	20.40	7.01	2.81	6.03	
12:26:17	20.10	1.25	18.13	6.26	2.93	6.23	
12:26:32	20.13	1.31	15.69	7.62	2.86	6.35	
12:26:47	20.21	1.20	15.16	8.76	2.93	6.55	
12:27:02	20.26	1.08	15.69	8.87	3.18	6.73	
12:27:17	20.28	1.03	15.16	8.90	3.11	6.75	
12:27:32	20.30	1.00	16.22	9.14	2.93	6.86	
12:27:47	20.28	1.00	15.43	9.24	3.08	6.78	
12:28:02	20.28	0.98	15.70	9.24	3.18	6.92	
12:28:17	20.26	0.97	15.16	11.15	3.21	6.68	
12:28:32	20.31	0.90	14.26	12.83	3.43	6.59	
12:28:47	20.42	0.77	13.46	12.99	3.66	6.70	
12:29:02	20.54	0.63	10.24	15.38	3.51	6.66	
12:29:17	20.62	0.48	1024	19.63	3.83	6.67	
12:29:32	20.69	0.40	10.69	27.33	3.88	6.68	
12:29:47	20.69	0.36	10.24	28.94	3.78	6.47	
12:30:02	20.70	0.33	9.70	28.53	3.38	6.43	
12:30:17	20.70	0.32	9.17	27.05	3.38	6.30	
12:30:32	20.71	0.30	10.24	28.18	3.19	6.12	
12:30:47	20.73	0.28	10.24	28.76	3.25	6.06	
12:31:02	20.78	0.27	10.24	28.40	3.05	6.00	
12:31:17	20.75	0.26	9.44	29.23	3.11	6.04	
12:31:32	20.79	0.25	9.17	29.88	2.76	5.96	
12:31:47	20.78	0.24	9.17	30.66	2.86	5.96	
12:32:02	20.78	0.23	10.24	29.14	2.88	5.96	
12:32:17	20.79	0.22	9.44	29.97	2.66	5.93	
12:32:32	20.79	0.22	9.17	30.58	2.76	5.79	
12:32:47	20.79	0.22	9.97	30.86	2.66	5.77	
12:33:02	20.80	0.21	9.17	31.69	2.71	5.76	
12:33:17	20.80	0.21	9.17	31.93	2.63	5.73	
12:33:32	20.81	0.21	9.17	30.27	2.61	5.67	
12:33:47	20.80	0.21	9.17	30.11	2.46	5.71	
12:34:02	20.81	0.21	9.17	30.70	2.61	5.72	
12:34:17	20.81	0.21	9.17	29.98	2.53	5.79	
12:34:32	20.82	0.21	8.68	30.55	2.33	5.70	
12:34:47	20.79	0.21	8.11	30.71	2.29	5.75	
12:35:02	20.81	0.21	8.11	31.23	2.19	5.80	
12:35:17	20.80	0.21	8.10	31.01	2.39	5.70	
12:35:32	20.82	0.20	8.89	31.38	2.33	7.51	
12:35:47	20.83	0.20	8.11	29.09	2.46	-1.25	
12:36:02	20 84	0.19	8 11	28 64	2 48	-1 26	End Run #1
12:36:17	1974	0 17	5 83	115	2 28	-1 30	

Range	0-25%	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
12:36:32	0.02	0.07	3.82	1.02	0.11	-1.40
12:36:47	0.02	0.02	3.82	0.98	0.01	-1.31
12:37:02	0.00	0.00	3.28	0.90	0.88	-1.31
12:37:17	0.04	0.01	4.09	0.88	0.20	-1.25
12:37:32	0.38	-0.01	3.82	0.89	0.51	-1.27
12:37:47	0.36	-0.01	3.02	0.84	0.35	-1.29
12:38:02	0.36	-0.02	2.79	0.87	0.91	50.29
12:38:17	0.36	-0.02	2.79	0.81	0.31	50.02
12:38:32	0.35	-0.02	3.01	0.85	0.93	49.91
12:38:47	0.35	-0.02	3.01	0.88	0.58	49.81
12:39:02	0.35	-0.02	3.01	0.86	0.76	41.67
12:39:17	0.35	-0.02	2.34	0.86	0.36	7.25
12:39:32	0.33	-0.02	3.01	1.11	2.43	1.68
12:39:47	3.37	-0.02	3.02	1.10	2.41	-1.57
12:40:02	15.42	0.02	2.79	1.01	2.21	-2.04
12:40:17	20.06	-0.02	2.11	1.04	0.38	-2.07
12:40:32	19.66	-0.01	4.33	22.69	0.41	-1.48
12:40:47	12.89	0.00	4.33	3.67	0.46	-1.28
12:41:02	11.91	0.00	3.01	2.08	4.43	-1.25
12:41:17	11.91	0.00	3.01	1.71	4.22	-1.26
12:41:32	11.92	0.00	1.85	1.54	0.98	-1.30
12:41:47	11.92	0.00	1.85	1.43	0.26	-1.40
12:42:02	12.44	0.00	2.52	3.88	0.18	-1.31
12:42:17	10.69	2.92	0.19	5.28	0.11	-1.31
12:42:32	2.86	9.84	1.04	2.81	0.78	-1.25
12:42:47	0.64	9.98	0.19	2.53	1.86	-1.27
12:43:02	1.20	9.90	6.13	2.92	1.53	-1.29
12:43:17	5.87	9.96	24.54	109.70	1.99	-1.29
12:43:32	1.88	1.08	14.77	298.05	3.76	-0.39
12:43:47	0.48	0.10	4.82	506.50	32.90	0.53
12:44:02	0.36	0.03	2.34	498.62	14.83	0.49
12:44:17	0.33	0.02	3.01	496.26	7.45	0.55
12:44:32	0.32	0.01	3.01	497.89	9.65	0.53
12:44:47	1.63	0.01	11.44	300.72	36.59	0.54
12:45:02	5.62	0.01	218.14	150.66	54.73	0.51
12:45:17	1.33	0.01	499.79	8.98	16.15	0.51
12:45:32	0.39	0.00	587.21	6.43	9.51	0.50
12:45:47	0.30	0.00	594.90	5.48	6.49	0.53
12:46:02	0.29	0.00	596.58	4.95	3.78	0.54
12:46:17	0.28	0.00	598.98	4.47	2.80	0.53
12:46:32	0.61	0.00	597.63	3.42	2.40	0.52
12:46:47	6.61	0.00	280.51	3.72	2.24	0.58
12:47:02	2.99	0.00	220.49	22.30	1.03	0.57
12:47:17	0.53	0.00	97.72	2.75	0.48	0.57
12:47:32	0.33	0.00	20.13	3.20	33.82	0.57
12:47:47	0.25	0.00	13.17	3.56	49.33	0.54
12:48:02	0.15	-0.02	12.93	3.41	50.91	0.51
12:48:17	0.29	-0.02	10.72	3.41	50.98	0.61
12:48:32	4.14	-0.02	6.29	2.10	50.85	0.60
12:48:47	16.05	-0.02	2.60	1.66	30.25	0.49
12:49:02	20.11	-0.02	3.00	1.57	15.93	0.60
12:49:17	19.91	1.34	182.08	8.38	0.81	13.19
12:49:32	19.93	1.33	198.08	8.46	0.91	13.12
12:49:47	19.90	1.32	175.88	7.76	0.81	13.21
12:50:02	19.88	1.32	153.60	7.98	0.86	13.44
12:50:17	19.93	1.33	185.72	8.03	1.13	13.67
12:50:32	19.87	1.34	152.31	7.66	1.06	15.76
12:50:47	19.91	1.34	182.08	8.38	0.81	13.19
12:51:02	19.93	1.33	198.08	8.46	0.91	13.12
12:51:17	19.90	1.32	175.88	7.76	0.81	13.21
12:51:32	19.88	1.32	153.60	7.98	0.86	13.44
12:51:47	19.93	1.33	185.72	8.03	1.13	13.67
12:52:02	19.90	1.32	175.88	7.76	0.81	13.21
12:52:17	19.88	1.32	153.60	7.98	0.86	13.44
12:52:32	19.93	1.33	185.72	8.03	1.13	13.67
12:52:47	19.91	1.34	218.94	7.74	0.83	13.77
12:53:02	19.91	1.34	182.08	8.38	0.81	13.19
12:53:17	19.93	1.33	198.08	8.46	0.91	13.12
12:53:32	19.90	1.32	175.88	7.76	0.81	13.21
12:53:47	19.88	1.32	153.60	7.98	0.86	13.44
12:54:02	19.93	1.33	185.72	8.03	1.13	13.67
12:54:17	19.90	1.32	175.88	7.76	0.81	13.21
12:54:32	19.88	1.32	153.60	7.98	0.86	13.44
12:54:47	19.93	1.33	185.72	8.03	1.13	13.67
12:55:02	19.91	1.34	218.94	7.74	0.83	13.77
12:55:17	19.91	1.34	182.08	8.38	0.81	13.19
12:55:32	19.93	1.33	198.08	8.46	0.91	13.12
12:55:47	19.90	1.32	175.88	7.76	0.81	13.21

Zero ppm Post-Test Cal:
0.020 %Oxygen
0.018 % CO2
3.751 ppm CO
0.943 ppm Nox
0.301 ppm SO2
-1.316 ppm VOC

50 ppm VOC Post-Test Cal:
50.006 ppm VOC

12.0% Oxygen Post-Test Cal:
11.916 %Oxygen

10.0% CO2 System Bias:
9.922 % CO2

500 ppm Nox Post-Test Cal:
499.816 ppm Nox

600 ppm CO Post-Test Cal:
597.023 ppm CO

50 ppm SO2 Post Test Cal:
50.516 ppm SO2

Start Run #2

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
12:56:02	19.88	1.32	153.60	7.98	0.86	13.44
12:56:17	19.93	1.33	185.72	8.03	1.13	13.67
12:56:32	19.87	1.34	152.31	7.66	1.06	15.76
12:56:47	19.91	1.34	182.08	8.38	0.81	13.19
12:57:02	19.93	1.33	198.08	8.46	0.91	13.12
12:57:17	19.90	1.32	175.88	7.76	0.81	13.21
12:57:32	19.88	1.32	153.60	7.98	0.86	13.44
12:57:47	19.93	1.33	185.72	8.03	1.13	13.67
12:58:02	19.90	1.32	175.88	7.76	0.81	13.21
12:58:17	19.88	1.32	153.60	7.98	0.86	13.44
12:58:32	19.93	1.33	185.72	8.03	1.13	13.67
12:58:47	19.91	1.34	218.94	7.74	0.83	13.77
12:59:02	19.88	1.32	153.60	7.98	0.86	13.44
12:59:17	19.93	1.33	185.72	8.03	1.13	13.67
12:59:32	19.91	1.34	218.94	7.74	0.83	13.77
12:59:47	19.90	1.40	219.67	8.01	0.98	13.30
13:00:02	19.93	1.47	217.97	8.00	1.28	13.04
13:00:17	20.00	1.48	253.53	9.05	0.88	12.73
13:00:32	19.97	1.49	280.95	9.04	1.01	12.69
13:00:47	19.92	1.56	240.12	9.30	1.16	12.53
13:01:02	19.94	1.57	242.25	10.27	1.36	12.11
13:01:17	19.95	1.57	272.58	9.77	1.28	12.22
13:01:32	19.91	1.57	255.23	11.18	1.21	12.26
13:01:47	19.91	1.60	227.31	11.12	1.14	12.19
13:02:02	19.87	1.65	222.08	10.10	1.16	12.15
13:02:17	19.81	1.73	227.38	9.61	1.16	12.23
13:02:32	19.82	1.74	242.40	9.62	1.03	12.12
13:02:47	19.85	1.74	255.52	10.91	1.29	12.03
13:03:02	19.88	1.72	264.68	10.99	0.98	11.96
13:03:17	19.88	1.71	235.10	10.33	1.16	12.00
13:03:32	19.82	1.80	201.07	11.05	0.88	11.95
13:03:47	19.85	1.80	164.41	12.80	0.91	12.07
13:04:02	19.91	1.80	131.00	13.74	1.31	11.76
13:04:17	19.93	1.78	117.89	15.62	1.28	11.77
13:04:32	19.95	1.77	103.14	15.07	1.38	11.66
13:04:47	19.94	1.77	106.36	15.04	1.33	11.64
13:05:02	19.95	1.77	121.66	13.47	1.38	11.65
13:05:17	19.93	1.79	150.10	13.63	1.59	11.65
13:05:32	19.91	1.84	204.41	15.11	1.71	11.68
13:05:47	19.91	1.87	227.31	19.51	1.53	11.70
13:06:02	19.94	1.87	214.02	16.15	1.46	11.78
13:06:17	19.91	1.87	208.68	15.28	1.82	11.80
13:06:32	19.89	1.93	228.08	14.94	1.63	11.80
13:06:47	19.82	2.02	248.30	13.87	1.79	11.71
13:07:02	19.79	2.10	238.23	11.82	1.81	11.71
13:07:17	19.84	2.09	198.73	10.68	1.60	11.60
13:07:32	19.90	1.99	158.18	10.37	1.69	11.52
13:07:47	19.90	1.86	130.61	9.77	1.89	11.50
13:08:02	19.88	1.78	99.15	9.90	1.73	11.32
13:08:17	19.93	1.65	67.78	11.08	1.86	11.15
13:08:32	19.99	1.58	49.41	10.51	1.31	11.27
13:08:47	20.02	1.49	41.79	10.00	1.31	11.16
13:09:02	20.08	1.36	38.33	10.32	1.46	11.17
13:09:17	20.15	1.25	35.99	10.90	1.48	11.17
13:09:32	20.17	1.21	35.72	11.93	1.59	11.04
13:09:47	20.20	1.17	35.72	12.38	1.31	11.01
13:10:02	20.18	1.17	36.80	13.49	1.54	11.02
13:10:17	20.19	1.17	35.99	13.82	1.28	10.98
13:10:32	20.21	1.15	34.28	14.26	1.24	11.06
13:10:47	20.25	1.09	32.62	14.57	1.41	11.10
13:11:02	20.25	1.08	31.55	14.19	1.29	11.07
13:11:17	20.25	1.07	30.07	14.43	1.18	10.90
13:11:32	20.27	1.05	28.33	14.48	1.19	10.83
13:11:47	20.26	1.05	26.85	15.01	1.16	10.86
13:12:02	20.31	1.01	24.51	15.97	1.16	10.86
13:12:17	20.39	0.87	19.14	17.63	1.13	10.61
13:12:32	20.45	0.77	14.63	26.69	1.16	10.42
13:12:47	20.45	0.73	12.42	56.55	1.36	10.65
13:13:02	20.49	0.67	13.73	46.80	1.81	11.32
13:13:17	20.59	0.52	24.57	27.32	1.59	11.66
13:13:32	20.40	0.65	29.33	19.38	1.76	12.31
13:13:47	20.40	0.68	33.20	16.68	2.09	12.83
13:14:02	20.48	0.67	37.30	14.20	1.76	13.27
13:14:17	20.57	0.61	41.78	13.80	2.21	13.36
13:14:32	20.61	0.56	43.48	13.37	2.31	12.57
13:14:47	20.65	0.50	34.39	12.22	1.99	12.86
13:15:02	20.66	0.46	31.14	17.62	1.81	13.07
13:15:17	20.50	0.67	42.44	21.22	1.66	13.13

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
13:15:32	20.28	0.94	74.32	18.43	1.81	12.93
13:15:47	19.98	1.20	70.64	16.52	1.44	12.60
13:16:02	19.90	1.26	47.35	17.67	1.48	12.31
13:16:17	19.93	1.26	36.05	17.15	1.84	12.41
13:16:32	19.91	1.26	28.83	17.44	2.23	12.44
13:16:47	19.88	1.29	24.94	17.23	2.34	12.53
13:17:02	19.89	1.30	23.09	16.68	2.16	12.76
13:17:17	19.91	1.30	21.62	16.82	2.19	12.75
13:17:32	19.88	1.33	17.85	16.54	2.53	12.84
13:17:47	19.86	1.37	16.18	15.68	2.52	12.68
13:18:02	19.86	1.38	21.37	14.49	2.41	12.71
13:18:17	19.90	1.38	29.75	14.21	2.33	13.09
13:18:32	19.92	1.42	51.55	13.30	2.71	12.94
13:18:47	19.88	1.55	63.20	13.12	2.53	12.34
13:19:02	19.86	1.58	54.49	14.21	2.83	12.12
13:19:17	19.93	1.56	88.22	12.90	2.78	12.19
13:19:32	19.89	1.56	136.73	11.77	3.06	11.91
13:19:47	19.91	1.56	126.09	11.87	3.18	11.59
13:20:02	19.93	1.55	133.10	12.63	3.46	11.52
13:20:17	19.94	1.54	152.28	13.13	3.58	11.51
13:20:32	19.96	1.52	152.49	15.27	3.53	11.50
13:20:47	20.05	1.45	139.58	16.27	3.36	11.41
13:21:02	20.11	1.42	144.68	15.66	3.51	11.44
13:21:17	20.12	1.42	176.72	15.71	3.61	11.38
13:21:32	20.16	1.42	202.57	14.89	3.41	11.36
13:21:47	20.11	1.50	210.14	14.27	3.21	11.33
13:22:02	20.05	1.56	212.53	13.71	3.58	11.17
13:22:17	20.00	1.62	199.44	13.39	3.38	11.11
13:22:32	19.94	1.68	189.43	11.88	3.38	10.80
13:22:47	19.93	1.70	210.30	11.54	3.53	10.62
13:23:02	19.98	1.70	225.50	12.21	3.80	10.80
13:23:17	19.96	1.70	200.95	11.12	3.71	10.80
13:23:32	19.90	1.71	195.44	10.29	3.86	10.78
13:23:47	19.78	1.84	231.79	9.90	3.81	10.84
13:24:02	19.74	1.89	259.60	9.83	4.03	10.86
13:24:17	19.77	1.89	259.60	9.24	3.91	10.88
13:24:32	19.71	1.93	239.41	9.07	4.08	10.92
13:24:47	19.66	1.99	243.23	9.58	4.06	10.91
13:25:02	19.75	1.93	254.33	9.61	4.16	11.17
13:25:17	19.79	1.87	262.96	8.16	4.30	11.31
13:25:32	19.77	1.87	265.66	8.09	5.06	11.48
13:25:47	19.77	1.87	258.78	7.93	5.30	H.33
13:26:02	19.75	1.87	258.78	7.78	4.88	11.50
13:26:17	19.70	1.87	264.93	7.83	5.30	11.36
13:26:32	19.67	1.88	276.49	7.78	5.90	11.32
13:26:47	19.69	1.90	297.16	7.99	5.90	11.38
13:27:02	19.63	2.05	311.97	7.82	6.10	11.32
13:27:17	19.49	2.27	334.25	7.55	6.20	11.25
13:27:32	19.49	2.34	327.33	7.62	6.28	11.30
13:27:47	19.50	2.34	336.54	7.70	6.39	11.41
13:28:02	19.52	2.34	337.99	7.63	7.14	11.49
13:28:17	19.49	2.36	314.25	7.22	6.79	11.71
13:28:32	19.50	2.37	315.31	6.78	6.75	11.71
13:28:47	19.46	2.54	300.87	6.37	6.43	11.41
13:29:02	19.39	2.76	286.07	6.54	5.83	11.35
13:29:17	19.35	2.89	279.92	6.92	5.40	11.05
13:29:32	19.33	2.98	281.67	7.26	5.35	11.12
13:29:47	19.34	2.98	312.22	7.19	5.23	11.13
13:30:02	19.41	2.93	340.93	6.93	5.70	11.02
13:30:17	19.41	2.87	368.70	7.26	5.83	11.21
13:30:32	19.42	2.90	342.42	7.18	5.73	11.30
13:30:47	19.48	2.84	324.04	7.37	5.08	11.04
13:31:02	19.55	2.72	339.12	7.31	4.88	10.89
13:31:17	19.56	2.69	348.27	6.86	4.68	10.97
13:31:32	19.57	2.69	350.35	6.80	4.68	10.99
13:31:47	19.54	2.74	348.00	6.90	4.31	10.95
13:32:02	19.49	2.85	322.80	7.02	4.23	10.88
13:32:17	19.58	2.76	296.73	6.60	4.06	10.95
13:32:32	19.58	2.75	288.91	6.45	3.91	11.12
13:32:47	19.63	2.69	282.07	6.27	3.66	11.21
13:33:02	19.65	2.64	270.47	6.59	3.33	11.47
13:33:17	19.64	2.63	254.42	6.50	3.33	11.75
13:33:32	19.65	2.60	223.53	6.46	3.18	11.58
13:33:47	19.66	2.51	156.83	6.59	3.43	11.22
13:34:02	19.65	2.36	94.09	6.76	3.13	10.88
13:34:17	19.71	2.15	63.39	6.67	3.11	10.74
13:34:32	19.78	2.01	52.15	6.94	2.86	10.61
13:34:47	19.82	1.93	49.02	7.00	2.51	10.50

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
13:35:02	19.86	1.87	45.76	7.20	2.66	10.24
13:35:17	19.98	1.65	40.48	8.93	2.38	10.37
13:35:32	20.14	1.35	37.24	12.75	2.43	10.54
13:35:47	20.28	1.14	33.38	22.45	2.26	10.57
13:36:02	20.33	1.02	27.82	53.73	2.36	10.68
13:36:17	20.37	1.00	23.87	72.99	2.24	10.90
13:36:32	20.48	0.81	21.34	36.86	2.51	10.81
13:36:47	20.66	0.55	22.15	38.92	2.86	11.13
13:37:02	20.70	0.50	23.30	43.98	3.81	11.26
13:37:17	20.69	0.50	24.11	46.23	4.26	11.51
13:37:32	20.69	0.50	25.16	46.64	4.65	11.51
13:37:47	20.49	0.68	29.05	21.98	4.89	11.87
13:38:02	20.28	0.87	30.63	17.72	5.22	12.52
13:38:17	20.35	0.87	31.31	14.95	5.39	13.11
13:38:32	20.46	0.80	36.71	13.97	5.58	13.65
13:38:47	20.54	0.73	41.19	13.57	5.15	13.60
13:39:02	20.60	0.67	45.45	13.22	4.96	13.72
13:39:17	20.63	0.62	50.13	12.19	4.21	13.96
13:39:32	20.66	0.58	54.39	12.64	4.16	14.08
13:39:47	20.65	0.58	59.02	12.96	3.91	15.75
13:40:02	20.65	0.58	71.61	13.93	3.51	16.88
13:40:17	20.64	0.58	84.58	14.01	3.31	17.35
13:40:32	20.64	0.58	88.66	13.67	3.33	17.25
13:40:47	20.64	0.58	78.69	13.27	3.03	17.22
13:41:02	20.66	0.58	74.62	13.53	3.06	18.22
13:41:17	20.68	0.57	86.86	13.96	2.86	19.54
13:41:32	20.68	0.56	91.26	13.21	2.91	18.41
13:41:47	20.69	0.54	75.87	13.66	2.68	16.79
13:42:02	20.70	0.52	55.66	11.35	2.68	16.29
13:42:17	20.72	0.49	55.66	14.92	2.71	16.29
13:42:32	20.65	0.53	71.60	18.25	2.61	16.75
13:42:47	20.54	0.68	83.04	18.75	2.58	17.03
13:43:02	20.52	0.71	85.35	20.88	2.56	17.24
13:43:17	20.51	0.72	132.27	25.65	2.43	18.53
13:43:32	20.35	0.88	219.92	18.16	2.41	16.53
13:43:47	20.02	1.08	181.74	16.66	2.41	15.15
13:44:02	19.98	1.16	109.60	15.07	2.53	15.28
13:44:17	20.02	1.17	75.69	13.35	2.49	15.08
13:44:32	20.03	1.17	57.33	12.78	2.68	14.93
13:44:47	19.98	1.19	47.23	12.36	2.68	14.64
13:45:02	19.96	1.21	42.48	12.45	2.66	14.76
13:45:17	19.96	1.23	41.67	12.07	2.63	14.70
13:45:32	19.98	1.23	39.23	11.80	2.88	14.96
13:45:47	19.98	1.23	37.75	11.57	3.01	15.67
13:46:02	19.98	1.23	45.19	11.08	2.83	15.77
13:46:17	20.05	1.23	49.87	10.67	2.91	14.84
13:46:32	20.15	1.23	48.46	11.86	2.96	14.10
13:46:47	20.19	1.23	47.10	11.72	3.01	13.92
13:47:02	20.20	1.23	53.91	11.85	3.08	13.87
13:47:17	20.21	1.23	57.65	11.75	2.91	13.75
13:47:32	20.22	1.22	63.42	10.56	3.26	13.57
13:47:47	20.16	1.22	66.10	10.86	3.48	13.16
13:48:02	20.16	1.22	66.81	10.66	3.88	13.06
13:48:17	20.16	1.22	63.12	10.80	4.03	13.00
13:48:32	20.20	1.21	67.73	10.66	4.18	13.21
13:48:47	20.23	1.17	79.04	10.67	4.43	12.69
13:49:02	20.24	1.16	88.48	10.60	4.47	12.50
13:49:17	20.30	1.11	91.81	12.42	4.25	12.57
13:49:32	20.32	1.10	96.43	10.94	4.03	12.34
13:49:47	20.28	1.10	110.80	9.53	3.96	12.07
13:50:02	20.23	1.14	119.47	8.03	4.23	11.74
13:50:17	20.18	1.18	106.71	8.55	4.16	11.82
13:50:32	20.20	1.20	93.80	9.89	4.13	11.89
13:50:47	20.24	1.21	99.93	10.03	4.16	11.81
13:51:02	20.24	1.26	107.83	9.55	4.36	11.78
13:51:17	20.20	1.37	104.07	8.82	4.08	11.88
13:51:32	20.18	1.41	9485	8.75	3.98	11.95
13:51:47	20.20	1.41	96.37	8.18	4.11	11.96
13:52:02	20.18	1.43	114.01	7.82	4.38	12.07
13:52:17	20.14	1.49	138.97	7.39	4.38	11.87
13:52:32	20.11	1.55	152.85	7.28	4.53	11.91
13:52:47	20.10	1.59	152.78	7.62	4.61	11.85
13:53:02	20.09	1.64	164.34	7.45	4.63	11.86
13:53:17	20.03	1.76	187.93	7.18	4.61	11.88
13:53:32	19.95	1.91	224.89	6.93	4.29	11.81
13:53:47	19.90	2.03	178.33	7.39	4.18	11.63
13:54:02	20.02	1.84	118.59	10.33	4.58	11.64
13:54:17	20.12	1.70	148.78	9.77	3.98	12.01

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv w b
Time	Oxygen	CO2	CO	NOx	SO2	VOC
13:54:32	20.10	1.69	220.93	8.52	3.89	11.89
13:54:47	20.03	1.73	207.29	8.74	3.93	11.67
13:55:02	20.02	1.75	126.87	10.72	4.08	11.36
13:55:17	20.11	1.65	115.50	13.37	3.83	11.20
13:55:32	20.15	1.60	140.83	11.60	3.46	11.17
13:55:47	20.07	1.68	136.42	12.28	3.81	11.04
13:56:02	20.06	1.73	108.52	10.10	3.83	11.16
13:56:17	19.99	1.82	96.82	9.76	3.73	11.12
13:56:32	20.01	1.82	132.18	9.92	3.66	10.98
13:56:47	20.01	1.82	163.98	8.88	4.23	10.82
13:57:02	19.99	1.83	188.71	9.34	4.01	10.73
13:57:17	19.97	1.88	206.35	9.33	4.13	10.77
13:57:32	19.96	1.93	200.15	9.25	4.11	10.63
13:57:47	19.96	1.95	166.97	9.08	3.86	10.46
13:58:02	19.95	1.99	147.99	11.42	3.96	10.47
13:58:17	19.98	2.00	145.61	10.54	3.38	10.43
13:58:32	19.94	2.04	120.55	10.09	3.76	10.53
13:58:47	19.94	2.07	107.16	9.54	3.63	10.56
13:59:02	19.93	2.07	131.96	10.02	3.43	10.56
13:59:17	19.91	2.10	122.64	9.47	3.96	10.68
13:59:32	19.89	2.15	95.81	9.51	4.02	10.73
13:59:47	19.89	2.15	94.36	8.48	3.70	10.54
14:00:02	19.87	2.16	99.52	8.61	3.83	10.49
14:00:17	19.84	2.22	101.52	8.76	4.06	10.57
14:00:32	19.84	2.24	95.03	8.89	4.03	10.50
14:00:47	19.86	2.24	81.51	9.59	4.03	10.70
14:01:02	19.87	2.24	52.58	9.78	3.88	10.59
14:01:17	19.90	2.19	40.25	10.52	3.93	10.42
14:01:32	19.96	2.08	39.54	12.80	3.66	9.98
14:01:47	19.99	2.01	43.19	11.74	3.56	9.83
14:02:02	20.01	1.92	42.72	10.25	3.61	9.71
14:02:17	20.04	1.81	31.68	9.67	3.21	9.58
14:02:32	20.09	1.65	22.13	11.36	3.51	9.50
14:02:47	20.10	1.56	21.86	12.85	2.91	9.50
14:03:02	20.11	1.55	22.13	13.99	2.81	9.36
14:03:17	20.15	1.50	21.33	14.69	2.61	9.38
14:03:32	20.14	1.49	22.40	15.18	2.61	9.28
14:03:47	20.15	1.48	21.37	15.13	2.41	9.14
14:04:02	20.13	1.48	1928	15.97	2.71	9.19
14:04:17	20.14	1.48	19.27	17.08	2.54	8.83
14:04:32	20.16	1.48	19.54	16.26	2.48	8.90
14:04:47	20.18	1.44	21.37	16.32	2.22	9.15
14:05:02	20.20	1.42	23.30	17.25	2.45	9.30
14:05:17	2021	1.40	22.85	19.18	2.33	9.33
14:05:32	20.22	1.37	22.40	19.90	2.16	9.49
14:05:47	20.26	1.32	22.40	21.53	2.38	9.49
14:06:02	20.29	1.30	22.40	17.80	2.46	9.24
14:06:17	20.28	1.29	22.39	20.42	2.39	9.30
14:06:32	20.28	1.29	23.07	14.91	2.21	9.23
14:06:47	2021	1.35	24.94	11.88	2.43	9.21
14:07:02	20.07	1.60	56.91	10.96	2.19	9.52
14:07:17	19.83	1.95	100.02	10.43	2.06	10.40
14:07:32	19.71	2.11	112.88	10.93	2.04	9.34
14:07:47	19.70	2.10	71.28	11.11	2.23	9.07
14:08:02	19.86	1.87	29.47	11.60	2.01	9.00
14:08:17	19.95	1.75	20.84	12.06	1.84	8.80
14:08:32	20.01	1.68	17.03	13.49	2.04	8.53
14:08:47	20.05	1.63	15.64	14.45	2.11	8.52
14:09:02	20.08	1.61	14.88	15.69	2.01	8.57
14:09:17	20.07	1.60	14.65	15.60	1.94	8.46
14:09:32	20.07	1.60	15.10	16.15	2.11	8.41
14:09:47	20.10	1.59	15.64	16.45	1.93	8.47
14:10:02	20.12	1.57	17.02	16.74	1.94	8.46
14:10:17	20.13	1.54	16.74	18.53	1.78	8.41
14:10:32	20.14	1.53	19.12	18.53	1.46	8.37
14:10:47	20.16	1.51	23.43	15.45	1.73	8.21
14:11:02	20.18	1.51	28.57	12.54	1.61	8.29
14:11:17	20.19	1.50	27.59	12.24	1.63	8.22
14:11:32	20.20	1.49	25.24	13.27	1.38	8.17
14:11:47	20.18	1.48	23.38	13.28	1.71	8.18
14:12:02	20.18	1.48	25.80	13.48	1.84	8.20
14:12:17	20.20	1.48	26.60	14.47	1.81	8.25
14:12:32	20.19	1.48	24.98	14.35	1.81	8.34
14:12:47	20.19	1.48	23.30	14.59	1.91	8.35
14:13:02	20.17	1.48	21.89	14.24	1.81	8.44
14:13:17	20.13	1.51	20.84	13.46	1.89	8.37
14:13:32	20.14	1.53	23.19	17.84	2.09	8.21
14:13:47	20.22	1.45	25.53	18.37	2.04	8.25

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	pprnv db	pprnv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
14:14:02	20.29	1.31	26.03	18.68	2.09	8.40
14:14:17	20.30	1.29	27.50	18.48	2.28	8.53
14:14:32	20.33	1.24	30.62	18.06	2.14	8.96
14:14:47	20.32	1.22	42.75	16.05	2.19	8.68
14:15:02	20.23	1.29	45.67	13.61	2.23	8.42
14:15:17	20.12	1.42	36.15	17.13	2.21	8.54
14:15:32	20.26	1.31	30.63	18.44	2.31	8.51
14:15:47	20.37	1.17	30.62	17.42	2.24	8.47
14:16:02	20.40	1.11	31.30	18.71	2.43	8.41
14:16:17	20.39	1.10	30.09	17.48	2.36	8.34
14:16:32	20.35	1.11	30.63	15.32	2.91	8.35
14:16:47	20.34	1.12	30.09	15.64	3.16	8.32
14:17:02	20.33	1.13	29.56	16.79	2.81	8.34
14:17:17	20.29	1.18	30.54	14.36	2.83	8.29
14:17:32	20.22	1.34	29.05	11.88	2.78	8.27
14:17:47	20.15	1.47	26.52	11.83	3.43	8.15
14:18:02	20.10	1.57	22.81	11.14	3.51	8.14
14:18:17	20.04	1.69	20.31	10.51	3.56	8.08
14:18:32	20.01	1.77	35.06	10.98	3.03	8.10
14:18:47	19.62	2.03	44.22	10.71	3.13	7.94
14:19:02	19.71	2.27	26.99	9.79	2.96	7.91
14:19:17	19.94	2.08	17.73	9.52	3.34	7.76
14:19:32	20.04	1.80	17.80	12.90	3.18	7.88
14:19:47	20.20	1.54	19.82	12.19	3.36	7.98
14:20:02	20.25	1.41	21.09	12.49	3.21	7.92
14:20:17	20.28	1.35	20.84	12.96	3.03	7.92
14:20:32	20.27	1.33	21.89	8.91	3.03	7.88
14:20:47	20.15	1.50	19.37	8.25	2.98	7.93
14:21:02	20.08	1.61	15.90	8.65	2.73	7.96
14:21:17	20.12	1.62	14.65	9.04	2.66	7.99
14:21:32	20.12	1.62	14.20	9.03	2.63	7.92
14:21:47	20.10	1.62	13.67	9.26	2.58	7.94
14:22:02	20.10	1.62	14.21	8.99	2.51	7.82
14:22:17	20.09	1.62	14.21	8.67	2.46	7.81
14:22:32	20.09	1.62	13.13	8.80	2.36	7.82
14:22:47	20.13	1.62	13.67	8.75	2.33	7.73
14:23:02	20.14	1.62	14.20	8.99	2.21	7.67
14:23:17	20.14	1.61	14.20	9.11	2.31	7.59
14:23:32	20.14	1.61	14.88	9.20	2.24	7.57
14:23:47	20.15	1.61	13.67	9.30	2.14	7.52
14:24:02	20.14	1.61	13.14	9.10	1.86	7.76
14:24:17	20.14	1.61	13.13	9.66	1.99	7.87
14:24:32	20.16	1.61	14.21	9.87	2.21	7.82
14:24:47	20.14	1.61	13.67	8.83	2.14	7.87
14:25:02	20.12	1.61	13.13	8.64	2.09	7.93
14:25:17	20.12	1.61	13.13	8.71	2.16	7.79
14:25:32	20.18	1.59	15.37	8.55	2.06	7.76
14:25:47	20.20	1.54	16.17	12.66	2.07	8.06
14:26:02	20.29	1.33	15.90	14.75	2.16	8.13
14:26:17	20.40	1.12	14.65	15.86	2.23	8.05
14:26:32	20.43	1.07	15.66	14.74	1.91	8.25
14:26:47	20.37	1.07	18.30	13.22	2.18	8.33
14:27:02	20.33	1.13	19.55	12.99	2.39	8.27
14:27:17	20.31	1.20	19.82	11.89	2.46	7.99
14:27:32	20.26	1.29	18.12	10.63	2.51	8.00
14:27:47	20.22	1.38	17.32	9.69	2.93	7.83
14:28:02	20.21	1.40	16.17	9.50	3.08	7.81
14:28:17	20.20	1.43	16.18	9.53	3.18	8.15
14:28:32	20.21	1.43	15.91	11.66	3.23	8.23
14:28:47	20.30	1.31	14.66	13.35	3.26	820
14:29:02	20.36	1.19	15.37	13.96	2.96	8.15
14:29:17	20.35	1.16	17.28	10.87	3.18	8.17
14:29:32	20.27	1.15	18.39	12.10	3.31	8.14
14:29:47	20.27	1.15	17.86	13.88	3.56	8.03
14:30:02	20.26	1.17	16.18	11.49	3.91	8.02
14:30:17	20.24	1.19	15.64	9.68	4.91	7.91
14:30:32	20.24	1.19	1468	12.68	5.68	7.83
14:30:47	20.27	1.19	13.67	14.19	6.65	7.88
14:31:02	20.30	1.19	12.16	14.33	6.61	7.88
14:31:17	20.32	1.19	12.65	13.91	6.76	8.05
14:31:32	20.29	1.21	15.66	10.30	6.63	8.12
14:31:47	20.21	1.34	17.85	8.64	6.68	8.14
14:32:02	20.14	1.41	17.03	8.84	6.35	8.09
14:32:17	20.17	1.41	15.64	9.30	6.28	7.94
14:32:32	20.29	1.41	15.11	10.03	6.01	7.76
14:32:47	20.24	1.40	14.66	13.96	5.98	8.07
14:33:02	20.31	1.28	11.89	16.36	5.80	8.23
14:33:17	20.41	1.10	10.10	19.02	5.75	8.41

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
14:33:32	20.53	0.90	8.06	24.37	5.68	8.56
14:33:47	20.57	0.82	8.06	28.91	5.83	8.27
14:34:02	20.59	0.80	6.99	29.08	5.40	8.15
14:34:17	20.62	0.75	7.53	29.91	5.16	8.23
14:34:32	20.63	0.71	7.26	30.99	5.18	8.40
14:34:47	20.65	0.68	7.53	30.49	5.06	8.19
14:35:02	20.67	0.65	6.99	32.12	4.80	8.19
14:35:17	20.68	0.63	6.99	32.28	4.44	8.38
14:35:32	20.70	0.60	6.99	32.59	4.36	8.35
14:35:47	20.71	0.59	6.99	31.51	4.24	8.41
14:36:02	20.73	0.58	6.32	31.81	4.22	8.19
14:36:17	20.73	0.57	6.99	33.20	4.25	8.25
14:36:32	20.75	0.57	6.99	34.16	4.28	8.30
14:36:47	20.75	0.56	6.99	33.02	4.06	8.24
14:37:02	20.75	0.55	6.77	33.34	3.81	8.21
14:37:17	20.76	0.53	6.55	34.03	4.28	8.32
14:37:32	20.77	0.53	6.99	33.00	3.73	8.38
14:37:47	20.77	0.53	6.99	33.07	3.76	8.33
14:38:02	20.78	0.52	6.32	33.59	3.61	8.31
14:38:17	20.78	0.52	6.55	33.40	3.53	8.46
14:38:32	20.78	0.51	6.32	33.68	3.28	8.68
14:38:47	20.79	0.51	7.00	33.85	3.36	8.70
14:39:02	2079	0.51	7.00	32.99	3.1[illegible]	8.77
14:39:17	20 74	0 51	7 00	29 83	3 27	8.55
14:39:32	20 80	O M	6.10	32 73	3 06	8.55
14:39:47	20.81	0.49	6.55	32.07	3.18	8.51
14:40:02	20.83	0.49	6.77	31.94	2.91	8.47
14:40:17	20.81	0.49	6.10	33.56	2.73	5.44
14:40:32	20.81	0.49	6.10	37.40	2.83	2.10
14:40:47	20.81	0.49	5.56	35.60	2.51	1.57
14:41:02	17.56	0.46	2.48	10.64	2.86	1.50
14:41:17	4.85	0.36	1.01	4.55	2.86	1.09
14:41:32	0.76	0.32	1.01	4 42	2.84	1 27
14:41:47	0 41	0.32	1 01	4.53	2.32	1.00
14:42:02	0.04	0.31	0.15	0.46	2.48	0.74
14:42:17	0.03	0.31	1.01	0.45	3.08	0.63
14:42:32	0.03	0.30	1.28	0.34	3.13	0.62
14:42:47	0.04	0.30	2.08	0.32	3.33	0.56
14:43:02	0.05	0.30	1.82	4.35	3.46	0.55
14:43:17	0.03	0.30	0.44	4.30	3.03	0.52
14:43:32	0.09	0.30	1.77	4.43	3.13	0.50
14:43:47	7.93	0.35	4.54	17.61	3.06	0.43
14:44:02	10.47	0.41	3.56	4.84	2.33	0.45
14:44:17	11.67	0.32	1.55	4.64	65.18	0.43
14:44:32	11.89	0.31	1.01	4.48	23.58	0.42
14:44:47	11.93	0.30	1.01	4.43	7.85	0.43
14:45:02	11.95	0.30	1.01	4.48	3.61	0.42
14:45:17	11.95	0.29	1.55	4.33	2.56	0.44
14:45:32	11.95	0.29	1.01	4.32	1.89	0.48
14:45:47	11.95	0.29	1.01	4.22	1.58	0.46
14:46:02	11.96	0.29	2.08	4.25	1.63	0.44
14:46:17	11.96	0.29	2.08	4.23	1.89	0.42
14:46:32	12.51	0.29	2.08	8.93	1.73	0.35
14:46:47	11.95	2.66	0.98	7.53	1.49	0.32
14:47:02	3.50	8.39	-0.39	5.56	10.32	0.32
14:47:17	0.71	10.11	-1.20	5.32	30.77	0.27
14:47:32	0.40	10.17	-0.93	5.34	10.83	0.22
14:47:47	0.36	10.19	-0.13	5.24	5.58	0.23
14:48:02	0.33	10.11	-1.20	5.31	4.08	0.22
14:48:17	0.31	10.12	-1.20	5.20	3.96	0.25
14:48:32	0.31	10.13	-0.93	5.12	3.41	0.25
14:48:47	0.31	10.13	-0.66	5.11	3.33	0.28
14:49:02	0.34	10.12	0.42	4.85	3.41	0.27
14:49:17	6.10	6.86	45.88	13.20	3.13	0.27
14:49:32	5.22	2.56	342.36	5.20	2.18	0.24
14:49:47	0.88	0.63	529.46	4.57	49.59	0.26
14:50:02	0.35	0.36	593.06	4.30	55.58	0.26
14:50:17	0.30	0.34	595.41	4.28	17.18	0.29
14:50:32	0.28	0.33	595.63	4.22	7.33	0.27
14:50:47	0.27	0.33	597.37	4.21	4.18	0.28
14:51:02	0.27	0.32	599.20	4.13	3.56	0.23
14:51:17	0.30	0.32	548.82	4.09	3.28	0.24
14:51:32	5.03	0.32	395.04	4.41	3.03	0.24
14:51:47	3.88	0.32	278.63	176.94	2.43	0.20
14:52:02	0.67	0.32	74.80	315.40	2.56	0.18
14:52:17	0.35	0.32	17.88	320.35	21.44	0.17
14:52:32	0.30	0.31	5.04	380.19	14.84	0.15
14:52:47	0.30	0.31	4.55	443.14	9.18	0.14

End Run #2

Zero ppm Post-Test Cal:

0.034	% Oxygen
0.304	% CO2
1.131	ppm CO
0.391	ppm Nox
3.008	ppm SO2
0.638	ppm VOC

12.0% Oxygen Post-Test Cal:

11.954	% Oxygen

10.0% CO2 System Bias:

10.123	% CO2

600 ppm CO Post-Test Cal:

596.901	ppm CO

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmvdb	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	C02	CO	NOx	SO2	VOC	
14.53.02	0 29	0 31	4 05	446 8'	1860	0 14	
14:53:17	0 29	0 31	3 52	487 56	50 54	0 12	
14:53:32	0.29	0.31	2.98	485.79	6418	0.12	
14:53:47	0.29	0.31	2.98	**488.04**	68.65	0.11	**500 ppm Nox Post-TestCal:**
14:54:02	0.29	0.31	2 98	**496.63**	70.90	0.12	**494.638 ppm Nox**
14:54:17	0 29	0.31	2.98	**496.50**	72.68	0 11	
14:54:32	0.29	0.31	2.98	**497.38**	73.30	0.10	
14:54:47	1.91	0.31	2.99	409.25	73.03	0.09	
14:55:02	2.71	0.31	2.76	68.52	69.45	0.09	
14:55:17	0.58	0.31	2.09	11.50	20.33	0.11	
14:55:32	0.31	0.31	2.31	12.71	99.99	0.13	
14:55:47	0.29	0.31	2.99	13.48	83.67	0.10	
14:56:02	0.28	0.31	2.98	12.68	52.80	0.13	
14:56:17	0.28	0.31	2.54	11.93	44.77	0.13	
14:56:32	0.28	0.31	2.09	11.38	44.44	0.11	
14:56:47	0.28	0.30	2.09	10.82	46.13	0.09	
14:57:02	0.28	0.30	2.09	10.30	47.63	0.07	
14:57:17	0.28	0.30	2.09	10.09	48.33	0.07	
14:57:32	0.28	0.30	2.09	9.81	49.18	0.09	
14:57:47	0.28	0.30	2.09	9.58	49.76	0.04	
14:58:02	0 28	0.30	2.09	9.23	49.46	0.04	
14:58:17	0.28	0.30	2.54	9.02	**49.94**	0.02	**50 ppm SO2 Post Test Cal:**
14:58:32	0.28	0.30	2.09	8.86	**50.66**	2 08	**50.104 ppm SO2**
14:58:47	2.14	0.30	2.09	8.60	**50.04**	2.97	
14:59:02	10.29	0.30	2.09	7.01	**49.79**	3.30	
14:59:17	18.68	0.30	2.09	6.87	40.67	3.34	
14:59:32	20.55	0.30	2.09	6.65	18.23	3.74	
14:59:47	20.83	0.30	1.56	6.67	6.48	8.53	
15:00:02	20.88	0.30	2.09	6.56	3.16	19.82	
15:00:17	20.88	0.30	2.09	6.50	2.81	30.97	
15:00:32	20.89	0.31	1.29	6.40	2.48	38.53	
15:00:47	20.89	0.31	2.09	6.48	1.88	43.78	
15:01:02	20.89	0.32	1.02	6.30	1.93	**50.62**	**50 ppm VOC Post-Test Cal:**
15:01:17	20.88	0.32	1.02	6.31	1.89	**50.18**	**50.863 ppm VOC**
15:01:32	20.89	0.33	2.09	6.38	1.63	**51.12**	
15:01:47	20.89	0.33	2.09	6.25	1.66	**51.53**	
15:02:02	20.88	0.33	1.83	6.33	1.63	51.83	
15:02:17	20.88	0.33	1.56	6.11	1.66	51.88	
15:02:32	20.88	0.33	2.09	6.17	1.62	12.50	
15:02:47	20.88	0.33	2.54	6.23	1.79	4.46	
15:03:02							

Client	Northwest Steel and Wire
Location	Sterling, Illinois
Source	EAF #8 Baghouse Inlet
Date	04/12/01
Run X	Heat X3
Filter Width	4.00
Pre Scans	0.00
Post Scans	576100
Scan Rate	0.27
TrigEvent	Manual
TrigChan	None
TrigLevel	None
TrigEdge	None
Hysteresis	None

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100		
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb		
Time	Oxygen	CO2	CO	NOx	SO2	VOC		
7:12:42	1.09	-0.41	7.04	-7.43	-0.38	0.01		
7:12:57	12.43	-0.41	6.36	-7.42	-0.15	0.01		
7:13:12	19.54	-0.41	6.36	-7.42	-0.08	0.02		
7:13:27	20.17	-0.41	7.04	-7.49	-0.28	0 00		
7:13:42	10.14	-0.41	6.10	-7.56	-0.42	-0.06		
7:13:57	1.46	-0.41	6.10	-7.58	-0.33	-0.09		
7:14:12	0.47	-0.41	6.59	-7.58	-0.18	-0.10		
7:14:27	0.32	-0.41	6.59	-7.56	0.20	-0.13		
7:14:42	0.28	-0.41	6.10	-7.55	0.12	-0.10		
7:14:57	0.23	-0.41	6.10	-7.62	0.52	-0.12		
7:15:12	0.23	-0.41	6.59	-7.54	0.57	-0.13		
7:15:27	0.23	-0.41	6.59	-7.65	0.52	-0.15		
7:15:42	0.26	-0.41	6.37	-7.63	0.37	-0.17		
7:15:57	0.64	-0.41	6.37	-7.61	0.57	-0 19		
7:16:12	1.50	-0.08	6.36	-7.59	0.57	-0.17		
7:16:27	0.31	-0.03	6.37	-7.61	0.12	-0.17		
7:16:42	0.09	-0.02	5.57	-7.62	0.30	-0.14		
7:16:57	0.07	-0.03	6.37	-7.40	0.47	-0.11		
7:17:12	0.10	-0.03	7.04	3.58	0.57	-0.10		
7:17:27	0.09	-0.03	6.37	2.63	0.20	-0.09		
7:17:42	0.07	-0.04	6.37	1.99	0.20	-0.10		
7:17:57	0.08	-0.04	6.10	1.41	0.37	-0.12		
7:18:12	0.08	-0.04	0.77	1.37	0.27	0.11		
7:18:27	0.08	-0.04	1.28	1.46	0.20	-0.11		
7:18:42	0.07	-0.05	1.28	1.13	0.40	-0.10		
7:18:57	0.12	-0.05	1.53	1.06	0.17	-0.11		
7:19:12	0.08	-0.05	-0.13	1.03	0.25	-0.12		
7:19:27	0.14	-0.05	0.93	1.08	0.30	0.14		
7:19:42	0.08	4.06	0.13	1.07	O M	4.14	Zero ppm Cal Error:	
7:19:57	0.08	4.06	0.14	1.00	0.20	4.15	0.080	%Oxygen
7:20:12	0.09	4.06	4.13	1.02	0.35	4.16	4.058	% CO2
7:20:27	0.07	-0.06	-0.94	1.09	0.30	4.13	4200	ppm CO
7:20:42	0.04	-0.06	0.42	1.05	0.27	-0.14	1.044	ppm Nox
7:20:57	0.01	-0.06	0.42	1.06	0.30	-0.14	0.310	ppm SO2
7:21:12	0.01	0.06	-0.93	1.03	0.60	0.14	4.142	ppm VOC
7:21:27	4.80	0.06	0.13	1.22	0.37	-0.12		
7:21:42	14.47	0.03	1.27	4.59	0.07	0.13		
7:21:57	17.14	0.03	0.42	1.32	0.30	-0.11		
7:22:12	19.69	0.03	-0.67	1.17	0.38	-0.14		
7:22:27	20.15	-0.05	0.14	1.25	-0.20	-0.12		
7:22:42	20.80	-0.06	0.14	1.16	-0.50	0.12	20.9% Oxygen Cal Error:	
7:22:57	20.87	0.06	0.14	1.13	0.49	-0.14	20.858	%Oxygen
7:23:12	20.89	-0.06	0 14	1.13	0.47	0.16		
7:23:27	20.87	-0.06	0.14	1.18	-0.58	0.14		
7:23:42	20.87	-0.06	0.99	1.06	-0.33	-0.14		
7:23:57	19.67	0.06	0.67	1.11	0.60	-0.13		
7:24:12	14.46	-0.06	0.67	1.07	-0.53	0.13		
7:24:27	12.15	-0.07	0.99	1.10	0.55	0.12		
7:24:42	11.98	-0.07	0.14	1.00	-0.53	-0.15	12.0% Oxygen Cal Error:	
7:24:57	11.91	-0.07	0.67	1.11	4.63	-0.14	11.941	% Oxygen
7:25:12	11.97	-0.07	0 14	1.09	0.45	-0.16		
7:25:27	11.90	0.07	0.99	1.09	0.30	0.13		
7:25:42	11.87	-0.07	0.14	1.09	-0.30	0.15		
7:25:57	11.87	-0.07	0.14	1.09	-0.38	-0.13		
7:26:12	11.00	-0.07	0.42	1.08	0.35	-0.15		
7:26:27	6.48	0.07	0.42	1.06	0.15	0.15		
7:26:42	5.13	-0.07	0.14	1.03	4.35	-0.12		
7:26:57	4.99	-0.07	0.14	1.11	-0.45	-0.13	5.0% Oxygen Cal Error:	
7:27:12	4.97	-0.07	0.42	0.98	0.30	0.13	4.995	% Oxygen
7:27:27	5.03	0.08	0.42	1.03	0.35	-0.14		
7:27:42	4.99	-0.08	-0.66	1.01	-0.28	0.13		
7:27:57	4.95	-0.08	0.14	1.00	-0.28	-0.12		
7:28:12	6.43	0.04	-0.35	3.80	-0.24	-0.10		

