

Report of a...

Relative Accuracy Test Audit

Performed for ...

Cleveland-Cliffs, Inc.
Tilden Mining Company, L.C.
Ishpeming, Michigan

On...

Unit 1

At the...

Tilden Mine
National Mine, Michigan

August 14-15, 2024

Project #: 053.68

By...

Network Environmental, Inc.
Grand Rapids, MI

performed for

Cleveland-Cliffs, Inc.