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	C02	CO	NOx	SO2	VOC	
7:28:27	4.37	6.98	-3.37	4.25	-0.29	-0 10	
7:28:42	1.40	13.54	-3.88	2.58	-0 10	-0.12	
7:28:57	0.29	17.66	-3.15	2.39	-0.03	-0.13	
7:29:12	011	14.13	-2.90	2.26	0.32	-0.12	
7:29:27	0.08	18.00	-2.90	2.22	0.15	-0.12	
7:29:42	0.05	18.01	-2.90	2.15	0.50	-0.11	18.0% CO2 Cal Error:
7:29:57	0.06	18.01	-2.90	2.15	0.40	-0.12	18.011 % C02
7:30:12	0.05	18.01	-2.10	2.16	0.45	-0.14	
7:30:27	0.06	18.02	-3.64	2.11	0.35	-0.13	
7:30:42	0.06	18.02	-3.64	2.09	0.37	-0.13	
7:30:57	0.06	18.04	-2.10	2.11	0.30	-0.13	
7:31:12	0.11	16.17	-2.10	1.83	0 32	-0.13	
7:31:27	0.07	10.83	-2.90	1.80	0.47	-0.13	
7:31:42	-0.03	9.97	-1.83	1.75	0.37	-0.11	10.0% CO2 Cal Error:
7:31:57	0.05	9.95	-1.83	1.74	0.37	-0.10	9.974 % CO2
7:32:12	0.05	9.99	-2.09	1.70	0.45	-0.12	
7:32:27	0 07	9.99	-2 09	1.74	0.35	-0.11	
7:32:42	0.03	9.99	-2.63	1.68	0.37	-0.12	
7:32:57	0.04	8.99	-1.15	1.52	0.30	-0.11	
7:33:12	0.02	5.77	-1.83	1.46	0.55	-0.11	
7:33:27	0.02	4.97	-1.83	1.46	0.53	-0 12	5.0% C02 Cal Error:
7:33:42	0.03	4.93	-0.93	1.47	0.45	-0.14	4.937 % CO2
7:33:57	-0.02	4.92	-0.93	1.41	0.27	-0.15	
7:34:12	-0.03	4.92	-1.83	1.42	0.20	-0.13	
7:34:27	1.41	4.44	-0.35	1.23	0.32	-0.15	
7:34:42	6.59	2.34	240.48	1.51	0.37	-0.13	
7:34:57	1.46	0.68	688.11	1.29	-0.10	-0.15	
7:35:12	0.16	0.03	869.32	1.26	-0.10	-0.12	
7:35:27	0 03	-0.02	890 00	1 23	0 12	-0 15	
7:35:42	-0 03	-0 02	899.71	1 22	0 20	-0 14	900 ppm CO Cal Error.
7:35:57	0 00	-0 03	906.37	116	0 10	-0 17	903.040 ppm CO
7:36:12	0 04	-4 03	902.25	118	047	-0 17	
7:36:27	-0 01	-0.04	903.83	114	0 32	-0 14	
7:36:42	-0 02	-0 04	869 43	112	0 22	-0.14	
7:36:57	0 02	-0 04	649 59	23 49	0 17	-0 14	
7:37:12	0 01	-0 04	563 85	1 61	2 35	-0 15	
7:37:27	-0 02	-0 04	588.46	1 35	56 66	-0 16	600 ppm CO Cal Error:
7:37:42	0 00	-0 04	595.92	1 23	19 92	-0 15	591.936 ppm CO
7:37:57	0 02	-0 04	595.92	115	5 60	-0 16	
7:38:12	-0.02	-0.05	587.44	1.13	1.97	-0.15	
7:38:27	0.00	-0.05	473.22	1.12	0.92	-0.16	
7:38:42	0.01	-0.05	332.82	1.10	0.90	-0.16	
7:38:57	0.00	-0.05	297.82	1.10	0.60	-0.17	300 ppm CO Cal Error:
7:39:12	0.00	-0.05	295.19	1.10	0.62	-0.19	295.277 ppm CO
7:39:27	0.01	-0.06	294.39	1.09	0.30	-0.18	
7:39:42	0.02	-0.06	293.71	1.02	0.57	-0.17	
7:39:57	0.01	-0.06	282.07	1.06	0.50	-0.19	
7:40:12	2.53	-0.06	255.38	1.11	0.27	-0.18	
7:40:27	4.33	-0.06	266.03	178.00	0.40	-0.16	
7:40:42	0.71	-0.06	107.90	356.11	-0.13	-0.18	
7:40:57	0.24	-0.06	18.05	933.72	0.62	-0.17	
7:41:12	0.07	-0.06	6.79	839.47	1.02	-0.18	
7:41:27	0.04	-0.06	5.31	843.07	44.31	-0.17	
7:41:42	0.05	-0.06	4.33	847.07	94.52	-0.18	850 ppm Nox Cal Error:
7:41:57	0.04	-0.06	5.06	847.96	99.99	-0.20	848.424 ppm Nox
7:42:12	0.04	-0.06	4.33	849.00	99.99	-0.20	
7:42:27	0.02	-0.06	3.52	849.66	99.99	-0.21	
7:42:42	0.03	-0.06	3.52	849.76	99.99	-0.21	
7:42:57	0.03	-0.06	4.33	676.82	99.99	-0.20	
7:43:12	0.03	-0.07	3.03	499.59	99.99	-0.20	500 ppm Nox Cal Error:
7:43:27	0.25	-0.07	2.36	497.28	100.00	-0.22	497.339 ppm Nox
7:43:42	0.12	-0.07	2.58	496.17	89.40	-0.22	
7:43:57	0.02	-0.07	3.26	496.31	81.75	-0.22	
7:44:12	0.03	-0.07	2.36	496.70	80.19	-0.23	
7:44:27	0.03	-0.07	2.36	405.05	80.04	-0.22	
7:44:42	0.02	-0.07	2.58	196.05	80.00	-0.21	
7:44:57	0.02	-0.07	3.26	244.88	74.92	-0.21	250 ppm Nox Cal Error:
7:45:12	0.02	-0.07	2.36	246.16	46.16	4.22	245.387 ppm Nox
7:45:27	0.02	-0.07	2.36	245.43	42.39	-0.22	
7:45:42	0.02	-0.07	2.36	245.09	41.71	-0.23	
7:45:57	0.02	-0.08	2.36	244.85	41.72	-0.22	
7:46:12	0 25	-0.08	1.29	182.74	41.99	-0.24	
7:46:27	3.51	-0.08	1.29	104.08	41.54	-0.22	
7:46:42	1.10	-0.08	2.36	12.46	19.19	-0.24	
7:46:57	0.12	-0.08	1.56	13.87	6.12	-0.23	
7:47:12	0.04	-0.08	0.15	11.37	9.32	-0.23	
7:47:27	0.02	-0.08	1.01	9.70	33.77	-0.24	
7:47:42	0.03	-0.08	1.29	8.67	58.06	-0.24	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	%db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	C02	CO	NOx	SO2	VOC	
7:47:57	0.00	-0.08	0.44	7.72	71.23	-0.20	
7:48:12	0.02	-0.09	1.29	6.94	76.88	0.41	
7:48:27	0.02	-0.09	1.29	6.36	78.83	0.42	
7:48:42	0.02	-9.09	1.29	5.92	79.55	0.41	
7:48:57	0.02	-0.09	0.44	5.46	80.50	0.44	
7:49:12	0.01	-0.09	0.44	5.08	80.79	0.46	
7:49:27	0.07	-0.09	2.09	4.74	84.08	0.45	85 ppm SO2 Cal Error:
7:49:42	0.02	0.09	1.29	4.43	8421	0.45	84.213 ppm SO2
7:49:57	0.02	-0.09	1.29	4.23	84.24	0.44	
7:50:12	0.02	-0.09	1.29	4.03	84.33	0.46	
7:50:27	0.02	-0.09	1.29	3.83	81.45	0.46	
7:50:42	0.02	-0.09	0.15	2.99	81.82	0.47	
7:50:57	0.14	-0.09	0.15	2.94	81.41	0.43	
7:51:12	0.02	-0.09	1.56	2.78	65.98	0.43	
7:51:27	0.01	-0.09	1.56	2.74	56.08	0.42	
7:51:42	0.00	-0.09	1.01	2.68	53.63	0.43	
7:51:57	0.02	-0.09	1.01	2.66	53.81	0.43	
7:52:12	0.03	-0.09	1.29	2.62	51.18	0.44	50 ppm SO2 Cal Error:
7:52:27	0.13	-0.09	0.44	2.55	50.96	0.43	51.040 ppm SO2
7:52:42	0.01	-0.09	0.44	2.41	50.96	0.46	
7:52:57	0.01	-0.09	1.29	1.80	51.06	0.48	
7:53:12	0.01	-0.09	1.29	1.55	53.06	0.51	
7:53:27	0.02	-0.09	0.44	1.53	42.81	0.47	
7:53:42	0.02	-0.09	0.16	1.45	30.02	0.51	
7:53:57	0.00	-0.09	1.01	1.40	26.62	0.47	
7:54:12	0.02	-0.09	1.30	1.36	25.98	0.49	
7:54:27	0.02	-0.09	0.44	1.34	25.46	0.50	25 ppm SO2 Cal Error:
7:54:42	0.02	-0.09	1.29	1.39	25.42	0.53	25.402 ppm SO2
7:54:57	0.02	-0.09	1.29	1.36	25.24	0.51	
7:55:12	0.02	-0.10	1.01	1.39	25.48	0.49	
7:55:27	0.03	-0.10	0.15	1.23	25.62	0.49	
7:55:42	4.58	-0.10	0.44	17.19	25.27	0.50	
7:55:57	8.74	-0.10	2.10	24.95	24.14	0.48	
7:56:12	15.29	-0.10	2.10	0.34	13.52	0.55	
7:56:27	20.11	-0.10	1.30	0.22	6.75	0.54	
7:56:42	20.82	-0.10	1.56	0.16	2.23	0.50	
7:56:57	19.43	-0.10	2.37	18.44	0.75	0.49	
7:57:12	7.21	-0.10	1.30	8.06	0.10	2.42	
7:57:27	0.98	-0.10	0.44	3.95	0.25	8.04	
7:57:42	0.42	-0.10	0.15	3.04	0.87	10.37	
7:57:57	0.34	-0.10	20.23	2.56	1.00	10.89	
7:58:12	0.33	-0.10	86.22	16.12	0.90	13.80	
7:58:27	0.46	-0.10	44.87	5.25	0.92	81.72	
7:58:42	0.29	-0.10	5.79	2.96	1.40	48.92	
7:58:57	0.26	-0.10	0.44	2.20	0.97	16.02	
7:59:12	0.23	-0.10	-0.91	2.09	0.82	12.31	
7:59:27	0.21	-0.10	-0.11	1.91	0.86	65.40	
7:59:42	0.19	-0.10	0.16	1.75	0.63	103.54	
7:59:57	0.18	-0.10	-0.65	1.66	0.77	126.01	
8:00:12	0.18	-0.10	-0.64	1.61	0.82	113.65	
8:00:27	0.26	-0.10	0.16	1.09	0.92	94.51	
8:00:42	7.40	4.10	0.16	0.06	0 95	89 56	
8:00:57	17.77	-0.10	0 16	-0 12	0 80	85.06	85 ppm VOC Cal:
8:01:12	20.35	-0.09	0.44	-0.07	0 30	84.82	84.863 ppm VOC
8:01:27	M.76	-0.09	1 30	-0.11	0 25	84.79	
8:01:42	20.86	-0.09	1.01	-0.13	0 60	84.78	
8:01:57	20.88	-0.09	0.16	-0.16	0.42	73.73	
8:02:12	20.92	-0.09	0.44	-0.16	0.27	50.83	50 ppm VOC Cal:
8:02:27	20.90	-0.09	1.30	-0.20	0.05	49.69	49.950 ppm VOC
8:02:42	20 94	-0.09	1.01	-0.15	0 25	49.40	
8:02:57	20.93	-0.09	1.01	-0.22	0.22	49.88	
8:03:12	20.94	-0.09	1.57	-0.20	-0.08	49.97	
8:03:27	20.93	-0.09	1.57	-0.24	0.17	31.47	
8:03:42	20.91	-0.09	1.30	-0.21	0.37	3.41	
8:03:57	20.93	-0.08	1.30	-0.21	0.22	5.16	
8:04:12	20.98	-0.08	1.30	-0.38	0.00	12.95	
8:04:27	20.92	-0.08	1.30	-0.22	0.02	20.06	
8:04:42	20.93	-0.08	1.30	-0.21	0.19	23.81	
8:04:57	20.93	-0.08	1.30	-0.25	0.05	25.47	
8:05:12	20.93	-0.08	2.37	-0.25	0.17	25.58	
8:05:27	20.93	-0.08	1.56	-0.22	0.27	25.10	25 ppm VOC Cal:
8:05:42	20.92	-0.08	1.30	-0.21	0.00	25.21	25.225 ppm VOC
8:05:57	20.92	-0.07	2.10	-0.23	0.15	25.26	
8:06:12	20.92	-0.07	2.10	-0.21	0.02	25.33	
8:06:27	20.92	-0.07	1.30	-0.23	0.10	24.98	
8:06:42	20.94	-0.07	2.37	-0.24	0.05	16.60	
8:06:57	20.92	-0.07	2.36	-0.25	0.07	6.78	
8:07:12	20.92	-0.07	2.10	-0.26	0.12	2.63	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	oxygen	CO2	CO	NOx	SO2	VOC
8:07:27	20.92	-0.07	2.10	-0.25	0.22	1.25
8:07:42	20.92	-0.07	2.36	0.27	0.12	0.30
8:07:57	20.92	-0.07	2.36	-0.29	0.00	0.25
8:08:12	20.92	-0.07	2.10	-0.25	0.17	0.27
8:08:27	20.92	-0.07	2.10	0.22	-0.03	0.27
8:08:42	20.67	-0.07	2.36	-019	0.27	0.27
8:08:57	10.98	-0.07	0.71	-0 19	0.02	0 26
8:09:12	1.62	-0.07	-0.12	-0.16	0.17	0.26
8:09:27	0.44	-0.07	-0 12	-0.19	0.52	0.26
8:09:42	0.30	-0.07	0.15	-0 13	0.70	0 25
8:09:57	0.26	-0.07	0.15	-0.15	0.85	0.25
8:10:12	0.23	-0.07	-0.92	-0.21	1.03	0.26
8:10:27	0.22	-0.07	-0.92	-0.20	0.87	0.26
8:10:42	0.21	-0.07	0.15	-0.21	0.92	0.26
8:10:57	0.20	-0.07	0.15	-0.22	0.75	0.26
8:11:12	0.19	-0.07	-0.65	-0.20	0.75	0.28
8:11:27	0.19	-0.07	0.15	-0.23	0.87	0.25
8:11:42	0.19	4.07	0.15	4.22	0.67	0.28
8:11:57	0.18	4.07	0.15	0.24	0.65	0.25
8:12:12	0.17	4.07	0.15	4.21	0.60	0.28
8:12:27	0.17	-0.07	0.15	4.21	0.55	0.27
8:12:42	0.25	-0.07	3.26	3.73	0.52	0.28
8:12:57	4 92	4.07	2.59	0.22	0.67	4.30
8:13:12	10 62	-0 07	0 15	0 10	0 30	3 46
8:13:27	11 67	-0 07	1 01	-0 04	0 12	0 96
8:13:42	11.83	-0.07	0.15	-0.04	-0.23	0.49
8:13:57	11.86	-0.07	0.15	-0.07	-0 20	0.41
8:14:12	11.91	-0.07	0.15	-0.10	-0.25	0.40
8:14:27	11.99	-0.08	0.15	-0.05	0 00	0.36
8:14:42	12.01	-0.08	-0.34	1.38	-0.15	0.36
8:14:57	11.23	2.82	-2.63	0.99	-0.43	1.65
8:15:12	2.94	8.06	-2.62	0.60	0.10	3.46
8:15:27	0.58	9.47	-1.82	0.52	0 40	1.30
8:15:42	0.31	9.97	-2.09	0.54	0.47	0.94
8:15:57	0.25	10.01	-2.89	0.50	0.42	1.13
8:16:12	0.24	10.04	-2.63	0.55	0.62	1.35
8:16:27	0.23	10.05	-1.82	0.45	0.40	1.50
8:16:42	4.36	7.67	23.90	3.52	0.52	1.53
8:16:57	7.70	2.82	249.06	1.66	0.65	2.89
8:17:12	1.40	0.56	507.66	0.42	0.02	4.88
8:17:27	0.29	0.07	575.16	0.32	0.72	2.12
8:17:42	0.20	0.01	582.53	0.20	0.62	1.37
8:17:57	0.18	0.01	589.22	0.25	0.45	1.13
8:18:12	0.16	-0.02	589.46	0.17	0.47	0.95
8:18:27	0.16	-0.02	589.92	0.15	0.55	0.85
8:18:42	0.15	-0.03	589.14	0.15	0.70	0.74
8:18:57	0.15	-0.04	588.62	0.12	0.45	0.65
8:19:12	0.15	-0.05	589.69	0.12	0.50	0.63
8:19:27	0.15	-0.05	588.89	0.02	0.45	0.63
8:19:42	0.14	-0.05	566.69	0.08	0.42	0.59
8:19:57	2.42	-0.06	446.50	0.23	0.57	0.58
8:20:12	6.16	-0.06	306.21	230.30	0.48	0.57
8:20:27	1.18	-0.06	108.70	392.09	-0.18	1.35
8:20:42	0.30	-0.06	20.05	578.89	4.35	1.19
8:20:57	0.17	-0.06	6.33	672.17	12.51	0.88
8:21:12	0.21	-0.06	3.03	651.04	22.15	0.65
8:21:27	0.18	-0.06	2.36	640.42	36.07	0.59
8:21:42	0.17	-0.06	2.35	632.02	40.29	0.59
8:21:57	0.15	-0.07	2.35	624.97	40.94	0.57
8:22:12	0.17	0.07	1.28	516.69	41.54	0.54
8:22:27	0.20	0.07	1.28	501.93	41.42	0.54
8:22:42	0.15	-0.07	1.55	501.64	38.22	0.54
8:22:57	0.15	-0.07	1.55	501.55	35.26	0.55
8:23:12	0.20	-0.08	1.00	502.83	35.49	0.50
8:23:27	0.14	-0.08	1.00	503.52	35.44	0.52
8:23:42	0.17	-0.08	1.28	504.09	35.94	0.55
8:23:57	0.16	-0.08	1.28	504.24	35.74	0.55
8:24:12	1.70	-0.08	0.14	221.07	36.04	0.56
8:24:27	7.45	-0.08	0.99	117.49	36.49	0.55
8:24:42	1.88	-0.08	1.28	17.08	8.95	0.92
8:24:57	0.34	-0.08	0.43	11.23	46.76	0.72
8:25:12	0.18	-0.08	-0 66	10.09	99.99	0.56
8:25:27	0.17	-0.08	0.14	9.22	99.99	0.52
8:25:42	0.15	-0.08	1.28	8.54	99.99	0.53
8:25:57	0.16	-0.08	0.42	8.02	99.99	0.53
8:26:12	0.15	-0.08	0.14	7.49	99.99	0.56
8:26:27	0.15	-0.08	0.99	4.37	99.99	0.54
8:26:42	0.15	-0.08	1 00	4.22	99.99	0.97

Zero ppm System Bias:

0.178	% Oxygen
4.071	% CO2
0.150	ppm CO
4.220	ppm Nox
0.617	ppm SO2
0 272	ppm VOC

12.01 Oxygen System Bias:

11.943	% Oxygen

10.0% CO2 System Bias:

10.017	% CO2

600 ppm CO System Bias:

589.433	ppm CO

500 ppm Nox System Bias:

501.987	ppm Nox

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	**% db**	**% db**	**ppmv db**	**ppmv db**	**ppmv db**	**ppmv wb**	
Time	Oxygen	**CO2**	**CO**	**NOx**	**SO2**	VOC	
8:26:57	0 14	-0.08	0.14	4.42	99.99	1 54	
8:27:12	0.15	-0.08	0 14	3.98	88.57	1.36	
8:27:27	0 11	-0.08	0.14	3.68	53.03	1.02	
8:27:42	0 15	-0.08	0.14	3.52	46 19	0.81	
8:27:57	0.13	-0.08	0 14	3 56	47.29	0 68	
8:28:12	0 13	0.08	0.14	3.42	49.16	0.65	50 **ppm SO2** System **Bias:**
8:28:27	0.16	-0.08	0.99	3.35	50.11	0.62	49.902 **ppm** SO2
8:28:42	0 12	-0.08	0.99	3.27	50.06	0.61	
8:28:57	0.14	-0.08	0.13	3.17	**50.28**	0.59	
8:29:12	0.15	-0.08	0.13	3.06	50.43	0.61	
8:29:27	0.11	-0.08	0.99	2.85	52.63	0.58	
13:19:06	0.01	0.00	0.08	1.44	1.35	0.54	
13:19:21	0.00	0.00	-0 46	141	1.25	0.50	
13:19:36	0.01	0.00	-0.19	1.46	1.20	0.52	Zero **ppm** Pre-Test Cal:
13:19:51	0.02	0.00	0.08	1.46	1.30	0.53	**-0.015** **%** Oxygen
13:20:06	0.02	0.00	0.08	1.43	1.38	0.53	-0.002 % C02
13:20:21	-0.02	0.00	-0.46	1.44	1.13	0.51	-0.121 **ppm CO**
13:20:36	-0.02	0.00	-0 18	143	1.30	0.53	1.450 **ppm Nox**
13:20:51	-003	0.00	0.08	1.39	113	0.52	1.252 **ppm SO2**
13:21:06	-0.03	0.00	0.08	1.45	1.25	0.53	0.524 **ppm VOC**
13:21:21	4.03	0.00	0.08	2.92	1.05	0.50	
13:21:36	-0.04	0.00	0.36	5.64	1.28	0.53	
13:21:51	-0.04	0.00	1.22	7.99	8.35	0.53	
13:22:06	-0.04	0.00	0.36	9.24	25.22	0.56	
13:22:21	-0.05	0.00	0.65	7.87	32.69	0.55	
13:22:36	-0.05	0 00	1.22	5.80	33.74	0.55	
13:22:51	-0 05	000	0.65	4.35	35.39	0.53	
13:23:06	-0.05	0.00	0.08	3.50	39.42	0 51	
13:23:21	-0.05	0.00	0 08	3.03	43.21	0.45	
13:23:36	-0.06	000	0.93	2.72	45.99	0.48	
13:23:51	4.06	0.00	0.65	2.57	47.31	0.47	50 **ppm SO2** Pre-Test **Cal**:
13:24:06	-0.05	0.00	0.08	2.33	48.78	0.49	08.315 **ppm SO2**
13:24:21	4.36	0.00	0.65	24.85	49.11	0.49	
13:24:36	6.94	0.05	1.22	6.80	48.06	0.51	
13:24:51	1.11	0.05	0.65	3.06	57.16	27.37	
13:25:06	0.11	0.02	0.08	2.54	90.25	51.58	
13:25:21	-0.01	0.02	0.08	2.34	40 01	50.48	**50 ppm** VOC Cal:
13:25:36	-0.04	0.01	0.08	2.19	17.87	**50.92**	**50.535** **ppm VOC**
13:25:51	-0.05	0.01	0.08	2.15	11.37	**50.53**	
13:26:06	-0.05	0.01	-0.45	2.09	8.72	**50.21**	
13:26:21	-0.06	0.01	0.08	2.44	7.52	47.97	
13:26:36	-0.06	0.01	0.93	10.09	6.60	44.59	
13:26:51	-0.06	0.01	0.12	8.09	7.32	26.29	
13:27:06	-0.06	0.01	-0.72	3.45	35.99	5.86	
13:27:21	3.34	0.01	0.65	1.53	46.34	3.35	
13:27:36	12.61	0.01	1.22	8.54	26.17	2.01	
13:27:51	4.58	0.01	0.65	219.83	11.90	4.33	
13:28:06	0.46	0.01	0.08	330.27	15.32	7.05	
13:28:21	0.09	0.01	0.65	494.37	23.29	2.11	
13:28:36	0.00	0.01	0.36	495.03	16.65	0.88	500 **ppm** Nox Pre-Test Cal:
13:28:51	-0.03	0.01	0.08	492.92	31.00	0.66	496.124 **ppm Nox**
13:29:06	4.04	0.01	0.08	497.18	40.95	0.57	
13:29:21	-0.04	0.01	0.08	499.38	44.49	0.56	
13:29:36	-0.05	0.01	0.65	499.26	46.06	0.48	
13:29:51	0.05	001	0.08	499.32	46.85	0.52	
13:30:06	-0.05	0.01	0.08	499.62	47.69	0.50	Instrumenl Re-Cal
13:30:21	-0.05	0.01	0.65	494.93	48.58	0.53	
13:30:36	2.62	0.01	65.37	220.85	49.51	0.52	
13:30:51	6.33	0.01	311.38	39.96	45.63	0.48	
13:31:06	1.00	0.01	525.92	9.55	7.67	0.50	
13:31:21	0.05	0.01	587.17	7.67	7.67	0.46	
13:31:36	-0.04	0.01	591.99	6.75	4.77	0.44	600 **ppm** CO **Pre-Test Cal:**
13:31:51	-0.06	0.01	591.81	6.31	2.83	0.46	592.270 **ppm CO**
13:32:06	-0.07	0 01	592.03	5.81	2.30	0.43	
13:32:21	4.08	0.01	593.24	5.57	2.10	0.40	
13:32:36	-0.08	0.01	593.78	5.27	1.78	0 42	
13:32:51	-0.08	0.01	590.16	4.95	1.80	0.44	
13:33:06	0.37	001	456.06	4.13	1.73	0.45	
13:33:21	9.04	0.14	300.10	28.41	1.80	0.48	
13:33:36	6.23	4.59	153.92	6.31	1.05	5.56	
13:33:51	0.98	9.13	34.29	4.93	1.60	7.55	
13:34:06	0.10	10 12	6.76	4.48	2.15	2.73	
13:34:21	0.00	10.03	3.19	4.26	1.55	1.98	**10.0% CO2** Pre-Test Cal:
13:34:36	-0.02	**10.06**	2.25	4.05	1.45	1.89	**10.068** **% CO2**
13:34:51	-0.03	**10.08**	1.22	3.96	1.58	1.91	
13:35:06	-0.04	**10.10**	1.22	3.79	1.53	1.82	
13:35:21	-0.04	10.12	1.22	3.62	1.30	1.85	
13:35:36	-0.04	10.09	0.36	3.59	1.20	1.87	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
13:35:51	4.02	10.00	0.08	3.57	1.25	1.84	
13:36:06	0.60	9.64	4.22	5.48	1.08	1.73	
13:36:21	6.08	5.13	5.78	3.12	1.20	1.67	
13:36:36	10.38	0.96	2.76	2.73	0.60	1.60	
13:36:51	11.46	0.23	1.22	2.59	0.35	1.39	
13:37:06	11.77	0.16	1.49	2.63	0.28	1.20	
13:37:21	12 06	0 13	1 76	2 49	0 00	1 01	
13:37:36	11.94	0 11	1 22	2 32	0 20	0 88	12.0% Oxygen Pre-Test Cal:
13:37:51	11.91	0 10	1 22	2 29	0 28	0 77	11.923 %Oxygen
13:38:06	11.93	0 09	1 75	2 24	0.33	0 71	
13:38:21	11.91	0 07	1 22	2 24	0 33	0 62	
13:38:36	11 96	0 03	1 22	2 23	0 08	0 47	
13:38:51	11.94	0 03	1 22	2 09	0 10	0 59	Start Run #3
14:36:03	20.87	0.25	3.43	28.51	0.58	1.38	
14:36:18	20.84	0.25	2.93	29.10	0.28	1.38	
14:36:33	20.88	0.25	2.93	31.34	0.35	1.35	
14:36:48	20.88	0.25	2.93	29.92	0.63	1.37	
14:37:03	20.89	0.25	5.94	29.64	0.40	1.33	
14:37:18	20.65	0.51	18.16	24.75	0.33	1.36	
14:37:33	20.34	0.80	25.18	19.53	0.40	1.39	
14:37:48	20.53	0.67	25.18	18.57	0.43	1.45	
14:38:03	20.64	0.59	22.83	18.65	0.58	1.45	
14:38:18	20.60	0.58	31.34	22.16	0.38	1.40	
14:38:33	20.45	0.75	50.34	25.35	0.50	1.37	
14:38:48	20.31	0.94	80.46	23.81	0.30	1.33	
14:39:03	20.18	1.05	75.84	20.19	0.45	1.32	
14:39:18	20.16	1.08	59.81	20.27	0.55	1.30	
14:39:33	20.14	1.13	73.52	20.20	0.60	1.29	
14:39:48	20.21	1.15	85.80	18.83	0.40	1.30	
14:40:03	20.20	1.15	90.50	18.69	0.45	1.33	
14:40:18	20.20	1.18	89.62	19.81	0.30	1.33	
14:40:33	20.18	1.20	95.79	20.94	0.44	1.34	
14:40:48	20.14	1.21	114.20	21.56	0.25	1.35	
14:41:03	20.18	1.22	122.70	21.47	0.25	1.36	
14:41:18	20.20	1.22	128.51	21.56	0.23	1.37	
14:41:33	20.19	1.24	130.79	21.54	0.35	1.40	
14:41:48	20.18	1.26	128.08	21.02	0.53	1.37	
14:42:03	20.20	1.26	120.37	20.83	0.40	1.37	
14:42:18	20.17	1.27	112.33	20.32	0.40	1.39	
14:42:33	20.15	1.29	106.09	18.90	0.43	1.39	
14:42:48	20.16	1.29	105.55	19.14	0.53	1.38	
14:43:03	20.13	1.30	97.12	19.52	0.50	1.42	
14:43:18	20.11	1.31	87.58	19.72	0.43	1.41	
14:43:33	20.13	1.33	81.43	19.46	0.45	1.39	
14:43:48	20.13	1.33	77.67	18.97	0.50	1.36	
14:44:03	20.14	1.33	86.03	19.07	0.38	1.33	
14:44:18	20.14	1.33	101.73	18.48	0.40	1.33	
14:44:33	20.08	1.36	101.06	17.82	0.40	1.34	
14:44:48	20.08	1.37	97.04	16.54	0.58	1.33	
14:45:03	20.14	1.37	104.93	15.21	0.73	1.35	
14:45:18	20.09	1.37	121.75	14.06	0.76	1.34	
14:45:33	20.07	1.38	108.70	13.89	0.58	1.35	
14:45:48	20.09	1.38	95.38	14.22	0.63	1.36	
14:46:03	20.07	1.38	104.54	13.42	0.65	1.35	
14:46:18	20.11	1.38	116.65	13.34	0.68	1.34	
14:46:33	20.05	1.38	131.43	13.37	0.75	1.36	
14:46:48	20.06	1.38	135.29	13.86	0.83	1.36	
14:47:03	20.10	1.38	148.21	14.42	0.90	1.34	
14:47:18	20.16	1.43	161.83	15.32	0.88	1.37	
14:47:33	20.12	1.49	170.99	14.75	1.10	1.36	
14:47:48	20.18	1.49	167.67	14.96	0.90	1.40	
14:48:03	20.21	1.49	166.13	14.94	1.03	1.43	
14:48:18	20.24	1.46	169.47	14.98	1.08	1.47	
14:48:33	20.27	1.41	176.17	15.07	0.85	1.48	
14:48:48	20.25	1.39	155.42	15.06	0.88	1.51	
14:49:03	20.21	1.39	114.72	14.95	0.88	1.51	
14:49:18	20.25	1.39	78.46	15.04	1.00	1.54	
14:49:33	20.28	1.39	58.39	16.36	0.90	1.52	
14:49:48	20.32	1.38	44.71	16.61	1.16	1.55	
14:50:03	20.38	1.37	33.28	17.16	1.10	1.52	
14:50:18	20.49	1.27	31.04	18.04	1.30	1.53	
14:50:33	20.46	1.24	31.71	19.89	1.21	1.52	
14:50:48	20.39	1.25	31.05	19.71	1.20	1.51	
14:51:03	20.43	1.25	32.53	20.28	1.18	1.51	
14:51:18	20.39	1.25	32.53	20.93	1.35	1.51	
14:51:33	20.40	1.25	28.70	21.70	1.23	1.49	
14:51:48	20.41	1.25	24.86	23.05	1.18	1.50	
14:52:03	20.35	1.31	27.20	21.98	1.23	1.50	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
14:52:18	20.35	1.37	24.95	21.84	1.33	1.49
14:52:33	20.35	1.40	20.25	25.63	1.50	1.49
14:52:48	20.36	1.40	16.92	28.21	1.68	1.46
14:53:03	20.39	1.38	22.26	28.12	1.65	1.47
14:53:18	20.43	1.35	29.01	29.76	1.50	1.48
14:53:33	20.43	1.32	29.02	30.92	1.80	1.46
14:53:48	20.43	1.32	25.48	34.21	1.75	1.45
14:54:03	20.46	1.31	19.31	35.40	2.15	1.47
14:54:18	20.48	1.28	17.41	33.73	2.13	1.46
14:54:33	20.51	1.23	25.23	24.89	2.45	1.44
14:54:48	20.44	1.21	30.82	17.28	2.55	1.45
14:55:03	20.38	1.17	27.00	17.48	2.68	1.46
14:55:18	20.40	1.10	18.42	22.72	2.63	1.44
14:55:33	20.45	1.05	16.10	22.95	2.73	1.45
14:55:48	20.47	1.03	24.62	20.04	2.88	1.46
14:56:03	20.43	1.03	38.42	17.12	2.85	1.47
14:56:18	20.39	1.05	43.64	16.75	3.08	1.44
14:56:33	20.38	1.05	50.59	16.08	2.85	1.45
14:56:48	20.37	1.05	37.86	18.82	2.80	1.44
14:57:03	20.41	1.06	33.38	18.76	2.66	1.43
14:57:18	20.42	1.06	32.37	20.64	2.67	1.42
14:57:33	20.43	1.06	20.85	21.20	2.48	1.43
14:57:48	20.44	1.05	17.65	20.43	2.53	1.40
14:58:03	20.42	1.06	25.48	24.60	2.53	1.41
14:58:18	20.43	1.06	26.42	24.95	2.25	1.40
14:58:33	20.44	1.05	22.59	24.20	2.60	1.40
14:58:48	20.40	1.07	35.01	19.47	2.33	1.40
14:59:03	20.34	1.15	52.60	17.45	2.38	1.40
14:59:18	20.29	1.22	50.57	16.98	2.55	1.39
14:59:33	20.27	1.22	38.46	16.81	2.43	1.39
14:59:48	20.28	1.23	37.95	18.42	2.35	1.38
15:00:03	20.28	1.23	37.21	23.27	2.55	1.38
15:00:18	20.30	1.23	41.47	21.83	2.68	1.37
15:00:33	2029	1.23	40.00	2121	2.70	1.42
15:00:48	20.29	1.23	34.85	20.20	3.18	1.47
15:01:03	20.29	1.23	29.50	19.33	3.13	1.58
15:01:18	20.31	1.23	21.71	22.90	3.68	1.60
15:01:33	20.39	1.16	11.07	28.34	4.01	1.58
15:01:48	20.46	1.06	4.69	33.73	4.59	1.58
15:02:03	20.51	0.96	3.15	35.46	4.71	1.57
15:02:18	20.56	0.85	2.92	26.96	4.70	1.56
15:02:33	20.70	0.61	1.44	28.95	4.33	1.54
15:02:48	20.76	0.53	2.94	39.07	4.13	1.53
15:03:03	20.70	0.58	22.15	37.22	3.85	1.55
15:03:18	20.25	1.01	35.12	21.46	3.78	1.58
15:03:33	20.22	1.08	27.50	17.37	3.65	1.56
15:03:48	20.39	0.99	18.98	15.82	3.68	1.57
15:04:03	20.52	0.86	17.50	16.42	3.73	1.55
15:04:18	20.59	0.79	19.06	17.44	3.68	1.56
15:04:33	20.62	0.76	21.27	21.65	3.60	1.58
15:04:48	20.62	0.75	22.82	22.69	3.63	1.59
15:05:03	20.66	0.72	24.29	24.39	3.65	1.58
15:05:18	20.66	0.71	27.02	24.60	3.48	1.61
15:05:33	20.67	0.70	29.23	26.04	3.43	1.57
15:05:48	20.67	0.69	30.23	24.43	3.35	1.57
15:06:03	20.70	0.64	30.24	23.23	3.20	1.57
15:06:18	20.73	0.60	25.43	23.54	3.10	1.54
15:06:33	20.68	0.59	29.25	29.67	3.30	1.46
15:06:48	20.52	0.80	55.56	31.62	3.23	1.44
15:07:03	20.36	1.03	83.25	23.30	325	1.41
15:07:18	20.17	1.17	59.26	21.09	3.00	1.40
15:07:33	20.12	1.22	31.01	19.91	3.02	1.39
15:07:48	20.07	1.24	18.42	18.62	2.73	1.38
15:08:03	20.11	1.24	14.61	17.91	2.98	1.35
15:08:18	20.09	1.24	12.80	18.22	3.10	1.37
15:08:33	20.08	1.25	11.26	18.93	2.90	1.37
15:08:48	20.09	1.27	10.37	18.75	3.10	1.39
15:09:03	20.11	1.27	9.57	18.67	2.93	1.39
15:09:18	20.12	1.27	9.03	16.89	3.35	1.46
15:09:33	20.11	1.27	9.03	16.32	3.08	1.47
15:09:48	20.09	1.27	9.30	16.23	3.05	1.51
15:10:03	20.11	1.29	9.30	16.21	3.03	1.50
15:10:18	20.10	1.35	8.76	15.97	3.00	1.47
15:10:33	20.08	1.37	7.16	16.03	3.00	1.49
15:10:48	20.05	1.41	6.94	16.45	2.88	1.46
15:11:03	20.03	1.45	6.27	17.12	3.23	1.48
15:11:18	20.01	1.49	6.94	16.51	3.23	1.43
15:11:33	20.00	1.49	7.74	17.60	3.38	1.42

c

Range	0-25%	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
15:11:48	20.04	1.50	15.17	17.61	3.43	1.40
15:12:03	20.04	1.51	18.97	17.82	3.50	1.39
15:12:18	20.00	1.51	39.03	17.73	3.75	1.39
15312333	19.98	1.54	51.81	17.22	3.94	1.39
15:12:48	20.00	1.55	44.62	16.62	3.75	1.34
15:13:03	20.02	1.55	60.75	16.24	3.85	1.34
15:13:18	19.99	1.56	83.04	15.57	3.92	1.32
15:13:33	20.03	1.56	101.50	14.75	4.08	1.34
15:13:48	20.06	1.57	105.73	13.73	4.25	1.32
15:14:03	20.01	1.58	83.23	13.30	4.13	1.34
15:14:18	20.01	1.58	81.20	13.29	4.23	1.34
15:14:33	20.00	1.59	120.57	13.99	4.23	1.36
15:14:48	19.99	1.64	159.53	14.12	4.35	1.36
15:15:03	19.96	1.71	172.45	13.79	4.38	1.33
15:15:18	19.93	1.76	169.44	13.73	4.30	1.35
15:15:33	19.90	1.82	155.65	13.92	4.18	1.34
15:15:48	19.89	1.88	146.72	13.84	4.40	1.36
15:16:03	19.87	1.93	140.57	13.82	4.05	1.35
15:16:18	20.01	1.93	141.00	13.64	4.23	1.31
15:16:33	19.94	2.00	155.59	14.14	3.95	1.26
15:16:48	19.78	2.06	173.27	14.16	3.95	1.35
15:17:03	19.77	2.15	192.22	14.10	4.11	1.34
15:17:18	19.76	2.21	200.51	14.03	4.03	1.32
15:17:33	19.77	2.23	194.36	14.07	3.83	1.32
15:17:48	19.75	2.25	192.33	14.42	3.95	1.32
15:18:03	19.81	2.24	190.06	14.48	3.83	1.30
15:18:18	19.87	2.19	167.70	14.76	3.85	1.30
15:18:33	19.88	2.19	141.00	14.75	3.75	1.28
15:18:48	19.87	2.19	159.35	13.63	3.58	1.31
15:19:03	19.87	2.19	178.43	14.15	3.55	1.33
15:19:18	19.86	2.19	187.91	14.15	3.60	1.33
15:19:33	19.91	2.19	195.55	14.50	3.35	1.33
15:19:48	19.83	2.23	186.41	15.18	3.45	1.34
15:20:03	19.83	2.34	199.53	15.50	3.38	1.31
15:20:18	19.75	2.46	218.15	15.20	3.25	1.30
15:20:33	19.72	2.60	206.65	14.92	3.23	1.31
15:20:48	19.67	2.74	173.62	15.70	3.28	1.30
15:21:03	19.61	2.89	202.11	16.49	3.18	1.28
15:21:18	19.50	3.03	263.06	17.90	3.23	1.26
15:21:33	19.51	2.99	193.65	15.55	3.33	1.27
15:21:48	19.77	2.57	150.98	14.95	3.55	1.26
15:22:03	19.88	2.42	157.15	14.94	3.50	1.23
15:22:18	19.93	2.34	159.20	14.14	3.65	1.23
15:22:33	19.98	2.27	167.70	13.89	3.78	1.23
15:22:48	19.93	2.27	178.45	13.92	3.63	1.23
15:23:03	19.96	2.23	180.78	13.92	3.77	1.23
15:23:18	19.98	2.20	189.92	14.38	4.07	1.24
15:23:33	19.98	2.19	199.95	14.52	4.18	1.23
15:23:48	20.02	2.16	198.25	15.33	4.35	1.23
15:24:03	20.05	2.10	207.35	16.55	4.43	1.23
15:24:18	20.07	2.06	201.24	16.32	4.45	124
15:24:33	20.07	2.05	173.74	18.24	4.63	1.23
15:24:48	20.12	1.97	143.64	21.01	4.65	1.21
15:25:03	20.13	1.90	108.97	19.52	4.83	1.22
15:25:18	20.13	1.80	69.48	16.88	4.95	1.22
15:25:33	20.15	1.70	44.26	16.64	5.08	1.23
15:25:48	20.17	1.62	30.03	17.78	4.83	1.20
15:26:03	20.24	1.54	30.03	16.50	4.48	1.20
15:26:18	20.20	1.53	31.22	16.08	4.30	1.17
15:26:33	20.19	1.53	26.73	15.82	3.85	1.21
15:26:48	20.22	1.52	20.78	16.44	3.85	1.20
15:27:03	20.25	1.51	16.91	16.63	3.73	1.17
15:27:18	20.23	1.51	21.22	16.65	3.53	1.20
15:27:33	20.19	1.51	76.35	16.14	3.15	1.18
15:27:48	20.07	1.69	147.13	16.14	3.23	1.17
15:28:03	19.85	2.07	138.02	18.58	3.20	1.18
15:28:18	19.79	2.24	84.93	18.03	3.07	1.15
15:28:33	19.94	2.02	48.05	17.66	2.78	1.16
15:28:48	20.08	1.77	32.29	17.70	2.65	1.14
15:29:03	20.15	1.63	32.29	20.65	2.85	1.15
15:29:18	20.13	1.61	25.90	25.60	2.60	1.15
15:29:33	20.17	1.55	16.60	29.51	2.60	1.14
15:29:48	20.29	1.37	13.07	29.93	2.65	1.13
15:30:03	20.44	1.10	12.33	22.94	2.50	1.12
15:30:18	20.65	0.77	9.56	21.12	2.50	1.13
15:30:33	20.66	0.72	14.85	25.41	2.43	1.15
15:30:48	20.30	1.10	19.46	21.14	2.40	1.15
15:31:03	20.22	1.17	17.98	19.56	2.65	1.16

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
15:31:18	20.33	1.13	16.90	17.81	2.53	1.16
15:31:33	20.46	1.00	20.04	18.14	2.45	1.15
15:31:48	20.52	0.94	23.37	18.14	2.65	1.16
15:32:03	20.56	0.88	27.20	18.35	2.90	1.18
15:32:18	20.58	0.87	30.23	19.36	2.68	1.21
15:32:33	20.60	0.85	31.71	19.19	2.75	1.23
15:32:48	20.61	0.82	33.07	19.73	2.83	1.26
15:33:03	20.62	0.81	33.92	20.36	2.63	1.25
15:33:18	20.64	0.80	34.19	21.50	2.48	1.25
15:33:33	20.67	0.75	35.00	19.85	2.59	1.26
15:33:48	20.70	0.70	32.29	18.68	2.49	1.30
15:34:03	20.70	0.69	31.49	21.31	2.40	1.29
15:34:18	20.59	0.80	60.79	27.20	2.73	1.31
15:34:33	20.36	1.13	123.85	23.28	2.70	1.28
15:34:48	20.07	1.41	95.79	18.71	2.45	1.31
15:35:03	19.91	1.53	44.52	18.10	2.45	1.28
15:35:18	19.89	1.54	24.43	17.35	2.70	1.24
15:35:33	19.86	1.55	19.06	16.19	2.68	1.18
15:35:48	19.83	1.57	19.72	15.87	2.65	1.21
15:36:03	19.84	1.57	20.53	15.79	2.85	1.21
15:36:18	19.86	1.57	21.05	17.43	2.95	1.23
15:36:33	19.87	1.58	27.95	18.25	2.73	1.19
15:36:48	19.86	1.61	37.47	18.69	2.90	1.22
15:37:03	19.87	1.62	45.64	19.18	3.08	1.22
15:37:18	19.88	1.62	69.72	18.57	2.93	1.24
15:37:33	19.89	1.63	97.41	18.17	3.03	1.23
15:37:48	19.91	1.68	144.14	17.88	2.93	1.26
15:38:03	19.92	1.69	173.92	17.73	3.05	1.25
15:38:18	19.93	1.70	166.48	17.23	2.98	1.27
15:38:33	20.00	1.69	183.96	17.42	3.10	1.27
15:38:48	20.02	1.65	213.80	17.73	3.09	1.26
15:39:03	19.97	1.65	219.95	16.80	3.15	1.25
15:39:18	19.95	1.66	208.09	16.39	3.10	1.26
15:39:33	19.96	1.66	196.66	15.63	3.13	1.27
15:39:48	19.93	1.66	189.66	15.72	3.38	1.25
15:40:03	19.95	1.66	206.59	16.41	3.55	1.26
15:40:18	19.94	1.67	212.64	16.26	3.25	1.26
15:40:33	19.94	1.68	216.58	15.08	3.48	1.29
15:40:48	19.98	1.68	222.16	15.10	3.45	1.29
15:41:03	20.00	1.68	219.15	14.96	3.33	1.29
15:41:18	20.03	1.67	204.34	15.98	3.53	1.29
15:41:33	20.05	1.66	190.42	16.90	3.63	1.31
15:41:48	20.02	1.66	181.09	17.19	3.18	1.30
15:42:03	19.98	1.66	165.05	17.54	3.10	1.32
15:42:18	19.97	1.71	131.35	17.62	3.23	1.31
15:42:33	20.10	1.71	108.93	17.16	3.03	1.31
15:42:48	20.12	1.71	107.88	16.56	3.00	1.33
15:43:03	20.13	1.70	117.25	16.21	3.20	1.33
15:43:18	20.16	1.69	117.99	16.44	2.88	1.31
15:43:33	20.17	1.68	101.73	17.21	2.78	1.33
15:43:48	20.19	1.68	85.27	17.02	2.86	1.33
15:44:03	20.21	1.68	80.60	16.24	2.87	1.32
15:44:18	20.18	1.68	79.59	15.97	3.05	1.32
15:44:33	20.18	1.68	85.74	16.02	2.78	1.31
15:44:48	20.18	1.68	107.94	15.28	3.03	1.30
15:45:03	20.19	1.68	115.65	14.50	2.73	1.28
15:45:18	20.27	1.64	99.95	15.44	2.65	1.29
15:45:33	20.19	1.62	89.17	16.42	2.98	1.31
15:45:48	20.23	1.58	90.65	16.85	2.75	1.29
15:46:03	20.20	1.58	94.54	15.38	3.00	1.26
15:46:18	20.19	1.60	98.09	15.46	3.05	1.25
15:46:33	20.18	1.63	98.09	14.88	3.10	1.26
15:46:48	20.20	1.63	96.32	16.02	3.05	1.25
15:47:03	20.18	1.63	125.70	15.62	3.28	1.22
15:47:18	20.09	1.74	127.98	15.60	3.18	1.23
15:47:33	20.00	1.86	82.53	18.75	3.18	1.23
15:47:48	20.16	1.68	48.78	21.61	3.35	1.25
15:48:03	20.23	1.59	34.33	21.89	3.40	1.18
15:48:18	20.26	1.54	30.01	23.11	3.38	1.17
15:48:33	20.26	1.53	32.29	21.96	3.43	1.18
15:48:48	20.25	1.53	32.28	18.81	3.70	1.18
15:49:03	20.21	1.53	30.00	19.14	3.71	1.16
15:49:18	20.22	1.53	48.05	20.55	3.97	1.16
15:49:33	20.18	1.60	84.72	17.42	4.05	1.17
15:49:48	20.06	1.80	70.44	17.89	4.42	1.17
15:50:03	20.14	1.75	46.68	21.71	4.62	1.15
15:50:18	20.20	1.64	41.17	19.78	4.58	1.14
15:50:33	20.19	1.62	31.28	21.59	4.85	1.15

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
15:50:48	20.25	1.56	23.80	25.39	4.77	1.16
15:51:03	20.28	1.50	20.78	28.42	4.93	1.20
15:51:18	20.33	1.42	24.54	26.85	5.23	1.17
15:51:33	20.33	1.39	36.85	28.53	6.07	1.19
15:51:48	20.32	1.39	55.32	26.11	7.02	1.20
15:52:03	20.18	1.51	43.21	17.98	7.90	1.22
15:52:18	20.11	1.56	82.08	14.18	9.10	1.24
15:52:33	20.04	1.65	176.37	13.48	9.47	1.24
15:52:48	19.78	1.94	144.09	12.86	8.85	1.26
15:53:03	19.94	1.82	70.27	19.19	7.95	1.25
15:53:18	20.16	1.55	37.18	18.06	7.27	1.24
15:53:33	20.25	1.38	29.50	18.98	6.54	1.25
15:53:48	20.30	1.30	23.79	21.54	6.02	1.26
15:54:03	20.33	1.23	20.78	23.15	5.65	1.27
15:54:18	20.37	1.16	18.97	24.01	5.12	1.25
15:54:33	20.40	1.09	16.63	23.25	4.98	1.25
15:54:48	20.45	1.02	17.98	21.99	4.67	1.25
15:55:03	20.44	1.02	18.78	22.76	4.30	1.26
15:55:18	20.44	1.02	19.30	21.72	4.25	1.27
15:55:33	20.43	1.02	24.67	19.51	3.95	1.27
15:55:48	20.41	1.02	43.71	17.99	3.70	1.27
15:56:03	20.30	1.16	52.80	14.44	3.40	1.28
15:56:18	20.18	1.37	36.69	17.03	3.63	1.26
15:56:33	20.26	1.38	32.02	16.69	3.73	1.27
15:56:48	20.26	1.38	30.21	16.19	3.43	1.25
15:57:03	20.19	1.41	24.85	15.94	3.33	1.27
15:57:18	20.24	1.42	25.96	15.63	3.13	1.26
15:57:33	20.23	1.42	20.46	17.47	3.23	1.29
15:57:48	20.32	1.34	16.08	19.52	2.95	1.27
15:58:03	20.37	1.25	16.08	20.66	3.13	1.28
15:58:18	20.38	1.22	17.21	21.56	2.73	1.26
15:58:33	20.42	1.14	14.07	23.51	2.88	1.27
15:58:48	20.48	1.07	11.25	25.44	2.83	1.25
15:59:03	20.48	1.04	9.78	24.56	2.95	1.28
15:59:18	20.42	1.01	9.02	24.05	2.78	1.29
15:59:33	20.53	0.99	7.42	26.51	2.63	1.30
15:59:48	20.49	0.98	8.23	25.20	2.22	1.27
16:00:03	20.48	0.98	7.42	28.94	2.61	1.27
16:00:18	20.49	0.98	7.16	29.98	2.63	1.30
16:00:33	20.52	0.97	7.16	26.86	2.50	1.30
16:00:48	20.54	0.95	9.29	22.35	2.78	1.30
16:01:03	20.54	0.95	8.49	22.41	2.78	1.32
16:01:18	20.55	0.95	6.93	21.79	2.90	1.34
16:01:33	20.55	0.95	6.93	21.64	2.75	1.35
16:01:48	20.56	0.95	7.15	22.35	2.58	1.36
16:02:03	20.56	0.95	6.48	21.92	2.55	1.36
16:02:18	20.55	0.95	6.26	23.25	2.58	1.36
16:02:33	20.55	0.95	7.73	24.89	2.73	1.35
16:02:48	20.52	0.96	12.84	21.51	2.63	1.36
16:03:03	20.47	1.04	13.58	25.12	2.70	1.33
16:03:18	20.44	1.09	12.06	25.93	2.38	1.37
16:03:33	20.44	1.09	10.58	27.08	2.35	1.34
16:03:48	20.46	1.09	10.36	24.87	2.43	1.35
16:04:03	20.46	1.09	10.36	26.54	2.23	1.32
16:04:18	20.45	1.09	10.09	28.83	2.45	1.33
16:04:33	20.45	1.09	9.29	27.70	2.38	1.32
16:04:48	20.45	1.09	12.04	23.49	2.34	1.37
16:05:03	20.38	1.16	15.86	22.85	2.58	1.32
16:05:18	20.40	1.20	17.12	21.90	2.41	1.28
16:05:33	20.31	1.28	35.59	18.80	2.73	1.33
16:05:48	20.25	1.37	72.33	16.57	2.70	1.37
16:06:03	20.05	1.64	57.67	17.11	2.38	1.37
16:06:18	20.13	1.62	25.93	22.75	2.43	1.36
16:06:33	20.28	1.46	15.15	25.57	2.50	1.35
16:06:48	20.36	1.34	15.27	22.68	2.35	1.36
16:07:03	20.40	1.28	15.28	23.48	2.30	1.35
16:07:18	20.41	1.25	14.38	23.73	2.13	1.37
16:07:33	20.43	1.23	15.05	28.31	2.08	1.35
16:07:48	20.46	1.18	12.57	27.03	2.45	1.36
16:08:03	20.48	1.14	8.76	26.14	2.10	1.36
16:08:18	20.47	1.13	8.22	26.80	2.15	1.35
16:08:33	20.49	1.13	9.02	27.06	2.16	1.36
16:08:48	20.46	1.13	9.55	28.86	2.08	1.36
16:09:03	20.46	1.13	9.55	28.05	2.01	1.35
16:09:18	20.50	1.13	9.02	28.67	1.83	1.39
16:09:33	20.46	1.12	8.22	29.92	1.93	1.39
16:09:48	20.47	1.10	8.22	29.46	2.08	1.38
16:10:03	20.51	1.07	7.42	27.06	1.99	1.41

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	pprnv db	pprnv db	ppmv db	ppmv wb	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
16:10:18	20.52	1.05	6.26	28.78	1.78	1.37	
16:10:33	20.55	1.03	6.26	27.31	1.71	1.38	
16:10:48	20.55	1.02	6.26	27.26	1.48	1.39	
16:11:03	20.55	1.01	6.26	28.97	1.91	1.41	
16:11:18	20.56	1.00	5.18	28.08	1.73	1.39	
16:11:33	20.56	0.98	5.99	25.66	1.71	1.39	
16:11:48	20.55	0.98	6.25	26.08	1.53	1.39	
16:12:03	20.58	0.92	5.45	29.87	1.51	1.40	
16:12:18	20.60	0.87	5.68	30.92	1.76	1.38	
16:12:33	20.59	0.85	8.75	24.92	1.41	1.41	
16:12:48	20.52	0.87	9.83	23.22	1.78	1.38	
16:13:03	20.52	0.89	6.75	24.64	1.88	1.41	
16:13:18	20.56	0.89	8.69	26.47	2.05	1.38	
16:13:33	20.51	0.91	17.25	20.99	2.43	1.38	
16:13:48	20.42	1.02	20.26	21.73	2.40	1.37	
16:14:03	20.43	1.03	17.99	23.98	2.93	1.37	
16:14:18	20.44	1.03	18.78	25.62	3.38	1.36	
16:14:33	20.44	1.03	26.43	28.77	4.15	1.35	
16:14:48	20.39	1.09	53.12	22.28	5.41	1.34	
16:15:03	20.23	1.34	57.61	19.37	6.64	1.33	
16:15:18	20.23	1.41	41.62	17.53	8.39	1.32	
16:15:33	20.31	1.36	30.31	18.50	10.70	1.31	
16:15:48	20.39	1.22	25.04	24.01	11.40	1.29	
16:16:03	20.39	1.17	36.69	26.11	11.00	1.28	
16:16:18	20.34	1.19	39.70	16.55	10.22	1.30	
16:16:33	20.31	1.23	31.28	17.95	9.40	1.30	
16:16:48	20.35	1.22	26.23	22.17	9.32	1.28	
16:17:03	20.37	1.15	25.42	21.14	9.10	1.28	
16:17:18	20.36	1.12	25.96	19.80	9.52	1.28	
16:17:33	20.31	1.12	22.00	18.60	9.92	1.28	
16:17:48	20.34	1.12	21.51	18.38	11.25	1.27	
16:18:03	20.38	1.12	21.52	17.96	12.47	1.28	
16:18:18	20.37	1.12	21.27	18.20	12.90	1.28	
16:18:33	20.37	1.12	19.05	22.70	13.20	1.27	
16:18:48	20.41	1.12	15.35	24.72	12.45	1.28	
16:19:03	20.44	1.08	10.05	30.14	12.35	1.26	
16:19:18	20.52	0.97	7.74	30.55	12.07	1.28	
16:19:33	20.61	0.80	5.46	33.89	12.02	1.23	
16:19:48	20.68	0.69	5.99	34.75	11.33	1.27	
16:20:03	20.72	0.65	4.45	36.11	10.45	1.26	
16:20:18	20.72	0.64	4.21	37.13	9.36	1.27	
16:20:33	20.72	0.63	4.21	36.53	8.59	1.25	
16:20:48	20.73	0.62	5.19	36.94	7.85	1.26	
16:21:03	20.73	0.62	4.45	36.61	7.52	1.24	
16:21:18	20.71	0.62	4.21	37.35	6.85	1.25	
16:21:33	20.71	0.62	4.21	36.82	6.55	1.23	
16:21:48	20.73	0.62	4.21	38.83	6.25	1.26	
16:22:03	20.73	0.62	4.21	38.31	5.90	1.26	
16:22:18	20.71	0.62	7.02	38.55	5.40	1.28	
16:22:33	20.67	0.63	14.59	38.61	5.37	1.26	
16:22:48	20.61	0.73	30.51	40.42	5.32	1.26	
16:23:03	20.58	0.79	44.17	39.84	5.07	1.27	
16:23:18	20.61	0.80	40.39	38.03	A57	1.27	
16:23:33	20.66	0.75	25.13	38.73	A75	1.27	
16:23:48	20.72	0.66	14.27	40.88	4.52	1.27	
16:24:03	20.73	0.62	9.78	40.64	4.32	1.27	
16:24:18	20.75	0.59	8.23	39.13	4.67	1.26	
16:24:33	20.76	0.57	8.23	40.09	4.37	1.29	
16:24:48	20.76	0.56	9.29	39.07	A31	1.27	
16:25:03	20.78	0.55	7.69	39.83	4.29	1.30	
16:25:18	20.77	0.55	7.16	38.96	4.19	1.29	
16:25:33	20.77	0.54	7.16	40.23	4.31	1.29	
16:25:48	20.78	0.53	7.16	39.53	3.83	1.31	
16:26:03	20.79	0.53	6.48	38.26	4.14	1.33	
16:26:18	20.80	0.52	7.16	39.35	4.00	1.29	
16:26:33	20.80	0.52	7.15	39.18	3.85	1.30	
16:26:48	20.81	0.51	6.93	38.98	3.70	1.31	
16:27:03	20.81	0.51	5.46	38.57	3.65	1.32	
16:27:18	20.95	0.50	5.19	39.51	3.58	1.26	
16:27:33	20.81	0.50	5.19	39.55	3.73	1.26	
16:27:48	20.76	0.49	5.19	40.10	3.48	1.32	
16:28:03	20.71	0.48	4.45	40.36	3.33	1.27	End Run #3
16:28:18	20.82	0.48	4.21	42.65	3.33	0.96	
16:28:33	20.83	0.48	4.21	42.42	3.40	0.79	
16:28:48	20.82	0.48	4.20	38.17	3.30	0.74	
16:29:03	20.80	0.48	11.84	26.48	3.15	0.76	
16:29:18	15.41	0.48	29.80	4.71	3.28	0.73	
16:29:33	5.07	0.42	16.68	3.54	3.80	0.75	

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100
Units	% db	% db	ppmv db	ppmv db	ppmv db	ppmv wb
Time	Oxygen	CO2	CO	NOx	SO2	VOC
16:29:48	0.77	0.15	1.42	3.50	4.13	0.74
16:30:03	0.12	0.02	-1.72	3.43	4.46	0.74
16:30:18	0.02	-0.02	-1.72	3.42	4.76	0.73
16:30:33	-0.02	-0.02	-1.05	3.37	4.86	0.75
16:30:48	-0.04	0.02	-1.04	3.35	2.50	0.74
16:31:03	-0.05	0.03	-1.72	3.34	-0.12	0.74
16:31:18	-0.06	4.03	-1.72	3.29	-0.15	0.73
16:31:33	-0.07	4.03	-1.05	3.30	4.30	0.74
16:31:48	-0.07	-0.03	-1.04	3.22	4.20	0.71
16:32:03	-0.08	-0.03	2.89	3.25	-0.47	0.71
16:32:18	1.16	-0.03	15.05	4.39	-0.42	0.76
16:32:33	8.12	-0.03	8.29	3.29	-0.65	0.74
16:32:48	11.18	-0.03	0.88	3.27	-1.55	0.73
16:33:03	11.62	-0.03	-0.78	3.23	-1.87	0.73
16:33:18	11.69	-0.03	-1.04	3.21	-2.05	0.73
16:33:33	11.72	-0.03	4.24	3.21	-2.07	0.73
16:33:48	11.73	4.03	4.24	3.24	-2.10	0.75
16:34:03	11.74	-0.03	-1.72	3.19	-2.15	0.74
16:34:18	11.74	-0.03	-1.05	3.21	-2.27	0.74
16:34:33	11.75	-0.03	-0.24	3.23	-2.25	0.72
16:34:48	11.76	-0.03	-0.78	3.13	-2.27	0.73
16:35:03	11.76	-0.03	-0.78	3.15	-2.25	0.72
16:35:18	11.75	-0.03	-1.05	3.14	-2.25	0.74
16:35:33	11.76	-0.03	-0.24	3.12	-2.27	0.73
16:35:48	11.84	-0.03	2.34	3.22	-2.22	0.75
16:36:03	12.84	0.93	10.09	5.06	-2.27	0.76
16:36:18	5.20	6.55	3.63	3.95	-2.27	0.75
16:36:33	0.76	9.38	-2.52	3.88	-2.27	0.72
16:36:48	0.12	9.81	-3.01	3.94	-2.02	0.77
16:37:03	0.03	10.03	-3.75	3.89	-1.87	0.73
16:37:18	-0.01	10.06	-3.75	3.93	-1.55	0.75
16:37:33	-0.02	10.09	-3.01	3.85	-1.50	0.77
16:37:48	4.03	10.10	-3.01	3.95	-1.37	0.75
16:38:03	-0.04	10.12	-3.75	3.88	-1.60	0.75
16:38:18	-0.05	10.13	-4.00	3.92	-1.65	0.72
16:38:33	4.05	10.13	-3.26	3.93	-1.57	0.75
16:38:48	-0.05	10.13	-3.01	3.91	-1.42	0.74
16:39:03	0.02	10.09	-3.01	3.56	-1.60	0.74
16:39:18	7.12	6.10	55.36	7.55	-1.52	0.74
16:39:33	6.26	2.31	209.05	4.27	-2.12	0.74
16:39:48	0.78	0.53	598.71	3.49	-2.27	0.73
16:40:03	0.02	0.13	603.25	3.39	-2.22	0.74
16:40:18	-0.06	0.08	603.87	3.38	-2.22	0.72
16:40:33	-0.09	0.06	600.64	3.38	-1.73	0.72
16:40:48	-0.10	0.04	327.92	3.35	-1.80	0.73
16:41:03	-0.10	0.03	305.71	3.30	-1.69	0.75
16:41:18	-0.11	0.03	284.95	3.31	-1.81	0.75
16:41:33	0.10	0.02	259.60	3.30	-1.67	0.76
16:41:48	0.66	0.02	240.22	3.29	-2.00	0.72
16:42:03	1.12	0.01	203.86	22.66	-2.27	0.73
16:42:18	4.03	0.01	118.48	253.77	-2.05	0.71
16:42:33	4.68	0.01	28.60	370.57	-2.27	0.72
16:42:48	16.07	0.01	1.42	484.43	-2.17	0.72
16:43:03	20.12	0.00	-1.72	485.57	4.05	0.72
16:43:18	20.74	0.00	-1.94	495.23	5.25	0.72
16:43:33	20.84	0.00	-1.27	499.51	7.62	0.72
16:43:48	20.86	0.01	-1.94	499.28	7.97	0.70
16:44:03	20.83	0.01	-1.94	499.70	8.05	0.71
16:44:18	20.89	0.00	-1.94	499.68	8.40	0.71
16:44:33	20.87	0.00	-1.94	500.93	8.12	0.73
16:44:48	20.89	0.00	-1.94	500.83	8.00	0.72
16:45:03	20.88	0.00	-2.74	499.41	8.37	0.73
16:45:18	20.87	0.00	-2.75	243.54	8.23	0.73
16:45:33	20.89	0.00	-1.95	16.42	8.43	0.73
16:45:48	20.90	0.00	-1.72	29.70	14.85	0.73
16:46:03	20.90	0.00	-1.72	10.87	16.72	0.74
16:46:18	20.91	-0.01	-1.72	9.65	47.84	0.73
16:46:33	20.91	-0.01	-1.04	7.80	98.41	0.74
16:46:48	20.92	-0.01	-1.27	6.83	99.99	0.74
16:47:03	20.91	-0.01	-1.94	6.58	99.99	0.74
16:47:18	20.93	-0.01	-1.94	6.14	98.61	0.74
16:47:33	20.92	-0.01	-1.27	5.88	72.95	0.75
16:47:48	20.90	4.01	-1.27	5.76	54.78	0.73
16:48:03	20.91	-0.01	-1.94	5.71	51.75	0.74
16:48:18	20.91	-0.01	-1.94	5.65	51.70	0.74
16:48:33	20.93	-0.01	-1.27	5.60	49.05	1.05
16:48:48	20.91	-0.01	-1.04	5.50	48.47	1.25
16:49:03	20.90	-0.01	-1.72	5.36	36.78	1.18

Zero ppm Post-Test Cal:
-0.069 % Oxygen
-0.025 % CO2
-0.229 ppm CO
3.266 ppm Nox
-0.280 ppm SO2
0.722 ppm VOC

12.0% Oxygen Post-Test Cal:
11.742 % Oxygen

10.0% CO2 System Bias:
10.095 % CO2

600 ppm CO Post-Test Cal:
601.614 ppm CO

500 ppm Nox Post-Test Cal:
498.430 ppm Nox

50 ppm SO2 Post Test Cal:
50.243 ppm SO2

Range	0-25 %	0-20%	0-1000	0-1000	0-100	0-100	
Units	% db	% db	ppmv db	ppmv db	ppmv db	pprnv w b	
Time	Oxygen	CO2	CO	NOx	SO2	VOC	
16:49:18	20.91	-0.01	-1.72	4.25	35.31	1.18	
16:49:33	20.91	-0.01	-1.72	4.18	34.34	11.04	
16:49:48	20.92	-0.01	-1.05	4.10	27.34	39.47	
16:50:03	20.92	-0.01	-1.05	4.05	20.44	48.81	
16:50:18	20.93	-0.01	-1.94	4.03	16.17	49.14	
16:50:33	20.93	-0.01	-1.27	3.93	13.08	49.52	
16:50:48	20.93	-0.01	-1.05	3.92	11.10	50.01	50 ppm VOC Post-Test Cal:
16:51:03	20.92	-0.01	-1.72	3.88	9.72	50.19	50.290 ppm VOC
16:51:18	20.93	-0.01	-1.94	3.89	8.67	50.37	
16:51:33	20.91	-0.01	-1.94	3.93	7.72	50.59	
16:51:48	20.90	-0.01	-1.05	3.93	6.82	47.31	
16:52:03	20.90	-0.01	-1.72	3.86	5.80	9.58	

APPENDIX

APPENDIX D

Process Data

N-254R

Mill Letter

From: D Long

Date 17 Apr 2001

To: Larry Caldwine

Subject: NOx CO VOC SOx testing of 4/4-12

Larry -

Here's the production information for heats #82080 and 82081 on April 11th & heat #82088 on Apr. 12th. A sample sheet shows the weights to be included in your calculations.

Any questions, call me at 815-625-2500 ext 2451.

D Long

JN130 (2000)

EAF Heat Report

DATE 4-11-01 | SHIFT 7-3 | Heat # 82081
FURNACE 8 | MELTER Waite | Grade
DELTA HEAT # 18 | 1st HELPER Erickson | Ladle # 12

Scrap Recipe | Burner Profile

HEEL	Prev. Heat >	
CHG. WT.	Current HT>	824
CHG> WT. X .90 >>>>		
TAP WT.	Current HT. >	
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	1039	1042	8	
FCE T@	1042	1048	6	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	1048	1050	2	P.C.	360		
23	1050	1113					
	1113	1117	4	B.C. + level	294		
24	1117	1141					
	1141	1144	3	B.C.	250		
44	1144	1228					
	1228	1229	1	Slag off			
	1229	1235	6	Tap off			
				Total Scrap	904,000#		

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen
91	XXXXXXXXXX	24	115 I think this was in 1425 113-91	89

Any Burners out of service, restricted flow and or problems:

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	289,98	INJECTION	21825.0	BURNERS	70.0
LANCES	104.6	CHARGE	14,000	LIME	LBS
TOTAL		ROOF	1,000	INJECTION	18,000
	394.58	TOTAL		CHARGE	5000
				TOTAL	

TIME LADLE ORDERED	1205
TIME LADLE REC.	1212
TAP TIME	1229
TAP TEMP	2988
TAP O2 PPM	554
KWH	141.6
KWHR/C TON	337.0
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
ST	.05	.08	.005	.053	.23	.16	.08	.05	.007
ND									
RD									
AST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

LADLE ADDITIONS:			TAPPED GRADE:						other
recarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	

Remarks:

Additions @ Tap: Si75 = 200# SiMn = 1000# MgO = 1200# SiC = 500# } alloys added during tapping

(2000)

EAF Heat Report

	4-11-01	SHIFT	7-3
	8	MELTER	Waites
T #	17	1st HELPER	Erikson

Heat # 82080
Grade
Ladle # 9

p Recipe
Burner Profile

HEEL	Prev. Heat >	
CHG. WT.	Current HT.>	810
CHG> WT. X .90 >>>>		
TAP WT.	Current HT. >	
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel

FROM	TO	TIME	COMMENTS
828	835	7	
835	840	5	

TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
840	842	2	P.C.	298		
842	849					
849	907	18	Add + Slip			
907	919					
919	923	4	BC	294		
923	947					
947	950	3	BC	232		
950	1033					
933	1034	1				
934	1042	8	Tap			
			Total Recy	824000#		

ort all fires or any potential hazards to the Melter and Maint. Supervisor

Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen
XXXXXXXXXX	40	126	

out of service, restricted flow and or problems: 121-86

KSCF	CARBON	LBS	GAS	
292.03	INJECTION	1844	BURNERS	70.05
90.	CHARGE	14000	LIME	LBS
382.03	ROOF	1000	INJECTION	18000
	TOTAL	16844	CHARGE	
			TOTAL	

TIME LADLE ORDERED	1016
TIME LADLE REC.	1030
TAP TIME	1034
TAP TEMP	2978
TAP O2 PPM	456
KWH	1294
KWHR/C TON	314
AFTER TAP TEMP	

C	Mn	P	S	Cu	Ni	Cr	Mo	N
6	10	012	61	25	20	11	06	007

s:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS
	A	191	SGL	1			Normal
	C	192	SGL	1			Normal

ONS: TAPPED GRADE: other

fin	SiMn	SI75	Al	FeV	FeB	CaC2	Art. Slag

at tap: CarbMn: 410# Si75=200# SiMn=6000# MgO=1200# SiC=500#

APPENDIX E

JN130 (2000)

EAF Heat Report

DATE 4-11-01
FURNACE 8
DELTA HEAT # 18

SHIFT 7-3
MELTER Waite
1st HELPER Erickson

Heat # 820
Grade
Ladle # 12

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >	
CHG. WT.	Current HT >	82
CHG> WT. X .90 >>>>		
TAP WT.	Current HT. >	
(Difference) TAP -90% of Charge + Prev. Heel		Current H

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	1039	1042	8	
FCE T@	1042	1048	6	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBO
	1048	1050	2	P.C.	360		
23	1050	1113					
	1113	1119	4	B.C. + level	294		
24	1119	1141					
	1141	1144	3	B.C.	250		
44	1144	1228					
	1228	1229	1	Slag off			
	1229	1235	6	Tap off			
				Total Scrap	904,000#		

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen
91	XXXXXXXXXX	24	115	8

Any Burners out of service, restricted flow and or problems: 113-91

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	289,98	INJECTION	2925.0	BURNERS	70.0
LANCES	104.6	CHARGE	14,000	LIME	LBS
TOTAL		ROOF	1,000	INJECTION	18,000
	394.58	TOTAL		CHARGE	4000 ?
				TOTAL	

TIME LADLE ORDERED	12
TIME LADLE REC.	12
TAP TIME	12
TAP TEMP	298
TAP O2 PPM	55
KWH	141
KWHR/C TON	33
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	.05	.08	.005	.053	.23	.16	.08	.05	.007
2ND									
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

LADLE ADDITIONS: TAPPED GRADE: other

	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	

Remarks:

Additions @ Tap: Si75 = 200# SiMn = 6000# MgO = 1200# SiC = 500#

30 (2000)

EAF Heat Report

	4-12-01	SHIFT 3-11	Heat # 82088
CE	8	MELTER Stuart	Grade
HEAT #	24	1st HELPER AGUILAR	Ladle # 4

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >	
CHG. WT.	Current HT.>	
CHG> WT. X .90 >>>>		
TAP WT.	Current HT. >	
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel

s	FROM	TO	TIME	COMMENTS
	149	156	7	
2	156	200	4	

On	TIME FROM	TIME TO	POWER OFF TOTAL	POWER OFF REASON	CHARGE (LBS) SCRAP	CHARGE (LBS) LIME	CHARGE (LBS) CARBON
	200	237	37	400 Ton Crane - elect -	A00 A+C, slip B		
	237	239	2	RC	367		
2	239	301					
	301	306	5	BC	273		
3	306	329					
	329	334	5	BC	192		
5	334	419					
	419	420	1	Slag			
	420	428	8	Tap			
				Total scrap	827,000#		

report all fires or any potential hazards to the Melter and Maint. Supervisor

Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	93
XXXXXXXXXX	61	151		

ers out of service, restricted flow and or problems:

KSCF	CARBON	LBS	GAS	
289.0	INJECTION	660	BURNERS	74.60
62.4	CHARGE		LIME	LBS
	ROOF		INJECTION	36 180000
	TOTAL		CHARGE	
			TOTAL	

TIME LADLE ORDERED	400
TIME LADLE REC.	412
TAP TIME	420
TAP TEMP	2988
TAP O2 PPM	643
KWH	1463
KWHR/C TON	3530
AFTER TAP TEMP	

C	Mn	P	S	Cu	Ni	Cr	Mo	N
6	10	7	53	24	10	8	.035	006

DDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS
	A	189	SGL	1			Normal -
	C	190	SGL	1			Normal

ITIONS:		TAPPED GRADE:					other
eMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag

Carbon 500# Si75 - 200# SiMn - 9000# CaC - 450# Lime - 200#

APPENDIX E

APPENDIX E

Calibration Data

Plant Name:	Northwest Steel and Wire	Plant Rep:	Dave Long	NOx 1000 ppm	CO_2 20 %
Sampling Location:	EAF #8 Baghouse Inlet	Proj. Mgr.:	W.C. James	CO 1000 ppm	SO_2 100 ppm
CEM Operator	W.C. James			O_2 25 %	THC 100 ppm

Run:	1			2			3		
Date:	4/11101			4/11/01			4/12/01		
Time:	1048-1235			1249-1439			1436-1608		
	Pretest	Posttest	Drift	Pretest	Posttest	Drift	Pretest	Posttest	Drift
NOx Zero, ppm	2.43	0.94	-1.48	0.94	0.39	-0.55	-0.22	3.27	3.49
Zero Bias, % of Span	0.24	0.09	-0.15	0.09	0.04	-0.06	-0.02	0.33	0.35
Cylinder Conc., ppm	500.00	500.00		500.00	500.00		500.00	500.00	
System Response, ppm	499.54	499.82	0.28	499.82	494.64	-5.18	501.99	498.43	-3.56
Cal Bias, % of Span	-0.05	-0.02	0.03	-0.02	-0.54	-0.52	0.20	-0.16	-0.36
CO Zero, ppm	2.92	3.75	0.83	3.75	1.13	-2.62	0.15	-0.23	-0.38
Zero Bias, % of Span	0.29	0.38	0.08	0.38	0.11	-0.26	0.01	-0.02	-0.04
Cylinder Conc., ppm	600.00	600.00		600.00	600.00		600.00	600.00	
System Response, ppm	598.76	597.02	-1.74	597.02	596.90	-0.12	589.43	601.61	12.18
Cal Bias, % of Span	-0.12	-0.30	-0.17	-0.30	-0.31	-0.01	-1.06	0.16	1.22
O_2 Zero, %	-0.10	0.02	0.12	0.02	0.03	0.01	0.18	-0.07	-0.25
Zero Bias, % of Span	-0.41	0.08	0.49	0.08	0.14	0.06	0.71	-0.28	-0.99
Cylinder Conc., %	12.00	12.00		12.00	12.00		12.00	12.00	
System Response, %	12.03	11.92	-0.11	11.92	11.95	0.04	11.94	11.74	-0.20
Cal Bias, % of Span	0.11	-0.33	-0.44	-0.33	-0.19	0.15	-0.23	-1.03	-0.80
CO_2 Zero,%	0.10	0.02	-0.08	0.02	0.30	0.29	-0.07	-0.03	0.05
Zero Bias, % of Span	0.48	0.09	-0.39	0.09	1.52	1.43	-0.35	-0.13	0.23
Cylinder Conc., %	10.00	10.00		10.00	10.00		10.00	10.00	
System Response, %	10.02	9.92	-0.10	9.92	10.12	0.20	10.02	10.09	0.08
Cal Bias, % of Span	0.11	-0.39	-0.50	-0.39	0.62	1.01	0.09	0.47	0.39
SO_2 Zero, ppm	-1.52	0.30	1.82	0.30	3.01	2.71	0.62	-0.28	-0.90
Zero Bias, % of Span	-1.52	0.30	1.82	0.30	3.01	2.71	0.62	-0.28	-0.90
Cylinder Conc., ppm	50.00	50.00		50.00	50.00		50.00	50.00	
System Response, ppm	49.52	50.52	1.00	50.52	50.10	-0.41	49.90	50.24	0.34
Cal Bias, % of Span	-0.48	0.52	1.00	0.52	0.10	-0.41	-0.10	0.24	0.34
THC Zero, ppm	-0.38	-1.32	-0.94	-1.32	0.64	1.95	0.27	0.72	0.45
Zero Bias, % of Span	-0.38	-1.32	-0.94	-1.32	0.64	1.95	0.27	0.72	0.45
Cylinder Conc., ppm	50.00	50.00		50.00	50.00		50.00	50.00	
System Response, ppm	49.96	50.01	0.05	50.01	50.86	0.86	49.95	50.29	0.34
Cal Bias, % of Gas	-0.04	0.01	0.05	0.01	0.86	0.86	-0.05	0.29	0.34

CEM Calibration Error Data Sheet

Analyzer Response

		ANALYZER SPAN VALUE (% or ppm)	
Plant Name:	Northwest Steel and Wire		
Sampling Location:	EAF #8 Baghouse Inlet	**NOx:**	1000
Date:	4/11/01	**CO:**	1000
Plant Rep.:	Dave Long	**O_2:**	25
Team Leader:	W.C. James	**CO_2:**	20
CEM Operator:	W.C. James	**SO_2:**	100
Time:	Pre-Test Cals	**THC:**	100

	CYLINDER NUMBER	CYLINDER VALUE (% or ppm)	ANALYZER CALIBRATION RESPONSE	DIFFERENCE (% OF GAS/SPAN)
NOx Zero	K-024782: Zero N2	0.0	0.90	0.09
NOx Low	ALM-029822: 905.3 ppm	250.0	253.08	0.31
NOx Mid	ALM-029822: 905.3 ppm	500.0	501.67	0.17
NOx High	ALM-029822: 905.3 ppm	850.0	853.40	0.34
CO Zero	K-024782: Zero N2	0.0	1.47	0.15
CO Low	ALM-017969: 8715 ppm	300.0	305.44	0.54
CO Mid	ALM-017969: 8715 ppm	600.0	605.21	0.52
CO High	ALM-017969: 8715 ppm	900.0	904.10	0.41
O_2 Zero	K-024782: Zero N2	0.0	-0.06	-0.25
O_2 Low	K-006565: 20.0 %	5.0	4.98	-0.08
O_2 Mid	K-006565: 20.0 %	12.0	11.94	-0.23
O_2 High	K-006565: 20.0 %	20.9	20.89	-0.06
CO_2 Zero	K-024782: Zero N2	0.0	-0.04	-0.19
CO_2 Low	AAL-1876: 19.97%	5.0	5.01	0.04
CO_2 Mid	AAL-1876: 19.97%	10.0	10.04	0.21
CO_2 High	AAL-1876: 19.97%	18.0	18.08	0.40
SO_2 Zero	K-024782: Zero N2	0.0	0.09	0.09
SO_2 Low	ALM-059619: 9966 ppm	25.0	25.29	0.29
SO_2 Mid	ALM-059619: 9966 ppm	50.0	50.19	0.19
SO_2 High	ALM-059619: 9966 ppm	85.0	85.14	0.14
THC Zero	K-024782: Zero N2	0.0	-0.38	-0.38
THC Low	AAL-21508: 4960 ppm	25.0	24.56	-1.78
THC Mid	AAL-21508: 4960 ppm	50.0	49.96	-0.08
THC High	AAL-21508: 4960 ppm	85.0	84.63	-0.44

CEM Calibration Error Data Sheet

Analyzer Response

		ANALYZER SPAN VALUE (% or ppm)	
Plant Name:	Northwest Steel and Wire		
Sampling Location:	EAF #8 Baghouse Inlet	**NOx:**	1000
Date:	4/12/01	**CO:**	1000
Plant Rep.:	Dave Long	**O_2:**	25
Team Leader:	W.C. James	**CO_2:**	20
CEM Operator:	W.C. James	**SO_2:**	100
Time:	Pre-Test Cals	**THC:**	100

	CYLINDER NUMBER	CYLINDER VALUE (% or ppm)	ANALYZER CALIBRATION RESPONSE	DIFFERENCE (% OF GAS/SPAN)
NOx Zero	K-024782: Zero N2	0.0	1.04	0.10
NOx Low	ALM-029822: 905.3 ppm	250.0	245.39	-0.46
NOx Mid	ALM-029822: 905.3 ppm	500.0	497.34	-0.27
NOx High	ALM-029822: 905.3 ppm	850.0	848.42	-0.16
CO Zero	K-024782: Zero N2	0.0	-0.20	-0.02
CO Low	ALM-017969: 8715 ppm	300.0	295.28	-0.47
CO Mid	ALM-017969: 8715 ppm	600.0	591.94	-0.81
CO High	ALM-017969: 8715 ppm	900.0	903.04	0.30
O_2 Zero	K-024782: Zero N2	0.0	0.08	0.32
O_2 Low	K-006565: 20.0 %	5.0	4.99	-0.02
O_2 Mid	K-006565: 20.0 %	12.0	11.94	-0.24
O_2 High	K-006565: 20.0 %	20.9	20.86	-0.17
CO_2 Zero	K-024782: Zero N2	0.0	-0.06	-0.29
CO_2 Low	AAL-1876: 19.97%	5.0	4.94	-0.32
CO_2 Mid	AAL-1876: 19.97%	10.0	9.97	-0.13
CO_2 High	AAL-1876: 19.97%	18.0	18.01	0.06
SO_2 Zero	K-024782: Zero N2	0.0	0.31	0.31
SO_2 Low	ALM-059619: 9966 ppm	25.0	25.40	0.40
SO_2 Mid	ALM-059619: 9966 ppm	50.0	51.04	1.04
SO_2 High	ALM-059619: 9966 ppm	85.0	84.21	-0.79
THC Zero	K-024782: Zero N2	0.0	0.27	0.27
THC Low	AAL-21508: 4960 ppm	25.0	25.23	0.89
THC Mid	AAL-21508: 4960 ppm	50.0	49.95	-0.10
THC High	AAL-21508: 4960 ppm	85.0	84.86	-0.16

Greg.

ARI ENVIRONMENTAL, INC.
EPA Method **5**
Model **522** Meter Box Calibration
Post-Test Orifice Method
English Volume Units, English K' Factor

Model #: APEX
Serial #: 901001

Date: 4/16/01
Barometric Pressure: 29.29 in Hg

DRY GAS METER READINGS								CALIBRATION ORIFICE READING					
						Temperature					Ambient Temwrature		
AH (in H20)	Time (min)	Volume Initial (cu ft)	Volume Final c u f t	Volume Total (cu ft)		Tmi Inlet (deg F)	Tmo Outlet (deg F)	Orifice Serial No	K' FACTOR (number)	Vacuum (in)	Initial (deg F)	Final (deg F)	Average (deg F)
1.90	10.0	72.223	80.098	7.875	Initial>	61	61	63	0.6235	18.000	60	60	60.000
					Final >	62	62						
1.90	10.0	80.098	87.987	7.889	Initial>	62	62	63	0.6235	18.000	60	60	60.000
					Final >	64	64						
1.90	10.0	87.987	95.885	7.898	Initial>	64	64	63	0.6235	18.000	60	61	60.500
					Final >	65	65						

METER CALIBRATION

METER FLOW (cu ft)	ORIFICE FLOW (cu ft)	FACTOR, Yc (number)	ΔH@ (in H20)
7.8394	8.01	1.022	1.67
7.8308	8.01	1.023	1.67
7.8173	8.00	1.024	1.67

AVERAGE METER CALIBRATZON FACTOR, Yc **1.023**
FULL TEST CALIBRATION FACTOR, Yd 0.994 ***% DIFFERENCE:*** -2.9 ***(+or- 5.0%*** allowable)

ARI Environmental, Inc.
Gas Meter Thermometer Calibration Data Form
Post-Test Calibration

Meter Box: APEX 901001
Calibrator: MEL
Date: 4/16/01
Barometric: 29.29
Ambient Temp: 61.00
Reference Thermometer: Altek Thermocouple Source

Reference Temperature	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean
Altek	Inlet	Inlet	Outlet	Outlet	Probe	Probe	Stack	Stack
0.00	0.00	N/A	0.00	N/A	0.00	N/A	0.00	N/A
100.00	99.00	1.0	99.00	1.0	99.00	1.0	99.00	1.0
200.00	201.00	0.5	201.00	0.5	201.00	0.5	201.00	0.5
300.00	301.00	0.3	301.00	0.3	301.00	0.3	301.00	0.3
400.00	397.00	0.8	397.00	0.8	397.00	0.8	397.00	0.8
500.00	498.00	0.4	498.00	0.4	498.00	0.4	498.00	0.4

Reference Temperature	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean
Altek	Filter	Filter	Exit	txIt	Aux	Aux
0.00	0.00	N/A	0.00	NIA	0.00	N/A
100.00	99.00	1.0	99.00	1.0	99.00	1.0
200.00	201.00	0.5	201.00	0.5	201.00	0.5
300.00	301.00	0.3	301.00	0.3	301.00	0.3
400.00	397.00	0.8	397.00	0.8	397.00	0.8
,500.00	498.00	0.4	498.00	0.4	498.00	0.4

ARI REFERENCE METHOD CEMS DATA
USEPA METHOD 205
DILUTION SYSTEM VERIFICATION

Company: Northwest Steel and Wire
Location: Sterling, Illinois
Dilution System ID: 2336
Dilution Flow Rate: 4 lpm
Verification date: 4/10/01

Analyzer Info

Monitor type: SO2
Monitor range: 1000 ppm
Monitor Serial No.: ARI TECO 43C

Initial Calibration Data

Calibration Concentration		Calibration results		% Difference	
Zero:	0.00	Zero:	0.84	Zero:	0.08
Low:	200.00	Low:	206.84	Low:	0.68
Mid:	450.00	Mid:	446.73	Mid:	0.33
High:	900.00	High:	892.51	High:	0.75

Dilution System Verification

Mid level gas type: USEPA Protocol 1
Mid level concentration: 908.50
Mid level tank serial #: ALM008459

High level dilution gas type: USEPA Protocol 1
High level concentration:
High level tank serial #:
Target concentration No. 1: 908.50
Target concentration No. 2: 450.00

Dilution System Results

Target Concentration No. 1	Instrument Response	% difference from average*	Target Concentration No. 2	Instrument Response	% difference from average*
Trial No. 1:	909.81	0.43	Trial No. 1:	456.36	0.38
Trial No. 2:	904.67	0.14	Trial No. 2:	456.76	0.29
Trial No. 3:	903.29	0.29	Trial No. 3:	461.20	0.67
Average:	905.924		Average:	458.106	

% Difference from target concentration: 0.28%

% Difference from target concentration: 1.80%

Mid Level Calibration Gas Results

	Instrument Response
Trial No. 1:	903.59
Trial No. 2:	915.36
Trial No, 3:	909.40

Mid Level calibration gas concentration: 908.5
Average analyzer response: 909.45
Percent difference: 0.10 *

c

* Must be less than 2 %

Source File A \M File is Comb Translated at Fr Apr 20 13 59 14 2001
Description NWSW Furnace #8
Description
Description
Description
Description
Description

ScanChannel	1
Port Channel	1017
Chnl Tag	SO2
Chnl Unit	ppm

Year	Month	Day	Hour	Minute	Second			
2001	4	10	13	7	57	0240503311		
2001	4	10	13	8	12	0.240503311		
2001	4	10	13	8	27	0 240503311		
2001	4	**10**	**13**	**8**	**42**	**0.831993103**	**Zero ppm SO2 Cal:**	
2001	4	**10**	**13**	**8**	**57**	**0.841175079**	**0.84**	**ppm SO2**
2001	4	**10**	**13**	**9**	**12**	**0.839323044**		
2001	4	10	13	9	27	0.839231491		
2001	4	10	13	9	42	90.84181976		
2001	4	**10**	**13**	**9**	**57**	**200.6401203**	**250 ppm SO2** Cal:	
2001	4	**10**	**13**	**10**	**12**	**208.8399792**	**206.84**	**ppm SO2**
2001	4	**10**	**13**	**10**	**27**	**210.8378983**		
2001	4	10	13	10	42	20.82976913		
2001	4	10	13	10	57	0.837364197		
2001	4	10	13	11	12	1154124603		
2001	4	**10**	**13**	**11**	**27**	**438.8408508**	**450 ppm SO2** Cal:	
2001	4	**10**	**13**	**11**	**42**	**448.9181519**	**446.73**	**ppm SO2**
2001	4	**10**	**13**	**11**	**57**	**452.4455566**		
2001	4	10	13	12	12	776.493103		
2001	4	10	13	12	27	872.2770996		
2001	4	10	**13**	**12**	**42**	**886.9324951**	**900 ppm SO2** Cal:	
2001	4	10	**13**	**12**	**57**	**894.3717651**	**892.51**	**ppm SO2**
2001	4	10	**13**	**13**	**12**	**896.2401123**		
2001	4	10	13	13	27	620 2405033		
2001	4	10	13	13	42	450.2405033		
2001	4	10	13	13	57	7024050331		
2001	4	10	13	14	12	0.831993103		
2001	4	10	13	14	27	907.3967896		
2001	4	**10**	**13**	**14**	**42**	**913.3285522**	**P-1, Trial 1**	
2001	4	**10**	**13**	**14**	**57**	**911.7320557**	**909.8**	**ppm SO2**
2001	4	**10**	**13**	**15**	**12**	**908.7421875**		
2001	4	**10**	**13**	**15**	**27**	**905.4422607**		
2001	4	10	13	15	42	645.1097412		
2001	4	10	13	15	57	489.0200806		
2001	4	10	13	16	11	467.1734924		
2001	4	10	13	16	26	459.0839233		
2001	4	**10**	**13**	**16**	**41**	**455.1793823**	**P-2, Trial 1**	
2001	4	**10**	**13**	**16**	**56**	**454.3182373**	**456.4**	**ppm SO2**
2001	4	**10**	**13**	**17**	**11**	**459.0839233**		
2001	4	**10**	**13**	**17**	**26**	**456.8729858**		
2001	4	10	13	17	41	168 4980316		
2001	4	10	13	17	56	35.14653778		
2001	4	10	13	18	11	12.87672424		
2001	4	10	13	18	26	5.025512695		
2001	4	10	13	18	41	4.887397766		
2001	4	10	13	18	56	2.874946594		
2001	4	10	13	19	11	2.882951736		
2001	4	10	13	19	26	2 880947113		
2001	4	10	13	19	41	56.70383835		
2001	4	10	13	19	56	11.35448837		
2001	4	10	13	20	11	4.871458054		
2001	4	10	13	20	26	2.864051819		
2001	4	10	13	20	41	2.863832474		
2001	4	10	13	20	56	2.88250351		
2001	4	10	13	21	11	2.838941574		
2001	4	10	13	21	26	2.864931107		
2001	4	10	13	21	41	0.897111893		
2001	4	10	13	21	56	0.851865768		
2001	4	10	13	22	11	0.853998184		
2001	4	10	13	22	26	0.853839874		
2001	4	10	13	22	41	0.853094101		
2001	4	10	13	22	56	0.852369308		
2001	4	10	13	23	11	0.837312698		

Year	Month	Day	Hour	Minute	Second			
2001	4	10	13	23	26	0.838279724		
2001	4	10	13	23	41	0.853059769		
2001	4	10	13	23	56	27.22633362		
2001	4	10	13	24	11	72.79868317		
2001	4	10	13	24	26	167.2864838		
2001	4	10	13	24	41	432.7928467		
2001	4	10	13	24	56	610.5505371		
2001	4	10	13	25	11	705.5654297		
2001	4	10	13	25	26	796.0784302		
2001	4	10	13	25	41	852.5379639		
2001	4	**10**	**13**	**25**	**56**	**886.8019409**	**P-1, Trial 2**	
2001	4	**10**	**13**	**26**	**1**	**904.164917**	**904.7**	**ppm SO2**
2001	4	**10**	**13**	**26**	**26**	**902.8874512**		
2001	4	**10**	**13**	**26**	**41**	**924.8156738**		
2001	4	10	13	26	56	924.9793701		
2001	4	10	13	27	11	925.4544067		
2001	4	10	13	27	26	925.822998		
2001	4	10	13	27	41	926.2488403		
2001	4	10	13	27	56	935.0913086		
2001	4	10	13	28	11	914.9827881		
2001	4	10	13	28	26	921.0984497		
2001	4	10	13	28	41	928.6553955		
2001	4	10	13	28	56	923.2680664		
2001	4	10	13	29	11	924.1769409		
2001	4	10	13	29	26	321.0119324		
2001	4	10	13	29	41	64.17082214		
2001	4	10	13	29	56	20.07933044		
2001	4	10	13	30	11	8.642623901		
2001	4	10	13	30	26	4.9002285		
2001	4	10	13	30	41	4.891685486		
2001	4	10	13	30	56	2.91229248		
2001	4	10	13	31	11	4.564544678		
2001	4	10	13	31	26	6.895494461		
2001	4	10	13	31	41	4.885082245		
2001	4	10	13	31	56	2.885839462		
2001	4	10	13	32	11	2.868721008		
2001	4	10	13	32	26	2.876728058		
2001	4	10	13	32	41	1999.615112		
2001	4	10	13	32	56	1551.388916		
2001	4	10	13	33	11	1039.834229		
2001	4	10	13	33	26	943.2371216		
2001	4	10	13	33	41	916.1446533		
2001	4	10	13	33	56	912.0513306		
2001	4	10	13	34	11	912.5742188		
2001	4	**10**	**13**	**34**	**26**	**903.2548828**	**P-1. Trial 3**	
2001	4	**10**	**13**	**34**	**41**	**904.8999634**	**903.3**	**ppm SO2**
2001	4	**10**	**13**	**34**	**56**	**904.8518066**		
2001	4	**10**	**13**	**35**	**11**	**900.1677856**		
2001	4	10	13	35	26	903.9622803		
2001	4	10	13	35	41	902.0943604		
2001	4	10	13	35	56	550.8366699		
2001	4	10	13	36	11	481.3302612		
2001	4	10	13	36	26	463.1533203		
2001	4	10	13	36	41	459.0018921		
2001	4	**10**	**13**	**36**	**56**	**457.3808594**	**P-2, Trial 2**	
2001	4	**10**	**13**	**37**	**11**	**457.1679993**	**456.8**	**ppm SO2**
2001	4	**10**	**13**	**37**	**26**	**455.334259**		
2001	4	**10**	**13**	**37**	**41**	**457.1436462**		
2001	4	10	13	37	56	373.8440247		
2001	4	10	13	38	11	90.05002594		
2001	4	10	13	38	26	21.10768509		
2001	4	10	13	38	41	7.042339325		
2001	4	10	13	38	56	4.888572693		
2001	4	10	13	39	11	4.887397766		
2001	4	10	13	39	26	2.869167328		
2001	4	10	13	39	41	2.875396729		
2001	4	10	13	39	56	298.590332		
2001	4	10	13	40	11	762.1640625		
2001	4	10	13	40	26	881.670166		
2001	4	**10**	**13**	**40**	**41**	**892.9632568**	**A.V.Trial 1**	
2001	4	**10**	**13**	**40**	**56**	**901.7750244**	**903.6**	**ppm SO2**
2001	4	**10**	**13**	**41**	**11**	**902.8978882**		
2001	4	**10**	**13**	**41**	**26**	**916.7345581**		

Year	Month	Day	Hour	Minute	Second			
2001	4	10	13	41	41	9148278198		
2001	4	10	13	41	56	919133667		
2001	4	10	13	42	11	9177989502		
2001	4	10	13	42	26	9186589966		
2001	4	10	13	42	41	3480281372		
2001	4	10	13	42	56	67 88948822		
2001	4	10	13	43	11	21 22245979		
2001	4	10	13	43	26	8909433365		
2001	4	10	13	43	41	5007619858		
2001	4	10	13	43	56	4 890130997		
2001	4	10	13	44	11	288807106		
2001	4	10	13	44	26	2872058868		
2001	4	10	13	44	41	2 88250351		
2001	4	10	13	44	56	2878282547		
2001	4	10	13	45	11	2 876728058		
2001	4	10	13	45	26	2884057999		
2001	4	10	13	45	41	2879392624		
2001	4	10	13	45	56	286138916		
2001	4	10	13	46	11	2 879838943		
2001	4	10	13	46	26	2 871835709		
2001	4	10	13	46	41	2 876277924		
2001	4	10	13	46	56	2902519226		
2001	4	10	13	47	11	7292718506		
2001	4	[illegible]	13	[illegible]	26	881 6450195		
2001	4		13		41	911 9840698		
2001	4	10	13	47	56	911.4033813		
2001	4	**10**	**13**	**48**	**11**	**920.2874756**	**A.V.Trial 2**	
2001	4	**10**	**13**	**48**	**26**	**915.3419189**	**915.4**	**ppm SO2**
2001	4	**10**	**13**	**48**	**41**	**911.8870239**		
2001	4	**10**	**13**	**48**	**56**	**913.9094238**		
2001	4	10	13	49	11	597 0006104		
2001	4	10	13	49	26	652 666687		
2001	4	10	13	49	41	6735640259		
2001	4	10	13	49	56	681 7938843		
2001	4	10	13	50	11	681 5471191		
2001	4	10	13	50	26	6578120117		
2001	4	10	13	50	41	5060247192		
2001	4	10	13	50	56	469 089447		
2001	4	**10**	**13**	**51**	**11**	**462.8340149**	**P-2, Trial 3**	
2001	4	**10**	**13**	**51**	**26**	**460.9425049**	**461.2**	**ppm SO2**
2001	4	**10**	**13**	**51**	**41**	**461.3192139**		
2001	4	**10**	**13**	**51**	**56**	**459.6981506**		
2001	4	10	13	52	11	370.9501953		
2001	4	10	13	52	26	68.50565338		
2001	4	10	13	52	41	15.40176392		
2001	4	10	13	52	56	6.904239655		
2001	4	10	13	53	11	4.887018204		
2001	4	10	13	53	26	2.893619537		
2001	4	10	13	53	41	2.881170273		
2001	4	10	13	53	56	2.88250351		
2001	4	10	13	54	11	2.876728058		
2001	4	10	13	54	26	478.1115417		
2001	4	10	13	54	41	842.3973389		
2001	4	**10**	**13**	**54**	**56**	**894.430603**	**A.V.Trial 3**	
2001	4	**10**	**13**	**55**	**11**	**917.0050049**	**909.4**	**ppm SO2**
2001	4	**10**	**13**	**55**	**26**	**910.9385376**		
2001	4	**10**	**13**	**55**	**41**	**915.2443848**		
2001	4	**10**	**13**	**55**	**56**	**915.3599243**		
2001	4	10	13	56	11	779.4970093		
2001	4	10	13	56	26	192.6295471		
2001	4	10	13	56	41	41.05096054		
2001	4	10	13	56	44	27.66444397		

Instrument: 2336 MFC: 1

MAX Flow: 5,000.00 CCM
Cal Date: 04/03/2000 , 11:43:57
Reference Gas: NITROGEN
Description: Factory MFC #1 Calibration Table

Set Flow	True Flow	- Table is selected
250.00	281.24	
500.00	548.59	
1,000.00	1,083.35	
1,500.00	1,613.21	
2,000.00	2,143.52	
2,500.00	2,673.24	
3,000.00	3,200.75	
3,500.00	3,730.76	
4,000.00	4,265.02	
4,500.00	4,801.33	
5,000.00	5,338.12	

Instrument: 2336 MFC: 2

MAX Flow: 5,000.00 CCM
Cal Date: 04/03/2000 , 11:44:57
Reference Gas: NITROGEN
Description: Factory MFC #2 Calibration Table

Set Flow	True Flow	- Table is selected
250.00	277.33	
500.00	541.71	
1,000.00	1,073.43	
1,500.00	1,598.12	
2,000.00	2,123.49	
2,500.00	2,645.22	
3,000.00	3,167.01	
3,500.00	3,685.11	
4,000.00	4,202.60	
4,500.00	4,724.06	
5,000.00	5,243.81	

onics Series 4000: Calibration Table Report 4/20/01

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[nstrument: 2336 MFC: 3

MAX Flow: 500.00 CCM
Cal Date: 04/04/2000 , 07:25:34
Reference Gas: NITROGEN
Description: Factory MFC #3 Calibration Table

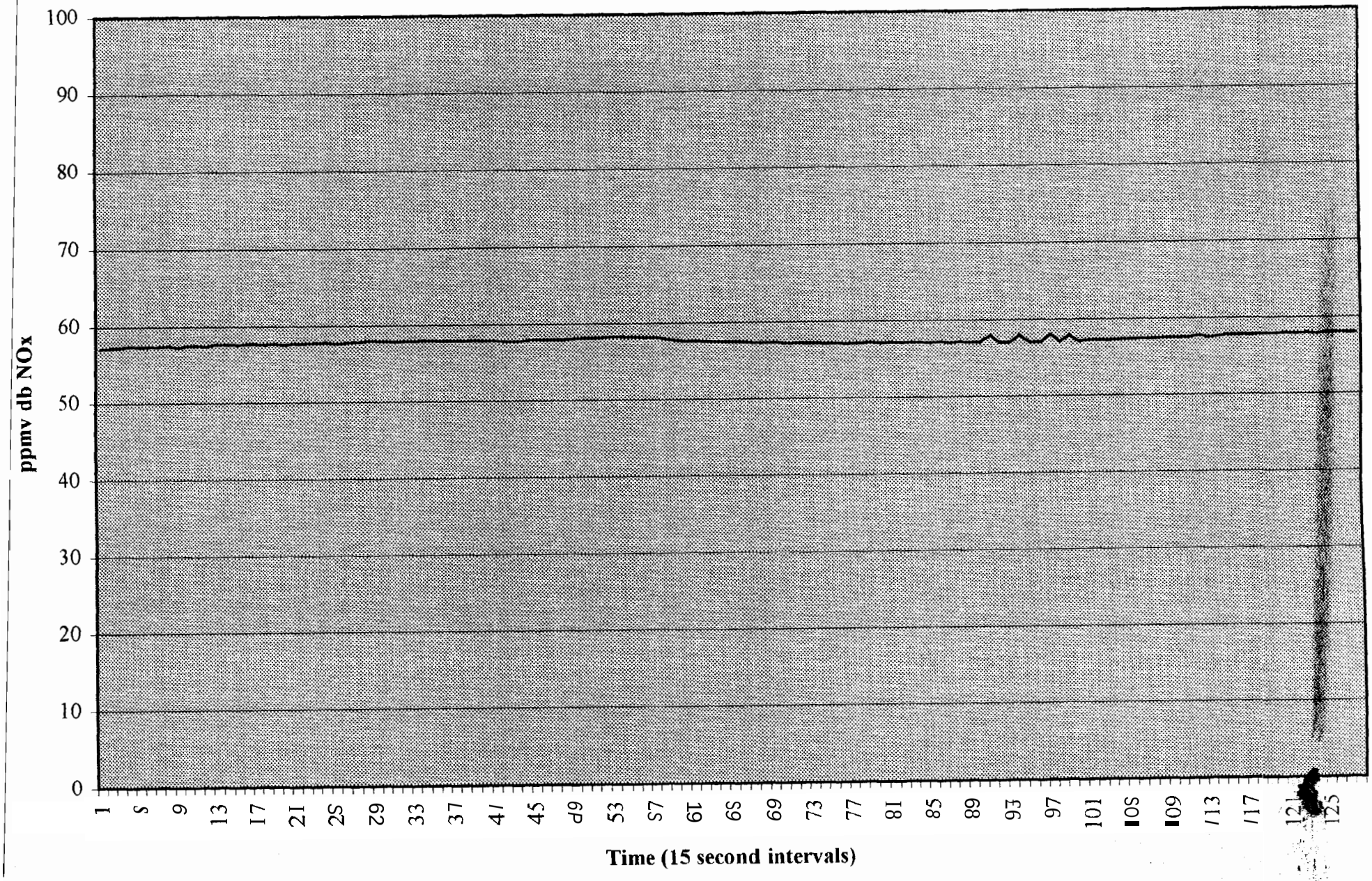
Set Flow	True Flow	- Table is selected
25.00	29.87	
50.00	56.81	
100.00	107.57	
150.00	158.38	
200.00	209.74	
250.00	260.75	
300.00	312.65	
350.00	362.67	
400.00	411.47	
450.00	462.67	
500.00	516.28	

nstrument: 2336 MFC: 4

MAX Flow: 50.00 CCM
Cal Date: 04/04/2000 , 06:43:17
Reference Gas: NITROGEN
Description: Factory MFC #4 Calibration Table

Set Flow	True Flow	- Table is selected
2.50	2.68	
5.00	5.23	
10.00	10.32	
15.00	15.38	
20.00	20.45	
25.00	25.50	
30.00	30.55	
35.00	35.64	
40.00	40.56	
45.00	45.84	
50.00	51.03	

NOx Converter Efficiency: Northwest Steel and Wire (4/10/01)



Source File File is: Co Translated at Mon Feb 26 14:04:03 2001
Description Alliance Fairmount
Description
Description
Description
description
Description

			ScanChannel			2
			Port.Channel			1005
			Chnl Tag			NOx
			Chnl Unit			ppm
Year	Month	Day	Hour	Minute	Second	
2001	4	10	14	32	7	57.35593
2001	4	10	14	32	22	57.036255
2001	4	10	14	32	37	57.855148
2001	4	10	14	32	52	57.796734
2001	4	10	14	33	7	57.93523
2001	4	10	14	33	22	57.931908
2001	4	10	14	33	37	57.937748
2001	4	10	14	33	52	57.984486
2001	4	10	14	34	7	57.124718
2001	4	10	14	34	22	57.180645
2001	4	10	14	34	37	57.264942
2001	4	10	14	34	52	57.365128
2001	4	10	14	35	8	57.315029
2001	4	10	14	35	22	57.330849
2001	4	10	14	35	37	57.384281
2001	4	10	14	35	52	57.416851
2001	4	10	14	36	7	57.239075
2001	4	10	14	36	22	57.462719
2001	4	10	14	36	37	57.469433
2001	4	10	14	36	52	57.407654
2001	4	10	14	37	7	57.673031
2001	4	10	14	37	22	57.592129
2001	4	10	14	37	37	57.557072
2001	4	10	14	37	52	57.679771
2001	4	10	14	38	7	57.668087
2001	4	10	14	38	22	57.609661
2001	4	10	14	38	37	57.682243
2001	4	10	14	38	52	57.574604
2001	4	10	14	39	7	57.674824
2001	4	10	14	39	22	57.673031

Source File File is: Co Translated at Mon Feb 26 14:04:03 2001
Description Alliance Fairmount
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			ScanChannel			2
			Port.Channel			1005
			Chnl Tag			NOx
			Chnl Unit			ppm
Year	Month	Day	Hour	Minute	Second	
2001	4	10	14	39	37	57.753258
2001	4	10	14	39	52	57.768314
2001	4	10	14	40	7	57.607182
2001	4	10	14	40	22	57.729885
2001	4	10	14	40	37	57.784946
2001	4	10	14	40	52	57.895031
2001	4	10	14	41	7	57.988503
2001	4	10	14	41	22	57.928551
2001	4	10	14	41	37	57.80584
2001	4	10	14	41	52	57.89349
2001	4	10	14	42	7	57.881798
2001	4	10	14	42	22	57.984528
2001	4	10	14	42	37	57.900253
2001	4	10	14	42	52	57.89349
2001	4	10	14	43	7	57.902721
2001	4	10	14	43	22	57.910095
2001	4	10	14	43	37	57.890106
2001	4	10	14	43	52	57.89687
2001	4	10	14	44	7	57.847657
2001	4	10	14	44	22	57.811684
2001	4	10	14	44	37	57.738194
2001	4	10	14	44	52	57.880886
2001	4	10	14	45	7	57.995274
2001	4	10	14	45	23	57.961155
2001	4	10	14	45	37	57.992821
2001	4	10	14	45	52	57.969448
2001	4	10	14	46	7	58.07217
2001	4	10	14	46	22	58.14135
2001	4	10	14	46	37	58.171509
2001	4	10	14	46	52	58.234829

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			ScanChannel			2
			Port.Channel			1005
			Chnl Tag			NOx
			Chnl Unit			ppm
'ear	Month	Day	Hour	Minute	Second	
001	4	10	14	47	7	58.250877
001	4	10	14	47	22	58.257725
001	4	10	14	47	37	58.213894
301	4	10	14	47	52	58.169064
001	4	10	14	48	7	58.179802
001	4	10	14	48	22	58.008835
001	4	10	14	48	37	57.82338
001	4	10	14	48	52	57.680664
001	4	10	14	49	7	57.594608
001	4	10	14	49	22	57.599747
001	4	10	14	49	37	57.585583
001	4	10	14	49	52	57.500404
001	4	10	14	50	7	57.511208
001	4	10	14	50	22	57.478634
001	4	10	14	50	37	57.409382
001	4	10	14	50	52	57.345104
001	4	10	14	51	7	57.373459
001	4	10	14	51	22	57.248258
001	4	10	14	51	37	57.225731
001	4	10	14	51	52	57.26664
001	4	10	14	52	7	57.251606
001	4	10	14	52	22	57.195767
101	4	10	14	52	37	57.22073
001	4	10	14	52	52	57.145584
001	4	10	14	53	7	57.131393
001	4	10	14	53	22	57.128052
001	4	10	14	53	37	57.245758
001	4	10	14	53	52	57.086304
001	4	10	14	54	7	57.19651
001	4	10	14	54	22	57.133896

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			ScanChannel			2
			Port.Channel			1005
			Chnl Tag			NOx
			Chnl Unit			ppm
Year	Month	Day	Hour	Minute	Second	
2001	4	10	14	54	37	57.199856
2001	4	10	14	54	52	57.119705
2001	4	10	14	55	7	57.07045
2001	4	10	14	55	22	57.138901
2001	4	10	14	55	37	57.050407
2001	4	10	14	55	52	57.119705
2001	4	10	14	56	7	57.096336
2001	4	10	14	56	22	57.075466
2001	4	10	14	56	37	57.897655
2001	4	10	14	56	52	57.035389
2001	4	10	14	57	7	57.016163
2001	4	10	14	57	22	57.906826
2001	4	10	14	57	37	57.04707
2001	4	10	14	57	52	57.015347
2001	4	10	14	58	7	57.976131
2001	4	10	14	58	22	57.035389
2001	4	10	14	58	37	57.942703
2001	4	10	14	58	52	57.006989
2001	4	10	14	59	7	57.243259
2001	4	10	14	59	22	57.229076
2001	4	10	14	59	37	57.181477
2001	4	10	14	59	52	57.237419
2001	4	10	15	0	7	57.301704
2001	4	10	15	0	22	57.315029
2001	4	10	15	0	37	57.359283
2001	4	10	15	0	52	57.375187
2001	4	10	15	1	7	57.494557
2001	4	10	15	1	22	57.465336
2001	4	10	15	1	37	57.494557
2001	4	10	15	1	52	57.684036

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			ScanChannel			2
			Port.Channel			1005
			Chnl Tag			NOx
			Chnl Unit			ppm
Year	Month	Day	Hour	Minute	Second	
2001	4	10	15	2	7	57.466946
2001	4	10	15	2	22	57.570526
2001	4	10	15	2	37	57.720005
2001	4	10	15	2	52	57.74247
2001	4	10	15	3	7	57.760006
2001	4	10	15	3	22	57.736633
2001	4	10	15	3	37	57.857888
2001	4	10	15	3	52	57.799358
2001	4	10	15	4	7	57.895332
2001	4	10	15	4	22	57.838444
2001	4	10	15	4	37	57.907024
2001	4	10	15	4	52	57.815063
2001	4	10	15	5	7	57.95723
2001	4	10	15	5	22	57.997147
'001	4	10	15	5	37	57.886108
2001	4	10	15	5	52	57.894413

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

SCOTT SPECIALTY GASES

CHICAGO WAREHOUSE
868 SIVERT
WOOD DALE IL 60191

PROJECT #: 05-69004-00
PO#: ARI STOCK
ITEM #: 0501809 K
DATE: 10/18/00

CYLINDER #: K024782
FILL PRESSURE: 2400PSI

PURE MATERIAL: NITROGEN CAS# 7727-37-9

GRADE: ULTRA-HI PURITY

PURITY: *99.9995%*

IMPURITY	MAXIMUM CONCENTRATIONS
THC	0.5 PPM
02	0.5 PPM
CO	1 PPM
C02	1 PPM
H20	2 PPM

ANALYST: _____

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

:ERTIFICATE OF ACCURACY: EPA Protocol Gas

ssay Laboratory

COTT SPECIALTY GASES
290 COMBERMERE STREET
ROY, MI 48083

P.O. No.: BLANKET
Project No.: 05-63914-001

Customer

ARI Environmental
951 Old Rand Rd #106
Wauconda IL 60084

NALYTICAL INFORMATION

his certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; ocedure #G1; September, 1997.

ylinder Number: ALM029822 Certification Date: 7/14/00 Exp. Date: 7/14/2002
ylinder Pressure**: 1900 PSIG

MPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
RIC OXIDE	905.3	PPM	+/- 1%	Direct NIST and NMi
ROGEN - OXYGEN FREE		BALANCE		

Do not use when cylinder pressure is below 150 psig.
nalytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

ERENCE STANDARD

E/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
M 1687	3/01103	AAL14464	1000. PPM	NITRIC OXIDE

TRUMENTATION

TRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
:MAN/951/010177	07/14/00	CHEMILUMINESCENCE

NALYZER READINGS

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

First Triad Analysis

'RIC OXIDE

:07/07/00	Response Unit:MV	
0.00000	R1 = 100.0000	T1 = 90.00000
100.0000	Z2 = 0.00000	T2 = 90.00000
0.00000	T3 = 90.00000	R3 = 100.0000
Concentration:	906.1	PPM

Second Triad Analysis

Dale: 07114100	Response Unit: MV	
Z1 = 0.00000	R1 = 100.0000	T1 = 89.90000
R2 = 100.0000	Z2 = 0.00000	T2 = 89.80000
Z3 = 0.00000	T3 = 89.80000	R3 = 100.0000
Avg. Concentration:	904.4	PPM

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4	
r = .999939	1687
Constants:	A = 5.117
8 = 10.01091	C=O
D = 0	E=O

ial Notes: NO2 CONCENTRATION-912.1 PPM

PROVED BY:

Scott Specialty Gases

1290 **COMBERMERE STREET, TROY, MI** 48083 Phone : (248) 589-2950 **Fax** (248) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ARI ENVIRONMENTAL
ATTN: CRAIG JAMES
951 OLD RAND ROAD #106
WAUCONDA, IL 60084

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : IL154-99
Scott Project # : 541187

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number : ALM017969 Certificate Date : 4/2/99 Expiration Date : 4/2/2002
Cylinder Pressure + : 1900 psig Previous Certificate Date : None

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon Monoxide	8715 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

+Do not use when cylinder presssure is below 150 psig.
*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM2638	6/1/2002	ALM014579	4954 ppm Carbon Monoxide in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO: Horiba/OPE-135	4/2/99	Non-dispersive Infrared

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

Components
Carbon Monoxide

First Triad **Analysis**

Date: 3/25/99	Response Units: mv	
Z1=0.00	R1=75.00	T1=66.70
R2=75.00	Z2=0.00	T2=66.70
Z3=0.00	T3=66.70	R3=75.00
Avg. Conc. of Cust. Cyl. 8715 ppm		

Second Triad **Analysis**

Date: 4/2/99	Response Units: mv	
Z1=0.00	R1=75.00	T1=66.70
R2=75.00	Z2=0.00	T2=66.70
Z3=0.00	T3=66.70	R3=75.00
Avg. Conc. of Cust. Cyl: 8715 ppm		

Calibration Curve

Concentration=A+Bx+Cx^2+Dx^3+Ex^4	
r=1.00000	NTRM2638
Constants:	A=12.099500000
B=**********	C=-0.537702700
D=0.006089433	E=0.000000000

Special Notes

Cylinder

Analyst

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

GENERAL STOCK
C/O SCOTT SPECIALTY GASES
868 SIVERT DRIVE
WOODDALE IL 60191

PROJECT #: 05-68032-001
PO#: GENERAL STOCK
ITEM #: 0501024 K
DATE: 9/28/00

CYLINDER #: K006565
FILL PRESSURE: 2400PSI

PURE MATERIAL: AIR CAS# 132259-10-0

GRADE: ZERO AIR

IMPURITY	MAXIMUM CONCENTRATIONS
02 CONTENT	=20 TO 21%
THC	1 PPM

NALYST: _____

KATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-51

CERTIFICATE OF ACCURACY: Interference Free™ EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: IL240-00
Project No.: 05-64259-002

Customer

ARI ENVIRONMENTAL

951 OLD RAND ROAD #106
WAUCONDA IL 60084

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: AAL1876 Certification Date: 7/26/00 Exp. Date: 7/26/2003

Cylinder Pressure***: 1928 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	19.97 %	+/- 1%	Direct NIST and
NITROGEN	BALANCE		

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

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

EFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1800	1/01/04	A021147	18.05 %	CARBON DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCI
FTIR System/8220/AAB9300205	07/26/00	Scott Enhanced FTIR

ANALYZER READINGS

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

First Triad Analysis

CARBON DIOXIDE

Date:07/26/00	Response Unit:%	
Z1=0.01030	R1=18.04533	T1=19.96223
R2=18.05085	Z2=0.01640	T2=19.97346
Z3=0.01760	T3=19.98460	R3=18.05380
Avg. Concentration:	[illegible]	%

Second Triad Analysis

Calibration Curve

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: Tom Harkness

Scott Specialty Cases

RATA CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: IL300-99
Project No.: 05-49459-002

Customer

ARI ENVIRONMENTAL
MIKE BARTON
951 OLD RAND ROAD #106
WAUCONDA IL 60084

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: AAL21508 *Certification* Date: 9/2/99 Exp Date: 9/02/2002
Cylinder Pressure * 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	4,960	PPM	+/- 1%	Direct NIST and NM
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 1200	8/01/01	AAL9557	1193. PPM	PROPANE

INSTRUMENTATION

INSTRUMENT MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/1400/[illegible]12426	09/02/99	FLAME IONIZATION

ANALYZER READINGS

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

First Triad Analysis

PROPANE
[illegible]/02/99 Response Unit:MV

Z1 = 0.00000	R1 = 3097.000	T1 = 12781.00
R2 = 3097.000	Z2 = 0.00000	T2 = 12747.00
Z3 = 0.00000	T3 = 12773.00	R3 = 3097.000
Avg. Concentration	4960.	PPM

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4

r = 1.0000000000	1200
Constants:	A = 26.9428
B = 0.3757974	C = 0.0000008354
D =	E =

APPROVED BY: Mary [illegible]

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

ERTIFICATE OF ACCURACY: Interference Free™ EPA Protocol Gas

say Laboratory

OTT SPECIALTY GASES
90 COMBERMERE STREET
OY, MI 48083

P.O. No.:
Project No.: 05-70559-011

Customer

C/O SCOTT SPECIALTY GASES
868 SIVERT DRIVE
WOODDALE IL 60191

IALYTICAL INFORMATION

s certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards:
cedure #G1; September, 1997.

inder Number: ALM008459 Certification Date: 12/08/00 Exp. Date: 12/08/2003
inder Pressure* * *: 1900 PSIG

PONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY* *	TRACEABILITY
UR DIOXIDE *	908.5	PPM	+/- 1%	Direct NIST and NMI
OGEN		BALANCE		

o nor use when cylinder pressure is below 150 psig
alytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997
duct certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.
Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols.

RENCE STANDARD

SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
1664	6/19/01	ALM016015	2509. PPM	SO2/N2

ZUMENTATION

UMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
ystem/8220/AAB9400262	11/09/00	Scott Enhanced FTIR

ALYZER READINGS

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

UR DIOXIDE *

First Triad Analysis

2/01/00	Response Unit: PPM	
.15190	R1 = 2506.842	T1 = 910.9316
i09.605	Z2 = 7.71710	T2 = 906.8420
03110	T3 = 907.7590	R3 = 2510.552
oncentration:	908.5	PPM

Second Triad Analysis

Date: 12108100	Response Unit: PPM	
21 = -0.08610	R1 = 2507.662	T1 = 908.6348
R2 = 2509.661	22 = 8.69000	T2 = 908.6507
Z3 = 10.55240	T3 = 907.9922	R3 = 2509.676
Avg. Concentration:	908.4	PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999990	
Constants:	A = 0.000000
8 = 1.000000	C = 0.000000
D = 0 000000	E = 0.000000

ROVED BY: Scott King

12.2

TEST REPORT

PARTICULATE EMISSION COMPLIANCE TEST PROGRAM
ELECTRIC ARC FURNACE #8 BAGHOUSE EXHAUST

NORTHWESTERN STEEL AND WIRE
STERLING; ILLINOIS

PREPARED FOR:

NORTHWESTERN STEEL AND WIRE
P.O. Box 618
Sterling, Illinois 61081
Phone: 815.625.2500
Fax: 815.625.8819
Attention: Mr. David Long

ARI Environmental, Inc.
951 Old Rand Road, Unit 106
Wauconda, Illinois 60084
Phone: 847.487.1580
Fax: 847.487.1587
Mr. Larry Goldfine
President

ARI PROJECT NO. 654-13
ARI TEST PLAN NO. 654-11
ARI PROPOSAL NO. 29800
NORTHWESTERN STEEL AND WIRE P.O. NO. 16357-01
NOVEMBER 29 - DECEMBER 1,2000 TEST PROGRAM

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APPENDICES	
Appendix A	Baghouse Field Data, Summary Calculation Data and Laboratory Data
Appendix B	Opacity Data
Appendix C	Furnace Operational Data
Appendix D	Test Equipment Calibration Data and QA/QC Procedures

SECTIONONE Introduction

This report details the results of the comprehensive particulate emission compliance test program conducted on the common positive pressure fabric filter baghouse exhaust system serving electric arc furnace (EAF) #8 at the Northwestern Steel and Wire facility in Sterling, Illinois.

The following test program was performed from November 29 through December 1, 2000.

Test Date	Location	Run No.
11/29/00	EAF #8 Common baghouse (compartments 1, 2, 3 and 4)	1
11/30/00	EAF #8 Common baghouse (compartments 9, 10, 11 and 12)	2
12/1/00	EAF #8 Common baghouse (compartments 19, 20, 21 and 22)	3

The test program was conducted by Mr. Bill Pearce, Mr. Steve Flaherty, Mr. Larry Goldfine and Mr. Craig James of ARI Environmental, Inc. (ARI). Mr. Evan Buskohl, Mr. David Long and Mr. Karrol Phillips of Northwestern Steel and Wire were present during the test program to monitor process operations and coordinate the test program. The test program was witnessed by Mr. Darrel Thomsen of the IEPA.

The average results of the test program for the discharge of the baghouse for EAF #8 are summarized below:

	Run 1	Run 2	Run 3	Average
EAF #8 Particulate concentration gr/dscf	0.0014	0.0010	0.0004	0.0009

These results are below the allowable control device exit particulate concentration of 0.0052 gr/dscf required in 40CFR Part 60, Subpart AA, 60.272(a)(1).

SECTION TWO Sampling and Analytical Procedures

2.1 POSITVE PRESSURE BAGHOUSE TEST PROGRAM

Sampling was conducted on four baghouse compartments during each run. One Method 5 sampling train was used to sample the North Baghouse compartments and a separate Method 5 sampling train was used to sample the South Baghouse compartments as follows:

Test Date	Run No.	Baghouse Compartments	
11/29/00	1	North	1 and 2
		South	3 and 4
11/30/00	2	North	9 and 10
		South	11 and 12
12/1100	3	North	21 and 22
		South	19 and 20

The sample time for each run for the North and South Baghouse locations was based upon the total sample time to complete two furnace heats. Generally, the North Baghouse compartments were tested each day during the first heat and the South Baghouse compartments were tested during the second heat.

Test methods followed 40CFR, Part 60, Subpart AA and Appendix A, USEPA Methods 1-4, 5D and 9.

2.1.1 Sampling Location (USEPA Method 1)

The positive pressure baghouse does not have an exhaust stack or acceptable sampling location in the roof monitor to meet USEPA Method 1 criteria. Therefore, volumetric flow rates were measured each day in the 20' x 20' baghouse inlet duct, and particulate sampling was conducted in the North and South baghouse compartment housing directly above the tops of the filter bags.

2.1.2 Gas Flow and Temperature (USEPA Method 2)

The velocity and temperature measurements at the baghouse inlet location were performed daily prior to beginning each run. Eight sampling ports were located on the top of the 20' x 20' baghouse inlet duct >2 diameters downstream and >0.5 diameters upstream from the nearest geometry changes. Sampling was conducted at six traverse points in each of the eight sampling ports for a total of 48 points. The measurements were conducted in accordance with USEPA Method 2 as described in Section 2.2.2 of ARI's test plan dated November 2, 2000.

2.1.3 Stack Gas CO_2 and O_2 Content (USEPA Method 3)

The stack gas molecular weight was determined following USEPA Method 3. Gas samples were collected in a 60-liter Tedlar bag using ARI's integrated bag collection system and analyzed for CO_2, O_2 and N_2 (by difference) using a Hays Orsat type gas analyzer after each sampling run.

2.1.4 Stack Gas Moisture (USEPA Method 4)

Moisture sampling was conducted following USEPA Method 4 procedures.

2.1.5 Particulate Sampling (USEPA Method 5D)

The baghouse consists of 24 separate compartments numbered 1 through 24. Compartments 1- 4 were tested during Run 1, 9-12 were tested during Run 2 and 19-22 were tested during Run 3.

Four ports were placed in each of the above compartments with two traverse points in each port for a minimum total of 32 points per test (8 points per compartment). One Method 5 train was used to traverse the two North baghouse compartments (16 traverse points) and a second Method 5 train was used to traverse the two South baghouse compartments (16 traverse points). This criteria meets the requirements specified in Section 4.2.2 and 4.2.3 of Method 5D.

Each baghouse compartment is 20' 3" wide by 18' 6" deep with 12' 1" catwalks. Therefore, the longest probe that can be used to traverse inside each baghouse compartment was approximately 10' and the traverse points in each port were located at ~ 5' and 10'. The ports in each compartment were located at approximate distances of 2.5' from each wall and 5' between the centroid of each port.

Sampling was conducted for 15 minutes a point at 16 points for a total of 240 minutes at each of the North and South locations. Sampling was then continued at 15 minutes/point in reverse order until the run was completed. The sample point readings were logged at 5-minute intervals during each run.

The average volumetric flow rate measured at the baghouse inlet prior to beginning each test was used to calculate the average gas velocity in each baghouse compartment using the following equation:

$$J = \frac{1}{60}\left(\frac{Q}{A} \times \frac{T_o}{T_i}\right)\frac{1}{N}$$

where:

J = average gas velocity at the measurement site (ft/sec)
Q = inlet gas volumetric flow rate, dscfm
A = particulate measurement site cross sectional area, ft^2
T_o = temperature of gas at particulate measurement site (°R)
T_i = temperature of gas at baghouse inlet measurement site (°R)
N = number of baghouse compartments in operation = 24

The average velocity at each measurement site was then used to calculate the isokinetic sampling rate at each sampling point.

2.1.6 Visual Emissions (Opacity) of EAF #8 (USEPA Method 9)

Visual emissions (VE) measurements were conducted simultaneously with the USEPA Method 5D particulate emission compliance runs in accordance with USEPA Method 9. ARI's certified visible emission observer visually monitored the baghouse exhaust roof monitors and recorded the plume opacity of emissions (%) at 15-second intervals during each particulate sampling run. No visible emissions were observed during this test program at this location.

Northwestern Steel and Wire's VE observer visually monitored the EAF #8 building exhaust points for fugitive emissions and recorded opacity of emissions (%) at 15-second intervals during each particulate sample run.

2.2 CALCULATION OF COMBINED DISCHARGE PARTICULATE CONCENTRATION

The allowable particulate concentration in accordance with 40CFR, Part 60, Subpart AA, 60.272(a)(1) is 0.0052 gr/dscf from the control device exit on EAF #8. The average particulate concentration (gr/dscf) for the baghouse control device for each run was calculated using the following equation:

$$C' = \frac{(C_{Nbh} + C_{Sbh})}{2}$$

where:

C' = Combined discharge average particulate concentration, gr/dscf
C_{Nbh} = Average North baghouse particulate concentration, gr/dscf
C_{Sbh} = Average South baghouse particulate concentration, gr/dscf

SECTION THREE Test Results

The results of the test program conducted on November 29 through December 1,2000 are summarized in Tables 3-1 through 3-3.

Table 3-1 presents the results of the North and South Baghouse Compartments testing. All baghouse field data, summary calculation data and laboratory data are included in Appendix A.

Tables 3-2 and 3-3 present the results of the opacity readings for the EAF #8 common baghouse exhaust roof monitor and the EAF #8 shop exhaust, respectively. Opacity data are included in Appendix B.

Furnace operational data are included in Appendix C.

Test equipment calibration data are included in Appendix D.

TABLE 3-1: EAF #8 COMMON BAGHOUSE SUMMARY OF TEST RESULTS

TEST RUN :	1		2		3	
TEST DATE :	11/29/00		11/30/00		12/1/00	
Baghouse Inlet Duct						
Temperature, °F	111.5		105.6		151.6	
Velocity, fps	42.1		45.1		48.4	
Volume flow, acfm	1,009,188		1,082,194		1,161,397	
Volume flow, scfm	908,594		986,950		982,852	
Volume flow, dscfh	53,848,092		58,365,042		58,217,409	
Moisture, %	1.2		1.4		1.3	
CO_2, % by volume	2.0		2.0		1.0	
O_2, % by volume	19.0		19.0		20.0	
Baghouse Exhaust						
Section	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
Compartment	1 and 2	3 and 4	9 and 10	11 and 12	21 and 22	19 and 20
Temperature, °F	132.4	128.4	134.9	127.0	123.3	115.9
Moisture, %	1.29	1.17	1.32	1.45	1.06	1.34
Particulate Sample						
Time, min.	365	350	240	240	335	330
Volume, dscf	191.727	179.452	132.081	124.873	172.491	172.597
Isokinetic ratio, %	108.3	105.6	103.6	97.8	104.1	106.1
Total particulates, mg	14.2	19.2	10.7	5.1	4.9	4.0
Total Particulate						
Concentration						
gr/dscf	0.0011	0.0017	0.0013	0.0006	0.0004	0.0004
lb/dscf x 10^{-6}	0.163	0.236	0.179	0.0901	0.0626	0.0511
Emission rate						
lb/hr[1]	4.40	6.35	5.21	2.63	1.82	1.49

[1] Based on 50% of flow through each section

TABLE 3-2: EAF #8 COMMON BAGHOUSE EXHAUST SUMMARY OF OPACITY RESULTS

RUN NO.	1	2	3
TEST DATE :	11/29/00	11/30/00	12/1/00
Average Opacity, %	0.0	0.0	0.0
Highest 6 min. average, %	0	0	0
Highest reading	0	0	0
Lowest reading	0	0	0

TABLE 3-3: EAF #8 SHOP EXHAUST SUMMARY OF OPACITY RESULTS

RUN NO.	1	2	3
TEST DATE :	11/29/00	11/30/00	12/1/00
Average Opacity, %	0.4	0.0	0.0
Highest 6 min. average, %	5	0	0
Highest reading	10	0	0
Lowest reading	0	0	0

APPENDIX A

Baghouse ield Data, Summ Calculation Data and Laboratory Data

EPA Method 5 Results Calculation Sheet

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: North Baghouse Compartments 1 and 2
TEST DATE: 11/29/00
RUN NO: 1

Input:

Pbar	29.25	"Hg	Qst (total flow thru BH)	53,848,092	dscfh
Vk	53.1	ml	Vbavg:(ave velocity thru BH)	1.72	fps
Mn	0.0142	grams	Vmstd	191.452	ft^3
Rt	365	minutes	Dn (nozzle dia.)	1.00	inches
DH	1.34	$"H_2O$	An (noule area)	0.00545	ft^3
Tmeter	58.0	°F	Yd	1.002	
Toutlet	132.4	°F			

Calculations:

English Units
(29.92 in. Ha. 68° F)

Percent isokinetic:
%I = ((0.0945) * (To+460) * (Vmstd)) / ((Ps) * (Vbavg) * (Rt) * (An) * (1-Bws)) = 108.3 %I

Volume of sample at standard conditions on dry basis:
Vmstd = (17.64) * (Vm) * (Yd) * ((Pbar + DH) / 13.6) / (Tm) = 191.727 dscf

Volume of water vapor in sample at standard conditions:
Vwstd = (0.04707 ft^3 / ml) * (Vlc) = 2.499 scf

Fractional moisture content of stack gas:
Bws = Vwstd / (Vmstd + Vwstd) = 0.0129 Bwo

Particulate Concentration:
Grains particulate per dry standard cubic feet:
grldscf = ((15.43 gr/gm) * (Mn)) / Vmstd = 0.0011 gr/dscf

Pounds particulate per dry standard cubic feet:
lb/dscf = ((2.205E-3 lb/gm) * (Mn)) / Vmstd) = 1.63E-07 lb/dscf

Particulate Emission Rate:
Pounds per hour of particulate:
lb/hr = ((grldscf) / (7000 gr/lb) * QsNorth (dscfh) = 4.397 lb/hr
(Assumed Qs North BH = Qstotal/2 = 26,924,046 dscfh)

Moisture Calculation **Summary**

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: North Baghouse Compartments 1 and 2
TEST DATE: 11/29/00
RUN NO: 1

INPUT

Vm:	191.452 cubic feet
Yd:	1.002 dimensionless
Pbar:	29.25 in. Hg
AH:	1.34 in. H_2O
Tm:	58.0 degrees F
Vlc:	53.1 milliliters

CALCULATIONS

Volume of sample at standard conditions on dry basis:

English Units
(29.92 in. **Hg,** 68° F)

Vmstd = (17.64)(Vm)(Yd)(Pbar+ΔH/13.6)/(Tm) = 191.727 **dscf**

Volume of water vapor in sample at standard conditions:

Vwstd = (0.04707 cu. ft/ml)(Vlc) = 2.499 scf

Fractional moisture content of stack gas:

Bws = Vwstd/(Vmstd+Vwstd) = **0.0129**

NORTH
RUN 1

FIELD DATA

PLANT NINSIN
DATE 11/29/00
LOCATION STERLING, IL
OPERATOR MT/BP
STACK NO. NORTH BAGHOUSE
RUN NO. 1
SAMPLE BOX NO. APBX
METER BOX NO. 601209

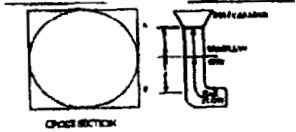
AMBIENT TEPERATURE 40
BAROMETRIC PRESSURE 29.25
ASSUMED MOISTURE, % 0.39
PROBE LENGTH, in 10'
NOZZLE DIAMETER, in 1.000
STACK DIAMETER, in

PROBE HEATER SETTING 175
HEATER BOX SETTING 175
METER H@ 1.89
C_p FACTOR 0.84
Y FACTOR 1.002

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_g)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
0902	1-1	0		86			1.31		941.154	61	56	175	175	N/A	35	2
	1	5		112			1.29		943.717	62	56				35	2
	1	10		112			1.29		946.281	62	56				36	2
	2	15		122			1.31		948.884	62	56				36	2
	2	20		128			1.35		951.407	66	52				36	2
	2	25		134			1.34		954.042	65	51				37	2
0932	3	30		120			1.31		956.705	65	51				37	2
	3	35		127			1.33		959.305	63	50				37	2
	3	40		131			1.34		961.936	62	49				37	2
	4	45		139			1.35		964.585	61	46				37	2
	4	50		144			1.36		967.270	65	50				36	2
	4	55		147			1.37		969.977	64	50				36	2
1002	5	60		138			1.35		972.698	62	50				36	2
	5	65		137			1.35		975.378	66	46				36	2
	5	70		140			1.36		978.054	65	50				36	2
									980.743							
TOTAL																
AVERAGE																

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL	128	96			229.1
INITAL	100	100	~~100~~	—	200
LIQUID COLLECTED	28	-4			29.1
TOTAL _____ COLLECTED (specify ml or g)					53.1

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1		20	19.0	
2				
3				
4				

LEAK CHECK
SYSTEM PRE: 0.011 CFM at 15" Hg
POST: 0.006 CFM at 15" Hg
PITOT PRE: ± OK
POST: ± OK

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NORTH
RUN 1 PG 2

FIELD DATA

PLANT NWSW
DATE 11/29/00
LOCATION STERLING, IL
OPERATOR WET/BD
STACK NO. NORTH BOWHOUSE
RUN NO. 1
SAMPLE BOX NO. APEX
METER BOX NO. 611209

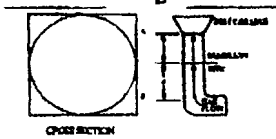
AMBIENT TEPERATURE _____
BAROMETRIC PRESSURE _____
ASSUMED MOISTURE, % _____
PROBE LENGTH, in. _____
NOZZLE DIAMETER, in. _____
STACK DIAMETER, in. _____

PROBE HEATER SETTING _____
HEATER BOX SETTING _____
METER H@ _____
C_d FACTOR _____
Y FACTOR _____

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= _____ B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft³	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1017	1-6	75		163			1.40	0.5584	980.743	62	50	175	175	N/A	37	2
	6	80		153			1.38	0.5494	983.535	62	50	↓	↓	↓	37	2
	6	85		173			1.43	0.5674	986.282	63	50				38	2
1032	7	90		176			1.43	0.5700	989.132	63	50				37	2
	7	95		179			1.44	0.5727	991.982	62	50				37	2
	7	100		177			1.44	0.5709	994.846	63	49				36	2
1047	8	105		155			1.39	0.5512	997.700	63	51				37	2
DP 55	8	110		140			1.36	0.5378	1000.456	62	50				37	2
0 stack → 57	8	115		111			1.29	0.5118	1003.145	61	48				35	2
1112	2-1	120		118			1.31	0.5181	1005.704	63	48				36	2
	1	125		123			1.32	0.5225	1008.295	63	48				35	2
	1	130		125			1.32	0.5243	1010.9075	62	48				36	2
1127	2	135		125			1.32	0.5243	1013.529	63	48				36	2
32	2	140		128			1.33	0.5270	1016.151	67	49				38	2
37	2	145		134			1.34	0.5324	1018.786	65	49				38	2
									1021.4480							
TOTAL																
AVERAGE					X											

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specifiy ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± _____
POST: ± _____

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Pg 3

FIELD DATA

PLANT NWSW
DATE 11/29/00
LOCATION STERLING, IL
OPERATOR UET/BP
STACK NO. NORTH EDGHOUS
RUN NO. 1
SAMPLE BOX NO. DPSX
METER BOX NO. 611209

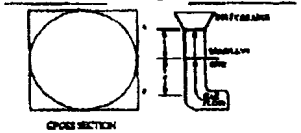
AMBIENT TEPERATURE _____
BAROMETRIC PRESSURE _____
ASSUMED MOISTURE, % _____
PROBE LENGTH, in. _____
NOZZLE DIAMETER, in. _____
STACK DIAMETER, in. _____

PROBE HEATER SETTING _____
HEATER BOX SETTING _____
METER H@ _____
C_d FACTOR _____
Y FACTOR _____

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= _____ B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft³	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1142	2-33	150		120			1.31	0.5199	1021.448	64	51				39	2
	3	155		~~[illegible]~~ 112			1.29	0.5127	1024.048	66	51				39	2
	3	160		124			1.32	0.5234	1026.612	66	52				39	2
1157	4	165		130			1.33	0.5288	1029.229	64	52				39	2
07	4	170		119			1.31	0.5190	1031.873	64	52				38	2
1212	4	175		133			1.33	0.5315	1034.468	62	51				40	2
1217	5	180		124			1.32	0.5234	1037.126	66	51				40	2
22	5	185		130			1.33	0.5288	1039.743	66	52				40	2
27	5	190		133			1.33	0.5315	1042.388	67	52				42	1.5
1232	6	195		136			1.35	0.5342	1045.046	68	54				41	2
37	6	200		147			1.37	0.5441	1047.717	64	54				41	2
42	6	205		127			1.33	0.5261	1050.438	63	53				40	2
1247	7	210		121			1.31	0.5207	1053.069	63	52				41	2
52	7	215		143			1.36	0.5405	1055.673	64	52				40	2
57	7	220		152			1.38	0.5485	1058.376	62	52				40	2
1302	8	225		140			1.36	0.5378	1061.119	65	52				41	2
TOTAL 07	8	230		125			1.3	0.5249	1063.808	65	52				40	2
AVERAGE	8	235 240		107	X		1.3	0.5082	1066.5225	65	52					

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specifiy ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± _____
POST: ± _____

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NORTH RUN
pg 4

FIELD DATA

PLANT NWSW
DATE 11/29/00
LOCATION Sterling IL
OPERATOR WCJ/BP
STACK NO. North Baghouse
RUN NO. 1
SAMPLE BOX NO. Apex
METER BOX NO. 611309

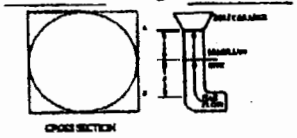
AMBIENT TEPERATURE _____
BAROMETRIC PRESSURE _____
ASSUMED MOISTURE, % _____
PROBE LENGTH, in. _____
NOZZLE DIAMETER, in. _____
STACK DIAMETER, in. _____

PROBE HEATER SETTING _____
HEATER BOX SETTING _____
METER H@ _____
C_p FACTOR _____
Y FACTOR _____

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= _____ B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1230	7-8	240		107			1.27	0.5062	~~+066.5225~~	52	51	175	175	N/A	39	2
35	8	245		122			1.31	0.5216	69.087	55	49				35	2
40	8	250		130			1.33	0.528	71.695	58	50				39	2
1345	7	255		120			1.31	0.5198	74.339	59	50				40	2
50	7	260		114			1.30	0.5145	76.938	59	50				40	2
55	7	265		125			1.32	0.5243	79.511	59	50				40	2
1400	6	270		137			1.35	0.5351	82.133	59	49				40	2
05	6	275		129			1.33	0.5279	84.808	61	49				40	2
10	6	280		124			1.32	0.5234	87.448	62	50				40	2
1415	5	285		129			1.33	0.5279	90.065	63	51				40	2
20	5	290		133			1.34	0.5315	92.705	63	51				39	2
25	5	295		141			1.36	0.5387	95.363	61	51				40	2
1430	4	300		123			1.32	0.5225	98.057	63	51				40	2
35	4	305		115			1.30	0.5154	100.669	65	52				41	2
40	4	310		133			1.34	0.5315	103.246	58	46				37	2
									105.904							
TOTAL																
AVERAGE																

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specifiy ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± _____
POST: ± _____

IMPOS.DOC 1990

NORTH RUN
pg 5

FIELD DATA

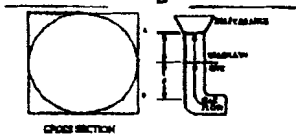
PLANT NWSW
DATE 11/29/00
LOCATION Sterling, IL
OPERATOR WCJ/BP
STACK NO. N. Bag House
RUN NO. 1
SAMPLE BOX NO. Apex
METER BOX NO. 611209

AMBIENT TEPERATURE _____
BAROMETRIC PRESSURE _____
ASSUMED MOISTURE, % _____
PROBE LENGTH, in _____
NOZZLE DIAMETER, in _____
STACK DIAMETER, in _____

PROBE HEATER SETTING _____
HEATER BOX SETTING _____
METER H@ _____
C_d FACTOR _____
Y FACTOR _____

/EIGHT OF PARTICULATE COLLECTED, mg		
ILTER NO.		
AMPLE	FILTER	PROBE
INAL WEIGHT		
ARE WEIGHT		
/EIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK
A= _____ B = _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1445	2-3	315		146			1.37	0.5432	105.904	68	53				41	2
50	3	320		145			1.37	0.5423	108.620	72	55				43	2
55	3	325		122			1.31	0.5216	111.332	71	57				45	2
1500	2	330		138			1.35	0.5360	113.940	71	59				44	2
05	2	335		144			1.36	0.5414	116.620	72	60				46	2
10	2	340		145			1.37	0.5423	119.327	74	61				45	2
1515	1	345		137			1.35	0.5351	122.039	71	61				45	2
20	1	350		127			1.33	0.5261	124.715	69	61				44	2
25	1	355		126			1.32	0.5252	127.345	66	60				43	2
1530	1-8	360		128			1.33	0.5278	129.971	65	58				42	2
35	8	365							132.606							
	6															
TOTAL																
AVERAGE				132.4			1.34		191.452	58.0						

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specifiy ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± _____
POST: ± _____

EPA Method 5 Results Calculation Sheet

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: South Baghouse Compartments 3 and 4
TEST DATE: 11/29/00
RUN NO: 1

Input:

Pbar	29.25 **"Hg**	Qst (total flow thru BH)	53,848,092 dscfh
Vlc	45.1 **ml**	Vbavg: (ave velocity thru **BH)**	1.71 **fps**
Mn	0.0192 grams	Vmstd	183.5 **ft^3**
Rt	350 minutes	Dn (nozzle dia.)	1.00 inches
AH	0.65 **"H_2O**	An (nozzle area)	0.00545 **ft^3**
Tmeter	72.7 **°F**	Yd	1.008
Toutlet	128.4 °F		

Calculations: English Units 129.92 in **Hg,** 68° F)

Percent isokinetic:
%I = ((0.0945) • (To+460) • (Vmstd)) / ((Ps) * (Vbavg) * (Rt) • (An) • (1-Bws)) = 105.6 **%I**

Volume of sample at standard conditions on dry basis:
Vmstd = (17.64) * (Vm) • (Yd) * ((Pbar + AH) / 13.6) / (Tm) = 179.452 dscf

Volume of water vapor in sample at standard conditions:
Vwstd = (0.04707 ft^3 / ml) * (Vlc) = 2.123 scf

Fractional moisture content of stack gas:
Bws = Vwstd / (Vmstd + Vwstd) = 0.0117 Bwo

Particulate Concentration:
Grains particulate per dry standard cubic feet:
gr/dscf = ((15.43 gr/gm) • (Mn)) / Vmstd = 0.0017 **gr/dscf**

Pounds particulate per dry standard cubic feet:
lb/dscf = ((2.205E-3 lb/gm) * (Mn)) / Vmstd) = 2.36E-07 **lb/dscf**

Particulate Emission Rate:
Pounds per hour of particulate:
lb/hr = ((gr/dscf) / (7000 gr/lb) • QsNorth (dscfh) = 6.352 **lb/hr**
(Assumed Qs South BH = Qstotal/2 = 26,924,046 dscfh)

Moisture Calculation Summary

COMPANY: Northwestern Steel **and** Wire
LOCATION: Sterling, Illinois
SOURCE: South Baghouse Compartments 3 and 4
TEST DATE: 11/29/00
RUN NO: 1

INPUT

Vm:	283.500	**cubic feet**
Yd:	1.008	**dimensionless**
Pbar:	29.25	**in. Hg**
AH:	0.65	in. **H_2O**
Tm:	72.7	**degrees F**
Vlc:	45.1	**milliliters**

CALCULATIONS

Volume of sample at standard conditions on dry basis:

English Units (29.92 in. Hg, 68° F)

Vmstd = (17.64)(Vm)(Yd)(Pbar+ΔH/13.6)/(Tm) = 179.452 **dscf**

Volume of water vapor in sample at standard conditions:

Vwstd = (0.04707 cu. ft/ml)(Vlc) = 2.123 **scf**

Fractional moisture content of stack gas:

Bws = Vwstd/(Vmstd+Vwstd) = **0.0117**

ARI Environmental Inc.

SOUTH

FIELD DATA

0.503 (Ts +460) 561

PLANT Northwest Steel & Wire
DATE 11-29-00
LOCATION Sterling IL
OPERATOR SF & LG
STACK NO. SOUTH BH
RUN NO. 1
SAMPLE BOX NO.
METER BOX NO. 604178

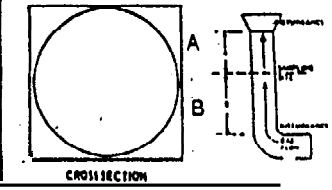
AMBIENT TEMPERATURE 45°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE,% 2
PROBE LENGTH,In.
NOZZLE DIAMETER,In. 1"
STACK DIAMETER, In.

PROBE HEATER SETTING 150°F
HEATER BOX SETTING 150°F
METER H@ 1.55
C_d FACTOR 0.84
Y FACTOR 1.008

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (In. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	OUTLET (Tm_{out}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM In., Hg
0902	3-1	0		97		.53	.65		609.700	53	53	153	41	2
07	-1	5		105			.67		12.3	57	53	157	42	2
12	-1	10		109			.67		14.8	59	53	155	42	2
17	-2	15		115			.68		17.4	61	53	152	42	2
22	-2	20		115			.68		19.9	61	53	153	42	2
27	-2	25		120			.69		22.5	59	52	152	42	2
32	-3	30		115			.68		25.1	57	50	158	43	2
37	-3	35		116			.69		27.7	58	49	156	43	2
42	3	40		119			.69		30.12	55	47	155	43	2
47	4	45		123			.69		32.70	54	47	153	43	2
52	4	50		125			.70		35.20	54	47	157	44	2
57	4	55		128			.71		37.87	55	44	157	44	2
1002	5	60		129			.71		40.45	58	45	152	45	2
07	5	65		126			.70		43.0	60	45	154	45	2
12	5	70		127			.71		45.6	60	46	156	45	2
17	6	75		146			.69		48.3	60	46	155	46	2
22	6	80		155			.72		50.0	61	48	158	46	2
27	6	85		159			.72		53.7	62	48	156	46	2
32	7	90		159			.72		56.4	65	50	156	46	2
37	7	95		161			.73		59.1	66	51	153	47	2
42	7	100		159			.72		61.8	65	52	157	47	2
47	8	105		157			.72		64.5	66	52	155	48	2
52	8	110		124			.70		67.15	66	52	155	48	2
55	8	118		—					68.65					
TOTAL 57														
AVERAGE									58.45					

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL COLLECTED (ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: .001 CFM at 15" Hg
POST: CFM at 15" Hg
PITOT PRE: ± OK
POST: ±

ARI Environmental Inc.

South

FIELD DATA

PLANT Northwest Steel & Wire
DATE 11-29-00
LOCATION Sterling IL
OPERATOR SF & LG
STACK NO.
RUN NO. 1
SAMPLE BOX NO.
METER BOX NO. 604178

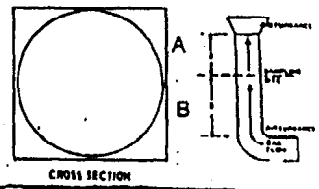
AMBIENT TEMPERATURE 45°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE,% 2
PROBE LENGTH, in. –
NOZZLE DIAMETER, in. 1"
STACK DIAMETER, in.

PROBE HEATER SETTING 150°F
HEATER BOX SETTING 150°F
METER H@ 1.55
C_d FACTOR 0.84
Y FACTOR 1.008

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	OUTLET (Tm_{out}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in., Hg
1110	3-8	115		110			.69		68.65	66	66	157	51	2
1112	3-8	120		112			.70		71.10	75	67	152	51	2
1117	4-1	125		118			.70		73.65	77	67	155	51	2
1122	4-1	130		120			.70		76.20	78	68	156	51	2
1127	4-1	135		122			.70		78.70	80	69	150	52	2
1132	4-2	140		124			.71		81.22	81	69	152	52	2
1137	4-2	145		127			.71		83.81	81	69	156	52	2
1142	4-2	150		130			.71		86.44	82	69	156	52	2
1147	4-3	155		130			.71		89.05	83	69	155	52	2
52	4-3	160		127			.71		91.60	83	69	157	53	2
57	4-3	165		132			.71		94.20	81	69	153	53	2
1202	4-4	170		122			.70		96.7	80	70	151	53	2
1209	4-4	175		123			.70		99.5	81	71	154	54	2
1214	4-4	180		128			.71		702.1	83	70	152	54	2
1219	4-5	185		120			.70		704.6	84	71	154	54	2
1224	4-5	190		124			.70		707.3	85	71	152	53	2
1229	4-5	195		126			.69		709.8	86	72	154	53	2
1234	4-6	200		129			.69		712.3	88	73	152	54	2
1239	4-6	205		134			.68		714.9	85	74	153	53	2
1244	4-6	210		137			.68		717.4	84	73	153	52	2
1249	4-7	215		138			.68		720.0	83	72	150	51	2
1254	4-7	220		134			.67		722.5	82	72	153	50	2
1259	4-7	225		132			.67		725.0	79	70	155	48	0
TOTAL														
AVERAGE														

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specify ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: .001 CFM at 15" Hg
POST: CFM at 15" Hg
PITOT PRE: + OK
POST: +

ARI Environmental Inc.

FIELD DATA

PLANT Northwest Steel & Wire
DATE 11-29-00
LOCATION Sterling, IL
OPERATOR SF & LG
STACK NO.
RUN NO. 1
SAMPLE BOX NO.
METER BOX NO. 604178

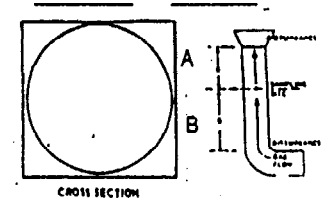
AMBIENT TEMPERATURE 45°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE,% 2
PROBE LENGTH,in.
NOZZLE DIAMETER,in. 1"
STACK DIAMETER, in.

PROBE HEATER SETTING 150°F
HEATER BOX SETTING 150°F
METER H@ 1.55
C_d FACTOR 0.84
Y FACTOR 1.003

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



	CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in., Hg
nt2	1304	4-8	230		131			.65		727.5	81	70	153	49	2
STOP	1309	4-8	235		132			.65		730.2	82	70	153	49	2
TART	1325	4-8													
nt3	1330	4-8	240		118			.65		732.6	81	73	150	46	2
	1335	4-8	245		124			.68		735.1	82	73	152	44	2
	1340	4-8	250		122			.67		737.7	82	72	153	45	2
	1345	4-8	255		113			.67		740.2	85	73	155	48	2
	1350	4-7	260		115			.66		742.7	86	73	154	48	2
	1355	4-7	265		119			.66		745.4	87	73	152	48	2
	1400	4-7	270		126			.65		747.9	87	74	153	48	2
	1405	4-6	275		125			.65		750.4	88	75	155	48	2
	1410	4-6	280		124			.65		752.9	87	75	154	48	2
	1415	4-6	285		123			.65		755.6	87	74	154	48	2
	1420	4-5	290		125			.65		758.1	89	78	152	48	2
	1425	4-5	295		134			.64		760.6	90	77	155	48	2
	1430	4-5	300		140			.64		763.1	90	77	154	48	2
	1435	4-4	305		142			.64		765.6	89	77	155	49	2
	1440	4-4	310		142			.64		768.1	89	77	155	50	2
	1445	4-4	315		139			.64		770.6	89	78	153	51	2
	1450	4-3	320		140			.64		773.1	89	77	154	52	2
	1455	4-3	325		139			.64		775.6	91	77	153	53	2
	1500	4-3	330		138			.64		778.2	90	78	154	55	2
	1505	4-2	335		134			.64		780.7	91	78	154	55	
TOTAL															
AVERAGE															

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL COLLECTED (specify ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK	
SYSTEM PRE: .001 CFM at 15" Hg	
POST: CFM at 15' Hg	
PITOT PRE: ± OK	
POST: ±	

ARi Environmental Inc.

FIELD DATA

PLANT Northwest Steel & Wire
DATE 11-29-00
LOCATION Sterling IL
OPERATOR SF & LG
STACK NO.
RUN NO. 1
SAMPLE BOX NO.
METER BOX NO. 604178

AMBIENT TEMPERATURE 45°
BAROMETRIC PRESSURE
ASSUMED MOISTURE,% 2
PROBE LENGTH,In.
NOZZLE DIAMETER,In. 1"
STACK DIAMETER, In.

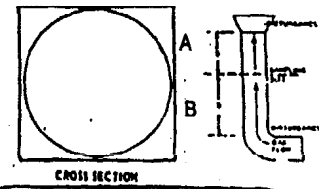
PROBE HEATER SETTING 150°F
HEATER BOX SETTING 150°F
METER H@
C_d FACTOR
Y FACTOR
1.55
0.84
1.008

GAS SAMPLE

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE		
FINAL WEIGHT		
TARE WEIGHT		
SAMPLE GAIN	FILTER	PROBE
FINAL WEIGHT	TOTAL	
TARE WEIGHT		
WEIGHT GAIN		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (In. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	DIFFERENTIAL PRESSURE ACROSS ORIFICE METER (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	DRY GAS METER INLET (Tm_{in}), °F	DRY GAS METER OUTLET (Tm_{out}), °F	SAMPLE BOX TEMPERATURE °F	CONDENSER OR LAST IMPINGER LEAVING °F	PUMP VACUUM In., Hg
1510	4-2	340		129			.64		783.2	91	78	154	55	2
1515	4-2	345		128			.64		785.7	92	79	154	56	2
1520	4-1	350		129			.64		788.2	91	79	153	57	2
1525	4-1	355		129			.64		790.7	89	79	154	57	2
1530	4-1	360		117			.64		793.2	88	78	149	56	2
										(sum) / 2				
TOTAL														
AVERAGE				128.4			.065		1835	72.7				

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL	110	108	–	–	227.1
INITIAL	100	100			00.0
LIQUID COLLECTED	10	8			27.1
TOTAL _____ COLLECTED (specify ml or g)					45.1

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: 0.001 CFM at 15" Hg
POST: 0.000 CFM at 15" Hg
PITOT PRE: ± OK
POST: ± OK

Volumetric Flow Rate Calculation Summary

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: Baghouse Met
TEST DATE: 11/29/00
RUN NO: I

INPUT

CO_2	2	%
O_2	19	%
CO	0	%
N_2	79	%
Bws	0.0122	dimensionless
Stack Temp.	111.521	degrees F
Cp	0.84	dimensionless
Squareroot AP	0.7116	inches H_2O
Pbar	29.25	inches Hg
Pstatic	-1.25	inches H_2O
Stack Area	400.00	sq. ft.

CALCULATIONS: English Units (29.92 in. Hg, 68° F)

Dry molecular weight of stack gas:

$Md = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2+\%CO)$ = 29.08 lb/lb-mole

Molecular weight of stack gas, wet basis:

$Ms = Md(1-Bws) + 18(Bws)$ = 28.944 lb/lb-mole

Pitot tube coefficient:

Cp (from calibration curve) = 0.84 dimensionless

Average velocity head of stack gas (sqroot of AP):

Square root of AP, average = 0.7116 inches H_2O

Average absolute stack gas temperature:

Ts = stacktemp (111.5) °F + 460 = 571.5 degrees R

Absolute stack gas pressure:

Ps = Pbar + (Static Pressure/13.6) = 29.16 inches Hg

Stack gas velocity:

$Vs = 85.49(Cp)(sqroot\ \Delta P)(sqroot((Ts)/(Ps*Ms)))$ = 42.049 feet/second

Stack gas volumetric flow rate:

acfm = (As)(Vs)(60) = 1,009,188 acfm

Stack gas volumetric flow rate, wet basis:

$Qs(wet) = 3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd))$ = 54,515,627 scfh

$Qs(wet) = (3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)))/60$ = 908,594 scfm

Stack gas volumetric flow rate, dry basis:

$Qs(dry) = Qs(wet)(1-Bws)$ = 53,848,092 dscfh

Moisture Determination Using Wet Bulb/Dry Bulb Temperatures

Company: Northwestern Steel and Wire
Location: Sterling, Illinois
Source: Baghouse Inlet
Test Date: 11/29/00
Run #: 1

Input

Pbar	29.25	**in. Hg**
Static Pressure	-1.25	**in. H_2O**
Wet bulb (tw)	72	**"Fahrenheit**
Dry bulb (td)	111.5	**"Fahrenheit**

Calculations

Absolute stack pressure:
Ps = *Pbar* + (Static / 13.6) = 29.16 **in H_2O**

Saturated vapor pressure of dry bulb (svp): = 0.7907 **in.** Hg

Actual vapor pressure:
Vp = svp-[(2.336 x 10^{-7}) x Ps x (td-tw) x (1539+tw)] = 0.3570 **in. Hg**

Fractional moisture content:
Bwo = Vp/Ps = 0.0122 **Bwo**

Percent moisture:
% moisture = Bwo x 100 = 1.22 **%**

Moisture and Flow Calculation Spreadsheet

Sheets 2 and 3 contain the actual printouts for moisture and volumetric flow calculation sheets.
Enter the raw data for calculations in the spaces below:

Company: Northwestern Steel and Wire
Location: Sterling, Illinois
Source: Baghouse Inlet
Test Date: 11/29/00
Run # : 1

Barometric Pressure	29.25	**in. Hg**	**Inlet Duct Area**	400.000 **sq. ft.**
Static Pressure	-1.25	**in. H_2O**	**Square Root of AP**	0.712 **in. H_2O**
% **Oxygen (02)**	19.0		**Stack Temperature**	111.5 **F**
% Carbon Dioxide (CO_2)	2.0		**Wet Bulb Temperature**	72.0 F
% Nitrogen (N_2)	79		**Pitot Coefficient**	0.840

		dp	sqrt dp	Ts			dp	sqrt dp	Ts
A	1	0.46	0.678	118	**E**	1	0.58	0.762	109
	2	0.51	0.714	121		2	0.57	0.755	108
	3	0.52	0.721	121		3	0.58	0.762	108
	4	0.52	0.721	123		4	0.58	0.762	109
	5	0.56	0.748	124		5	0.5	0.707	112
	6	0.38	0.616	125		6	0.36	0.600	116
B	1	0.56	0.748	124	**F**	1	0.51	0.714	104
	2	0.56	0.748	120		2	0.48	0.693	104
	3	0.58	0.762	121		3	0.5	0.707	103
	4	0.64	0.800	121		4	0.52	0.721	103
	5	0.64	0.800	126		5	0.47	0.686	103
	6	0.5	0.707	132		6	0.36	0.600	101
C	1	0.58	0.762	116	G	1	0.58	0.762	103
	2	0.6	0.775	113		2	0.53	0.728	105
	3	0.6	0.775	112		3	0.53	0.728	102
	4	0.6	0.775	115		4	0.47	0.686	100
	5	0.6	0.775	120		5	0.41	0.640	96
	6	0.52	0.721	124		6	0.25	0.500	98
D	1	0.58	0.762	112	**H**	1	0.45	0.671	101
	2	0.59	0.768	112		2	0.41	0.640	100
	3	0.6	0.775	112		3	0.35	0.592	100
	4	0.61	0.781	112		4	0.37	0.608	100
	5	0.57	0.755	118		5	0.36	0.600	100
	6	0.61	0.781	126		6	0.32	0.566	100
		SUM	**17.967**	**2868**			SUM	**16.188**	**2485**
							AVERAGE	**0.712**	**111.521**

SAMPLE FLOW RATE CALCULATION SUMMARY

COMPANY: Northwestern Steel and Wire
LOCATION Sterling, Illinois
SOURCE: Baghouse Inlet
TEST DATE: 11129100
RUN NO.: 1

INPUT DATA	North		South	
No. of Baghouse Comp. In Service (N)	24		24	
Compartment Area (Ac)[1]	374.625 sq. ft.		374.625 sq. ft.	
Baghouse Inlet Flow Rate (Qi)	897,468 dscfm		897,468 dscfm	
Nozzle Diam (W)	1.0 in.		1.0 in.	
Nozzle Area (As)	0.00545 sq. ft.		0.00646 sq. ft.	
Baghouse Outlet Temp (To)	132.4 deg F		128.4 deg F	
Baghouse inlet Temp (Tin)	111.62 deg F		111.62 deg F	
Meter temperature(Tm)	68.00 deg F		72.70 deg F	
BAGHOUSE COMPARTMENT VELOCITY				
Vb = [(Qi)/N *(To/Tin)*1/(Ac*60)]*To	1.724		1.713 fps	
wlo To	0.0029 To =	1.7244	0.0029 *To =	1.7128
Desired Sample Flow Rate (Icfm)				
Icfm = Vb*60*An*(1-Bwo)*Tm/To	0.487 cfm		0.601 cfm	
wlo Tm/To use to calc cfm at each pt	0.0009 *Tm =	0.487	0.0009 Tm =	0.501
To's cancel out				

[1]Compartment Dimensions 20'3 x 18'6"

VELOCITY TRAVERSE
AND
CYCLONIC FLOW VERIFICATION

PLANT: NWS&W
DATE: 11/29/00
LOCATION: STERLING, IL
SOURCE: EAF #8 BH INLET
STACK I.D.: 20' x 20'
BAROMETRIC PRESSURE, in. Hg: 29.25
OPERATORS: LB / BC / RP / CJ / SF

SCHEMATIC OF TRAVERSE POINT LAYOUT

RUN NO. 1 STATIC, in. H_2O -1.25

TRAVERSE POINT NUMBER	VELOCITY HEAD ($\Delta\rho_s$), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
A 1	0.46	118	2
2	0.51	121	3
3	0.52	121	3
4	0.52	123	3
5	0.56	124	4
6	0.38	125	2
B 1	0.56	124	2
2	0.56	120	4
3	0.58	121	6
4	0.64	121	6
5	0.64	126	5
6	0.50	132	5
C 1	0.58	116	3
2	0.60	113	3
3	0.60	112	2
4	0.60	115	2
5	0.60	120	2
6	0.52	124	1
D 1	0.58	112	0
2	0.59	112	0
3	0.60	112	0
4	0.61	112	2
5	0.57	118	3
6	0.61	126	1
AVERAGE			

RUN NO. 1 STATIC, in. H_2O -1.25

TRAVERSE POINT NUMBER	VELOCITY HEAD ($\Delta\rho_s$), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
E 1	0.58	109	0
2	0.57	~~108~~	2
3	0.58	109	2
4	0.58	109	2
5	0.50	112	1
6	0.36	116	1
F 1	0.51	104	3
F 2	0.48	104	3
3	0.50	103	3
4	0.52	103	4
5	0.47	103	5
6	0.36	~~104~~ 101	5
G 1	0.58	103	5
2	0.53	105	5
3	0.53	102	6
4	0.47	100	6
5	0.41	96	5
6	0.25	98	5
H 1	0.45	101	7
2	0.41	100	7
3	0.35	100	8
4	0.37	100	8
5	0.36	100	7
6	0.32	100	6
AVERAGE			

EPA Method 5 Results Calculation Sheet

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: North Baghouse Compartments 9 and 10
TEST DATE: 11130100
RUN NO: 2

Input:

Pbar	29.25	"Hg	Qst (total flow thru BH)	58,365,042	dscfh
Vlc	37.6	ml	**Vbavg:(ave** velocity thru BH)	1.90	fps
Mn	0.0107	grams	Vmstd	147.754	ft^3
Rt	240	minutes	Dn **(nozzle** dia.)	1.00	inches
DH	1.546	$"H_2O$	An (nozzle area)	0.00545	ft^3
Tmeter	120.6	°F	Yd	1.002	
Toutlet	134.9	°F			

Calculations:

English Units
(29.92 in. Ha. **68° F)**

Percent isokinetic:
%I = ((0.0945) * (To+460) * (Vrnstd)) / ((Ps) * (Vbavg) * (Rt) * (An) * (1-Bws)) = 103.6 %I

Volume of sample at standard conditions on dry basis:
Vmstd = (17.64) * (Vm) * (Yd) * ((Pbar + DH) / 13.6) / (Tm) = 132.081 dscf

Volume of water vapor in sample at standard conditions:
Vwstd = (0.04707 ft^3 / ml) * (Vlc) = 1.770 scf

Fractional moisture content of stack gas:
Bws = Vwstd / (Vmstd + Vwstd) = 0.0132 Bwo

Particulate Concentration:
Grains particulate per dry standard cubic feet:
grldscf = ((15.43 grlgm) * (Mn)) / Vrnstd = 0.0013 grldscf

Pounds particulate per dry standard cubic feet:
lb/dscf = ((2.205E-3 lb/gm) * (Mn)) / Vrnstd) = 1.79E-07 lb/dscf

Particulate Emission Rate:
Pounds per ***hour of particulate:***
lblhr = ((grldscf) / (7000 gr/lb) * QsNorth (dscfh) = 5.213 lblhr
(Assumed Qs North BH = Qstotal/2 = 29,182,521 dscfh)

Moisture Calculation Summary

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: North Baghouse Compartments 9 and 10
TEST DATE: 11/30/00
RUN NO: 2

INPUT

Vm:	147.754 cubic feet
Yd:	1.002 dimensionless
Pbar:	29.25 in. Hg
AH:	1.55 in. H_2O
Tm:	120.6 degrees F
Vlc:	37.6 milliliters

CALCULATIONS

Volume of sample at standard conditions on dry basis: English Units (29.92 in. Hg, 68° F)

$$Vmstd = (17.64)(Vm)(Yd)(Pbar+\Delta H/13.6)/(Tm) = 132.081 \text{ dscf}$$

Volume of water vapor in sample at standard conditions:

$$Vwstd = (0.04707 \text{ cu. ft/ml})(Vlc) = 1.770 \text{ scf}$$

Fractional moisture content of stack gas:

$$Bws = Vwstd/(Vmstd+Vwstd) = 0.0132$$

NORTH RUN 2

FIELD DATA

PLANT NWSW
DATE 11/30/00
LOCATION STERLING, IL
OPERATOR BP/WCJ
STACK NO. NORTH BAGHOUSE
RUN NO. 2
SAMPLE BOX NO. APOX
METER BOX NO. 611209

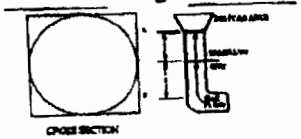
AMBIENT TEPERATURE 70
BAROMETRIC PRESSURE 29.35
ASSUMED MOISTURE, % 0.36
PROBE LENGTH, in. 10'
NOZZLE DIAMETER, in. 1.000
STACK DIAMETER, in.

PROBE HEATER SETTING 175
HEATER BOX SETTING 175
METER H@ 1.890
C_p FACTOR 0.84
Y FACTOR 1.002

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1030	13-1	0		125			1.50	0.5943	135.085	106	106				108	2
35	1	5		123			1.50	0.5954	138.057	109	105				94	2
40	1	10		121			1.51	0.5960	141.034	113	106				89	2
1128	2	15		95			1.48	0.5859	144.024	98	99				70	2
33	2	20		100			1.48	0.5880	146.954	102	98				67	2
38	2	25		110			1.49	0.5912	149.894	108	98				69	2
1143	3	30		124			1.50	0.5948	152.850	115	98				73	2
48	3	35		127			1.50	0.5969	155.824	118	99				75	2
53	3	40		124			1.51	0.5996	158.809	122	100				75	2
1158	4	45		144			1.52	0.6038	161.807	127	103				78	2
03	4	50		149			1.52	0.6038	164.826	127	103				79	2
08	4	55		150			1.52	0.6059	167.845	129	105				81	2
1213	5	60		134			1.53	0.6085	170.875	132	107				82	2
18	5	65		128		(15)	1.53	0.6090	173.918	132	108				82	2
23	5	70		132			1.54	0.6095	176.96	132	109					
									180.008							
TOTAL							23.11									
AVERAGE				1866						314						

ΔP 0.44

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT 8
FINAL	120	90			227.6
INITAL	100	100	0	—	200
LIQUID COLLECTED	20	-10			27.6
TOTAL _____ COLLECTED (specify ml or g)					37.6

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: 0.006 CFM at 15" Hg
POST: 0.002 CFM at 15" Hg
PITOT PRE: ± ✓
POST: ± ✓

IMPOS.DOC 1998

NORTH RUN 2
PS 2

FIELD DATA

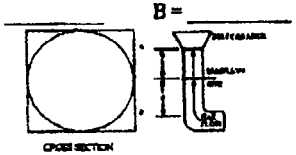
PLANT NWSW
DATE 11/30/00
LOCATION STERLING, IL
OPERATOR BD/WCT
STACK NO. NORTH BAGHOUSE
RUN NO. 2
SAMPLE BOX NO. 4A-X
METER BOX NO. 61 1209

AMBIENT TEPERATURE _____
BAROMETRIC PRESSURE _____
ASSUMED MOISTURE, % _____
PROBE LENGTH, in. _____
NOZZLE DIAMETER, in. _____
STACK DIAMETER, in. _____

PROBE HEATER SETTING _____
HEATER BOX SETTING _____
METER H@ _____
C_d FACTOR _____
Y FACTOR _____

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK
A= _____ B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft³	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1228	13-6	75		143			1.54	0.6101	180.008	132	110				85	2
33	6	80		146			1.54	0.6111	183.059	133	111				86	2
38	6	85		140			1.54	0.6116	186.114	134	111				74	2
1243	7	90		138			1.54	0.6127	189.172	135	112				69	2
48	7	95		140			1.54	0.6127	192.236	135	112				70	2
53	7	100		153			1.55	0.6137	195.300	136	113				70	2
1258	8	105		152			1.55	0.6143	198.369	136	114				69	2
03	8	110		140			1.55	0.6143	201.441	136	114				69	2
1317	8	115		115			1.53	0.6064	204.513	121	114				75	2
1322	14-1	120		122			1.54	0.6095	207.545	128	113				70	2
27	1	125		129			1.54	0.6106	210.593	130	113				69	2
32	1	130		131			1.54	0.6106	215.093	131	112				71	2
1337	2	135		134			1.54	0.6116	218.146	132	113				73	2
42	2	140		149			1.54	0.6122	221.204	133	113				70	2
47	2	145		150			1.54	0.6127	224.265	134	113				65	2
1352	3	150		135			1.54	0.6122	227.328	134	112				60	2
TOTAL							24.66		230.388							
AVERAGE				4103												

OP! (1307) AFT (1315)

1034

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specifiy ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± _____
POST: ± _____

IMPOS.DOC 1990

NORTH RUN C
PG 3

FIELD DATA

PLANT NWSW
DATE 11/30/00
LOCATION STERLING, IL
OPERATOR BP/WRT
STACK NO. NORTH BAGHOUSE
RUN NO. 2
SAMPLE BOX NO. AAXX
METER BOX NO. 611209

AMBIENT TEPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in
NOZZLE DIAMETER, in
STACK DIAMETER, in

PROBE HEATER SETTING
HEATER BOX SETTING
METER H@
C_p FACTOR
Y FACTOR

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET ($T_{m_{in}}$), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET ($T_{m_{out}}$), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1357	14-3	155		139			1.55	0.6132	230.388	134	114				62	2
02	3	160		152			1.55	0.6143	233.454	136	114				63	2
1407	4	165		146			1.55	0.6158	236.526	137	116				64	2
12	4	170		130			1.55	0.6158	239.6050	137	116				65	2
17	4	175		134			1.55	0.6158	242.684	137	116				66	2
1422	5	180		146			1.55	0.6164	245.763	138	116				66	2
27	5	185		148			1.55	0.6164	248.845	138	116				66	2
32	5	190		162			1.56	0.6174	251.927	139	117				66	2
1437	6	195		160			1.56	0.6174	255.014	139	117				67	2
42	6	200		156			1.56	0.6185	258.101	140	118				67	2
47	6	205		149			1.56	0.6190	261.1933	140	119				72	2
1452	7	210		137			1.56	0.6200	264.288	140	121				73	2
57	7	215		136			1.56	0.6190	267.388	139	120				73	2
02	7	220		135			1.56	0.6190	270.483	139	120				74	2
1507	8	225		118			1.56	0.6185	273.578	138	120				74	2
12	8	230		113			1.56	0.6174	276.671	137	119				74	2
TOTAL 17	8	235		109			1.55	0.6164	279.758	136	118				72	2
AVERAGE		240		134.9			1.546		282.839	120.6						

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specify ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± ____
POST: ± ____

IMPCS.DOC 1998

EPA Method 5 Results Calculation Sheet

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: South Baghouse Compartments 11 and 12
TEST DATE: 11130100
RUN NO: 2

Input:

Pbar	29.35 "Hg	Qst (total flow thru BH)	58,365,042 dscfh
Vlc	39 ml	Vbavg: (ave velocity thru BH)	1.87 fps
Mn	0.0051 grams	Vmstd	135.43 ft^3
Rt	240 minutes	Dn (nozzle dia.)	100 inches
AH	0.85 "H_2O	An (nozzle area)	0.00545 ft^3
Tmeter	107.2 "F	Yd	1.008
Toutlet	127 "F		

Calculations: English Units (29.92 in. Hg, 68" F)

Percent isokinetic:
%I = ((0.0945) • (To+460) • (Vrnstd)) / ((Ps) • (Vbavg) • (Rt) • (An) • (1-Bws)) = 97.8 %I

Volume of sample at standard conditions on dry basis:
Vmstd = (17.64) * (Vm) • (Yd) * ((Pbar + AH) / 13.6) / (Tm) = 124.873 dscf

Volume of water vapor in sample at standard conditions:
Vwstd = (0.04707 ft^3 / ml) • (Vlc) = 1.836 scf

Fractional moisture content of stack gas:
Bws = Vwstd / (Vmstd + Vwstd) = 0.0145 Bwo

Particulate Concentration:
Grains *particulate per dry standard cubic feet:*
gr/dscf = ((15.43 gr/gm) • (Mn)) / Vmstd = 0.0006 grldscf

Pounds particulate per dry standard cubic feet:
Ibldscf = ((2.205E-3 lb/gm) • (Mn)) I Vmstd) = 9.01E-08 lb/dscf

Particulate Emission Rate:
Pounds per hour of particulate:
lb/hr = ((gr/dscf) / (7000 gr/lb) • QsNorth (dscfh) = 2.628 lb/hr
(Assumed Qs South BH = Qstotal/2 = 29,182,521 dscfh)

Moisture Calculation **Summary**

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: South **Baghouse** Compartments 11 **and** 12
TEST DATE: 11/30/00
RUN NO: 2

INPUT

Vm:	135.430	cubic feet
Yd:	1.008	dimensionless
Pbar:	29.35	in. Hg
AH:	0.85	in. H_2O
Tm:	107.2	degrees F
Vlc:	39.0	milliliters

CALCUIATIONS

Volume of sample at standard conditions on dry basis:

English Units (29.92 in. Hg, 68° F)

Vmstd = (17.64)(Vm)(Yd)(Pbar+ΔH/13.6)/(Tm) = 124.873 dscf

Volume of water vapor in sample at standard conditions:

Vwstd = (0.04707 cu. ft/ml)(Vlc) = 1.836 scf

Fractional moisture content of stack gas:

Bws = Vwstd/(Vmstd+Vwstd) = **0.0145**

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Swish

FIELD DATA

PLANT Northwest Steel & Wire
DATE 11-30-00
LOCATION Sterling IL
OPERATOR SF & LG
STACK NO. South Baghouse
RUN NO. 2 4
SAMPLE BOX NO.
METER BOX NO. 604178

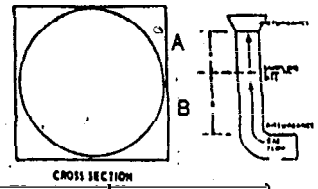
AMBIENT TEMPERATURE 96°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in. 1"
STACK DIAMETER, in.

PROBE HEATER SETTING 150
HEATER BOX SETTING 150
METER H@
C_d FACTOR 0.84
Y FACTOR 1.008

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
ANAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A- B=



	CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	OUTLET (Tm_{out}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in., Hg
	1030		0	–	120	–	–	.85		795.084	97	96	155	55	1
	1035	15-1	5		122			.95		797.5	101	95		48	1
	1040	-1	10		120			1.0		800.6	106	97		50	1
OP →	1045	-1	15		117			.98		803.4	108	97		50	1
ART →	1128	15-2	—		—			—		—	—	—		—	1
	1133	-2	20		102			.98		807.0	102	96		51	1
	1138	-2	25		109			.84		809.0	105	96		53	1
	1143	-2	30		113			.80		811.8	106	96		53	1
	1148	15-3	35		119			.79		814.8	108	96		53	1
	1153	-3	40		119			.79		817.6	109	97		54	1
	1158	-3	45		121			.79		820.4	110	97		54	1
	1203	15-4	50		130			.79		823.1	109	98		55	1
	1208	-4	55		132			.81		825.9	110	98		55	1
	1213	-4	60		131			.81		828.7	110	98		55	1
	1218	15-5	65		126			.81		831.4	112	99		56	1
	1223	-5	70		125			.82		834.2	112	99		57	1
	1228	-5	75		127			.82		837.1	112	101		58	1
	1233	15-6	80		130			.82		839.9	113	101		58	1
	1238	-6	85		127			.82		842.6	114	102		59	1
	1243	-6	90		125			.85		845.5	114	102		59	1
	1248	15-7	95		130			.86		848.4	114	102		60	1
	1253	15-7	100		135			.86		851.3	113	103		60	1
	1258	-7	105		140			.86		854.2	114	103		61	1
	TOTAL				2720			11.7							
	AVERAGE				123.6										

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL	114	100		SG	225
INITIAL	100ml	100ml	0ml	SG	200g
LIQUID COLLECTED	14	0			25

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK	
SYSTEM PRE:	0.005 CFM at 15" Hg
POST:	0.000 CFM at 15" Hg
PITOT PRE:	± ✓
POST:	± ✓

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FIELD DATA

PLANT Northwest Steel & Wire
DATE 11-30-00
LOCATION Sterling IL
OPERATOR SF & LG
STACK NO. S. Baghouse 13&14
RUN NO. 2
SAMPLE BOX NO.
METER BOX NO. 604178

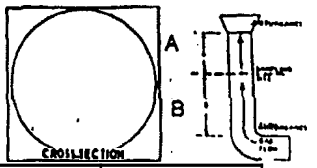
AMBIENT TEMPERATURE 95°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, In.
NOZZLE DIAMETER, In. 1"
STACK DIAMETER, In.

PROBE HEATER SETTING
HEATER BOX SETTING
METER H@
C_d FACTOR
Y FACTOR

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (In. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM In., Hg
1456	14-7	215	—	125	—	—	.85		916.3	112	102	155	53	.1
1501	-7	220		123			.86		919.1	112	102		55	1
1506	-7	225		117			.85		921.9	112	102		56	1
1511	14-8	230		113			.85		924.8	112			57	1
1516	-8	235		111			.85		927.7	115	103		58	1
STOP 1521	-8	240		[redacted]			[redacted]		930.514	[redacted]	[redacted]		58	1
TOTAL				577			4.26							
AVERAGE				127.0			.85		135.43	107.2				

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT 0
FINAL				56	
INITIAL	100 ml	100 ml	0 ml	56	200g
LIQUID COLLECTED					
TOTAL COLLECTED (specify ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: .005 CFM at 15" Hg
POST: .000 CFM at 15" Hg
PITOT PRE: + ✓ OK
POST: + ✓ OK

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FIELD DATA

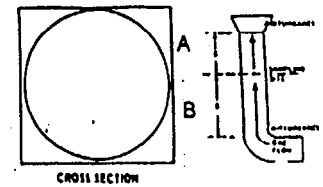
PLANT Northwest Steel & Wire
DATE 11-30-00
LOCATION Sterling IL
OPERATOR SF & LG
STACK NO. South Baghouse #13-14
RUN NO. 2
SAMPLE BOX NO.
METER BOX NO. 604178

AMBIENT TEMPERATURE 95°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE, % 2
PROBE LENGTH, In.
NOZZLE DIAMETER, In. 1"
STACK DIAMETER, In.

PROBE HEATER SETTING 150°F
HEATER BOX SETTING 150°F
METER $H_@$ 1.55
C_d FACTOR
Y FACTOR 1.008

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK
A= B=



	CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_S), °F	VELOCITY HEAD (ΔP_S)	VELOCITY HEAD ($\sqrt{\Delta P_S}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in., H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM In., Hg
EAT 1	1303	15-8	110	—	124	—	—	.85		857.1	115	104	155	61	1
OP →	1308	-8	115		122			.85		859.8	115	104		61	1
TART-	1315														
013-	1320	-8	120		115			.85		862.6	115	104			
RT 14	1321	—	—		—			—		—	—	—		—	
	1326	14-1	125		123			.85		865.4	115	105		62	1
	1331	-1	130		125			.85		868.2	116	105		63	1
	1336	-1	135		127			.85		871.0	116	105		63	1
	1341	14-2	140		132			.85		873.7	117	106		58	1
	1346	-2	145		140			.85		876.6	116	106		56	1
	1351	-2	150		134			.85		879.4	116	106		56	1
	1356	14-3	155		132			.85		882.2	116	106		54	1
	1401	-3	160		138			.85		885.1	116	106		54	1
	1406	-3	165		139			.86		887.9	116	106		53	1
	1411	14-4	170		131			.86		890.9	116	106		54	1
	1416	-4	175		129			.86		893.8	115	106		54	1
	1421	-4	180		131			.85		896.6	115	106		54	1
	1426	14-5	185		141			.88		899.4	113	105		54	1
	1431	-5	190		145			.80		902.3	114	105		54	1
	1436	-5	195		145			.83		905.1	114	105		54	1
	1441	14-6	200		143			.85		907.9	111	104		53	1
	1446	-6	205		137			.85		910.7	111	103		53	1
	1451	-6	210		132			.85		913.5	112	103		53	1
	TOTAL				2785/21			17.89							
	AVERAGE				132.6										

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL				SG	
INITIAL	100ml	100ml	0 ml	SG	200g
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: .005 CFM at 15' Hg
POST: CFM at 15' Hg
PITOT PRE: +
POST: +

Volumetric Flow Rate Cakulation Summary

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: Baghouse Inlet
TEST DATE: 11/30/00
RUN NO: 2

INPUT

CO_2	2	%
O_2	19	%
CO	0	%
N_2	79	%
Bws	0.0144	dimensionless
Stack Temp.	105.646	degrees F
Cp	0.84	dimensionless
Squareroot AP	0.7676	inches H_2O
Pbar	29.35	inches Hg
Pstatic	-1.60	inches H_2O
Stack Area	400.00	sq. ft.

CALCULATIONS:

English Units
139.92 in. Hg, 68° F)

Dry molecular weight of stack gas:

Md = O.44(%CO_2) + 0.32(%O_2) + 0.28(%N_2+%CO) = 29.08 lb/lb-mole

Molecular weight of stack gas, wet basis:

Ms = Md(1-Bws) + 18(Bws) = 28.921 lb/lb-mole

Pitot tube coefficient:

Cp (from calibration curve) = 0.84 dimensionless

Average velocity head of stack gas (sqroot of AP):

Square root of ΔP, average = 0.7676 inches H_2O

Average absolute stack gas temperature:

Ts = stacktemp (105.6) °F + 460 = 565.6 degrees R

Absolute stack gas pressure:

Ps = Pbar + (Static Pressure/13.6) = 29.23 inches Hg

Stack gas velocity:

Vs = 85.49(Cp)(sqroot ΔP)(sqroot((Ts)/(Ps*Ms))) = 45.091 feet/second

Stack gas volumetric flow rate:

acfm = (As)(Vs)(60) = 1,082,194 acfm

Stack gas volumetric flaw rate, wet basis:

Qs(wet) = 3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)) = 59,216,989 scfh

Qs(wet) = (3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)))/60 = 986,950 scfm

Stack gas volumetric flow rate, dry basis:

Qs(dry) = Qs(wet)(1-Bws) = 58,365,042 dscfh

Moisture Determination Using Wet Bulb/Dry Bulb Temperatures

Company: Northwestern Steel and Wire
Location: Sterling, Illinois
Source: Baghouse Inlet
Test Date: 11/30/00
Run #: 2

Input

Pbar	29.35 **in. Hg**
Static Pressure	**-1.6 in. H_2O**
Wet bulb (tw)	72 **"Fahrenheit**
Dry bulb (td)	105.6 **"Fahrenheit**

Calculations

Absolute stack pressure:
Ps = ***Pbar*** + (Static / 13.6) = 29.23 **in H_2O**

Saturated vapor pressure of dry bulb (svp): = 0.7907 **in. Hg**

Actual vapor pressure:
Vp = svp-[(2.336 x 10^{-7}) x Ps x (td-tw) x (1539+tw)] = 0.4206 **in.** Hg

Fractional moisture content:
Bwo = Vp/Ps = 0.0144 Bwo

Percent moisture:
% moisture = Bwo x 100 = 1.44 **%**

SAMPLE FLOW RATE CALCULATION SUMMARY

COMPANY: Northwestern Steel and Wire
LOCATION Sterling, Illinois
SOURCE: Baghouse Inlet
TEST DATE: 11/30/00
RUN NO.: 2

INPUT DATA	North		South	
No. of Baghouse Comp. In Service (N)	24		24	
Compartment Area (Ac)[1]	374.625 sq. R.		374.626 sq. R.	
Baghouse Inlet Flow Rate (Qi)	972,751 dscfm		972,751 dscfm	
Nozzle Diam (Di)	1.0 in.		1.0 in.	
Nozzle Area (As)	0.00546 sq. ft.		0.00545 sq. ft.	
Baghouse Outlet Temp (To)	134.9 deg F		127 deg F	
Baghouse inlet Temp (Tin)	105.65 deg F		105.65 deg F	
Meter temperature (Tm)	120.60 deg F		107.20 deg F	
BAGHOUSE COMPARTMENT VELOCITY				
Vb = [(Qi)/N *(To/Tin)*1/(Ac*60)]*To	1.896		1.871 fps	
w/o To	0.0032 *To =	1.8965	0.0032 *To =	1.8713
Desired Sample Flow Rate (Icfm)				
Icfm = Vb*60*An*(1-Bwo)*Tm/To	0.597 cfm		0.583 cfm	
w/o Tm/To use to calc cfm at each pt	0.00103 *Tm =	0.697	0.0010 *Tm =	0.583
To's cancel out				

[1]Compartment Dimensions 20'3" x 18'6"

Moisture and Flow Calculation Spreadsheet

Sheets 2 and 3 contain the actual printouts for moisture and volumetric flow calculation sheets.
Enter the raw data for calculations in the spaces below:

Company: Northwestern Steel and Wire
Location: Sterling, Illinois
Source: Baghouse Inlet
Test Date: 11/30/00
Run#: 2

Barometric Pressure	29.35	**in. Hg**	**Inlet Duct Area**	400.000 **sq. ft.**
Static Pressure	-1.6	**in. H_2O**	**Square Root of AP**	0.768 **in. H_2O**
% **Oxygen (O_2)**	19.0		**Stack Temperature**	105.6 F
% **Carbon Dioxide (CO_2)**	2.0		**Wet Bulb Temperature**	72.0 **F**
% **Nitrogen (N_2)**	79		**Pitot Coefficient**	**0.840**

		dp	sqrt dp	Ts			dp	sqrt dp	Ts
A	1	0.45	**0.671**	112	**E**	1	0.58	**0.762**	**105**
	2	0.53	**0.728**	112		2	0.66	**0.812**	**102**
	3	0.6	**0.775**	**114**		3	0.61	**0.781**	**102**
	4	0.64	**0.800**	**114**		4	0.63	**0.794**	**102**
	5	0.53	**0.728**	**116**		5	0.63	**0.794**	**100**
	6	0.49	**0.700**	**117**		6	0.47	**0.686**	**100**
B	1	0.58	**0.762**	**111**	F	1	0.69	**0.831**	**100**
	2	0.61	**0.781**	**111**		2	0.6	**0.775**	**100**
	3	0.69	**0.831**	**111**		3	0.66	**0.812**	**100**
	4	0.68	**0.825**	**114**		4	0.59	**0.768**	**100**
	5	0.64	**0.800**	**116**		5	0.6	**0.775**	**100**
	6	0.48	**0.693**	**118**		6	0.48	**0.693**	**95**
C	1	0.65	**0.806**	108	G	1	0.65	**0.806**	**103**
	2	0.63	**0.794**	**109**		2	0.65	**0.806**	**103**
	3	0.6	**0.775**	**109**		3	0.66	**0.812**	**100**
	4	0.62	**0.787**	**109**		4	**0.67**	**0.819**	**100**
	5	0.66	**0.812**	112		5	0.59	**0.768**	**100**
	6	0.48	**0.693**	112		6	0.51	**0.714**	**98**
D	1	0.58	**0.762**	106	**H**	1	0.5	**0.707**	**100**
	2	0.62	**0.787**	**106**		2	0.62	**0.787**	**100**
	3	0.6	**0.775**	**106**		3	0.6	**0.775**	**100**
	4	0.63	**0.794**	**106**		4	0.68	**0.825**	**100**
	5	0.62	**0.787**	**106**		5	**0.55**	**0.742**	**100**
	6	0.48	**0.693**	**106**		6	0.42	**0.648**	**100**
		SUM	**18.357**	2661			**SUM**	**18.490**	**2410**
							AVERAGE	**0.7676**	**105.65**

VELOCITY TRAVERSE AND CYCLONIC FLOW VERIFICATION

PLANT: NWS+W
DATE: 11/30/00
LOCATION: Sterling IL
SOURCE: EAF #8 BH Inlet Duct
STACK I.D.: 20' x 20'
BAROMETRIC PRESSURE, in. Hg:
OPERATORS: LG/SF/BP/BC

A B C D E F G H

SCHEMATIC OF TRAVERSE POINT LAYOUT

40°F Ambient

RUN NO. 2 STATIC, in. H_2O -1.60

TRAVERSE POINT NUMBER		VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
A	1	0.45	112	
	2	0.53	112	
	3	0.60	114	
	4	0.64	114	
	5	0.53	116	
	6	0.49	117	
B	1	0.58	111	
	2	0.61	111	
	3	0.69	111	
	4	0.68	114	
	5	0.64	116	
	6	0.48	118	
C	1	0.65	108	
	2	0.63	109	
	3	0.60	109	
	4	0.62	109	
	5	0.66	112	
	6	0.48	112	
D	1	0.58	106	
	2	0.62	106	
	3	0.60	106	
	4	0.63	106	
	5	0.62	106	
	6	0.48	106	
		18.357	266.1 ~~264~~	
AVERAGE				

RUN NO. 2 STATIC, in. H_2O -1.60

TRAVERSE POINT NUMBER		VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
E	1	0.58	105	
	2	0.66	102	
	3	0.61	102	
	4	0.63	102	
	5	0.63	100	
	6	0.47	100	
F	1	0.69	100	
	2	0.60	100	
	3	0.66	100	
	4	0.59	100	
	5	0.60	100	
	6	0.48	95	
G	1	0.65	105	
	2	0.65	103	
	3	0.66	100	
	4	0.67	100	
	5	0.59	100	
	6	0.51	98	
H	1	0.50	100	
	2	0.62	100	
	3	0.60	100	
	4	0.68	100	
	5	0.55	100	
	6	0.42	100	
		18.490	1410	
AVERAGE		0.7677	105.6	

EPA Method 5 Results Calculation Sheet

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: North Baghouse Compartments 21 and 22
TEST DATE: 1211/00
RUN NO: 3

Input:

Pbar	29.45	"Hg	Qst (total flow thru BH)	58,217,409	dscfh
Vlc	39.4	ml	Vbavg:(ave velocity thru BH)	1.72	fps
Mn	0.0049	grams	Vmstd	177.13	ft^3
Rt	335	minutes	Dn (nozzle dia.)	1.00	inches
DH	1.351	"H_2O	An (nozzle area)	0.00545	ft^3
Tmeter	76.3	°F	Yd	1.002	
Toutlet	123.299	°F			

Calculations:

English Units (29.92 in. Hg, 68° F)

Percent isokinetic:
.%I= ((0.0945) • (To+460) • (Vmstd))/((Ps) • (Vbavg) • (Rt) • (An) • (1-Bws)) = 104.1 %I

Volume of sample at standard conditions on dry basis:
Vmstd = (17.64) • (Vm) • (Yd) • ((Pbar + DH) / 13.6) / (Tm) = 172.491 dscf

Volume of water vapor in sample at standard conditions:
Vwstd = (0.04707 ft^3/ml) • (Vlc) = 1.855 scf

Fractional moisture content of stack gas:
Bws = Vwstd/(Vmstd + Vwstd) = 0.0106 Bwo

Particulate Concentration:
Grains particulate per dry standard cubic feet:
grldscf = ((15.43 grlgm) • (Mn))/Vmstd = 0.0004 grldscf

Pounds particulate per dry standard cubic feet:
lb/dscf = ((2.205E-3 lblgm) • (Mn)) / Vmstd) = 6.26E-08 lb/dscf

Particulate Emission Rate:
Pounds per hour of particulate:
lb/hr = ((grldscf) / (7000 gr/lb) • QsNorth (dscfh) = 1.823 lblhr
(Assumed Qs North BH = Qstotal/2 = 29,108,705 dscfh)

Moisture Calculation Summary

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: North Baghouse Compartments 21 and 22
TEST DATE: 12/1/00
RUN NO: 3

INPUT

Vm:	177.130	cubic feet
Yd:	1.002	dimensionless
Pbar:	29.45	in. Hg
AH:	1.35	in. H_2O
Tm:	76.3	degrees F
Vlc:	39.4	milliliters

CALCULATIONS

Volume of sample at standard conditions on dry basis:

English Units (29.92 in. Hg, 68° F)

Vmstd = (17.64)(Vm)(Yd)(Pbar+ΔH/13.6)/(Tm) = 172.491 dscf

Volume of water vapor in sample at standard conditions:

Vwstd = (0.04707 cu. ft/ml)(Vlc) = 1.855 scf

Fractional moisture content of stack gas:

Bws = Vwstd/(Vmstd+Vwstd) = 0.0106

NORTH RUN S
Pg 1

FIELD DATA

PLANT NWSW
DATE 12/1/00
LOCATION STERLING, IL
OPERATOR BP/WCT
STACK NO. NORTH BAGHOUSE
RUN NO. 3
SAMPLE BOX NO. APEX
METER BOX NO. 6

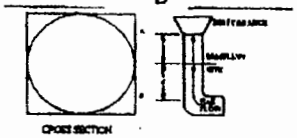
AMBIENT TEPERATURE 100
BAROMETRIC PRESSURE 29.45
ASSUMED MOISTURE, % 0.4%
PROBE LENGTH, in. 10'
NOZZLE DIAMETER, in. 1.000
STACK DIAMETER, in.

PROBE HEATER SETTING 175'
HEATER BOX SETTING 175'
METER H@ 1.890
C_p FACTOR 0.84
Y FACTOR 1.0020

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F (15)	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET ($T_{m_{in}}$), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET ($T_{m_{out}}$), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
910	21-1	0		97			1.39	.551	281.600	90	92				60	2
15	2	5		108			1.39	.552	284.36	92	91				59	2
20	2	10		118			1.39	.554	287.12	96	91				59	2
925	2	15		120			1.40	.555	289.89	99	91				61	2
30	2	20		134			1.40	.556	292.67	101	91				62	2
35	2	25		136			1.40	.558	295.45	103	92				63	2
940	3	30		135			1.40	.557	298.24	102	92				63	2
45	3	35		129			1.40	.557	301.03	102	92				64	2
50	3	40		133			1.40	.557	303.82	102	92				64	2
955	4	45		138			1.41	.559	306.61	104	93				64	2
00	4	50		139			1.41	.559	309.41	105	93				65	2
05	4	55		132			1.40	.558	312.21	103	92				65	2
1010	5	60		125			1.40	.556	315.00	100	92				60	2
14	5	65		134			1.39	.551	317.78	92	89				58	2
16	5	70		138			1.38	.546	320.54	88	84				59	2
									323.27							
TOTAL				1916			20.96			1479	1367					
AVERAGE																

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL	114	100			225.4
INITAL	100	100			200
LIQUID COLLECTED	14				25.4
TOTAL _____ COLLECTED (specify ml or g)					39.4

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: 0.00 CFM at 15" Hg
POST 0.00 CFM at 15" Hg
PITOT PRE: ± ✓ OK
POST: ± ✓ OK

IMPCS.DOC 1990

NORTH RUN 3
Pg 2

FIELD DATA

PLANT NWSW
DATE 12/1/60
LOCATION Sterling, IL
OPERATOR BP/WCJ
STACK NO. NORTH BAGHOUSE
RUN NO. 3
SAMPLE BOX NO. APEX
METER BOX NO. _____

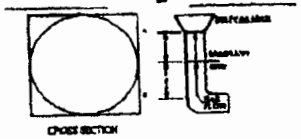
AMBIENT TEPERATURE _____
BAROMETRIC PRESSURE _____
ASSUMED MOISTURE, % _____
PROBE LENGTH, in. _____
NOZZLE DIAMETER, in. _____
STACK DIAMETER, in. _____

PROBE HEATER SETTING _____
HEATER BOX SETTING _____
METER H@ _____
C_d FACTOR _____
Y FACTOR _____

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= _____ B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O) (16)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET (Tm_{out}), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1025	21-6	75	141				1.38	0.546	323.27	90	82				59	2
30	6	80	134				1.37	0.545	326.00	88	82				56	2
35	6	85	131				1.36	0.541	328.73	84	78				56	2
1040	7	90	130				1.36	0.540	331.44	83	76				56	2
45	7	95	133				1.35	0.538	334.14	81	74				56	2
50	7	100	142				1.35	0.537	336.83	81	73				55	3
1055	8	105	141				1.35	0.534	339.52	76	72				55	3
1125	8	110	101				1.32	0.524	342.19	64	63				49	2
30	8	115	109				1.32	0.526	344.81	67	64				46	2
1135	22-1	120	114				1.33	0.528	347.44	70	65				47	2
1155	1	125	103				1.31	0.521	350.08	57	65				42	2
1200	1	130	104				1.31	0.522	352.69	58	65				42	2
1205	2	135	112				1.31	0.520	355.30	59	61				42	2
10	2	140	116				1.31	0.521	357.90	63	58				43	2
15	2	145	118				1.31	0.521	360.51	63	58				43	2
1220	3	150	115				1.31	0.521	363.12	65	56				44	2
TOTAL			1944				21.35		365.73	1149	1092					
AVERAGE																

TOP (1100) START (1125)
TOP (1139) START 1155

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specifiy ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± _____
POST: ± _____

IMPOS.DOC 1990

20

NORTH RUNS
pg3

FIELD DATA

PLANT NWSW
DATE 12/1/00
LOCATION SBRUNG, L
OPERATOR BP/WCT
STACK NO. NORTH BOILER
RUN NO. 3
SAMPLE BOX NO. APGX
METER BOX NO.

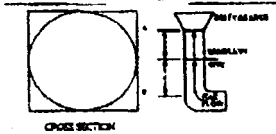
AMBIENT TEPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in.
STACK DIAMETER, in.

PROBE HEATER SETTING
HEATER BOX SETTING
METER H@
C_d FACTOR
Y FACTOR

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET ($T_{m_{in}}$), °F	GAS SAMPLE TEMP AT DRY GAS METER OUTLET ($T_{m_{out}}$), °F	PROBE TEMP. °F	SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
1225	22-3	155		113			1.31	0.519	365.73	63	55				41	2
30	3	160		115			1.30	0.517	368.33	60	53				40	2
1235	4	165		119			1.30	0.515	370.59	58	51				39	2
40	4	170		123			1.29	0.514	373.17	57	50				40	2
45	4	175		120			1.29	0.513	375.74	57	49				40	2
1250	5	180		117			1.29	0.514	378.31	59	48				41	2
55	5	185		120			1.29	0.514	380.88	60	48				41	2
00	5	190		122			1.29	0.514	383.45	60	48				41	2
1305	6	195		130			1.30	0.515	386.02	62	48				45	2
1310	6	200		133			1.31	0.518	388.595	65	51				47	2
15	6	205		135			1.31	0.520	391.185	67	52				49	2
1320	7	210		136			1.32	0.522	393.79	71	53				50	2
29	7	215		137			1.33	0.527	396.40	76	58				53	2
30	7	220		121			1.34	0.532	399.04	82	61				57	2
1335	8	225		116			1.33	0.536	401.70	86	66				56	2
1350	8	230		116			1.33	0.529	404.38	73	65				51	2
TOTAL	8	235		116			1.35	0.535	407.03	84	66				56	2
AVERAGE		240		2089			22.28		409.71	1140	922					

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL					
INITAL					
LIQUID COLLECTED					
TOTAL _____ COLLECTED (specify ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: _____ CFM at 15" Hg
POST: _____ CFM at 15" Hg
PITOT PRE: ± ____
POST: ± ____

IMPOS.DOC 1998

NORTH RUNS
pg. 4

FIELD DATA

PLANT	NWSW
DATE	12/1/00
LOCATION	STEELWG
OPERATOR	WC / BR
STACK NO.	NORTH BAG HOUSE
RUN NO.	3
SAMPLE BOX NO.	APEX
METER BOX NO.	611209
START TIME	

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in.
STACK DIAMETER, in.
MINUTES PER POINT
NUMBER OF POINTS
NUMBER OF PORTS 19

PROBE HEATER SETTING
HEATER BOX SETTING
METER $H_@$
C_p FACTOR
Y_d FACTOR

WEIGHT OF PARTICULATE mg

FILTER NO.	
TARE WT.	
GROSS WT.	
NET WT.	
TOTAL	mg

A= ____ B= ____

CROSS SECTION

CLOCK TIME	STACK TEMP. °F	VACUUM mm Hg	STACK PRESSURE in. H2O	STACK DP in. H2O	GAS SAMPLED ft³ (ft³)	GAS SAMPLED ft³ (m³)	ORIFICE METER ΔH@ ΔH	ORIFICE METER ΔH@ REQUIRED	GAS SAMPLED VOLUME ft³ (m³)	GAS TEMP. ORIFICE METER INLET °F	GAS TEMP. ORIFICE METER OUTLET °F	GAS TEMP. VOLT. °F	GAS TEMP. VOLT. °F	GAS TEMP. VOLT. °F	CROSS SECTION	VACUUM in. Hg
1400	22-8	240		117			1.36	0.539	409.71	89	66				59	2
05	8	245		117			1.37	0.542	412.41	93	71				61	2
10	8	250		117			1.38	0.547	415.12	96	77				60	2
1415	7	255		104			1.37	0.544	415.12	88	80				57	2
20	7	260		109			1.35	0.537	417.84	82	72				55	2
25	7	265		111			1.36	0.539	420.53	85	72				57	2
1430	6	270		115			1.36	0.540	423.225	87	73				59	2
35	6	275		120			1.37	0.543	425.93	91	75				60	2
40	6	280		121			1.37	0.543	428.65	90	76				60	2
1445	5	285		123			1.37	0.544	431.37	91	76				60	2
50	5	290		127			1.37	0.546	434.09	92	79				58	2
55	5	295		131			1.37	0.545	436.79	91	78				58	2
1300	4	300		131			1.37	0.543	439.52	90	76				57	2
05	4	305		130			1.37	0.542	442.24	89	75				57	2
10	4	310		126			1.37	0.543	444.95	91	75				58	2
1315	3	315		131			1.37	0.543	447.67	86	79				58	2
20	3	320		126			1.36	0.539	450.39	88	78				55	2
25	3	325		131			1.36	0.539	453.09	83	74				57	2
1330	2	330		125			1.33	0.527	455.79	75	58					
35	2	335							458.730							
40	2															
1345	1															
	1															
	1															
TOTAL				2312			25.93			16.69	1412					
AVERAGE																

123.279 — 1.351 — 177.130 — 76.34

9437 4795

VOLUME OF WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) #1	#2	#3	#4	SILICA GEL WEIGHT g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL	COLLECTED (specify ml or g)				

ORSAT DATA	TIME	CO_2	O_2
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average			

LEAK CHECK

SYSTEM PRE: ____ CFM@15"Hg
POST: ____ CFM@15"Hg

PITOT PRE: ____ @ > 2" Hg
POST: ____ @ > 2" Hg

21

EPA Method 5 Results Calculation Sheet

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: South Baghouse Compartments 19 and 20
TEST DATE: 1211100
RUN NO: 3

Input:

Pbar	29.45 "Hg	Qst (total flow thru BH)	58,217,409 dscfh
Vlc	49.8 ml	Vbavg: (ave velocity thru BH)	1.69 fps
Mn	0.004 grams	Vmstd	176.2 ft^3
Rt	330 minutes	Dn (nozzle dia.)	100 inches
AH	0.7855 "H_2O	An (nozzle area)	0.00545 ft^3
Tmeter	75.634 "F	Yd	1.008
Toutlet	115.866 °F		

Calculations:

English Units
129.92 in. Hg, 68° F)

Percent isokinetic:
%I = ((0.0945) • (To+460) • (Vmstd)) / ((Ps) • (Vbavg) • (Rt) • (An) • (I-Bws)) = 106.1 %I

Volume of sample at standard conditions on dry basis:
Vmstd = (17.64) • (Vm) • (Yd) • ((Pbar + AH)/ 13.6) / (Tm) = 172.597 dscf

Volume of water vapor in sample at standard conditions:
Vwstd = (0.04707 ft^3 / ml) • (Vlc) = 2.344 scf

Fractional moisture content of stack gas:
Bws = Vwstd1 (Vmstd + Vwstd) = 0.0134 Bwo

Particulate Concentration:
Grains particulate per dry standard cubic feet:
gr/dscf = ((15.43 gr/gm) • (Mn)) / Vmstd = 0.0004 gr/dscf

Pounds particulate per dry standard cubic feet:
lb/dscf = ((2.205E-3 lb/gm) • (Mn)) / Vmstd) = 5.11E-08 lb/dscf

Particulate Emission Rate:
Pounds per hour of particulate:
lb/hr = ((gr/dscf) / (7000 gr/lb) • QsNorth (dscfh) = 1.488 lb/hr
(Assumed Qs South BH = Qstotal/2 = 29,108,705 dscfh)

Moisture Calculation Summary

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: South Baghouse Compartments 19 and 20
TEST DATE: 12/1/00
RUN NO: 3

INPUT

Vm:	176.200	**cubic feet**
Yd:	1.008	**dimensionless**
Pbar:	29.45	**in. Hg**
AH:	0.79	**in. H_2O**
Tm:	**75.6**	**degrees F**
Vlc:	49.8	**milliliters**

CALCULATIONS

Volume of sample at standard conditions on dry basis: — **English Units (29.92 in. Hg, 68° F)**

Vmstd = (17.64)(Vm)(Yd)(Pbar+ΔH/13.6)/(Tm) = 172.597 **dscf**

Volume of water vapor in sample at standard conditions:

Vwstd = (0.04707 cu. ft/ml)(Vlc) = 2.344 **scf**

Fractional moisture content of stack gas:

Bws = Vwstd/(Vmstd+Vwstd) = **0.0134**

ARI Environmental Inc.

FIELD DATA

ON BACK SCHEMATIC OF STACK

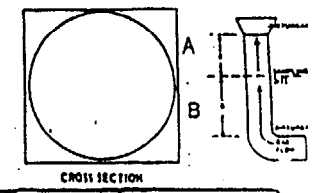
PLANT Northwest Steel & Wire
DATE 12-1-00
LOCATION Sterling IL.
OPERATOR SF & CG
STACK NO. S. Baghouse 19&20
RUN NO. 3
SAMPLE BOX NO.
METER BOX NO. 604178

AMBIENT TEMPERATURE 91°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE,% 2
PROBE LENGTH,In.
NOZZLE DIAMETER,In. 1"
STACK DIAMETER, In.

PROBE HEATER SETTING 150°F
HEATER BOX SETTING 150°F
METER H@ 1.55
C_d FACTOR 0.84
Y FACTOR 1.008

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

A= B=



(23)

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (Θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	OUTLET (Tm_{out}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM In., Hg
0910		0	—	97	—	—	.87	≈0.868	932.000	92	92	230	60	/
0915	19-1	5		112			.85		934.7	95	92		60	/
0920	-1	10		114			.84		937.5	98	92		60	/
0925	-1	15		114			.84		940.3	100	92		60	/
0930	19-2	20		123			.84		943.1	103	93		60	/
0935	-2	25		127			.84		945.9	104	93		60	/
0940	-2	30		128			.84		948.7	104	94		60	/
0945	19-3	35		122			.85		951.6	104	94		60	/
0950	-3	40		122			.85		954.4	105	94		60	/
0955	-3	45		124			.85		957.2	105	94		60	/
1000	19-4	50		126			.85		960.0	105	95		61	/
1005	-4	55		122			.85		962.8	104	95		60	/
1010	-4	60		119			.86		965.6	102	94		60	/
1015	19-5	65		125			.86		968.4	98	92		56	/
1020	-5	70		123			.86		971.2	92	89		52	/
1025	-5	75		125			.84		973.7	90	85		50	/
1030	19-6	80		123			.84		976.4	88	83		49	/
1035	-6	85		118			.84		979.2	88	81		49	/
1040	-6	90		120			.83		982.0	85	79		47	/
1045	19-7	95		121			.79		984.9	85	78		48	/
1050	-7	100		130			.80		987.6	83	76		47	/
HEAT #1 1055	-7	105		130			.74		990.3	82	75		46	/
TOP → 1100	19-8	110		117			.75		992.7	79	72		45	/
START HEAT #2 1125	—	—		—			—		—	—	—		—	
TOTAL				2782			19.18			2191	2024			
AVERAGE														

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL	134	-12	0	SG	227.8
INITIAL	100 ml	100 ml	0 ml	SG	200.0
LIQUID COLLECTED	34	-12			27.8
TOTAL COLLECTED (specify ml or g)					49.8

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK	
SYSTEM PRE: 0.005 CFM at 15" Hg	
POST: 0.000 CFM at 15" Hg	
PITOT PRE: ± ✓ OK	
POST: ± ✓ OK	

ARI Environmental Inc.

FIELD DATA

PLANT Northwest Steel & Wire
DATE 12-1-00
LOCATION Sterling IL.
OPERATOR SF & LG
STACK NO S Baghouse 19 & 20
RUN NO. 3
SAMPLE BOX NO.
METER BOX NO. 604178

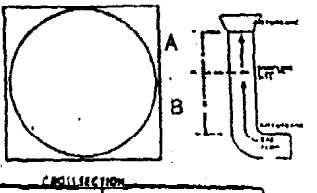
AMBIENT TEMPERATURE 95°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE,% 2
PROBE LENGTH, in.
NOZZLE DIAMETER, in. 1"
STACK DIAMETER, in.

PROBE HEATER SETTING 250°F
HEATER BOX SETTING 150°F
METER H@ 1.55
C_d FACTOR
Y FACTOR 1.008

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in., Hg
1130	19-8	115	–	107			.77		995.1	70	64	230	44	
1135	-8	120		111			.76		997.5	76	64		44	
1140	20-1	125		108			.77		1000.2	78	66		44	
1200	-1	130		106			.76		2.7	61	61		41	
1205	-1	135		110			.76		5.0	64	61		40	
1210	20-2	140		111			.76		7.5	67	58		40	
1215	-2	145		112			.76		10.1	65	57		40	
1220	-2	150		113			.76		12.7	66	56		40	
1225	20-3	155		111			.76		16.3	66	55		40	
1230	-3	160		109			.76		18.9	66	55		40	
	-3	165		114			.76		21.5	63	53		40	
	20-4	170		112			.76		23.9	64	51		41	
1245	20-4	175		110			.76		26.5	64	51		41	
	20-4	180		93			.76		29.0	64	51		42	
1255	20-5	185		119			.76		31.6	64	51		42	
1300	-5	190		11			.76		34.2	65	51		42	
1305	-5	195		118			.76		36.8	64	51		42	
1310	20-6	200		121			.76		39.4	65	51		42	
1315	-6	205		121			.76		42.0	65	52		42	
1320	-6	210		121			.76		44.5	71	55		43	
1325	20-7	215		119			.76			73	55		44	
1330	-7	220		117			.76		49.6	74	56		45	
1335	-3	225		113			.76		52.2	75	57		45	
1345														
TOTAL				2593			17.50			1550	1282			
AVERAGE														

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT 5
FINAL				5G	
INITIAL	100ml	100ml	0 ml	5G	200g
LIQUID COLLECTED					
TOTAL COLLECTED (specify ml or g)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK
SYSTEM PRE: .005 CFM at 15" Hg
POST: CFM at 15" Hg
PITOT PRE: ±
POST: ±

ARI Environmental Inc.

FIELD DATA

PLANT Northwest Steel & Wire
DATE 12-1-00
LOCATION Sterling IL
OPERATOR SF & RG
STACK NO. S Baghouse 196
RUN NO. 3
SAMPLE BOX NO.
METER BOX NO. 604178

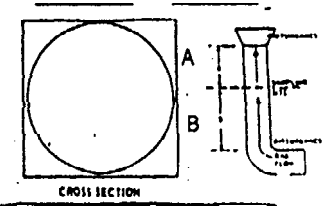
AMBIENT TEMPERATURE 96°F
BAROMETRIC PRESSURE
ASSUMED MOISTURE,% 2
PROBE LENGTH,In.
NOZZLE DIAMETER,In. 1"
STACK DIAMETER,In.

PROBE HEATER SETTING 180°F
HEATER BOX SETTING 150°F
METERH, 1.55
C_d FACTOR 0.84
Y FACTOR 1.008

WEIGHT OF PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

SCHEMATIC OF STACK

A= B=



(2)

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (Θ), min.	STATIC PRESSURE (In. H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS SAMPLE TEMP AT DRY GAS METER INLET (Tm_{in}), °F	OUTLET (Tm_{OUT}), °F	SAMPLE BOX TEMPERATURE °F	TEMP OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM In., Hg
1350	20-8	230	—	112	—	—	.76	≈0.863	54.8	64	60	230	46	
1355	-8	235		110			.77		57.4	73	57		44	
1400	-8	240		111			.75		59.9	81	62		48	
1405	20-8	245		104			.76		62.5	85	66		51	
1410	-8	250		111			.76		65.0	84	68		52	
1415	-8	255		108			.76		67.6	79	69		50	
1420	20-7	260		108			.76		70.2	80	67		49	
1425	-7	265		107			.76		72.8	79	67		45	
1430	-7	270		106			.76		75.4	79	67		41	
1435	20-6	275		112			.76		78.0	81	68		43	
1440	-6	280		110			.76		80.6	82	70		47	
1445	-6	285		116			.76		83.2	84	71		51	
1450	20-5	290		117			.75		85.8	84	71		51	
1455	-5	295		120			.76		88.4	84	71		52	
1500	-5	300		120			.76		91.0	83	72		52	
1505	20-4	305		119			.76		93.6	82	71		50	
1510	-4	310		118			.76		96.2	78	70		49	
1515	-4	315		118			.76		98.8	78	70		49	
1520	20-3	320		119			.76		101.4	76	69		48	
1525	-3	325		121			.76		103.9	76	67		48	
1530	-3	330		121			.76		106.5	76	67		48	
1532									108.200					
				2388			15.95			1668	1420			
TOTAL				115.866			.7855		1767		75.637			
AVERAGE														

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT g
FINAL				SG	
INITIAL	100ml	100ml	0ml	SG	200g
LIQUID COLLECTED					
TOTAL					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
4				

LEAK CHECK	
SYSTEM PRE: .005 CFM at 15" Hg	
POST: CFM at 15" Hg	
PITOT PRE: ±	
POST: ±	

Volumetric Flow Rate Calculation Summary

COMPANY: Northwestern Steel and Wire
LOCATION: Sterling, Illinois
SOURCE: Baghouse Inlet
TEST DATE: 12/1/00
RUN NO: 3

INPUT

CO_2	1	%
O_2	20	%
CO	0	%
N_2	79	%
Bws	0.0128	dimensionless
Stack Temp.	151.58	degrees F
Cp	0.84	dimensionless
Squareroot AP	0.7922	inches H_2O
Pbar	29.45	inches Hg
Pstatic	-1.65	incha H_2O
Stack Area	400.00	aq. ft.

CALCULATIONS:

English Units (29.92 in. Hg, 68° F)

Dry molecular weight of atack gas:

$Md = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2+\%CO)$ = 28.96 lb/lb-mole

Molecular weight of stack gas, wet basis:

$Ms = Md(1-Bws) + 18(Bws)$ = 28.820 lb/lb-mole

Pitot tube coefficient:

Cp (from calibrationcurve) = 0.84 dimensionless

Average velocity head of stack gas (sqroot of AP):

Square root of AP, average = 0.7922 inches H_2O

Average absolute atack gas temperature:

Ts = stacktemp (151.6) °F + 460 = 611.6 degrees R

Absolute stack gas pressure:

Ps = Pbar + (Static Pressure/13.6) = 29.33 inches Hg.

Stack gas velocity:

Vs = 85.49(Cp)(sqroot ΔP)(sqroot((Ts)/(Ps*Ms))) = 48.392 feet/second

Stack gas volumetric flow rate:

acfm = (As)(Vs)(60) 1,161,397 acfm

Stack gas volumetric flow rate, wet basis:

Qs(wet) = 3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)) = 58,971,140 scfh

Qs(wet) = (3600(Vs)(As)((Tstd*Ps)/(Ts*Pstd)))/60 = 982,852 scfm

Stack gas volumetric flow rate, dry basis:

Qs(dry) = Qs(wet)(1-Bws) = 58,217,409 dscfh

Moisture Determination Using Wet Bulb/Dry Bulb Temperatures

Company: Northwestern Steel and Wire
Location: Sterling, Illinois
Source: Baghouse Inlet
Test Date: 12/1/00
Run #: 3

Input

Pbar	29.45	**in. Hg**
Static Pressure	-1.65	**in. H_2O**
Wet bulb (tw)	83.0	**"Fahrenheit**
Dry **bulb (td)**	151.6	**"Fahrenheit**

Calculations

Absolute stack pressure:
Ps = ***Pbar*** + (Static / 13.6) = 29.33 **in H_2O**

Saturated vapor pressure of dry bulb (svp): = 1.137 **in. Hg**

Actual vapor pressure:
Vp = svp-[(2.336 x 10^{-7}) x Ps x (td-tw) x (1539+tw)] = 0.3749 **in. Hg**

Fractional moisture content:
Bwo = Vp/Ps = 0.0128 **Bwo**

Percent moisture:
% moisture = Bwo x 100 = 1.28 **%**

Moisture and Flow Calculation Spreadsheet

Sheets 2 and 3 contain the actual printouts for moisture and volumetric flow calculation sheets.
Enter the raw data for calculations in the spaces below:

Company: Northwestern Steel and Wire
Location: Sterling, Illinois
Source: Baghouse Inlet
Test Date: 12/1/00
Run # : 3

Barometric Pressure	29.45	in. Hg	Inlet Duct Area	400.000 sq. ft.
Static Pressure	-1.65	in. H_2O	Square Root of AP	0.792 in. H_2O
% Oxygen (O_2)	20.0		Stack Temperature	151.6 F
% Carbon Dioxide (CO_2)	1.0		Wet Bulb Temperature	83.0 F
% Nitrogen (N_2)	79		Pitot Coefficient	0.840

		dp	sqrt dp	Ts			dp	sqrt dp	Ts
A	1	0.65	0.806	123	E	1	0.66	0.812	129
	2	0.72	0.849	127		2	0.68	0.825	135
	3	0.74	0.860	131		3	0.7	0.837	150
	4	0.76	0.872	136		4	0.7	0.837	168
	5	0.78	0.883	141		5	0.6	0.775	176
	6	0.52	0.721	145		6	0.43	0.656	178
B	1	0.73	0.854	125	F	1	0.56	0.748	130
	2	0.73	0.854	132		2	0.64	0.800	140
	3	0.82	0.906	132		3	0.65	0.806	140
	4	0.82	0.906	135		4	0.65	0.806	175
	5	0.77	0.877	148		5	0.6	0.775	185
	6	0.68	0.825	154		6	0.38	0.616	190
C	1	0.72	0.849	123	G	1	0.58	0.762	130
	2	0.7	0.837	122		2	0.62	0.787	136
	3	0.75	0.866	128		3	0.58	0.762	156
	4	0.75	0.866	142		4	0.57	0.755	180
	5	0.66	0.812	158		5	0.5	0.707	185
	6	0.53	0.728	161		6	0.36	0.600	195
D	1	0.7	0.837	130	H	1	0.54	0.735	144
	2	0.66	0.812	130		2	0.62	0.787	145
	3	0.76	0.872	140		3	0.53	0.728	177
	4	0.74	0.860	153		4	0.58	0.762	182
	5	0.66	0.812	177		5	0.45	0.671	185
	6	0.56	0.748	180		6	0.32	0.566	192
		SUM	20.113	3373			SUM	17.913	3903
							AVERAGE	0.7922	151.6

SAMPLE FLOW RATE CALCULATION SUMMARY

COMPANY: Northwestern Steel and Wire
LOCATION Sterling, Illinois
SOURCE: Baghouse Inlet
TEST DATE: 12/01/00
RUN NO.: 3

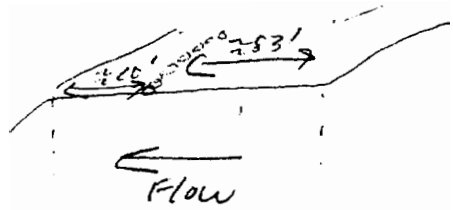
INPUT DATA	North			South		
No. of Baghouse Comp. In Service (N)	24			24		
Compartment Area (Ac)[1]	374.625	sq. ft.		374.625	sq. ft.	
Baghouse Inlet Flow Rate (Qi)	970,290	dscfm		970,290	dscfm	
Nozzle Diam (Di)	1.0	in.		1.0	in.	
Nozzle Area (As)	0.00545	sq. R.		0.00545	sq. R.	
Baghouse Outlet Temp (To)	123.299	deg F		116.866	deg F	
Baghouse inlet Temp (Tin)	151.68	deg F		161.68	deg F	
Meter temperature (Tm)	76.34	deg F		76.63	deg F	
BAGHOUSE COMPARTMENT VELOCITY						
Vb = [(Qi)/N *(To/Tin)*1/(Ac*60)]*To	1.715			1.694	fps	
w/o To	0.0029	'To =	1.7154	0.0029	*To =	1.6936
Desired Sample Flow Rate (Icfm)						
Icfm = Vb*60*An*(1-Bwo)*Tm/To	0.510	cfm		0.509	cfm	
w/o Tm/To use to calc dm at each pt	0.0010	*Tm =	0.610	0.0010	'Tm =	0.509
To's cancel out						

[1]Compartment Dimensions 20'3 x 18'6 128.82903

VELOCITY TRAVERSE AND CYCLONIC FLOW VERIF'ICATION

ARI ENVIRONMENTAL INC.

PLANT NWSW
DATE 12/1/00
LOCATION STERLING, IL
SOURCE BAGHOUSE BREECHING
STACK I.D. 20' x 20'
BAROMETRIC PRESSURE, in. Hg 29.45
OPERATORS



SCHEMATIC OF TRAVERSE POINT LAYOUT

RUN NO. 3 STATIC, in. H_2O -1.65

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
A - 1	0.65	123	
2	0.72	127	
3	.74	131	
4	.76	136	
5	.78	141	
6	.52	145	
B - 1	.73	125	
2	.73	132	
3	.82	132	
4	.82	135	
5	.77	148	
6	.68	154	
C - 1	.72	123	
2	.70	122	
3	.75	128	
4	.75	142	
5	.66	158	
6	.53	161	
D - 1	.70	130	
2	.66	130	
3	.76	140	
4	.74	163	
5	.66	177	
6	.56	180	
AVERAGE			

RUN NO. 3 STATIC, in. H_2O -1.65

TRAVERSE POINT. NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP. (Ts), °F	YAW ANGLE °
E - 1	.66	129	
2	.66	138	
3	.70	150	
4	.70	168	
5	.60	176	
6	.43	178	
F - 1	.56	130	
2	.64	140	
3	.65	140	
4	.65	175	
5	.60	185	
6	.38	190	
G - 1	.58	130	
2	.62	136	
3	.58	156	
4	.57	180	
5	.50	185	
6	.36	195	
H - 1	.54	144	
2	.62	145	
3	.53	177	
4	.58	182	
5	.45	185	
6	.32	192	
AVERAGE			

\CYCLOFLO $\sqrt{\Delta p}$ = 0.7922
$\bar{T}$ = 151.6

ANALYTICAL **SUMMARY**

CLIENT: Northwest Steel and Wire
LOCATION: Rock Island, IL
SAMPLE DATE: 11/29/00 - 12/1/00
ANALYSIS: Particulates
METHOD: EPA Method 5

Description		Volume (mls)	Tare	Wt. 1	Wt. 2	Particulate (mg)	Particulate minus blank (mg)	Total Particulate (mg) *
North Run 1	PW	120	114263.6	114266.6	114266.1	2.8	2.3	14.2
North Run 2	PW	170	114904.9	114914.1	114914.4	9.4	8.7	10.7
North Run 3	PW	185	117751.4	117756.2	117756.3	4.9	4.1	4.9
South Run 1	PW	150	109818.2	109829.1	109829.5	11.1	10.5	19.2
South Run 2	PW	170	112653.5	112659.5	112659.1	5.8	5.1	5.1
South Run 3	PW	105	105623.7	105627.1	105627.5	3.6	3.2	4.0
Blank	PW	210	118016.0	118017.0	118016.7	0.9		
North Run 1	FILTER	-	726.2	737.9	738.3	11.9		
North Run 2	FILTER	-	753.9	755.8	756.1	2.1		
North Run 3	FILTER	-	773.0	774.0	773.6	0.8		
South Run 1	FILTER	-	756.6	765.1	765.5	8.7		
South Run 2	FILTER	-	790.2	786.5	786.7	0.0		
South Run 3	FILTER	-	756.7	757.7	757.3	0.8		
North Run 1	HN03 PW filter	-	110.0	109.7	109.8	0.0		
North Run 2	HN03 PW filter	-	109.2	109.7	109.8	0.5		
North Run 3	HNO3 PW filter	-	109.0	109.5	109.4	0.5		
South Run 1	HN03 PW filter	-	108.8	109.5	109.2	0.5		
South Run 2	HN03 PW filter	-	109.9	110.1	110.2	0.3		
South Run 3	HNO3 PW filter	-	109.3	110.8	110.6	1.4		

*** Total particulate is particulate on filter plus particulate in probe wash**

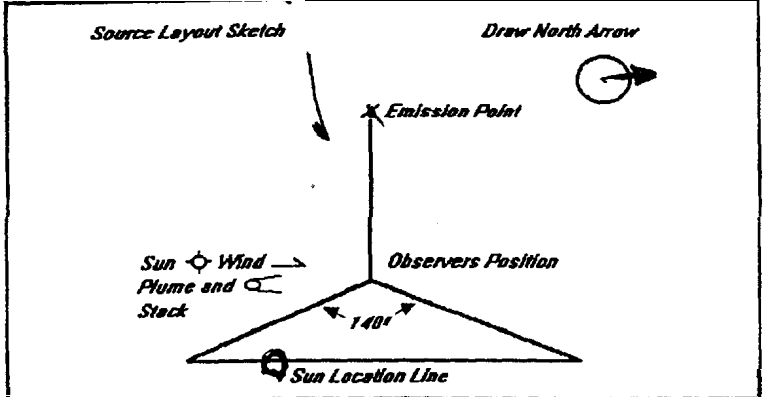
Analyst: ETV

APPENDIX B

Opacity Data

Visible Emission Observation Form NORTH RUN 1

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5'10' ABOVE ROOF STOP 5'11' ABOVE ROOF		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVRCST STOP OVRCST	
WIND SPEED: START STOP	WIND DIRECTION: START ——— STOP WEST	
AMBIENT TEMP.: START 33 STOP 34		



COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11-29-00	0902	

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
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14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
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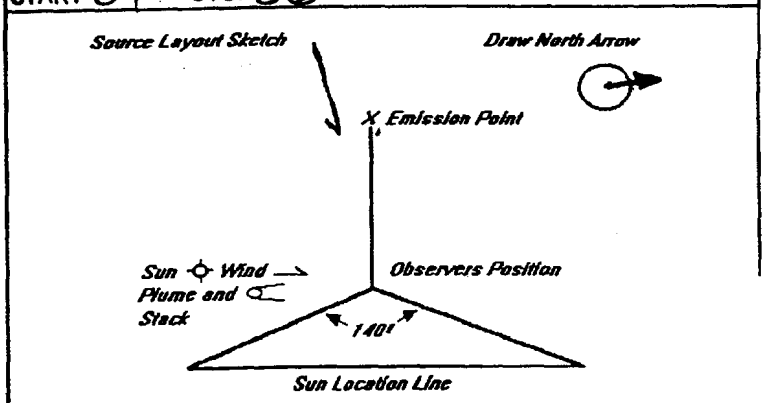
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0			60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: [signature]	DATE: 11-29-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: I-EPA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

NORTH RUN 1 p2

SOURCE NAME	NORTHWEST STEEL + WIRE,
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE: CONTINUOUS ☐	(FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START OVRCST STOP SAME
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP WEST
AMBIENT TEMP.	START 34 STOP 36



COMMENTS

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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
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23	0	0	0	0	53	0	0	0	0*
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26	0	0	0	0	56	0	0	0	0
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28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

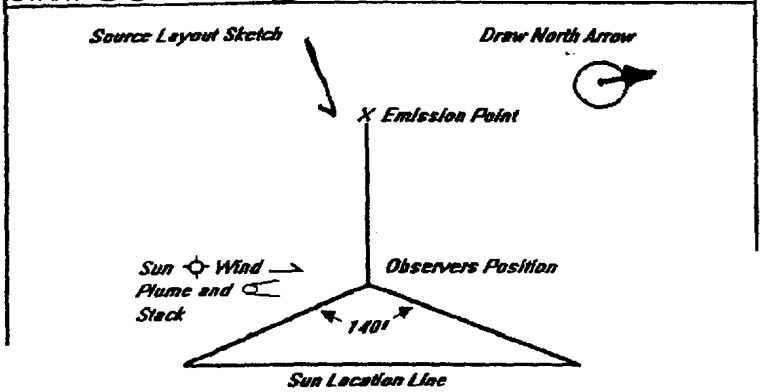
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W H Crane
DATE	11-29-00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	I-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

* 1ST HEAT STOPPED 1055; RESTART 1110

Visible Emission Observation Form

NORTH RUN 1 p 3

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT START: ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL START: 100' STOP: 100'	HEIGHT RELATIVE TO OBSERVER START: 100' STOP: 100'	
DESCRIBE EMISSIONS START	STOP	
EMISSION COLOR START	STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START: ABOVE ROOF	STOP: ABOVE ROOF	
DESCRIBE BACKGROUND START: SKY	STOP: SKY	
BACKGROUND COLOR START: GREY	STOP: GREY	SKY CONDITIONS START: OVRCST. STOP: SAME
WIND SPEED START	STOP	WIND DIRECTION START: WEST STOP: WEST
AMBIENT TEMP. START: 36	STOP: 36	



OBSERVATION DATE	START TIME	STOP TIME
11-29-00		

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
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15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE % WERE: 0
RANGE OF OPACITY READINGS MINIMUM: 0	MAXIMUM: 0
OBSERVERS NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W H Crane	DATE: 11-29-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: 1-EPA	DATE: 10-17-00
VERIFIED BY	DATE

COMMENTS

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TITLE	DATE

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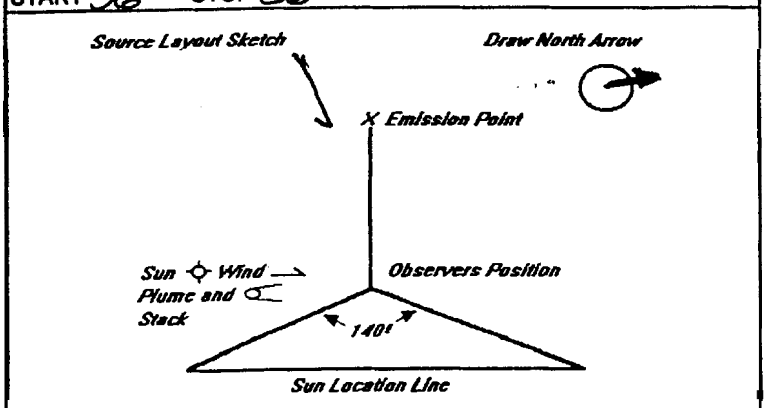
Visible Emission Observation Form

RUN 1 p1

SOURCE NAME	NORTHWEST STEEL + WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP SAME
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START OVRCST STOP OVRCST
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP WEST
AMBIENT TEMP.	START 36 STOP 36



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
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13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
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27	0	0	0	0	57	0	0	0	0
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29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

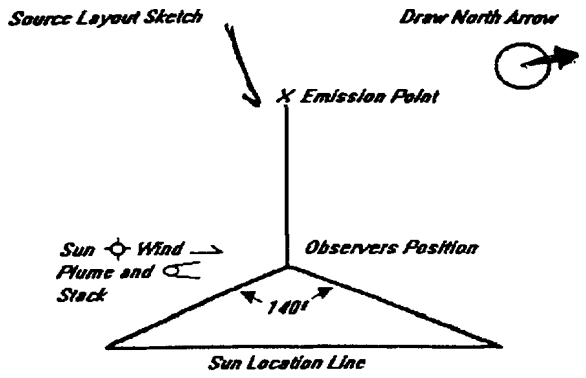
AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE % WERE	0
RANGE OF OPACITY READINGS MINIMUM	0
MAXIMUM	0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W Crane
DATE	11-29-00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	1-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

*1310 STOP END OF 2ND HEAT; 1325 START 3RD HEAT

Visible Emission Observation Form

NORTH RUN 1

SOURCE NAME: Northwest Steel & Wire		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOFMONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: S		
EMISSION COLOR: S	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT:	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVRCST STOP OVRCST	
WIND SPEED: START STOP	WIND DIRECTION: START WEST STOP WEST	
AMBIENT TEMP.: START 36 STOP 35		



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00		

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
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7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
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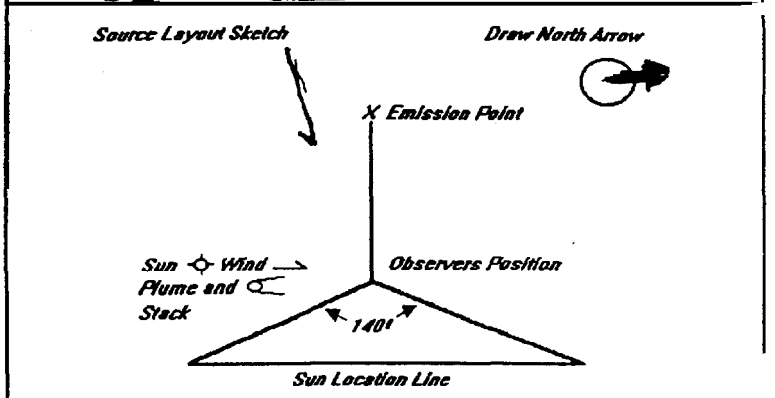
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W. Crane	DATE: 11-29-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: I-EPA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

NORTH RUN

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP SAME		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVERCAST STOP SAME	
WIND SPEED: START STOP	WIND DIRECTION: START ——— STOP WEST	
AMBIENT TEMP.: START 35 STOP 35		



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00		1330

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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8	0	0	0	0	38	0	0	0	0
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25	0	0	0	0	55	0	0	0	0
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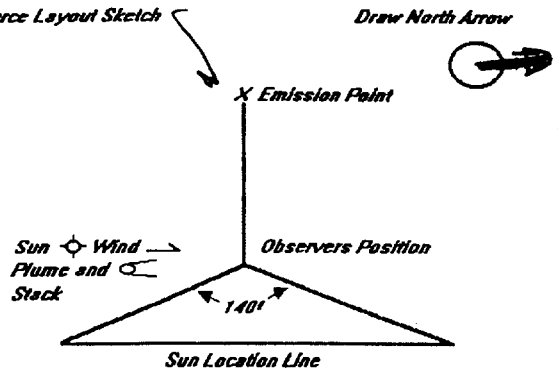
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS: MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W. Crane	DATE: 11-29-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: L-EPA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

NORTH RUN 1 p7

SOURCE NAME: NORTHWEST STEEL WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT START: ROOFTOP MONITOR STOP: SAME		
HEIGHT ABOVE GROUND LEVEL START: 101' STOP: 100	HEIGHT RELATIVE TO OBSERVER START: 100' STOP: 100'	
DESCRIBE EMISSIONS START: STOP:		
EMISSION COLOR START: STOP:	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ■	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START: 5-10' ABOVE ROOF STOP: SAME		
DESCRIBE BACKGROUND START: SKY STOP: SKY		
BACKGROUND COLOR START: GREY STOP: GREY	SKY CONDITIONS START: OVERCAST STOP: SAME	
WIND SPEED START: STOP:	WIND DIRECTION START: WEST STOP: WEST	
AMBIENT TEMP. START: 35 STOP: 35		



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OBSERVATION DATE	START TIME	STOP TIME
11-29-00		1330

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0*			33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
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11					41				
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15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

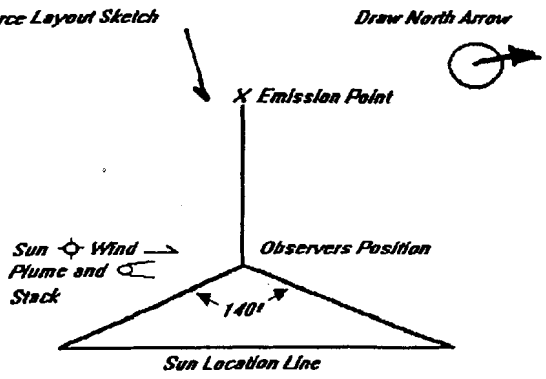
AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE % WERE: 0
RANGE OF OPACITY READINGS MINIMUM: 0	MAXIMUM: 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: [signature]	DATE: 11-29-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: 1-EPA	DATE: 10-17-00
VERIFIED BY	DATE

* STOP OBSERVATION 1332
HEAT ENDS 1330

Visible Emission Observation Form

SOUTH RUN 1 P

SOURCE NAME	NORTHWEST STEEL & WIRE
ADDRESS	
STATE	IL
CITY	STERLING
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP SAME
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 105' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START OVRCST STOP SAME
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP WEST
AMBIENT TEMP.	START 33 STOP 34



COMMENTS

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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00	0902	

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
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10	0	0	0	0	40	0	0	0	0
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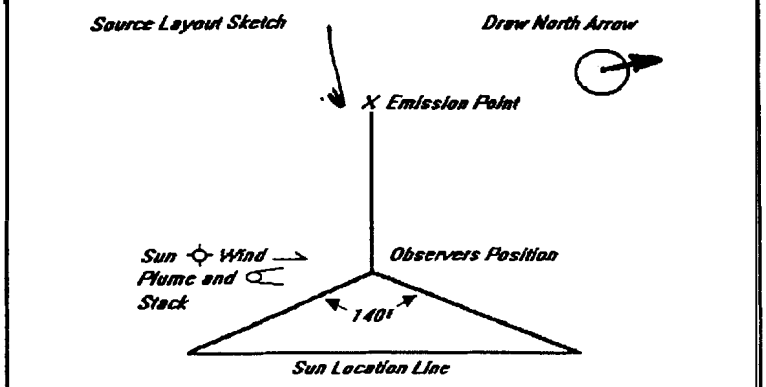
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W R Crane
DATE	11-29-00
ORGANIZATION	ARL ENVIRONMENTAL INC
CERTIFIED BY	1-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

Visible Emission Obsewation Form

SOUTH RUN 1 p2

SOURCE NAME: NORTHWEST STEEL + WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT START ROOF MONITOR STOP SAME		
HEIGHT ABOVE GROUND LEVEL START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER START 100' STOP 100'	
DESCRIBE EMISSIONS START STOP		
EMISSION COLOR START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND START SKY STOP SKY		
BACKGROUND COLOR START GREY STOP GREY	SKY CONDITIONS START OVRCST STOP*	
WIND SPEED START STOP	WIND DIRECTION START ——— STOP WEST	
AMBIENT TEMP. START 34 STOP 36		



COMMENTS

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SIGNATURE

TITLE	DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11-29-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
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4	0	0	0	0	34	0	0	0	0
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
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18	0	0	0	0	48	0	0	0	0
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

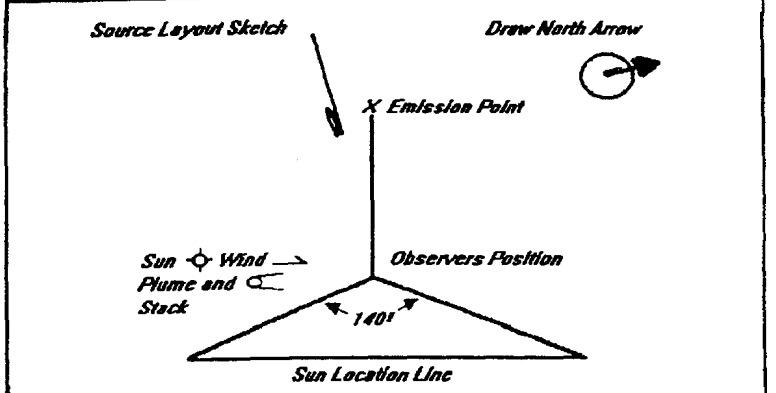
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE %WERE 0
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM 0
OBSERVER'S NAME (PRINT) WILLIAM CRANE	
OBSERVER'S SIGNATURE W Crane	DATE 11-29-00
ORGANIZATION ARI ENVIRONMENTAL, INC.	
CERTIFIED BY I-EPA	DATE 10-17-00
VERIFIED BY	DATE

*1ST HEAT STOPPED 1055; RESTART 1110

Visible Emission Observation Form

SOUTH RON 1 p.

SOURCE NAME	NORTHWEST STEEL & WIRE
ADDRESS	
CITY	STEPLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP SAME
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START OVRCST STOP SAME
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP WEST
AMBIENT TEMP.	START 36 STOP 36



COMMENTS

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SIGNATURE

TITLE | DATE

OBSERVATION DATE	START TIME	STOP TIME
11-29-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
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4	0	0	0	0	34	0	0	0	0
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7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
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17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
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23	0	0	0	0	53	0	0	0	0
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE % WERE	0
RANGE OF OPACITY READINGS MINIMUM	0
MAXIMUM	0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W. Crane
DATE	11-29-00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	I-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

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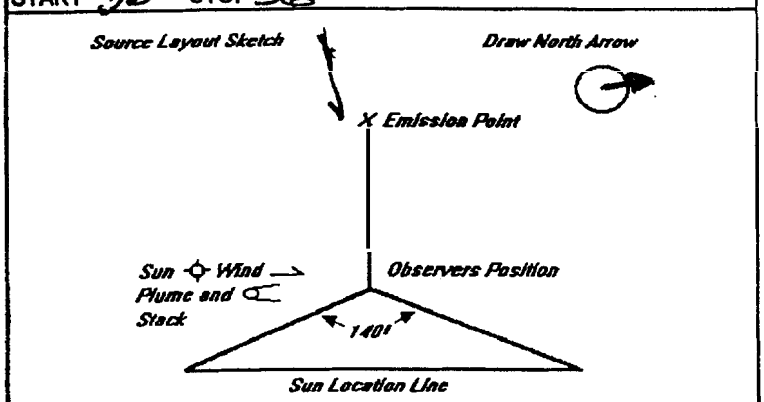
Visible Emission Observation Form

SOUTH RUN 1 p4

SOURCE NAME	NORTHWEST STEEL + WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP SAME
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START OVRCST STOP SAME
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP WEST
AMBIENT TEMP.	START 36 STOP 36



COMMENTS

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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11·29·00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
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17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
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24	0	0	0	0	54	0	0	0	0*
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

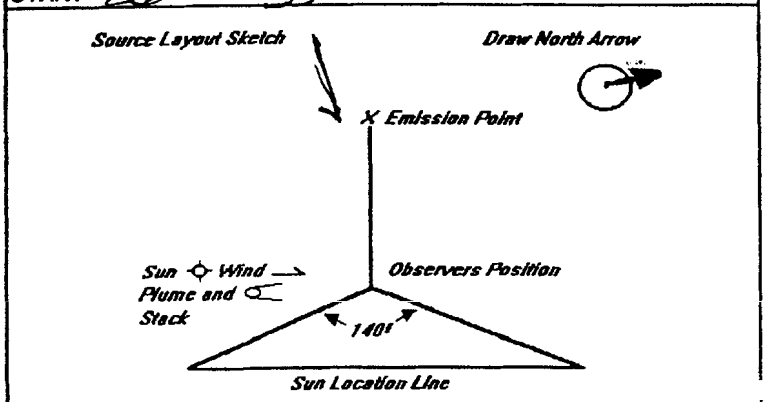
AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE %WERE
RANGE OF OPACITY READINGS	MINIMUM MAXIMUM
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W. Crane
DATE	11·29·00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	1-EPA
DATE	10·17·00
VERIFIED BY	
DATE	

*1310 STOP END OF 2ND HEAT; 1325 START 3RD HEAT

Visible Emission Observation Form

SOUTH RUN 1 P

SOURCE NAME: NORTHWEST STEEL + WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP SAME		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START ____ STOP ____		
EMISSION COLOR: START ____ STOP ____	PLUME NPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ____ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE DF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVRCST STOP OVRCST	
WIND SPEED: START ____ STOP ____	WIND DIRECTION: START WEST STOP WEST	
AMBIENT TEMP.: START 36 STOP 35		



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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
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4	0	0	0	0	34	0	0	0	0
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7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
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13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
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22	0	0	0	0	52	0	0	0	0
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W. Crane	DATE: 11-29-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: IEDA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

SOURCE NAME: NORTHWEST STEEL & WIRE

ADDRESS:

CITY: STERLING | STATE: IL | ZIP:

PHONE: | SOURCE ID NUMBER:

PROCESS EQUIPMENT: ARC FURNACE | OPERATING MODE: NORMAL

CONTROL EQUIPMENT: BAGHOUSE | OPERATING MODE: NORMAL

DESCRIBE EMISSION POINT
START ROOF MONITOR STOP SAME

HEIGHT ABOVE GROUND LEVEL
START 100' STOP 100'

HEIGHT RELATIVE TO OBSERVER
START 100' STOP 100'

DESCRIBE EMISSIONS
START
EMISSION COLOR
START

PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☑ YES ☐

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START 5-10' ABOVE ROOF STOP SAME

DESCRIBE BACKGROUND
START SKY STOP SKY

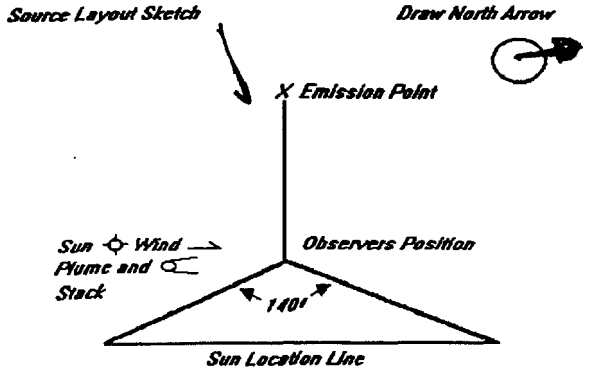
BACKGROUND COLOR
START GREY STOP GREY

SKY CONDITIONS
START OVRCST STOP SAME

WIND SPEED
START STOP

WIND DIRECTION
START WEST STOP WEST

AMBIENT TEMP.
START 35 STOP 35



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SIGNATURE

TITLE | DATE

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OBSERVATION DATE: 11-29-00 | START TIME: SOUTH RUN 1 | STOP TIME: 1330

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
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11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
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27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD: 0

NUMBER OF READINGS ABOVE % WERE: 0

RANGE OF OPACITY READINGS
MINIMUM: 0 MAXIMUM:

OBSERVER'S NAME (PRINT): WILLIAM CRANE

OBSERVER'S SIGNATURE: W. Crane | DATE: 11-29-00

ORGANIZATION: ARI ENVIRONMENTAL INC.

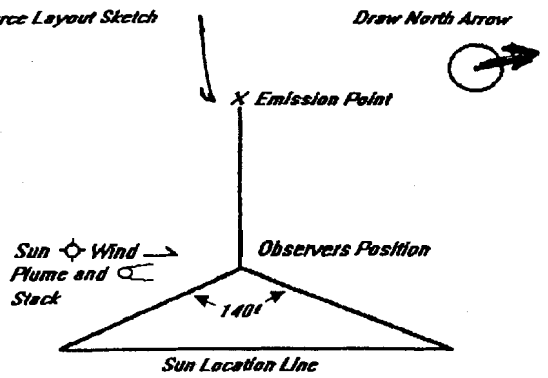
CERTIFIED BY: IEPA | DATE: 10-17-00

VERIFIED BY | DATE

Visible Emission Observation Form

SOUTH RUN 1 p7

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT START: ROOFTOP MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL START: 100' STOP: 100'	HEIGHT RELATIVE TO OBSERVER START: 100' STOP: 100'	
DESCRIBE EMISSIONS START: STOP:		
EMISSION COLOR START: STOP:	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START: 5-10' ABOVE ROOF STOP: SAME		
DESCRIBE BACKGROUND START: SKY STOP: SKY		
BACKGROUND COLOR START: GREY STOP: GREY	SKY CONDITIONS START: OVRCST STOP: SAME	
WIND SPEED START: STOP:	WIND DIRECTION START: WEST STOP: WEST	
AMBIENT TEMP. START: 35 STOP: 35		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1994

OBSERVATION DATE	START TIME	STOP TIME
11-29-00		1330

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32				
3	0	0*			33				
4					34				
5					35				
6					36				
7					37				
8					38				
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22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE % WERE: 0
RANGE OF OPACITY READINGS MINIMUM: 0	MAXIMUM: 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W Crane	DATE: 11-29-00
ORGANIZATION: ARI ENVIRONMENTAL, INC	
CERTIFIED BY: I.EPA	DATE: 10-17-00
VERIFIED BY	DATE

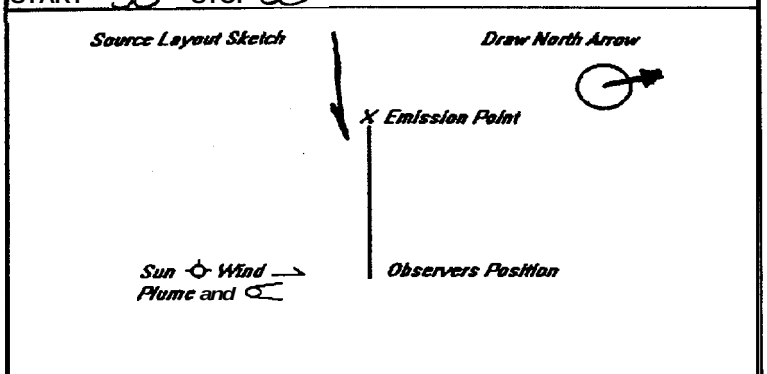
* STOP OBSERVATION 1332

HEAT ENDS 1330

Visible Emission Observation Form

NORTH RUN 2

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP SAME		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVERCAST STOP SAME	
WIND SPEED: START STOP	WIND DIRECTION: START WEST STOP WEST	
AMBIENT TEMP.: START 35 STOP 35		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11·30·00	1030	

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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4	0	0	0	0	34	0	0	0	0
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7	0	0	0	0	37	0	0	0	0
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27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

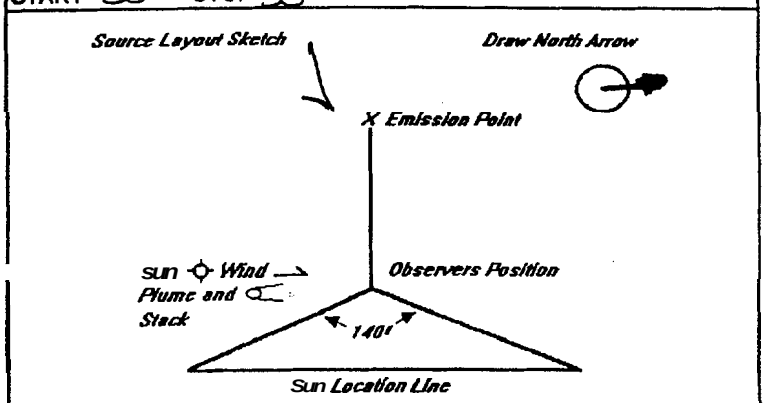
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRAWE	
OBSERVER'S SIGNATURE: [signature]	DATE 11·30·00
ORGANIZATION: ARI ENVIRONMENTAL, LC	
CERTIFIED BY: I-EPA	DATE 10·17·00
VERIFIED BY	DATE

* STOP 1043; RESTART 1128

Visible Emission Observation Form

NORTH RUN 2

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVERCAST STOP SAME	
WIND SPEED: START STOP	WIND DIRECTION: START WEST STOP WEST	
AMBIENT TEMP.: START 35 STOP 35		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11-30-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
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4	0	0	0	0	34	0	0	0	0
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16	0	0	0	0	46	0	0	0	0
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18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

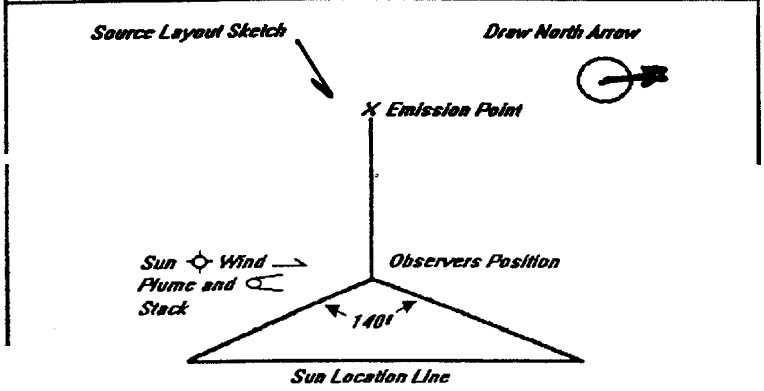
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W. Crane	DATE: 11-30-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: I-EPA	DATE: 10-17-00
VERIFIED BY	DATE

* STOP 1ST HEAT 1307; RESTART 1315

Visible Emission Observation Form

NORTH RUN 2 p3

SOURCE NAME	NORTHWEST STEELY WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT START	ROOF MONITOR STOP
HEIGHT ABOVE GROUND LEVEL START	100' STOP 100'
HEIGHT RELATIVE TO OBSERVER START	100' STOP 100'
DESCRIBE EMISSIONS START	STOP
EMISSION COLOR START	STOP
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒	YES ☐
IF WATER DROPLET PLUME: ATTACHED ☐	DETACHED ☐
POINT IN THE PLUME AT WHICH OPACIN WAS DETERMINED START	5'/0' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND START	SKY STOP SKY
BACKGROUND COLOR START	GREY STOP GREY
SKY CONDITIONS START	CURCST STOP SAME
WIND SPEED START	STOP
WIND DIRECTION START	——— STOP WEST
AMBIENT TEMP. START	35 STOP 35



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11·30·00		

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
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4	0	0	0	0	34	0	0	0	0
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
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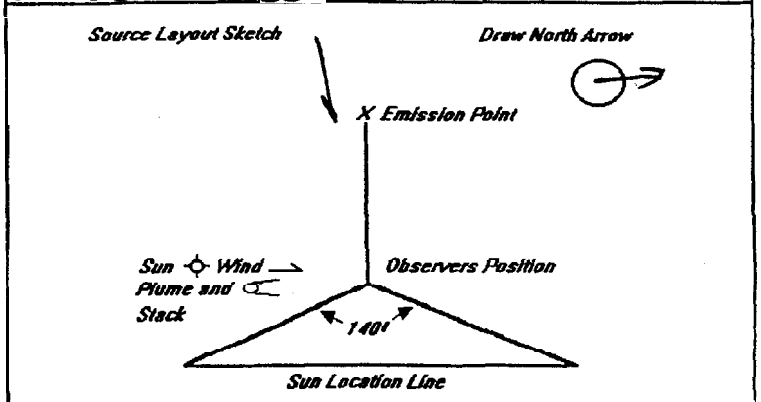
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE %WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W. Crane
DATE	11·30·00
ORGANIZATION	ARI ENVIRONMENTAL, INC
CERTIFIED BY	1-EPA
DATE	10·17·00
VERIFIED BY	
DATE	

Visible Emission Observation Form

NORTH RUN 2

SOURCE NAME	NORTHWEST STEEL + WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START OVRCST STOP SAME
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP WEST
AMBIENT TEMP.	START 35 STOP 35



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11-30-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
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16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
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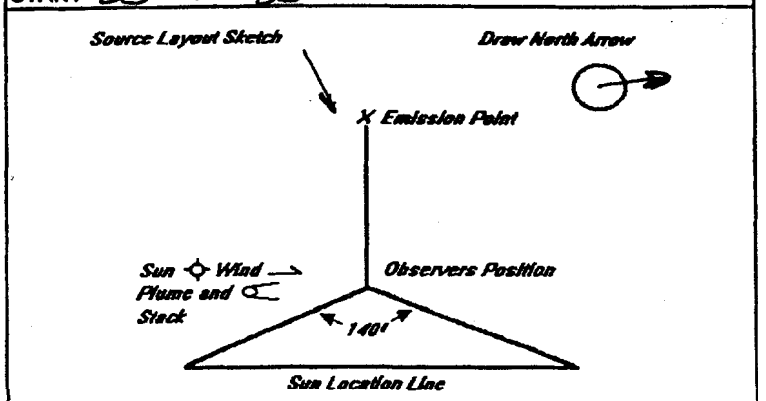
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W. Crane
DATE	11-30-00
ORGANIZATION	ARI ENVIRONMENTAL, INC
CERTIFIED BY	I-EDA
DATE	10-17-00
VERIFIED BY	
DATE	

Visible Emission Observation Form

North Run 2

SOURCE NAME: Northwest Steel & Wire		
ADDRESS		
CITY: Sterling	STATE: IL	UP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: Arc Furnace	OPERATING MODE: Normal	
CONTROL EQUIPMENT: Baghouse	OPERATING MODE: Normal	
DESCRIBE EMISSION POINT: START Roof Mon. ~~STOP~~		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5'/10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVRCST STOP SAME	
WIND SPEED: START STOP	WIND DIRECTION: START WEST STOP SAME	
AMBIENT TEMP.: START 35 STOP 35		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11-30-00		1522

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0*	36				
7					37				
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11					41				
12					42				
13					43				
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16					46				
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21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

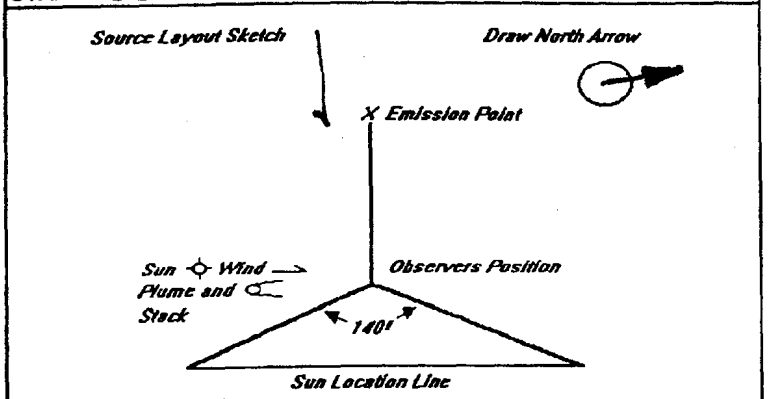
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): William Crane	
OBSERVER'S SIGNATURE: W Crane	DATE: 11-30-00
ORGANIZATION: ARI Environmental, Inc.	
CERTIFIED BY: I-EPA	DATE: 10-17-00
VERIFIED BY	DATE

* 2ND HEAT STOP 1522

Visible Emission Observation Form

SOUTH RUN 2

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAG HOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP SAME		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5'10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVRCST STOP SAME	
WIND SPEED: START STOP	WIND DIRECTION: START WEST STOP ———	
AMBIENT TEMP.: START 35 STOP 35		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11·30·00	1030	

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

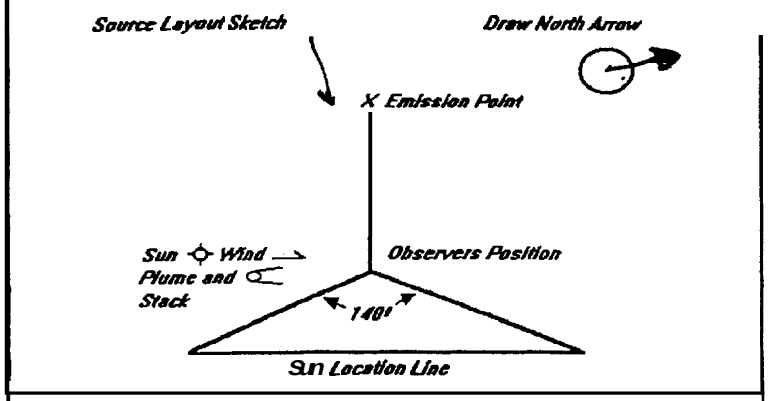
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W. Crane	DATE: 11·30·00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: 1-EPA	DATE: 10·17·00
VERIFIED BY	DATE

*STOP 1043; RESTART 1128

Visible Emission Observation Form

SOUTH RUN 2 p2

SOURCE NAME	NORTHWEST STEEL + WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP SAME
HEIGHT ABOVE GROUND LEVEL	START ' STOP 100
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5'10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START CLEAR STOP SAME
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP WEST
AMBIENT TEMP.	START 35 STOP



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11.30.00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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7	0	0	0	0	37	0	0	0	0
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29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

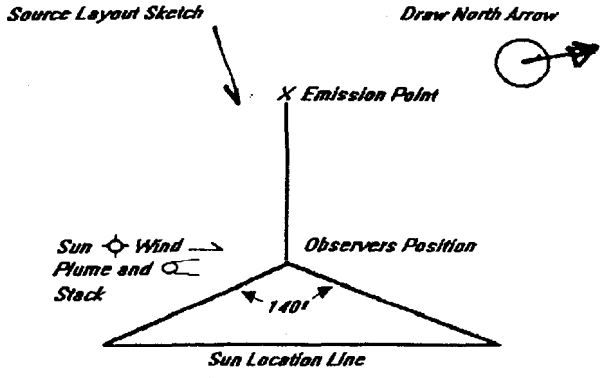
AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE % WERE	0
RANGE OF OPACITY READINGS MINIMUM	0
MAXIMUM	0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W Crane
DATE	11.30.00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	1-EPA
DATE	10.17.00
VERIFIED BY	
DATE	

*STOP 1ST HEAT 1307; RESTART 1315

Visible Emission Observation Form

SOUTH KILN 2 p3

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT START: ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL START: 100' STOP: '	HEIGHT RELATIVE TO OBSERVER START: 100' STOP: 150'	
DESCRIBE EMISSIONS START: STOP:		
EMISSION COLOR START: STOP:	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: (ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START: 5-10' ABOVE ROOF STOP: SAME		
DESCRIBE BACKGROUND START: SKY STOP: SKY		
BACKGROUND COLOR START: GREY STOP: GREY	SKY CONDITIONS START: OVERCAST STOP: SAME	
WIND SPEED START: STOP:	WIND DIRECTION START: WEST STOP: WEST	
AMBIENT TEMP. START: 35 STOP: 35		



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TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11-30-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
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22	0	0	0	0	52	0	0	0	0
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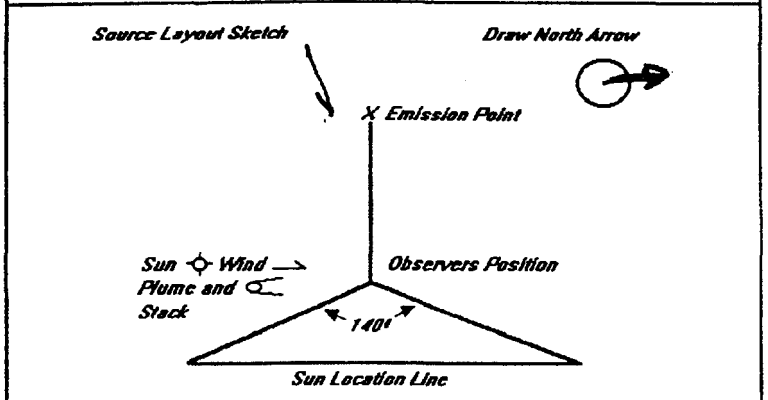
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT) WILLIAM CRANE	
OBSERVER'S SIGNATURE W. Crane	DATE 11-30-00
ORGANIZATION ARI ENVIRONMENTAL, INC.	
CERTIFIED BY 1-EPA	DATE 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

SOUTH RUN 2 p4

SOURCE NAME: NORTHWEST STEEL + WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP SAME		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START OVRCST STOP SAME	
WIND SPEED: START STOP	WIND DIRECTION: START WEST STOP WEST	
AMBIENT TEMP.: START 35 STOP 35		



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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8	0	0	0	0	38	0	0	0	0
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16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
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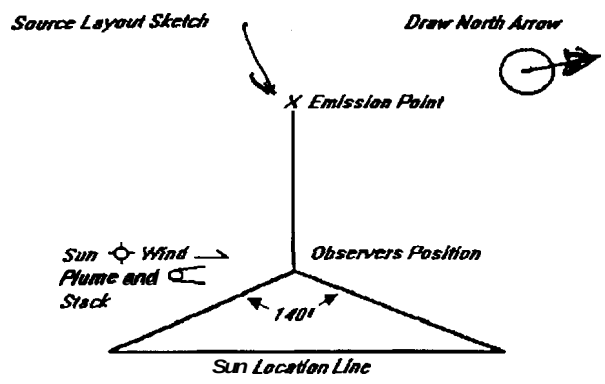
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W Crane	DATE: 11-30-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: C-EPA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

SOUTH RUN 2 p5

SOURCE NAME	NORTHWEST STEEL & WIRE
ADDRESS	
STERLING	STATE IL / ZIP
PHONE	SOURCE ID NUMBER
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START — Monitor STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START OVRCST STOP SAME
WIND SPEED	START STOP
WIND DIRECTION	START WEST STOP SAME
AMBIENT TEMP.	START 35 STOP



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TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
11-30-00		1522

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6	0	0	0	0*	36				
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21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

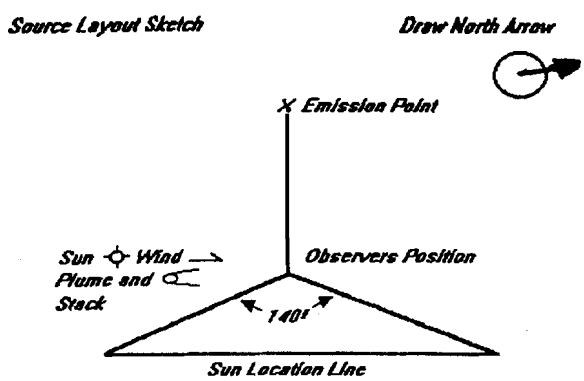
AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE % WERE	0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	William Crane
OBSERVER'S SIGNATURE	W. Crane
DATE	11-30-00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	I-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

* 2ND HEAT STOP 1522

Visible Emission Observation Form

NORTH RUN 3 p1

SOURCE NAME	NORTHWEST STEEL + WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAG HOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	(ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START STOP
WIND SPEED	START STOP
WIND DIRECTION	START STOP
AMBIENT TEMP.	START 30 STOP



COMMENTS

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OBSERVATION DATE	START TIME	STOP TIME
12-1-00	0910	

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4	0	0	0	0	34	0	0	0	0
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27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W. Crane
DATE	12-1-00
ORGANIZATION	ARI ENVIRONMENTAL, INC
CERTIFIED BY	I-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

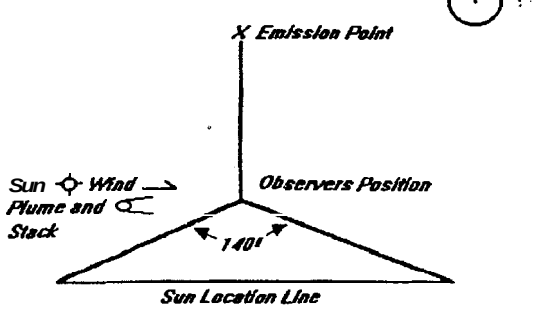
VISBLEMS.DOC 1998

Visible Emission Observation Form

NORTH RUN 3 p.

SOURCE NAME	NORTHWEST STEEL + WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	&*** —
DESCRIBE EMISSION POINT START	ROOF MONITOR STOP
HEIGHT ABOVE GROUND LEVEL START	100' STOP 100'
HEIGHT RELATIVE TO OBSERVER START	100' STOP 100'
DESCRIBE EMISSIONS START	STOP
EMISSION COLOR START	STOP
PLUME PIPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒	YES ☐
IF WATER DROPLET PLUME: ATTACHED ☐	DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND START	SKY STOP SKY
BACKGROUND COLOR START	GREY STOP GREY
SKY CONDITIONS START	STOP
WIND SPEED START	STOP
WIND DIRECTION START	STOP
AMBIENT TEMP. START	30 STOP 32

Source Layout Sketch *Draw North Arrow*



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
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10	0	0	0	0	40	0	0	0	0
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12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
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29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACIPI READINGS MINIMUM 6	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W Crane
DATE	12-1-00
ORGANIZATION	AR/ ENVIRONMENTAL, INC.
CERTIFIED BY	1-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

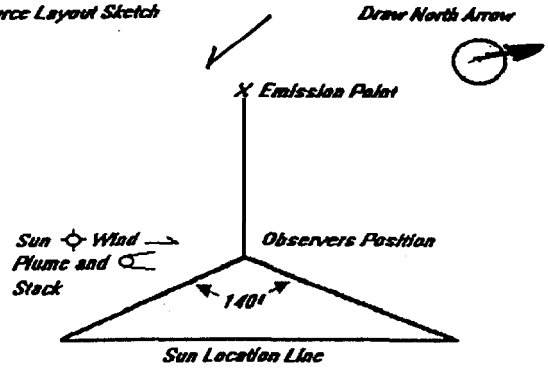
*END 1ST HEAT 1150; RESTART 1125

Visible Emission Observation Form

NORTH RUN 3 to 3

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START STOP	
WIND SPEED: START STOP	WIND DIRECTION: START STOP	
AMBIENT TEMP.: START 32 STOP		

Source Layout Sketch — Draw North Arrow



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
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4	0	0	0	0	34	0	0	0	0
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17	0	0	0	0	47	0	0	0	0
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19	0	0	0	0	49	0	0	0	0
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27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

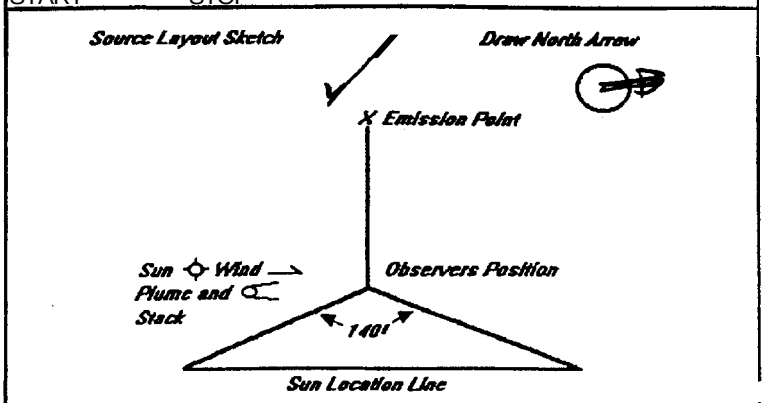
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W Crane	DATE: 12-1-00
ORGANIZATION: AR/ ENVIRONMENTAL, INC	
CERTIFIED BY: 1-EDA	DATE: 10-17-00
VERIFIED BY	DATE

* STOP 1139; RESTART 1155

Visible Emission Observation Form

NORTH RUN 3

SOURCE NAME	NORTHWEST STEEL & WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START STOP
WIND SPEED	START STOP
WIND DIRECTION	START STOP
AMBIENT TEMP.	START STOP



COMMENTS

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SIGNATURE

TITLE | DATE

VISEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
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5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0*
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
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24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

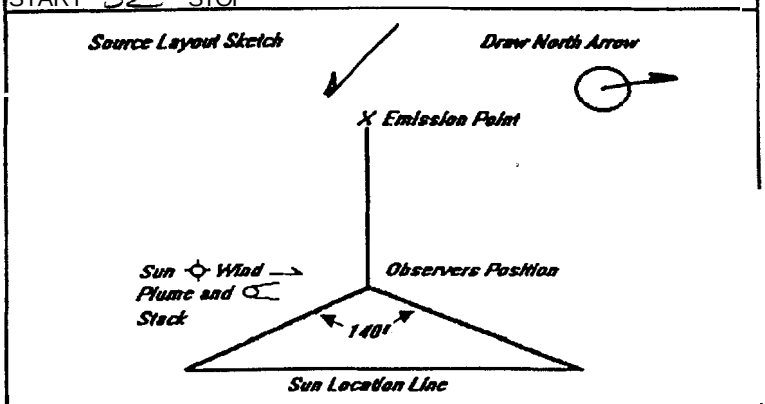
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W H Crane
DATE	12-1-00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	I-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

*STOP 1335; RESTART 1345

Visible Emission Observation Form

NORTH RUN 3 P5

SOURCE NAME	NORTHWEST STEEL & WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP SAME
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START STOP
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START STOP
WIND SPEED	START STOP
WIND DIRECTION	START STOP
AMBIENT TEMP.	START 32 STOP



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
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4	0	0	0	0	34	0	0	0	0
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7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
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12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
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24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

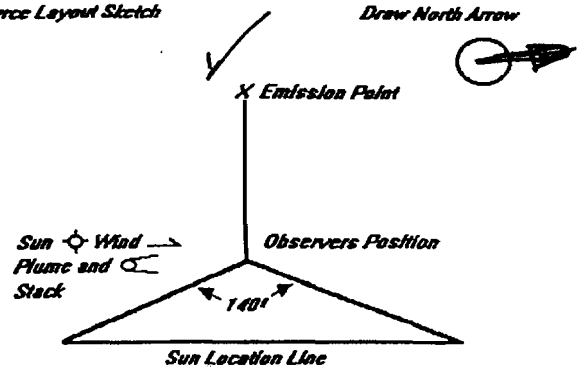
AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE % WERE	0
RANGE OF OPACITY READINGS MINIMUM	0
MAXIMUM	0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W. Crane
DATE	12-1-00
ORGANIZATION	ARI ENVIRONMENTAL
CERTIFIED BY	I-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

Visible Emission Observation Form

NORTH RUN 3

SOURCE NAME: NORTHWEST STEEL & CRE		
ADDRESS		
CITY: Sterling	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5'-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START STOP	
WIND SPEED: START STOP	WIND DIRECTION: START STOP	
AMBIENT TEMP.: START 32 STOP		

Source Layout Sketch — Draw North Arrow



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		1534

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31				
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3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
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8	0	0	0	0	38				
9	0	0	0	0	39				
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23	0	0	0	0	53				
24	0	0	0	0*	54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

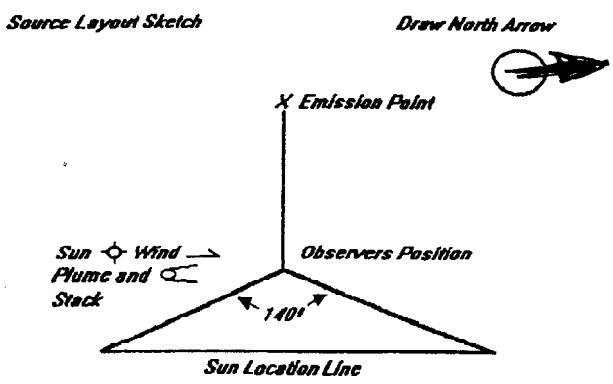
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W. Crane	DATE: 12-1-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: I.E.P.A.	DATE: 10-17-00
VERIFIED BY	DATE

*1534 STOP 3RD HEAT.

Visible Emission Observation Form

NORTH BETWEEN HEATS

SOURCE NAME	NORTHWEST STEEL & WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL BETWEEN HEATS
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP SAME
SKY CONDITIONS	START STOP
WIND SPEED	START STOP
WIND DIRECTION	START STOP
AMBIENT TEMP.	START 32 STOP



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00	1100	1125

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
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2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
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23	0	0	0	0	53				
24	0	0	0	0	54				
25	0	0	0	0	55				
26	0				56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD 0

NUMBER OF READINGS ABOVE % WERE 0

RANGE OF OPACITY READINGS MINIMUM 0 MAXIMUM 0

OBSERVER'S NAME (PRINT) William Crane

OBSERVER'S SIGNATURE W. Crane | DATE 12-1-00

ORGANIZATION ARI ENVIRONMENTAL

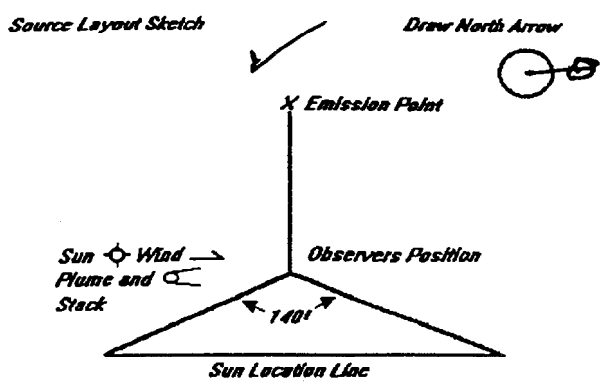
CERTIFIED BY 1-EPA | DATE 10-17-00

VERIFIED BY | DATE

Visible Emission Observation Form

NORTH RUN 3 BEW PAGE

SOURCE NAME	NORTHWEST STEEL + WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP SAME
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START STOP
WIND SPEED	START STOP
WIND DIRECTION	START STOP
AMBIENT TEMP.	START 32 STOP



COMMENTS

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SIGNATURE

TITLE	DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00	1335	1345

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
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2	0	0	0	0	32				
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4	0	0	0	0	34				
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8	0	0	0	0	38				
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13					43				
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16					46				
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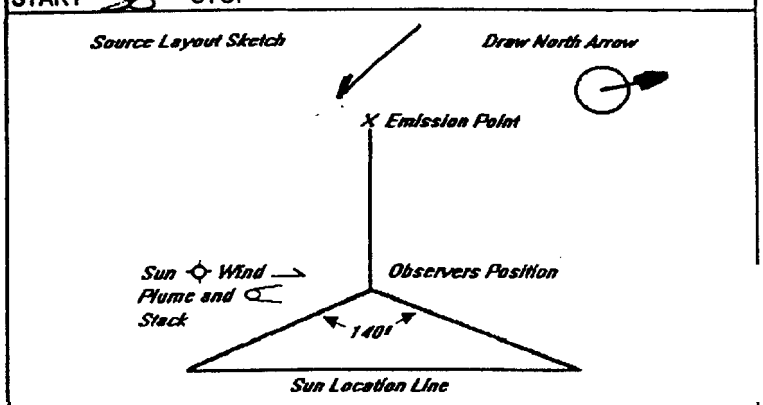
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W L Crane
DATE	12-1-00
ORGANIZATION	ARI ENVIRONMENTAL, INC.
CERTIFIED BY	1 EPA
DATE	10-17-00
VERIFIED BY	
DATE	

Visible Emission Observation Form SOUTH RUN 3 p1

SOURCE NAME: NORTHWEST STEEL + WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ /FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START STOP	
WIND SPEED: START STOP	WIND DIRECTION: START STOP	
AMBIENT TEMP.: START 30 STOP		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00	0910	1534

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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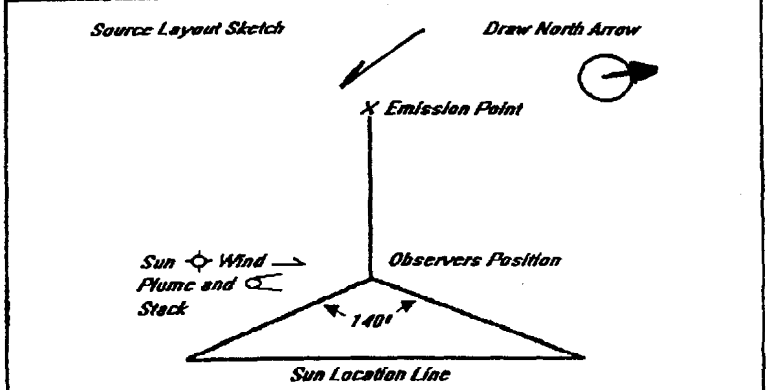
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W Crane	DATE: 12-1-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: I-EPA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

South Kun 3 p2

SOURCE NAME	Northwest Steel + Wire
ADDRESS	
CITY	Sterling
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Arc Furnace
OPERATING MODE	Normal
CONTROL EQUIPMENT	Baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START Roof Monitor STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 100' STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' Above Roof STOP Same
DESCRIBE BACKGROUND	START Sky STOP Sky
BACKGROUND COLOR	START Grey STOP Grey
SKY CONDITIONS	START STOP
WIND SPEED	START STOP
WIND DIRECTION	START STOP
AMBIENT TEMP.	START 30 STOP



COMMENTS

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SIGNATURE

TITLE	DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
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28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

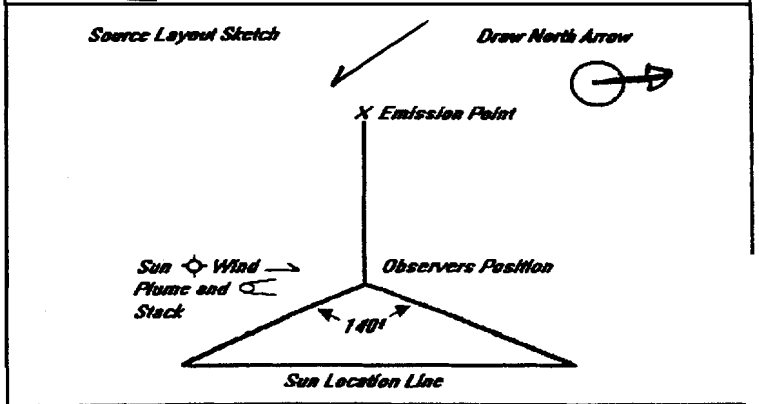
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	William Crane
OBSERVER'S SIGNATURE	W. Crane
DATE	12-1-00
ORGANIZATION	ARI Environmental, Inc
CERTIFIED BY	I-EPA
DATE	10-17-00
VERIFIED BY	
DATE	

*END 1ST HEAT 1100; RESTART 1125

Visible Emission Observation Form

SOUTH RUN 3

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 150' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START STOP	
WIND SPEED: START STOP	WIND DIRECTION: START STOP	
AMBIENT TEMP.: START 32 STOP		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

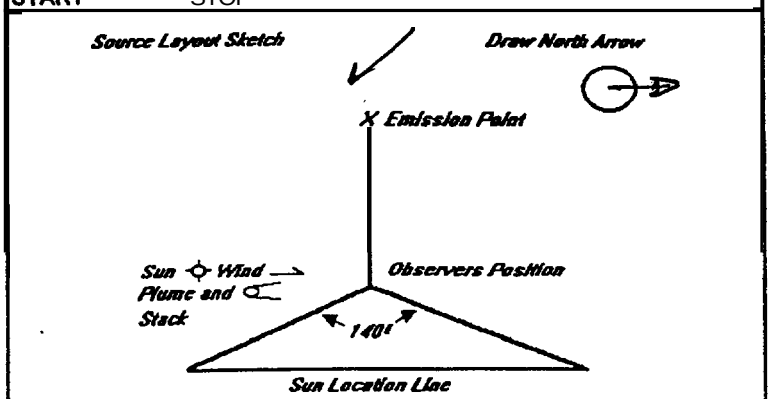
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM RANE	
OBSERVER'S SIGNATURE: [signature]	DATE: 12-1-00
ORGANIZATION: ARI ENVIRONMENTAL, INC	
CERTIFIED BY: 1-EPA	DATE: 10-17-00
VERIFIED BY	DATE

*STOP 1139; RESTART 1155

Visible Emission Observation Form

SOUTH RUN 3

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT START: ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL START: 100' STOP: 100'	HEIGHT RELATIVE TO OBSERVER START: 100' STOP: 100'	
DESCRIBE EMISSIONS START STOP		
EMISSION COLOR START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START: 5-10' ABOVE ROOF STOP		
DESCRIBE BACKGROUND START: SKY STOP: SKY		
BACKGROUND COLOR START: GREY STOP: GREY	SKY CONDITIONS START STOP	
WIND SPEED START STOP	WIND DIRECTION START STOP	
AMBIENT TEMP. START STOP		



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

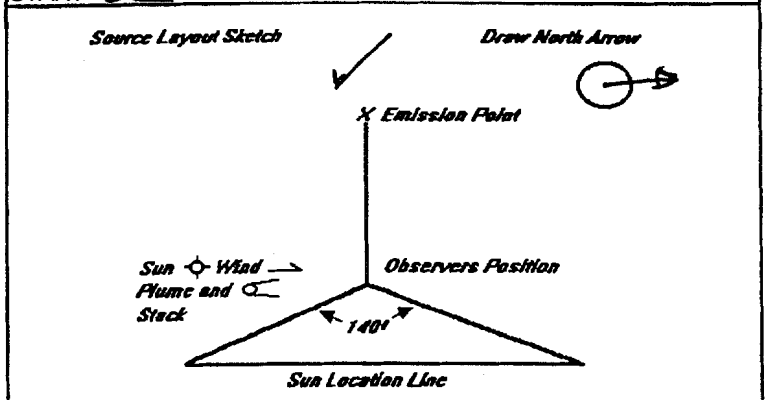
AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE % WERE: 0
RANGE OF OPACITY READINGS MINIMUM: 0	MAXIMUM: 0
OBSERVER'S NAME (PRINT): WILLIAM CRANE	
OBSERVER'S SIGNATURE: W. H. Crane	DATE: 12-1-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: I-EPA	DATE: 10-17-00
VERIFIED BY	DATE

*STOP 1335 ; RESTART 1345

Visible Emission Observation Form

South Run 3 p5

SOURCE NAME: Northwest Steel & Wire		
ADDRESS		
CITY: Sterling	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: Arc Furnace	OPERATING MODE: Normal	
CONTROL EQUIPMENT: Baghouse	OPERATING MODE: Normal	
DESCRIBE EMISSION POINT: START Roof Monitor STOP SAME		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START STOP	
WIND SPEED: START STOP	WIND DIRECTION: START STOP	
AMBIENT TEMP.: START 32 STOP		



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
12-1-00		

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27	0	0	0	0	57	0	0	0	0
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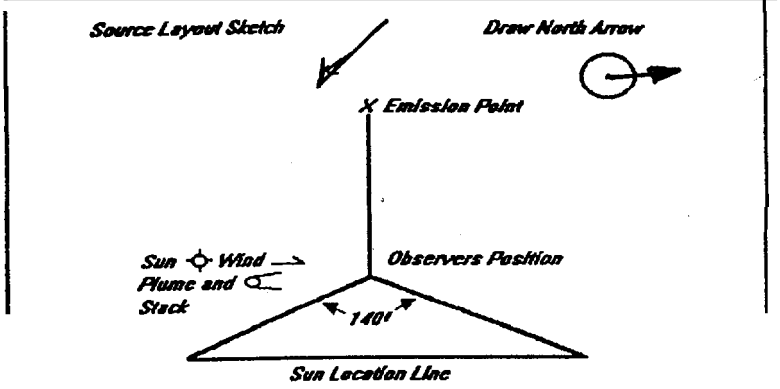
29	0	0	0		59	0	0	0	0
30					60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): William Crane	
OBSERVER'S SIGNATURE: W Crane	DATE: 12-1-00
ORGANIZATION: ARI Environmental, Inc	
CERTIFIED BY: 1-EPA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

SOUTH RUN 3

SOURCE NAME: NORTHWEST STEEL WIRE		
ADDRESS		
CITY: Sterling	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT START: ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER START 100' STOP 100'	
DESCRIBE EMISSIONS START STOP		
EMISSION COLOR START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☑ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START 5-10' ABOVE ROOF STOP		
DESCRIBE BACKGROUND START SKY STOP SKY		
BACKGROUND COLOR START GREY STOP GREY	SKY CONDITIONS START STOP	
WIND SPEED START STOP	WIND DIRECTION START STOP	
AMBIENT TEMP. START 32 STOP		



OBSERVATION DATE	START TIME	STOP TIME
12-1-00		1534

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6	0	0	0	0	36				
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24	0	0	0	0*	54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT) DUANE CRANE	
OBSERVER'S SIGNATURE	DATE 12-1-00
ORGANIZATION ARI ENVIRONMENTAL INC.	
CERTIFIED BY IEPA	DATE 10-17-00
VERIFIED BY	DATE

COMMENTS	
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS SIGNATURE	
TITLE	DATE

VISBLEMS.DOC 1998

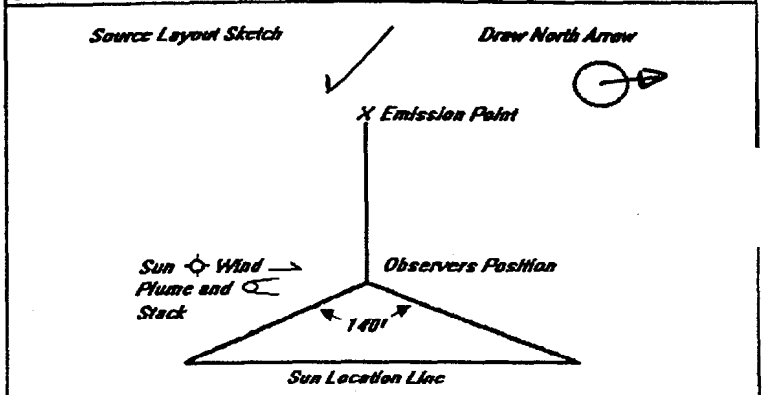
* 1534 STOP 3RD HEAT.

BETWEEN HEATS

Visible Emission Observation Form

SOUTH RUN 3

SOURCE NAME: NORTHWEST STEEL & WIRE		
ADDRESS		
CITY: STERLING	STATE: IL	ZIP
PHONE	SOURCE ID NUMBER	
PROCESS EQUIPMENT: ARC FURNACE	OPERATING MODE: NORMAL	
CONTROL EQUIPMENT: BAGHOUSE	OPERATING MODE: NORMAL	
DESCRIBE EMISSION POINT: START ROOF MONITOR STOP		
HEIGHT ABOVE GROUND LEVEL: START 100' STOP 100'	HEIGHT RELATIVE TO OBSERVER: START 100' STOP 100'	
DESCRIBE EMISSIONS: START STOP		
EMISSION COLOR: START STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 5-10' ABOVE ROOF STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SKY		
BACKGROUND COLOR: START GREY STOP GREY	SKY CONDITIONS: START STOP	
WIND SPEED: START STOP	WIND DIRECTION: START STOP	
AMBIENT TEMP.: START 32 STOP		



COMMENTS

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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
12-1-00	1335	1345

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
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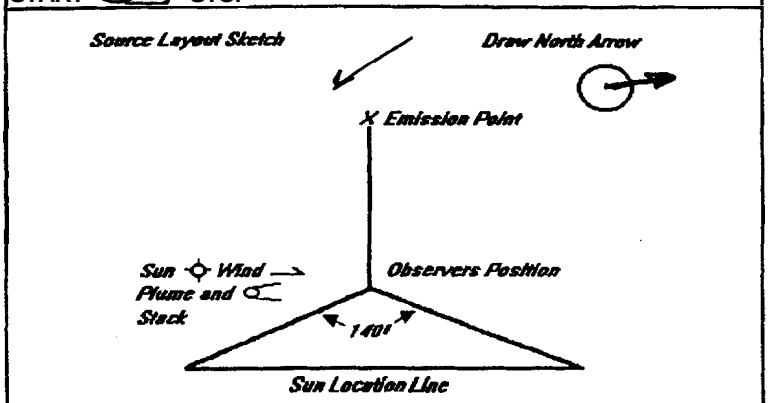
8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	0	0	40				
11	0	0			41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): WILLIAM CAMUE	
OBSERVER'S SIGNATURE: W Came	DATE: 12-1-00
ORGANIZATION: ARI ENVIRONMENTAL, INC.	
CERTIFIED BY: 1-EPA	DATE: 10-17-00
VERIFIED BY	DATE

Visible Emission Observation Form

SOUTH BETWEEN HEATS

SOURCE NAME	NORTHWEST STEEL & WIRE
ADDRESS	
CITY	STERLING
STATE	IL
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ARC FURNACE
OPERATING MODE	NORMAL @
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	NORMAL
DESCRIBE EMISSION POINT	START ROOF MONITOR STOP
HEIGHT ABOVE GROUND LEVEL	START 100' STOP 100'
HEIGHT RELATIVE TO OBSERVER	START 110 STOP 100'
DESCRIBE EMISSIONS	START STOP
EMISSION COLOR	START STOP
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☒ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 5-10' ABOVE ROOF STOP SAME
DESCRIBE BACKGROUND	START SKY STOP SKY
BACKGROUND COLOR	START GREY STOP GREY
SKY CONDITIONS	START STOP
WIND SPEED	START STOP
WIND DIRECTION	START STOP
AMBIENT TEMP.	START 32 STOP



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OBSERVATION DATE	START TIME	STOP TIME
12-1-00	1100	1125

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
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8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	0	0	40				
11	0	0	0	0	41				
12	0	0	0	0	42				
13	0	0	0	0	43				
14	0	0	0	0	44				
15	0	0	0	0	45				
16	0	0	0	0	46				
17	0	0	0	0	47				
18	0	0	0	0	48				
19	0	0	0	0	49				
20	0	0	0	0	50				
21	0	0	0	0	51				
22	0	0	0	0	52				
23	0	0	0	0	53				
24	0	0	0	0	54				
25	0	0	0	0	55				
26	0				56				
27					57				
28					58				
29					59				
30					60				

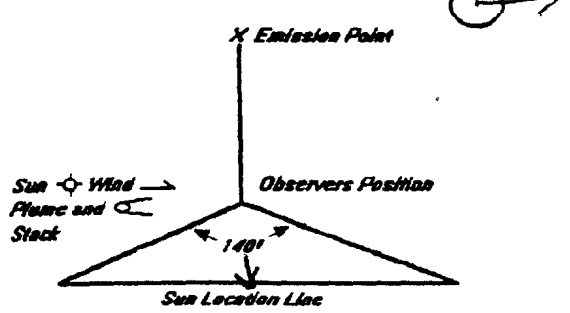
AVERAGE OPACITY FOR HIGHEST PERIOD 0	NUMBER OF READINGS ABOVE %WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM CRANE
OBSERVER'S SIGNATURE	W Crane
DATE	12-1-00
ORGANIZATION	ARI ENVIRONMENTAL
CERTIFIED BY	IEPA
DATE	10-17-00
VERIFIED BY	
DATE	

(1)

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire Co.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	bag house
OPERATING MODE	Normal
DESCRIBE EMISSION POINT START	building east
DESCRIBE EMISSION POINT STOP	building east
HEIGHT ABOVE GROUND LEVEL START	75
HEIGHT ABOVE GROUND LEVEL STOP	75
HEIGHT RELATIVE TO OBSERVER START	75
HEIGHT RELATIVE TO OBSERVER STOP	75
DESCRIBE EMISSIONS START	None
DESCRIBE EMISSIONS STOP	None
EMISSION COLOR START	NA
EMISSION COLOR STOP	NA
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☑ YES ☐	
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	base
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP	base
DESCRIBE BACKGROUND START	overcast
DESCRIBE BACKGROUND STOP	overcast
BACKGROUND COLOR START	Gray
BACKGROUND COLOR STOP	Gray
SKY CONDITIONS START	Cloudy
SKY CONDITIONS STOP	Cloudy
WIND SPEED START	5
WIND SPEED STOP	13
WIND DIRECTION START	N
WIND DIRECTION STOP	N-W
AMBIENT TEMP. START	32
AMBIENT TEMP. STOP	36

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE	START TIME	STOP TIME
11-29-00	9:05 Am	10:54 Am

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
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22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	5	5
26	0	0	0	0	56	5	5	10	5
27	0	0	0	0	57	5	0	5	5
28	0	0	0	0	58	5	5	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	5

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 12
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 10
OBSERVER'S NAME (PRINT) Karrol Phillips	
OBSERVER'S SIGNATURE Karrol Phillips	DATE 12-1-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

COMMENTS

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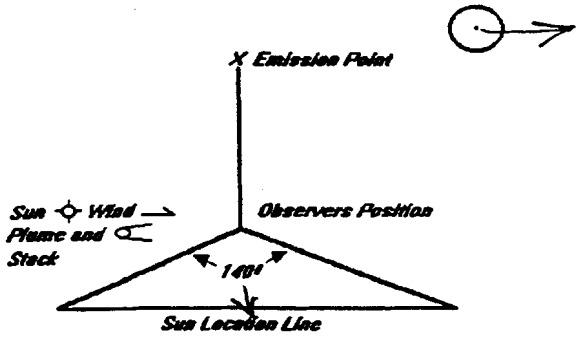
(2)

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire Co.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818-AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT START	building east
DESCRIBE EMISSION POINT STOP	building ~~west~~ east
HEIGHT ABOVE GROUND LEVEL START	75'
HEIGHT ABOVE GROUND LEVEL STOP	75
HEIGHT RELATIVE TO OBSERVER START	75'
HEIGHT RELATIVE TO OBSERVER STOP	75'
DESCRIBE EMISSIONS START	None
DESCRIBE EMISSIONS STOP	None
EMISSION COLOR START	NA
EMISSION COLOR STOP	NA
PLUME TYPE	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☑ YES ☐
IF WATER DROPLET PLUME	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	base
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP	base
DESCRIBE BACKGROUND START	overcast
DESCRIBE BACKGROUND STOP	Overcast
BACKGROUND COLOR START	white
BACKGROUND COLOR STOP	white
SKY CONDITIONS START	snow
SKY CONDITIONS STOP	Clear
WIND SPEED START	5
WIND SPEED STOP	13
WIND DIRECTION START	N
WIND DIRECTION STOP	N-W
AMBIENT TEMP. START	32
AMBIENT TEMP. STOP	36

Source Layout Sketch

Draw North Arrow



COMMENTS

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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00	9:05 Am	10:54 Am

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	5	5	5	5
2	0	0	0	0	32	5	5	5	5
3	0	0	0	0	33	5	5	5	5
4	0	0	0	0	34	5	5	5	5
5	0	0	0	0	35	5	5	5	5
6	0	0	0	0	36	5	5	5	5
7	0	0	0	0	37	5	5	5	5
8	0	0	0	0	38	5	5	5	5
9	0	0	0	0	39	5	5	5	5
10	0	0	0	0	40	5	5	5	5
11	0	0	0	0	41	5	5	5	5
12	0	0	0	0	42	5	5	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	5	5	5	48	0	0	0	0
19	5	5	5	5	49	0	0	0	0
20	5	5	5	5	50	~~0~~	~~0~~	0	0
21	5	5	5	0	51	~~0~~	~~0~~	~~0~~	~~0~~
22	5	5	5	5	52	~~0~~	~~0~~	~~0~~	10:5
23	5	5	5	5	53				
24	5	5	5	5	54	Stop			
25	5	5	5	5	55		10:54		
26	5	5	5	5	56				
27	5	5	5	5	57				
28	5	5	5	5	58				
29	5	5	5	5	59				
30	5	5	5	5	60				

AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE 96

RANGE OF OPACITY READINGS MINIMUM 0 MAXIMUM 5

OBSERVER'S NAME (PRINT) Karrol Phillips

OBSERVER'S SIGNATURE Karrol Phillips | DATE 11-29-00

ORGANIZATION

CERTIFIED BY | DATE

VERIFIED BY | DATE

(3)

Visible Emission Observation Form

SOURCE NAME: Northline rn Steel + wire Co.

ADDRESS: 121 Wallace St.

CITY: Sterling | **STATE**: IL | **UP**: 61081

PHONE: 815-6252500 | **SOURCE ID NUMBER**: 195 818 AAI

PROCESS EQUIPMENT: EAF | **OPERATING MODE**: Normal

CONTROL EQUIPMENT: baghouse | **OPERATING MODE**: Normal

DESCRIBE EMISSION POINT
START building East STOP Building - west

HEIGHT ABOVE GROUND LEVEL
START 75 STOP 75

HEIGHT RELATIVE TO OBSERVER
START 75 STOP 75

DESCRIBE EMISSIONS
START None STOP None

EMISSION COLOR
START NA STOP NA

PLUME TYPE: CONTINUOUS
FUGITIVE ☑ INTERMITTENT ☐

WATER DROPLETS PRESENT:
NO ☑ YES ☐

IF WATER DROPLET PLUME:
ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START base STOP base

DESCRIBE BACKGROUND
START overcast STOP overcast

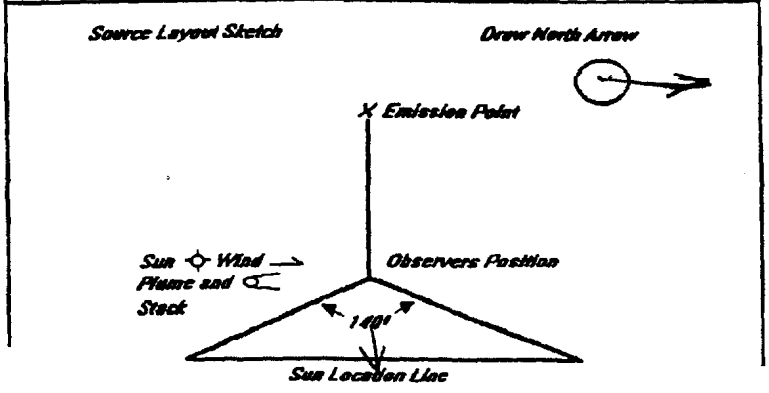
BACKGROUND COLOR
START white STOP white

SKY CONDITIONS
START snow STOP clear

WIND SPEED
START 5 STOP 13

WIND DIRECTION
START N STOP N-W

AMBIENT TEMP.
START 32 STOP 36



COMMENTS

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OBSERVATION DATE: 11-29-00 | START TIME: 11:10 AM | STOP TIME: 1:08 PM

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	Stop 11:57			
25	0	0	0	0	55	Start 12:04			
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE 0

RANGE OF OPACITY READINGS
MINIMUM 0 MAXIMUM 0

OBSERVER'S NAME (PRINT): Karrol Phillips

OBSERVER'S SIGNATURE: Karrol Phillips | **DATE**: 11-29-00

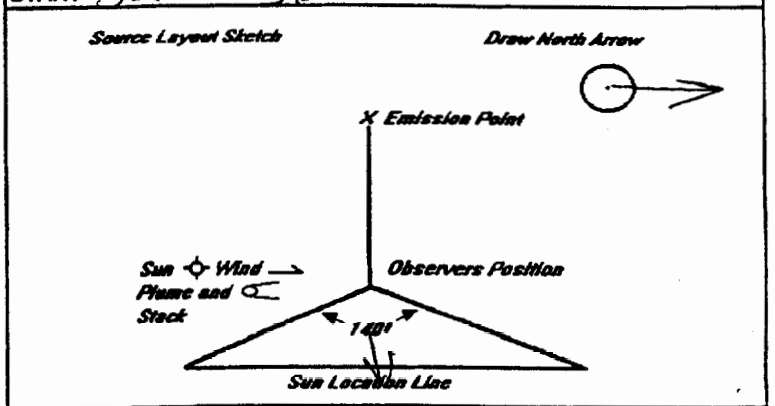
ORGANIZATION

CERTIFIED BY | DATE

VERIFIED BY | DATE

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire Co
ADDRESS	121 Wallace St
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818 AA1
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT START	building-east
DESCRIBE EMISSION POINT STOP	building-west
HEIGHT ABOVE GROUND LEVEL START	75
HEIGHT ABOVE GROUND LEVEL STOP	75
HEIGHT RELATIVE TO OBSERVER START	75
HEIGHT RELATIVE TO OBSERVER STOP	75
DESCRIBE EMISSIONS START	None
DESCRIBE EMISSIONS STOP	None
EMISSION COLOR START	NA
EMISSION COLOR STOP	NA
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☑ YES ☐	
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	base
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP	base
DESCRIBE BACKGROUND START	overcast
DESCRIBE BACKGROUND STOP	overcast
BACKGROUND COLOR START	white
BACKGROUND COLOR STOP	white
SKY CONDITIONS START	W
SKY CONDITIONS STOP	Clear
WIND SPEED START	5
WIND SPEED STOP	13
WIND DIRECTION START	N
WIND DIRECTION STOP	N-W
AMBIENT TEMP. START	32
AMBIENT TEMP. STOP	36



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TITLE	DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00	11:10 am	1:08 pm

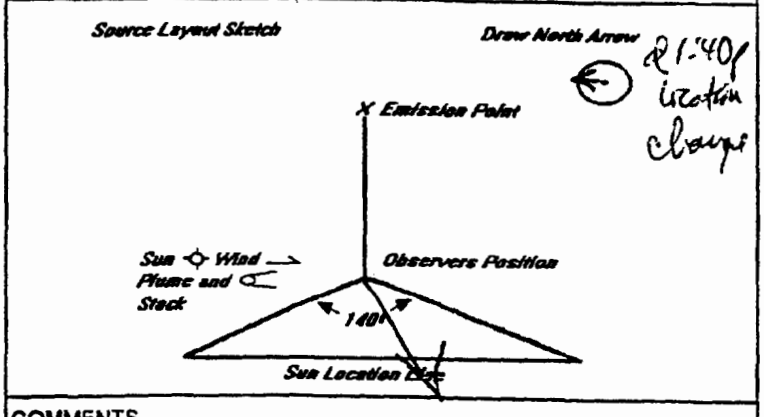
SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	62	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karrol Phillips
OBSERVER'S SIGNATURE	Karrol Phillips
DATE	11-29-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

(5)

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & wire co
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818 AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building east STOP building - west
HEIGHT ABOVE GROUND LEVEL	START 75 STOP 75
HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START overcast STOP overcast
BACKGROUND COLOR	START white STOP white
SKY CONDITIONS	START snow STOP clear
WIND SPEED	START 5 STOP 13
WIND DIRECTION	START N STOP N-W
AMBIENT TEMP.	START 32 STOP 36



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00	1:25 pm	3:30 pm

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE 0

RANGE OF OPACITY READINGS MINIMUM 0 MAXIMUM 0

OBSERVER'S NAME (PRINT): Karrol Phillips

OBSERVER'S SIGNATURE: Karrol Phillips | DATE: 11-29-00

ORGANIZATION

CERTIFIED BY | DATE

VERIFIED BY | DATE

Visible Emission Observation Form

SOURCE NAME North Western Steel & Wire Co.

ADDRESS 121 Wallace St.

CITY Sterling | **STATE** IL | **ZIP** 61081

PHONE 815-625-2500 | SOURCE ID NUMBER 195818AAI

PROCESS EQUIPMENT EAF | OPERATING MODE Normal

CONTROL EQUIPMENT baghouse | **OPERATING MODE** Normal

DESCRIBE EMISSION POINT
START building east **STOP** building west

HEIGHT ABOVE GROUND LEVEL **START** 75 STOP 75 | **HEIGHT RELATIVE TO OBSERVER** **START** 75 STOP 75

DESCRIBE EMISSIONS
START None STOP None

EMISSION COLOR
START NA STOP NA

PLUME TYPE: CONTINUOUS ☐ **FUGITIVE** ☑ **INTERMITTENT** ☐

WATER **DROPLETS** PRESENT: NO ☑ YES ☐

IF WATER DROPLET PLUME: **ATTACHED** ☐ DETACHED ☐

POINT IN THE PLUME AT **WHICH OPACITY** WAS DETERMINED
START base **STOP** base

DESCRIBE BACKGROUND
START overcast STOP overcast

BACKGROUND COLOR
START white **STOP** white

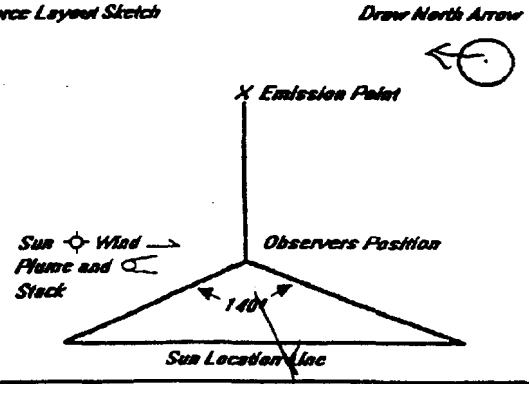
SKY CONDITIONS
START snow STOP clear

WIND SPEED
START 5 STOP 13

WIND DIRECTION
START N **STOP** N-W

AMBIENT TEMP.
START 32 **STOP** 36

Source Layout Sketch *Draw North Arrow*



COMMENTS

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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00	1:25 Pm	3:30 Pm

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD | **NUMBER OF READINGS** ABOVE % WERE 0

RANGE OF OPACITY READINGS
MINIMUM 0 **MAXIMUM** 0

OBSERVER'S NAME (PRINT) Karrol Phillips

OBSERVER'S SIGNATURE Karrol Phillips | **DATE** 11-29-00

ORGANIZATION

CERTIFIED BY | DATE

VERIFIED BY | DATE

(7)

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & wire Co.
ADDRESS	121 4 St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	144818AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal

DESCRIBE EMISSION POINT
START building east STOP building west

HEIGHT ABOVE GROUND LEVEL START 75' STOP 75'
HEIGHT RELATIVE TO OBSERVER START 75' STOP 75'

DESCRIBE EMISSIONS
START None STOP None

EMISSION COLOR
START NA STOP NA

PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☑ YES ☐

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START base STOP base

DESCRIBE BACKGROUND
START overcast STOP overcast

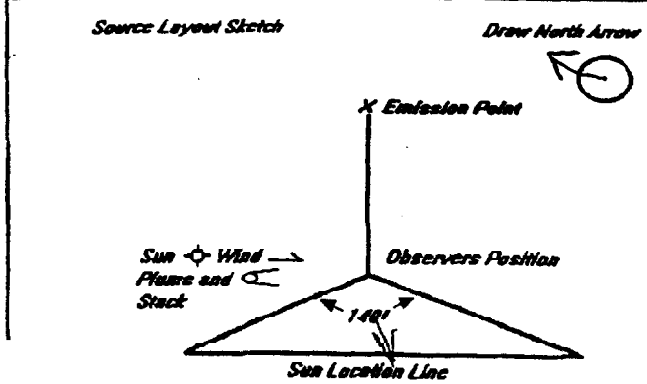
BACKGROUND COLOR
START white STOP white

SKY CONDITIONS
START snow STOP ø

WIND SPEED
START 5 STOP 13

WIND DIRECTION
START N STOP N-W

AMBIENT TEMP.
START 32 STOP 36



COMMENTS

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TITLE DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-29-00	1:25 Pm	3:30 Pm

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
3:30 Pm 6	0	0	0	0	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE 0

RANGE OF OPACITY READINGS
MINIMUM 0 MAXIMUM 0

OBSERVER'S NAME (PRINT) Karrol Phillips

OBSERVER'S SIGNATURE Karrol Phillips DATE 11-29-00

ORGANIZATION

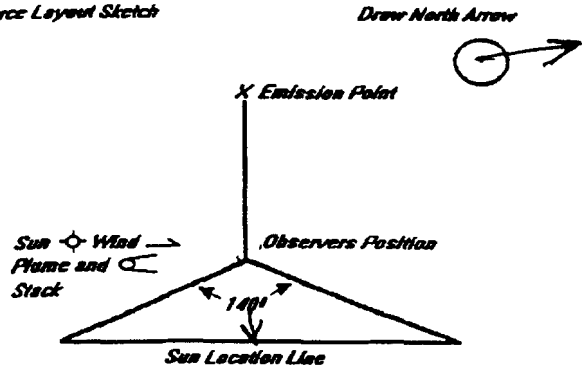
CERTIFIED BY DATE

VERIFIED BY DATE

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel + wire Co.
ADDRESS	121 Wallace st. 10:30
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818AAI
PROCESS EQUIPMENT	~~Baghouse~~ EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START Building east STOP Building west
HEIGHT ABOVE GROUND LEVEL	START 75 STOP 75
HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE: CONTINUOUS ☐	FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START overcast STOP overcast
BACKGROUND COLOR	START Gray STOP White
SKY CONDITIONS	START Solid STOP White
WIND SPEED	START 5-~~10~~ STOP 5
WIND DIRECTION	START West STOP N-W
AMBIENT TEMP.	START 35° STOP 38°

Source Layout Sketch



COMMENTS: Gray to white sky - solid over cast

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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-30-00	10:30 Am	1:05 Pm

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0 Stop - 10:43				43	0	0	0	0
14	Start - 10:28				44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

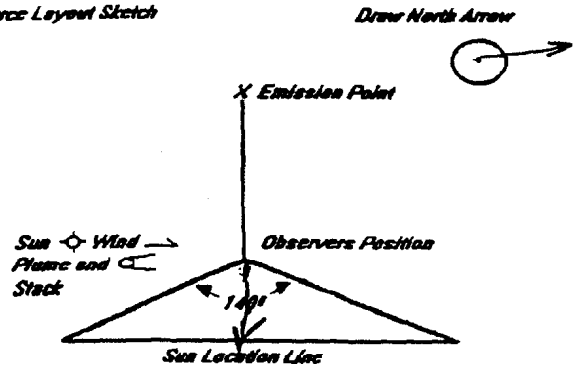
AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karral Phillips
OBSERVER'S SIGNATURE	Karral Phillips — DATE 11-30-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

(2)

Visible Emission Observation Form

SOURCE NAME: Northwestern Steel & wire Co.	
ADDRESS: 121 Wallace St	
CITY: Sterling	STATE: IL 61081
PHONE: 815-625-2500	SOURCE ID NUMBER: 195818 AAE
PROCESS EQUIPMENT: EAF	OPERATING MODE: Normal
CONTROL EQUIPMENT: baghouse	OPERATING MODE: Normal
DESCRIBE EMISSION POINT: START building east STOP building west	
HEIGHT ABOVE GROUND LEVEL: START 75' STOP 75'	HEIGHT RELATIVE TO OBSERVER: START 75' STOP 75'
DESCRIBE EMISSIONS: START None STOP None	
EMISSION COLOR: START NA STOP NA	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☑ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START base STOP base	
DESCRIBE BACKGROUND: START Overcast STOP Overcast	
BACKGROUND COLOR: START White STOP White	SKY CONDITIONS: START white STOP white
WIND SPEED: START 5 STOP 5	WIND DIRECTION: START West STOP N-W
AMBIENT TEMP.: START 35° STOP 38°	

Source Layout Sketch



COMMENTS: Gray to white sky

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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-30-00	10:30 am	1:05

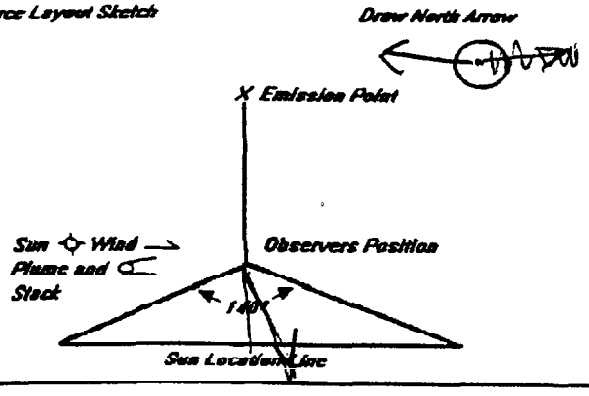
SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	1:05 pm			
25	0	0	0	0	55				
26	0	0	0	0	56				
27	0	0	0	0	57				
28	0	0	0	0	58				
29	0	0	0	0	59				
30	0	0	0	0	60				

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): Karrol Phillips	
OBSERVER'S SIGNATURE: Karrol Phillips	DATE: 11-30-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire Co.
ADDRESS	121 Wallace St. 1:15 pm
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818 AAT
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building east STOP building west
HEIGHT ABOVE GROUND LEVEL	START 75 STOP 75
HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT a
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	(ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START overcast STOP overcast
BACKGROUND COLOR	START White STOP white
SKY CONDITIONS	START White STOP White
WIND SPEED	START 5 STOP 5
WIND DIRECTION	START N-W STOP N-W
AMBIENT TEMP.	START 38° STOP 39

Source Layout Sketch



OBSERVATION DATE	START TIME	STOP TIME
11-30-00	1:15 pm	3:25 pm

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0		0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karrol Phillips
OBSERVER'S SIGNATURE	Karrol Phillips — DATE 11-30-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

COMMENTS: Gray to White Sky

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SIGNATURE

TITLE	DATE

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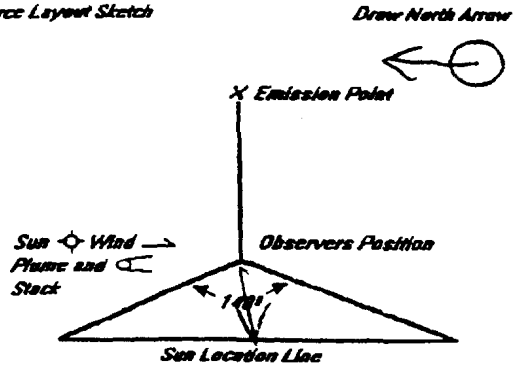
Visible Emission Observation Form

SOURCE NAME	North Western Steel + wire CO.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-6252500
SOURCE ID NUMBER	195818 AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building west STOP building west
HEIGHT ABOVE GROUND LEVEL	START 75 STOP 75
HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START overcast STOP overcast
BACKGROUND COLOR	START white STOP white
SKY CONDITIONS	START ~~cloudy~~ white STOP ~~clear~~
WIND SPEED	START 5 STOP 5
WIND DIRECTION	START N-W STOP N-W
AMBIENT TEMP.	START 38° STOP 39°

Source Layout Sketch



COMMENTS

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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-30-00	1:15 Pm	3:25 Pm

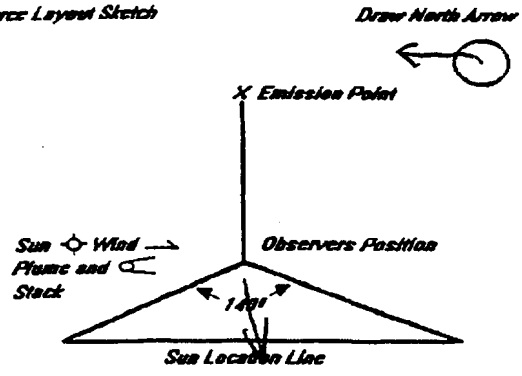
MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0		57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karral Phillips
OBSERVER'S SIGNATURE	Karral Phillips — DATE 11-30-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & wire Co.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195 818 AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building west STOP building west
HEIGHT ABOVE GROUND LEVEL	START 75 STOP 75
HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START N/A STOP N/A
PLUME TYPE: CONTINUOUS	FUGITIVE ☑ INTERMITTENT a
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED a DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START overcast STOP overcast
BACKGROUND COLOR	START white STOP white
SKY CONDITIONS	START white STOP white
WIND SPEED	START 5 STOP 5
WIND DIRECTION	START N-W STOP N-W
AMBIENT TEMP.	START 38° STOP 38°

Source Layout Sketch



COMMENTS

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SIGNATURE

TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
11-30-00	1:15 Pm	3:25 Pm

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
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7	0	0	0	0	37				
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10	0	0	0	0	40				
11	3:25 Pm				41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

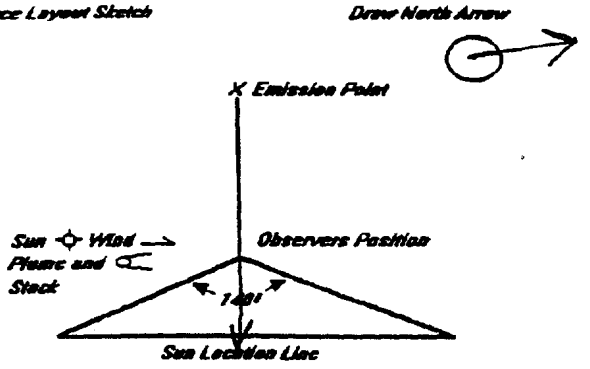
AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karrol Phillips
OBSERVER'S SIGNATURE	Karrol Phillips — DATE 11-30-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

(1)

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire Co.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL.
ZIP	61081
PHONE	815-6252500
SOURCE ID NUMBER	195 818 AAT
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building east STOP building east
HEIGHT ABOVE GROUND LEVEL	START 75 STOP 75
HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START Overcast STOP Overcast
BACKGROUND COLOR	START Gray STOP Gray
SKY CONDITIONS	START Gray STOP Snow Gray
WIND SPEED	START STOP
WIND DIRECTION	START N-E STOP N-E
AMBIENT TEMP.	START 33° STOP 35°

Source Layout Sketch — Draw North Arrow



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
12-1-00	9:10 AM	11:00 AM

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
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8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
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13	0	0	0	0	43	0	0	0	0
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15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
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25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karrol Phillips
OBSERVER'S SIGNATURE	Karrol Phillips — DATE 12-1-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

(2)

Visible Emission Observation Form

SOURCE NAME: Northwestern Steel & Wire Co.

ADDRESS: 121 Wallace St.

CITY: Sterling | STATE: IL. | ZIP: 61081

PHONE: 815-625-2500 | SOURCE ID NUMBER: 195818 AAI

PROCESS EQUIPMENT: EAF | OPERATING MODE: Normal

CONTROL EQUIPMENT: baghouse | OPERATING MODE: Normal

DESCRIBE EMISSION POINT
START building east STOP building east

HEIGHT ABOVE GROUND LEVEL
START 75 STOP 75

HEIGHT RELATIVE TO OBSERVER
START 75 STOP 75

DESCRIBE EMISSIONS
START None STOP None

EMISSION COLOR
START NA STOP NA

PLUME TYPE: CONTINUOUS ☐
FUGITIVE ☑ INTERMITTENT ☐

WATER DROPLETS PRESENT:
NO ☑ YES ☐

IF WATER DROPLET PLUME:
ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START base STOP base

DESCRIBE BACKGROUND
START Overcast STOP overcast

BACKGROUND COLOR
START Gray STOP Gray

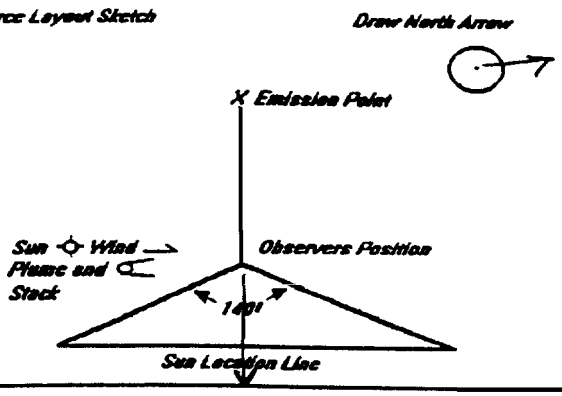
SKY CONDITIONS
START Gray STOP Gray
snowing

WIND SPEED
START STOP

WIND DIRECTION
START N-E STOP N-E

AMBIENT TEMP.
START 33° STOP 35°

Source Layout Sketch



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TITLE | DATE

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OBSERVATION DATE: 12-1-00 | START TIME: 9:10 Am | STOP TIME: 11:00 Am

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
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16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE 0

RANGE OF OPACITY READINGS
MINIMUM 0 MAXIMUM 0

OBSERVER'S NAME (PRINT): Karrol Phillips

OBSERVER'S SIGNATURE: Karrol Phillips | DATE: 12-1-00

ORGANIZATION

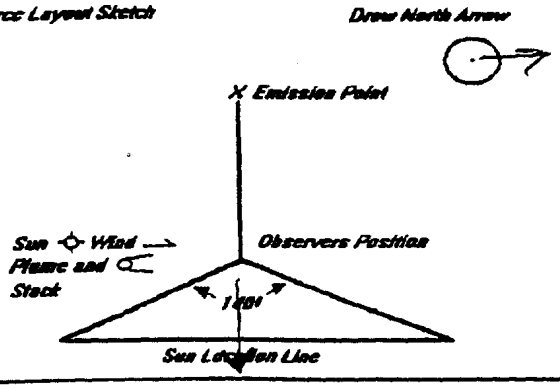
CERTIFIED BY | DATE

VERIFIED BY | DATE

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire Co.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818 AAI
PROCESS EQUIPMENT	EAF
OPERATING MOOE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT START	building east
DESCRIBE EMISSION POINT STOP	building
HEIGHT ABOVE GROUND LEVEL START	75
HEIGHT ABOVE GROUND LEVEL STOP	75
HEIGHT RELATIVE TO OBSERVER START	75
HEIGHT RELATIVE TO OBSERVER STOP	75
DESCRIBE EMISSIONS START	None
DESCRIBE EMISSIONS STOP	None
EMISSION COLOR START	NA
EMISSION COLOR STOP	NA
PLUME TYPE	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☑ YES ☐
IF WATER DROPLET PLUME	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	base
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP	base
DESCRIBE BACKGROUND START	overcast
DESCRIBE BACKGROUND STOP	overcast
BACKGROUND COLOR START	Gray
BACKGROUND COLOR STOP	Gray
SKY CONDITIONS START	Gray
SKY CONDITIONS STOP	Gray
WIND SPEED START	15
WIND SPEED STOP	15
WIND DIRECTION START	N-E
WIND DIRECTION STOP	N-E
AMBIENT TEMP. START	35°
AMBIENT TEMP. STOP	35°

Source Layout Sketch — Draw North Arrow



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
12-1-00	11:25 AM	1:37 PM

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
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6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Start test 11:25

Stop test 11:36

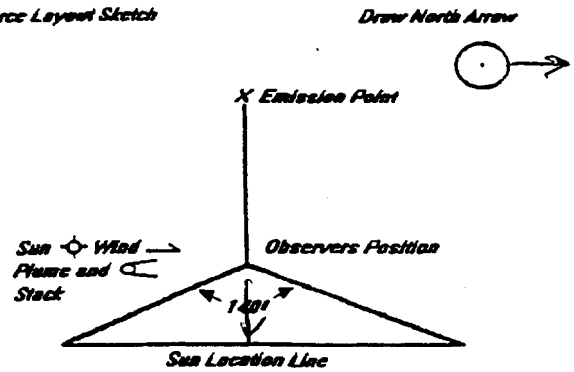
AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karral Phillips
OBSERVER'S SIGNATURE	Karral Phillips
DATE	12-1-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

(4)

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire CO.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-6252500
SOURCE ID NUMBER	195818 AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building east STOP building
HEIGHT ABOVE GROUND LEVEL	START 75' STOP 75'
HEIGHT RELATIVE TO OBSERVER	START 75' STOP 75'
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START ~~overcast~~ cloudy STOP ~~overcast~~ cloudy partly
BACKGROUND COLOR	START Grey STOP Grey
SKY CONDITIONS	START Grey STOP Grey-Blue
WIND SPEED	START 15 STOP 15
WIND DIRECTION	START N-E STOP N-E
AMBIENT TEMP.	START 35° STOP 35°

Source Layout Sketch



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TITLE | DATE

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OBSERVATION DATE	START TIME	STOP TIME
12-1-00	11:25 AM	1:34 PM

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
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2	0	0	0	0	32	0	0	0	0
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15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
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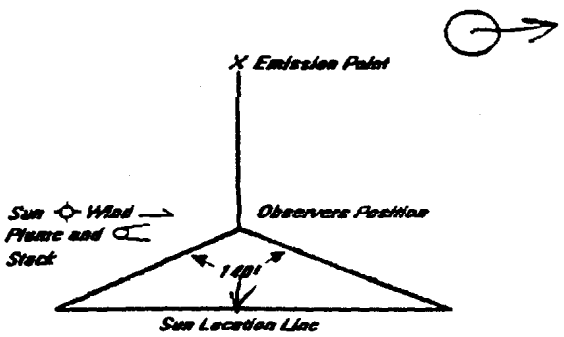
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS	MINIMUM MAXIMUM
OBSERVER'S NAME (PRINT)	Karrol Phillips
OBSERVER'S SIGNATURE	Karrol Phillips
DATE	12-1-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

Visible Emission Observation Form

SOURCENAME	Northwestern Steel & wire Co.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL.
ZIP	61081
PHONE	815-6252500
SOURCE ID NUMBER	195818 AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building east STOP building east
HEIGHT ABOVE GROUND LEVEL	START 75' STOP 75'
HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT.	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START Cloudy STOP Cloudy over cast
BACKGROUND COLOR	START Grey STOP Grey
SKY CONDITIONS	START Cloudy STOP Cloudy overcast
WIND SPEED	START 15 STOP 15
WIND DIRECTION	START N-E STOP N-E
AMBIENT TEMP.	START 35° STOP 36°

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE	12-1-00
START TIME	1:25 Pm
STOP TIME	1:34 Pm

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
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4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
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8	0	0	0	0	38				
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13	0	0	0	0	43				
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15	0	0	0	0	45				
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17	0	0	0	0	47				
18	0	0	0	0	48				
19	0	0	0	0	49				
20	0	0	0	0	50				
21	0	0	0	0	51				
22	0	0	0	0	52				
23	0	0	0	0	53				
Pm 24	0	0	0	0	54				
25	0	0	0	0	55				
26	0				56				
27					57				
28					58				
29					59				
30					60				

stop Heat 1:34

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karrol Phillips
OBSERVER'S SIGNATURE	Karrol Phillips — DATE 12-1-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

COMMENTS

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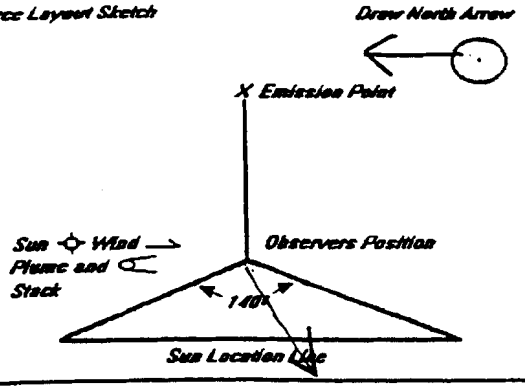
(6)

Visible Emfssion Observation Form

SOURCE NAME: Northwestern Steel & Wire Co.		
ADDRESS: 121 Wallace St.		
CITY: Sterling	STATE: IL.	ZIP: 61081
PHONE: 815-6752500	SOURCE ID NUMBER: 195818 AAI	
PROCESS EQUIPMENT: EAF	OPERATING MODE: Normal	
CONTROL EQUIPMENT: baghouse	OPERATING MODE: Normal	
DESCRIBE EMISSION POINT: START building west STOP building west		
HEIGHT ABOVE GROUND LEVEL: START 75 STOP 75	HEIGHT RELATIVE TO OBSERVER: START 75 STOP 75	
DESCRIBE EMISSIONS: START None STOP None		
EMISSION COLOR: START N/A STOP N/A	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☑ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START base STOP base		
DESCRIBE BACKGROUND: START Cloudy STOP Cloudy		
BACKGROUND COLOR: START Grey STOP Grey	SKY CONDITIONS: START Cloudy STOP Cloudy (overcast)	
WIND SPEED: START 15 STOP 15	WIND DIRECTION: START N-E STOP N-E	
AMBIENT TEMP.: START 37° STOP 37°		

Source Layout Sketch



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00	1:45 pm	3:32 pm

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1 (start 1:40 pm Reading)	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5 (start time 1:45 pm)	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0		0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD 0 | NUMBER OF READINGS ABOVE % WERE 0

RANGE OF OPACITY READINGS: MINIMUM | MAXIMUM 0

OBSERVER'S NAME (PRINT): Carrol Phillips

OBSERVER'S SIGNATURE: Carrol Phillips | DATE 12-1-00

ORGANIZATION

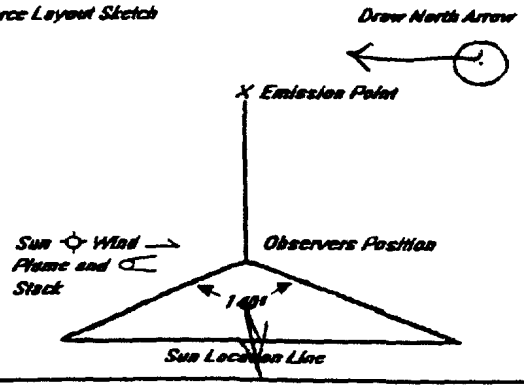
CERTIFIED BY | DATE

VERIFIED BY | DATE

Visible Emission Observation Form

SOURCE NAME	Northwestern Steel & Wire Co.
ADDRESS	121 Wallace St.
CITY	Sterling
STATE	IL
ZIP	61081
PHONE	815-625-2500
SOURCE ID NUMBER	195818 AAI
PROCESS EQUIPMENT	EAF
OPERATING MODE	Normal
CONTROL EQUIPMENT	baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START building west STOP building west
HEIGHT ABOVE GROUND LEVEL	START 75 STOP 75
(HEIGHT RELATIVE TO OBSERVER	START 75 STOP 75
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START NA STOP NA
PLUME TYPE:	CONTINUOUS ☐ FUGITIVE ☑ INTERMITTENT ☐
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START base STOP base
DESCRIBE BACKGROUND	START Cloudy STOP Cloudy
BACKGROUND COLOR overcast	START Grey STOP Grey
SKY CONDITIONS overcast	START Cloudy STOP Cloudy
WIND SPEED	START STOP
WIND DIRECTION	START N-E STOP N-E
AMBIENT TEMP.	START 37° STOP 37°

Source Layout Sketch



COMMENTS

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SIGNATURE

TITLE | DATE

VISBLEMS.DOC 1998

OBSERVATION DATE	START TIME	STOP TIME
12-1-00	1:45 PM	3:32 PM

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0		0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	Done Tapping			
24	0	0	0	0	54		3:32 PM		
25	0	0	0	0	55				
26	0	0	0	0	56				
27	0	0	0	0	57				
28	0	0	0	0	58				
29	0	0	0	0	59				
30	0	0	0	0	60				

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE 0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	Karrol Phillips
OBSERVER'S SIGNATURE	Karrol Phillips — DATE 12-1-00
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

APPENDIX C Furnace al Data

#8 FURNACE OPERATION DATA

DURING COMPLIANCE TESTING

November 29, 30, and December 1, 2000

JN130 (2000)

EAF Heat Report

BATE	11-29-00	SHIFT	Z-3	Heat #	81260
FURNACE	8	MELTER	WAITES	Grade	STEA6
DELTA HEAT #	12	1st HELPER	Aguilar, Erikson	Ladle #	1

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >	
CHG. WT.	Current HT.>	
CHG> WT. X .90 >>>>		
TAP WT.	Current HT. >	
(Difference) TAP -90% of		Current Heel
Charge + Prev. Heel		

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	811	817	6	
FCE T@	817	829	14	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	829	903	34	Can't chg; EPA.			
	903	906	3	PC	334		—
20	906	928					
	926	932	6	BC	253		
23	932	955					
	955	959	4	BC	238		
45	959	1044					
	1044	1047	3	slag			
	1047	1053	6	Tap			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	94
88	XXXXXXXXXX	71	159		

Any Burners out of service, restricted flow and or problems: 156-88

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	317.17	INJECTION	1653	BURNERS	127.15
LANCES	88.8	CHARGE	[illegible]	LIME	LBS
TOTAL	405.97	ROOF		INJECTION	44 22100.0
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	1030
TIME LADLE REC.	1040
TAP TIME	1041
TAP TEMP	2950
TAP O2 PPM	273
KWH	1376
KWHR/C TON	333.0
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	31	16	.03	56	27	8	10	19	0069
2ND	9	19	28	52	27	8	11	20	
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

LADLE ADDITIONS:			TAPPED GRADE:						other
Recarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	

Remarks: _____

412.5 T/HR

L823 1129 81260 FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO. 81260

ADDITION TYPE	FCE	STIR
RECARB		200
FE MN		
SI 75	1000	
SI MN	7200	
ALUM NOTCH BAR		
CA SI		
CA ROD		190
FE V		210
BORON		
DCA		500
FE TI		
SULGON		
CA C2	150	
LIME	1100	3000
FE CB		
SI C	250	
MGO	500	

FINAL CHEMICAL ANALYSIS

	A HEAT	B HEAT
C	.141	
S	.034	
MN	.85	
P	.028	
SI	.2690	
CU	.2880	
NI	.0800	
CR	.1140	
MO	.0210	
SN	.0100	
AL	.0035	
V	.0306	
B		
TI	.0040	
NB	.0015	
N2	,0089	
W	.0039	
CA	.0017	

AIM STERCG

A FINAL STERCG

B FINAL

	TENS.l	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A						.0
B						.0

("F13" FOR SEMI-FINISH PRODUCTION)

JN130 (2000)

EAF Heat Report

DATE 11-29-00 SHIFT 7-3 Heat # 81261
FURNACE 8 MELTER Waits Grade STEAG
DELTA HEAT # 13 1st HELPER [illegible] Ladle # 7

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >	
CHG. WT.	Current HT.>	842
CHG> WT. X .90 >>>>		757.80
TAP WT.	Current HT. >	760
(Difference) TAP -90% of		Current Heel
Charge + Prev. Heel		

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	1047	1053	6	
FCE T@	1053	1110	28	17

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	1110	1113	3	P.C.	350		
23	1113	1136	23				
	1136	1142	6	B.C.	247		
12	1142	1154					
	1154	1204	10	Lost OCI, BTT Trip Tran for CPower System			
6	1204	1210					
	1210	1217	8	P.C. [illegible]	244		
40	1217	1258					
	1258	101	2	Temp Test			
2	101	103					
	103	105	2	Slag			
	105	110	5	Tap			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	90
83	XXXXXXXXXX	60			

Any Burners out of service, restricted flow and or problems: 137-83

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	314.44	INJECTION	133.75	BURNERS	11456
LANCES	1334	CHARGE	1 0	LIME	LBS
TOTAL	447.88	ROOF	16 Dec 2000	INJECTION	36 19000
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	1230
TIME LADLE REC.	1246
TAP TIME	102
TAP TEMP	2957
TAP O2 PPM	444.0
KWH	133.6
KWHR/C TON	317.0
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	.059	.12	.0108	.044	.295	.076	.062	.019	
2ND	.053	.13	.0118	.0476	.287	.075	.064	.019	
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

LADLE ADDITIONS: TAPPED GRADE: other

Recarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	

Remarks: _____

420.5 [illegible]

L823 1129 81261 FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO. 81261

ADDITION TYPE	FCE	STIR
RECARB		550
FE MN		100
SI 75		200
SI MN		
ALUM NOTCH BAR		
CA SI		
CA ROD		190
FE V		220
BORON		
DCA		900
FE TI		
SULGON		
CA C2	150	
LIME	1100	3000
FE CB		
SI C	250	
MGO	500	

FINAL CHEMICAL ANALYSIS

	A HEAT	B HEAT
C	.161	
S	.030	
MN	.75	
P	.017	
SI	.2360	
CU	.2900	
NI	.0790	
CR	.0800	
MO	.0200	
SN	.0120	
AL	.0038	
V	.0315	
B		
TI	.0002	
NB	.0011	
N2	.0092	
W	.0031	
CA	.0024	

AIM STERCG

A FINAL STERCG

B FINAL

	TENS.1	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A					.0	.0
B					.0	.0

("F13" FOR SEMI-FINISH PRODUCTION)

4

JN130 (2000)

EAF Heat Report

DATE 11-29-00
FURNACE #4
DELTA HEAT # #14

SHIFT 3rd
MELTER [illegible]
1st HELPER [illegible]

Heat # 81262
Gmde AH36
Ladle # 10

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >		
CHG. WT.	Current HT.>	834	
CHG> WT. X .90 >>>>		750.60	
TAP WT.	Current HT. >	733	
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel	

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	105	110	5	
FCE T@	110	123	13	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	POWER OFF REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	123	127	4	PC	382		
11	128	134					
	139	147	8	[illegible]			
13	147	200					
	200	206	6	[illegible]	264		
24	206	230					
	230	237	7	BC	190		
49	237	326					
	326	331	5	THD			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	88
97	XXXXXXXXXX	43	140		

Any Burners out of service, restricted flow and or problems: 141 - 97

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	284.3	INJECTION	4801.0	BURNERS	102.20
LANCES	90.1	CHARGE	0	LIME	LBS
TOTAL	374.4	ROOF	1200.	INJECTION	30000
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	3:00
TIME LADLE REC.	3:12
TAP TIME	326
TAP TEMP	2975
TAP O2 PPM	395
KWH	148.8
KWHR/C TON	355.0
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	08	10	008	041	24	07	05	020	
2ND	06	12	007	56					
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

1331K

LADLE ADDITIONS: TAPPED GR: AH36 other

Recarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	other
100		9500	300				250	1000	2505.C

Remarks: 500 LINWOOD

L823 1129 81262 FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO. **81262**

ADDITION TYPE	FCE	STIR
RECARB	100	
FE MN		300
SI 75	300	200
SI MN	9500	
ALUM NOTCH BAR		
CA SI		
CA ROD		190
FE V		360
BORON		
DCA		
FE TI		
SULGON		2000
CA C2	250	
LIME	1000	4500
FE CB		
SIC 250		
MGO 500		

("F13" FOR SEMI-FINISH PRODUCTION)

FINAL CHEMICAL ANALYSIS

	A HEAT	B HEAT		
C	.104			
S	.022			
MN	.99			
P	.011			
SI	.2300			
CU	.2410		AIM	AH36
NI	.0700		A FINAL	AH36
CR	.0700		B FINAL	
MO	.0210			
SN	.0110			
AL	.0039			
V	.0529			
B				
TI	.0009			
NB	.0017			
N2	.0088			
W	.0040			
CA	.0021			

	TENS.1	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A					.0	.0
B					.0	.0

JN130 (2000)

EAF Heat Report

DATE 11-30-00
FURNACE 4
DELTA HEAT # 22

SHIFT 7-3
MELTER WAITES
1st HELPER AGUILAR

Heat # 81271
Grade C1006I0
Ladle #

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >	
CHG. WT.	Current HT.>	
CHG> WT. X .90 >>>>		
TAP WT.	Current HT. >	
(Difference) TAP -90% of		Current Heel
Charge + Prev. Heel		

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	1015	1022	7	
FCE T@	1022	1030	8	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	1030	1033	3	PC	376		
8	1033	1041					
	1041	1050	9	slip electrode			
	1050	1121	31	change Hydraulic Hose "C"			
	1121	1127	6	ADD A, slip C electrode			
17	1127	1144					
	1144	1149	5	B.C.	271		
21	1149	1210					
	1210	1217	7	B.C., put sand in box	201		
39	1217	1256					
	1256	1259	3	wait Ladle			
	1259	105		Top			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	86
85	XXXXXXXXXX	79	164		

Any Burners out of service, restricted flow and or problems: 165-85

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	290.58	INJECTION	675	BURNERS	103.23
LANCES	161.0	CHARGE	1 Bag 2000	LIME	LBS
TOTAL	451.58	ROOF	1 Bag 2000	INJECTION	40' 20000
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	1245
TIME LADLE REC.	1258
TAP TIME	1259
TAP TEMP	
TAP O2 PPM	828
KWH	124.2
KWHR/C TON	292.0
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr.	Mo	N
1ST	3	6	7	22	18	6	23	14	0075
2ND	4	.076	.007	.024	.175	.062	.029	.014	
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS
	A	1013	[illegible]	1		11:17	N

424.6
364

LADLE ADDITIONS:			TAPPED GRADE:						other
Recarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	

Remarks: _____

L823 1130 81271 FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO. 81271

ADDITION TYPE	FCE	STIR
RECARB		
FE MN		
SI 75	1300	200
SI MN	2740	400
ALUM NOTCH BAR		
CA SI		
Q		
CA ROD		280
Q		
FE V		
BORON		
DCA		1300
FE TI		
SULGON		
CA C2	150	100
LIME	1100	4000
FE CB		
MGO	1000	

FINAL CHEMICAL ANALYSIS

	A HEAT	B HEAT		
C	.040			
S	.020			
MN	.35			
P	.009			
SI	.1080			
CU	.1960		AIM	C1006I
NI	.0610		A FINAL	C1006I
CR	.0380		B FINAL	
MO	.0140			
SN	.0190			
AL	.0026			
V	.0016			
B				
TI	.0002			
NB	.0020			
N2	.0072			
W	.0003			
CA	.0019			

	TENS.l	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A					.0	.0
B					.0	.0

("F13" FOR SEMI-FINISH PRODUCTION)

JN130 (2000)

EAF Heat Report

DATE 11-30-00
FURNACE #2
DELTA HEAT # 23

SHIFT 3-11
MELTER AGUILAR 5
1st HELPER WAITES 2

Heat # 81272
Grade C100614
Ladle # 1

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >	
CHG. WT.	Current HT.>	836
CHG> WT. X .90 >>>>		
TAP WT.	Current HT. >	701
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	1259	105	6	
FCE T@	105	115	10	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	115	118	3	B.C.			
23	118	143			346		
	143	148	5	B.C. + put scrap in BOX			
17	148	205			262		
	205	210	5	B.C.			
47	210	257			191		
	257	302	5	TAP			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	89
89	XXXXXXXXXX	29	118		

Any Burners out of service, restricted flow and or problems: 11-89

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	276.19	INJECTION	3426.0	BURNERS	100.40
LANCES	108.6	CHARGE		LIME	LBS
TOTAL	384.79	ROOF	—	INJECTION	18225.0
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	245
TIME LADLE REC.	255
TAP TIME	257
TAP TEMP	2986
TAP O2 PPM	667
KWH	135.8
KWHR/C TON	3240
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	06	09	007	39	19	07	08	014	
2ND	05	10	007	39					
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

LADLE ADDITIONS: TAPPED GRADE: 06IQ

Recarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	other
		2400	1100				150	1000	100 SiC

Remarks: 6 CARB MAX

1000 LINWOOD

MOIK

418.6
350.5

L823 1130 81272 FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO. 81272

ADDITION TYPE	FCE	STIR		FINAL CHEMICAL ANALYSIS A HEAT	B HEAT		
RECARB			C	.044			
FE MN			S	.015			
SI 75	1100	100	MN	.36			
SI MN	2400	300	P	.010			
ALUM NOTCH BAR			SI	.1000			
CA SI			CU	.1850		AIM	C1006I
Q							
CA ROD		280	NI	.0580		A FINAL	C1006I
Q							
FE V			CR	.0510		B FINAL	
BORON			MO	.0140			
DCA			SN	.0160			
[redacted] TI			AL	.0031			
SULGON		3000	V	.0019			
CA C2	150	100	B				
LIME	1000	6000	TI	.0002			
[redacted] CB			NB	.0016			
SIC 100			N2	.0082			
MGO 1000			W	.0004			
			CA	.0020			

	TENS.1	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A					.0	.0
B					.0	.0

("F13" FOR SEMI-FINISH PRODUCTION)

JN130 (2000)

EAF Heat Report

DATE 12-1-00
FURNACE 8
DELTA HEAT # 29

SHIFT 7-3
MELTER Wait
1st HELPER [illegible]

Heat # 81279
Grade A36T
Ladle # 13

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >		
CHG. WT.	Current HT.>	840	
CHG> WT. X .90 >>>>		756.0	
TAP WT.	Current HT. >	720	
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel	

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	838	843	5	
ICE T@	843	850	7	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	850	910	20	Replace Water Hose "O"			
	910	913	3	Pc	338		
20	913	1033					
	1033	937	4	BC	309		
19	937	956					
	956	1001	5	BC	192		
29	1001	1030					
	1030	1052	2	check wall, Leak			
22	1052	1054					
	1054	1100	6	Tap			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	89
90	XXXXXXXXXX	47	137		

Any Burners out of service, restricted flow and or problems: 131-90

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	259.47	INJECTION	2151	BURNERS	80.19
LANCES	121.7	CHARGE	0	LIME	LBS
TOTAL	381.17	ROOF	1000	INJECTION	40" 18000
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	1026
TIME LADLE REC.	1048
TAP TIME	1054
TAP TEMP	2968
TAP O2 PPM	232
KWH	144.2
KWHR/C TON	343.0
AFTER TAP TEMP	1054

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	7	11	7	49	23	11	.054	25	0056
2ND	9	14	10	51	22	10	.065	.025	0054
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

LADLE ADDITIONS: TAPPED GRADE: other

Lecarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	

Remarks: _____

L823 1201 81279 **FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO.** 81279

ADDITION TYPE	FCE	STIR
RECARB		300
FE MN		
SI 75	1300	
SI MN	6980	
ALUM NOTCH BAR		
CA SI		
CA ROD		190
FE V		
BORON		
DCA		700
FE TI		
SULGON		
CA C2	150	
LIME	1100	3000
FE CB		
SI C	250	
MGO	500	

FINAL CHEMICAL ANALYSIS

	A HEAT	B HEAT		
C	.156			
S	.024			
MN	.73			
P	.012			
SI	.2410			
CU	.2200		AIM	A36T
NI	.1030		A FINAL	A36T
CR	.0780		B FINAL	
MO	.0250			
SN	.0120			
AL	.0032			
V	.0026			
B				
TI	.0012			
NB	.0017			
N2	.0082			
W	.0005			
CA	.0022			

	TENS.l	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A					.0	.0
B					.0	.0

("F13" FOR SEMI-FINISH PRODUCTION)

8

JN130 (2000)

EAF Heat Report

DATE 12-1-00
FURNACE 8
DELTA HEAT # 30

SHIFT 7-3
MELTER Wait
1st HELPER Aguilar

Heat # 81280
Grade A36T
Ladle # 1

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >	
CHG. WT.	Current HT.>	830
CHG> WT. X .90 >>>>		747
TAP WT.	Current HT. >	715
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	1054	1100	6	
FCE T@	1100	1109	9	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	1109	1125	16	Replace Hose "C" Phase, Power Cable Feed			
	1125	1128	3	PE	348		
8	1128	1136					
	1136	1152	16	ADD A, slip B+C			
	1152	1155	3	Replace Lance barrel			
18	1155	1213					
	1213	1218	5	B.C. + 2 bbl scrap	215		
21	1218	1239					
	1239	1245	6	B.C.	266		
41	1245	126					
	126	128	2	Slag-out			
	128	131	3	Wait Lab			
	131	137	6	[illegible]			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	90
86	XXXXXXXXXX	69	155		

Any Burners out of service, restricted flow and or problems: 151-88

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	339.32	INJECTION	1138	BURNERS	85.03
LANCES	19.2	CHARGE	0	LIME	LBS
TOTAL	358.57	ROOF	40 BaO	INJECTION	40" 18000
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	113
TIME LADLE REC.	121
TAP TIME	131
TAP TEMP	2968
TAP O2 PPM	61
KWH	136.0
KWHR/C TON	327.0
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	6	11	7	49	25	8	6	21	0052
2ND	5	11	7	48	25	8	6	.20	-005
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS
	A	995	SG4	1			N

LADLE ADDITIONS:			TAPPED GRADE:						other
Recarb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	

Remarks: O2 Lance not in operation for most of HEAT

L823 1201 81280 FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO. 81280

ADDITION TYPE	FCE	STIR
RECARB	300	400
FE MN		600
SI 75	1400	
SI MN	7200	
ALUM NOTCH BAR		
CA SI		
CA ROD		190
FE V		
BORON		
DCA		
FE TI		
SULGON		800
CA C2	150	
LIME	1100	3000
FE CB		
SIC 250		
MGO 500		

FINAL CHEMICAL ANALYSIS

	A HEAT	B HEAT
C	.165	
S	.028	
MN	.76	
P	.010	
SI	.2470	
CU	.2510	
NI	.0790	
CR	.0620	
MO	.0220	
SN	.0120	
AL	.0029	
V	.0028	
B		
TI	.0011	
NB	.0022	
N2	.0069	
W	.0002	
CA	.0022	

AIM A36T
A FINAL A36T
B FINAL

	TENS.l	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A					.0	.0
B					.0	.0

("F13" FOR SEMI-FINISH PRODUCTION)

JN130 (2000)

EAF Heat Report

DATE	12-1-00	SHIFT	3-11	Heat #	81281
FURNACE	4	MELTER	[illegible]	Grade	A36T
DELTA HEAT #	31	1st HELPER	[illegible]	Ladle #	7

Scrap Recipe _____ Burner Profile _____

HEEL	Prev. Heat >		
CHG. WT.	Current HT.>	832	
CHG> WT. X .90 >>>>			
TAP WT.	Current HT. >		
(Difference) TAP -90% of Charge + Prev. Heel		Current Heel	

PREVIOUS	FROM	TO	TIME	COMMENTS
TAP	131	136	5	
FCE T@	136	146	16	

Power On MIN.	TIME FROM	TIME TO	POWER OFF TOTAL	POWER OFF REASON	CHARGE (LBS) SCRAP	LIME	CARBON
	146	149	3	PC	310		2-coke
18	149	207					
	207	214	7	BC	200		
17	214	232					
	232	236	4	BC	204		
14	236	250					
	250	254	4	BC	118		
35	254	329					
	329	334	5	TAP			

Note and report all fires or any potential hazards to the Melter and Maint. Supervisor

Total Power ON	Add Power On Time to Power Off Time	Total Power Off	Your total power on time and the power off times should equal the total heat time.	After the 1st. Temp. has been taken note the MW on the Overview screen	92
98	XXXXXXXXXX	33	117		

Any Burners out of service, restricted flow and or problems: 118-85

OXYGEN	KSCF	CARBON	LBS	GAS	
BURNERS	244.78	INJECTION	1458.0	BURNERS	64.88
LANCES	99.4	CHARGE	4000	LIME	LBS
TOTAL	344.18	ROOF	—	INJECTION	10825.0
		TOTAL		CHARGE	
				TOTAL	

TIME LADLE ORDERED	315
TIME LADLE REC.	326
TAP TIME	329
TAP TEMP	3060
TAP O2 PPM	623
KWH	137.6
KWHR/C TON	330.0
AFTER TAP TEMP	

PRELIM	C	Mn	P	S	Cu	Ni	Cr	Mo	N
1ST	07	10	008	37	25	08	06	023	
2ND									
3RD									
LAST									

ELECTRODE ADDS:	PHASE	# NEW	TYPE	# PCS	# SAL.	TIME	REASON & REMARKS

LADLE ADDITIONS: TAPPED GRADE: A36T

carb	FeMn	SiMn	Si75	Al	FeV	FeB	CaC2	Art. Slag	other
300		5800	1000				150	500	250 SiC

Remarks: _____

4160 Tue

L823 1201 81281 FINAL ALLOY ADDITIONS AND CHEMISTRY FOR HEAT NO. 81281

ADDITION TYPE	FCE	STIR
RECARB	300	600
FE MN		1200
SI 75	1000	450
SI MN	5800	
ALUM NOTCH BAR		
CA SI		
CA ROD		190
FE V		
BORON		
DCA		
FE TI		
SULGON		1000
CA C2	150	
LIME	500	3000
FE CB		
SIC 250		

FINAL CHEMICAL ANALYSIS

	A HEAT	B HEAT		
C	.160			
S	.026			
MN	.70			
P	.011			
SI	.2080			
CU	.2730		AIM	A36T
NI	.0840		A FINAL	A36T
CR	.0680		B FINAL	
MO	.0250			
SN	.0120			
AL	.0029			
V	.0029			
B				
TI	.0004			
NB	.0023			
N2	.0078			
W	.0034			
CA	.0019			

	TENS.1	TENS.2	YLD PT1	YLD PT2	ELONG1	ELONG2
A					.0	.0
B					.0	.0

("F13" FOR SEMI-FINISH PRODUCTION)

APPENDIX D

Test Equipment Calibration Data and QA/QC Procedures

ARI ENVIRONMENTAL, INC
EPA Method 5
Model 522 Meter Box Calibration
Pre-Test Orifice Method
English Volume Units, English K' Factor

Model #: APEX
Serial #: 611209

Date: 1/3/00
Barometric Pressure 29.51 **in Hg**

DRY GAS METER READINGS						CALIBRATION ORIFICE READING							
						Temperature					Ambient Temperature		
ΔH (in H20)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)		Tmi Inlet (deg F)	Tmo Outlet (deg F)	Orifice Serial No	' FACTO (number)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.53	10.0	329.236	333.438	4.202	Initial>	73	68	47	0.327	24.000	62	62	62.000
					Final >	70	67						
1.10	10.0	352.026	357.810	5.784	Initial>	68	66	55	0.450	22.000	62	62	62.000
					Final >	71	66						
1.90	10.0	342.730	350.355	7.625	Initial>	67	66	63	0.580	20.000	62	62	62.000
					Final >	72	66						
3.80	10.0	359.028	369.130	10.102	Initial>	67	66	73	0.778	17.000	62	63	62.500
					Final >	78	66						
5.00	10.0	316.330	328.750	12.420	Initial>	70	67	81	0.935	16.000	62	62	62.000
					Final >	83	68						

METER CALIBRATION

METER FLOW (cu ft)	ORIFICE FLOW (cu ft)	FACTOR, Yc (number)	ΔH@ (in H2O)
4.1365	4.22	1.020	1.67
5.7208	5.81	1.015	1.83
7.5567	7.49	0.992	1.90
10.0301	10.04	1.001	2.12
12.3042	12.08	0.982	1.92
AVERAGE METER CALIBRATION FACTOR, Yc		1.002	1.89

ARI ENVIRONMENTAL, INC.
EPA Method 5
Model 522 Meter Box Calibration
Post-Test Orifice Method
English Volume Units, English K' Factor

Model #: APEX
Serial #: 611209

Date: 12/4/00
Barometric Pressure 29.79 in Hg

		DRY GAS METER READINGS				Temperature		CALIBRATION ORIFICE READING					
						Tmi	Tmo				Ambient Temperature		
AH	Time	Volume Initial	Volume Final	Volume Total		Inlet	Outlet	Orifice	K' FACTOR	Vacuum	Initial	Final	Average
(in H20)	(min)	(cu ft)	(cu ft)	(cu ft)		(deg F)	(deg F)	Serial No	(number)	(in Hg)	(deg F)	(deg F)	(deg F)
2.10	10.0	495.215	503.388	8.173	Initial>	63	65	63	0.6235	16.000	63	63	63.000
					Final >	67	65						
2.10	10.0	503.388	511.565	8.177	Initial>	65	64	63	0.6235	16.000	63	63	62.000
					Final >	70	65						
2.10	10.0	511.565	519.743	8.178	Initial>	66	65	63	0.6235	16.000	63	63	63.000
					Final >	71	65						

METER FLOW (cu ft)	ORIFICE FLOW (cu ft)	FACTOR, Yc (number)	ΔH@ (in H20)
8.2231	8.12	0.988	1.77
8.2115	8.13	0.990	1.77
8.2008	8.12	0.990	1.77

AVERAGE METER CALIBRATION FACTOR, Yc 0.989
FULL TEST CALIBRATION FACTOR, Yd 1.002 **% *DIFFERENCE:*** 1.3 *(+or- 5.0% allowable)*

ARI Environmental, Inc.
Gas Meter Thermometer Calibration Data Form
Post-Test Calibration

Meter Box: APEX611209
Calibrator: Mel
Date: 12/4/00
Barometric: 29.79
Ambient Temp: 64
Reference Thermometer: Altek Thermocouple Source

Reference Temperature	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean
Altek	Inlet	inlet	Oulet	Oulet	Probe	Probe	Stack	Stack
0	-1	NIA	-1	N/A	-1	N/A	-1	N/A
100	97	3.0	97	3.0	97	3.0	97	3.0
200	199	0.5	199	0.5	199	0.5	199	0.5
300	299	0.3	299	0.3	299	0.3	299	0.3
400	395	1.3	395	1.3	395	1.3	395	1.3
500	496	0.8	496	0.8	496	0.8	496	0.8

Reference Temperature	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer1 Temperature	Difference (%) mean
Altek	Filter	Filter	Exit	Exit	Aux	Aux
0	-1	N/A	-1	N/A	-1	N/A
100	97	3.0	97	3.0	97	3.0
200	199	0.5	199	0.5	199	0.5
300	299	0.3	299	0.3	299	0.3
400	395	1.3	395	1.3	395	1.3
500	496	0.8	496	0.8	496	0.8

ARI **ENVIRONMENTAL, INC.**

EPA Method **5**

Model ***522*** Meter Box Calibration

Post-Test Orifice Method

English Volume Units, English K' Factor

Model #: Apes

Serial #: 604178

Date: 12/4/00

Barometric Pressure: 24.90 in Hg

DRY GAS METER READINGS								CALIBRATION ORIFICE READING					
						Temperature					Ambient Temperature		
ΔH (in H20)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)		Tmi Inlet (deg F)	Tmo Outlet (deg F)	Orifice Serial No	K' FACTOR (number)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
1.80	10.0	116.133	124.055	7.922	**Initial>**	57	54	63	0.6235	15.000	57	57	57.000
					Final >	63	56						
1.80	10.0	124.055	132.028	7.973	**Initial>**	61	57	63	0.6235	15.000	57	57	57.000
					Final >	65	58						
1.80	10.0	131.028	139.985	7.957	**Initial>**	64	58	63	0.6235	15.000	57	57	57.000
					Final >	68	59						

METER CALIBRATION

METER FLOW (cu ft)	ORIFICE FLOW (cu ft)	FACTOR, Yc (number)	ΔH@ (in H20)
8.1098	8.20	1.011	1.47
8.1189	8.20	1.010	1.47
8.0716	8.20	1.016	1.47

AVERAGE METER CALIBRATION FACTOR, Yc 1.012

FULL TEST CALIBRATION FACTOR, Yd 1.008

% DIFFERENCE: -0.4 *(+or- 5.0% allowable)*

ARI Environmental, Inc.
Gas Meter Thermometer Calibration Data Form
Post-Test Calibration

Meter Box: Apex **604178**
Calibrator: Mel
Date: **12/4/00**
Barometric: **29.86**
Ambient Temp: **59.00**
Reference Thermometer: Altek Thermocouple Source

Reference Temperature	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean
Altek	Inlet	Inlet	Outlet	Outlet	Probe	Probe
0.00	-2.00	N/A	-2.00	N/A	-1.00	N/A
100.00	97.00	3.0	97.00	3.0	97.00	3.0
200.00	199.00	0.5	199.00	0.5	199.00	0.5
300.00	299.00	0.3	299.00	0.3	299.00	0.3
400.00	395.00	1.3	395.00	1.3	395.00	1.3
500.00	497.00	0.6	497.00	0.6	497.00	0.6

Reference Temperature	Th[illegible] Temperature	(%) mean	Th[illegible] Temperature	Difference (%) mean	[illegible] Temperature	Difference (%) mean
Altek	Filter	Filter	Exit	Exit	Aux	Aux
0.00	-1.00	N/A	-1.00	N/A	-1.00	N/A
100.00	97.00	3.0	97.00	3.0	97.00	3.0
200.00	199.00	0.5	199.00	0.5	199.00	0.5
300.00	299.00	0.3	299.00	0.3	299.00	0.3
400.00	396.00	1.0	396.00	1.0	396.00	1.0
500.00	497.00	0.6	497.00	0.6	497.00	0.6

Thermometer Temperature	Difference (%) mean
Stack	Stack
-2.00	NIA
97.00	3.0
199.00	0.5
299.00	0.3
396.00	1.0
497.00	0.6

ARI ENVIRONMENTAL, INC
EPA Method 5
Mode1522 Meter Box Calibration
Pre-Test Orifice Method
English Volume Units, English K' Factor

Model #: APEX
Serial #: 604178

Date: 12/27/99
Barometric Pressure 29.70 in Hg

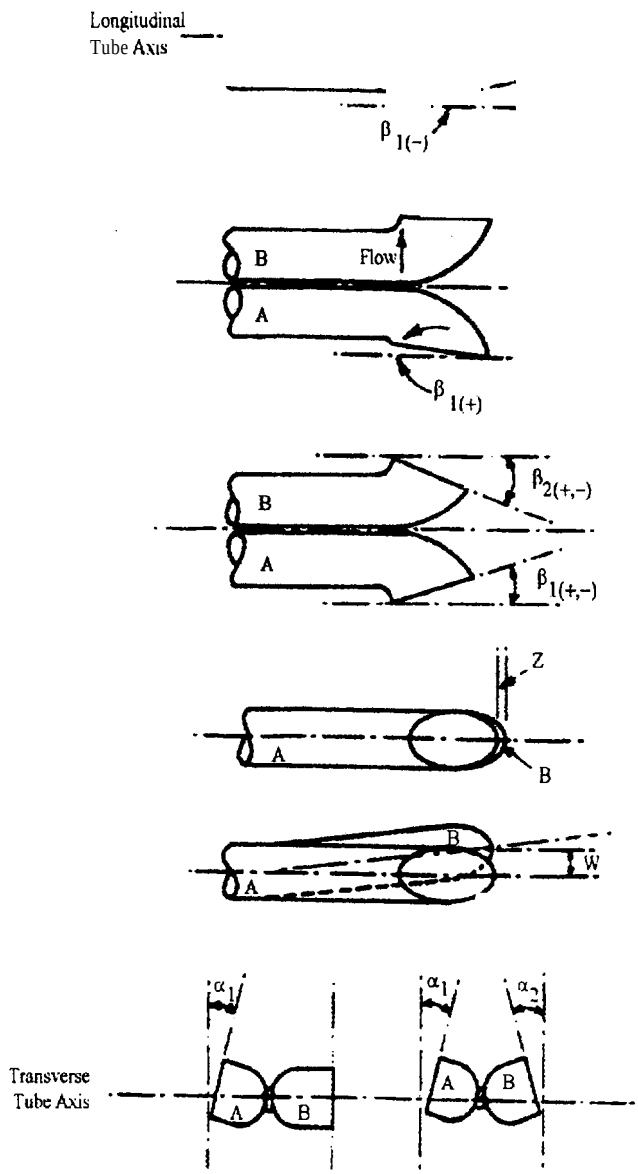
DRY GAS METER READINGS						CALIBRATION ORIFICE READING							
						Temperature					Ambient Temperature		
AH (in H20)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)		Tmi Inlet (deg F)	Tmo Outlet (deg F)	Orifice Serial No	' FACTO (number)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.46	11.0	291.715	296.285	4.570	Initial>	60	60	47	0.327	23.000	58	59	58.500
					Final >	62	61						
0.90	10.0	319.630	325.406	5.776	Initial>	67	64	55	0.450	21.000	61	61	61.000
					Final >	68	64						
1.70	10.0	311.220	318.776	7.556	Initial>	69	63	63	0.580	19.000	60	61	60.500
					Final >	72	64						
2.90	10.0	326.535	336.550	10.015	Initial>	66	64	73	0.778	17.000	61	61	61.000
					Final >	76	64						
4.40	10.0	298.034	310.216	12.182	Initial>	64	61	81	0.935	15.000	60	60	60.000
					Final >	79	63						

METER CALIBRATION

METER FLOW (cu ft)	ORIFICE FLOW (cu ft)	FACTOR, Yc (number)	AH@ (in H20)
4.6030	4.69	1.018	1.40
5.7686	5.85	1.014	1.46
7.5433	7.55	1.001	1.66
10.0182	10.12	1.010	1.57
12.2483	12.18	0.995	1.65
AVERAGE METER CALIBRATION FACTOR, Yc		1.008	1.55

Pitot Tube Inspection Data

Client Name: Northwest Steel and Wire



Pre-Sample Date: 10/20/00		Post-Sample Date: 12/4/00
Yes	level?	YES
NO	obstructions?	NO
NO	damaged?	NO
0	$-10' < \alpha_1 < +10°$	0
0	$-10° < \alpha_2 < +10°$	0
0	$-5° < \beta_1 < +5°$	0
0	$-5° < \beta_2 < +5°$	0
1	γ	1
0	θ	0
0.78	A	0.78
0.385	$0.2625 < P_A < 0.375$	0.385
0.395	$0.2625 < P_B < 0.375$	0.395
0.25	3/16" <= D_t <= 3/8"	0.25
0.014	A tan y < 0.125"	0.014
0.00672	A tan θ < 0.03125"	0.00672
TRUE	$P_A = P_B$ +/- 0.063	TRUE

Comments: S-type pitot tube with k-type thermocouple enclosed in 10' effective length M5 probe.

Pitot tube/probe number 4814 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature: W H Sane

Date: 12-4-00

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: BC
Thermocouple ID. 4814

	pretest	posttest
Date:	10/20/00	12/4/00

Barometric:
Reference Thermometer = Mercury in glass

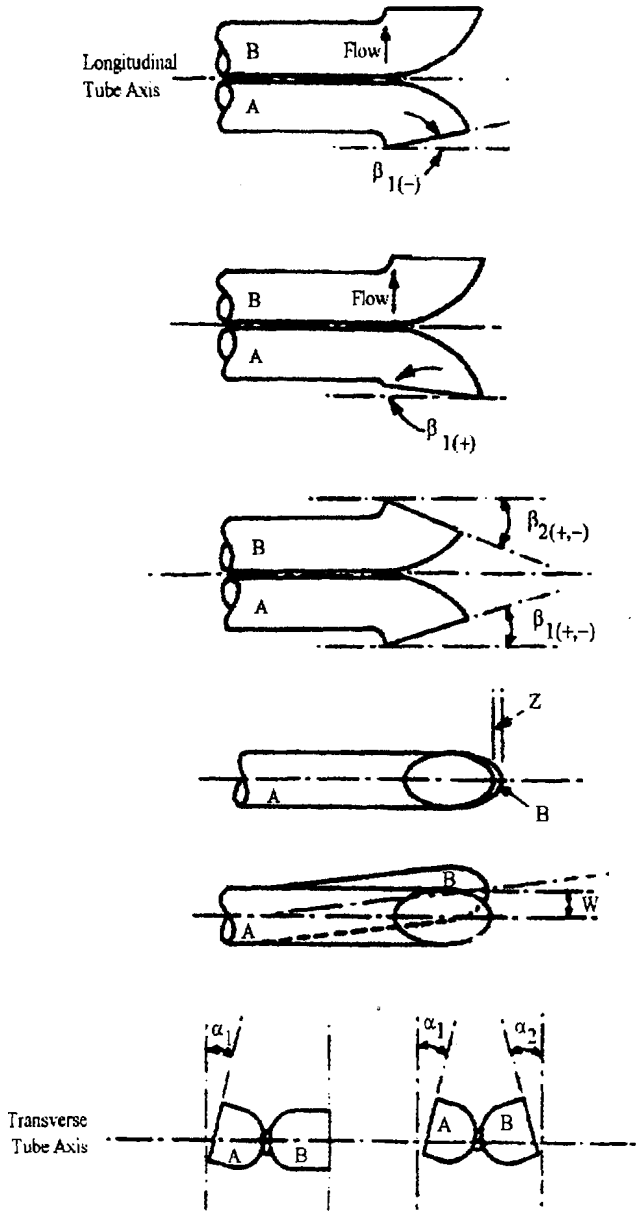
	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Temperatur Difference (%) a
Pre Test	T.C	Ice Water	35.0	35.0	0.00
		Hot Water	205.0	205.0	0.00
Post Test	T.C	Ice Water	35.0	35.0	0.00
		Hot Water	208.0	208.0	000

a (temp. diff.) = (ref.temp + 460) - (Thermo. temp. + 460) / (ref. temp. +460) x 10

Where 1.5 < a < 1.5

Pitot Tube Inspection Data

Client Name: Northwest Steel and Wire



Pre-Sample Date: 10/20/00		Post-Sample Date: 12/4/00
Yes	level?	YES
NO	obstructions?	NO
NO	damaged?	NO
-1	$-10^\circ < a_1 < +10^\circ$	0
1	$-10^\circ < a_2 < +10^\circ$	0
0	$-5^\circ < \beta_1 < +5^\circ$	0
0	$-5^\circ < \beta_2 < +5^\circ$	0
1	γ	0
0	θ	0
0.75	A	0.75
0.375	$0.2625 < P_A < 0.375$	0.375
0.375	$0.2625 < P_B < 0.375$	0.375
0.25	$3/16" <= D_t <= 3/8"$	0.25
0.013	$A \tan\gamma < 0.125"$	0.000
0.00654	$A \tan\theta < 0.03125"$	0.00000
TRUE	$P_A = P_B$ +/- 0.063	TRUE

Comments: S-type pitot tube with k-type thermocouple enclosed in 10' effective length M5 probe.

Pitot tube/probe number 4850 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is heareby assigned a pitot tube calibration factor of 0.84.

Signature: A H Crane

Date: 12.4.00

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: BC
Thermocouple ID. 4850

	pretest	posttest
Date:	10/20/00	12/4/00

Barometric:
Reference Thermometer = Mercury in glass

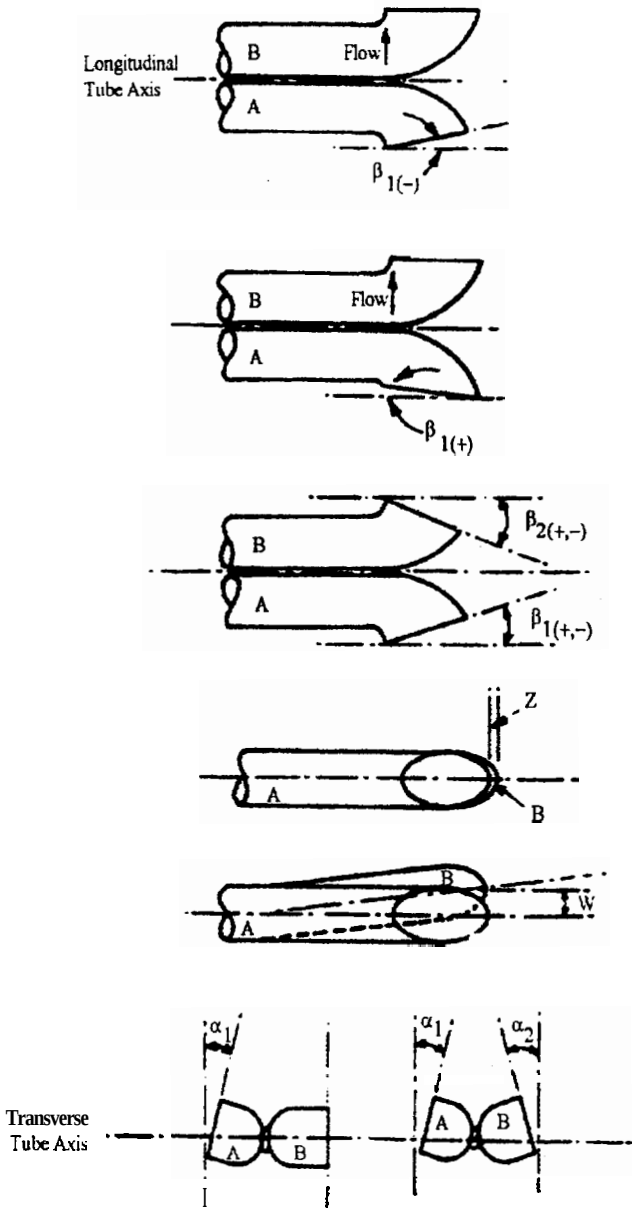
	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Temperatur Difference (%)a
Pre Test	T.C	Ice Water	35.0	35.0	0.00
		Hot Water	205.0	205.0	0.00
Post Test	T.C	Ice Water	35.0	35.0	0.00
		Hot Water	208.0	207.0	0.15

a (temp. diff.) = (ref.temp + 460) - (Thermo. temp. + 460) / (ref. temp. +460) x 10

Where 1.5 < a < 1.5

Pitot Tube Inspection Data

Client Name: Northwest Steel and Wire



Pre-Sample (Date: 10/20/00)		Post-Sample (Date: 12/4/00)
Yes	**level?**	YES
NO	**obstructions?**	NO
NO	**damaged?**	NO
-2	**$-10^\circ < \alpha_1 < +10^\circ$**	-2
-2	**$-10^\circ < \alpha_2 < +10^\circ$**	-2
-2	**$-5^\circ < \beta_1 < +5^\circ$**	-2
-3	**$-5^\circ < \beta_2 < +5^\circ$**	-3
2	**Y**	2
2	**8**	2
1.1	**A**	1.1
0.545	**$0.39375 < P_A < 0.5625$**	0.545
0.555	**$0.39375 < P_B < 0.5625$**	0.555
0.375	**3/16" <= D_t <= 3/8"**	0.375
0.038	**A tan γ < 0.125"**	0.038
0.01902	**A tan 8 < 0.03125"**	0.01902
TRUE	**$P_A = P_B$ +/- 0.063**	TRUE

Comments: S-type pitot tube with k-type thermocouple attached. 22 foot effective length.

Pitot tube/probe number 17422 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is heareby assigned a pitot tube calibration factor of 0.84.

Signature:

Date: 12-9-00

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: BC
Thermocouple ID. 17422

	pretest	posttest
Date:	10/20/00	12/4/00

Barometric:
Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Temperatur Difference (%) a
Pre Test	T.C	Ice Water	35.0	35.0	0.00
		Hot Water	205.0	205.0	0.00
Post Test	T.C	Ice Water	35.0	35.0	0.00
		Hot Water	208.0	208.0	0.00

a (temp. diff.) = (ref.temp + 460) - (Thermo. temp. + 460)1(ref. temp. +460) x 100

Where 1.5< a < 1.5

NOZZLE CALIBRATION DATA FORM

Date 12-4-00 Calibrated by R Sane

Nozzle identification number	Nozzle Diameter[a]			ΔD,[b] mm (in.)	D_{avg}[c]
	D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)		
1"-SS-01	0.998	0.998	0.998	0.000	0.998
1"-SS-03	0.997	0.998	0.998	0.001	0.998

where:

[a] $D_{1,2,3}$, = *three* different nozzles diameters, mm (in.); each diameter must be within (0.025 mm) 0.001 in.

[b] AD = maximum difference between any two diameters, mm (in.), AD $\leq$(0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3.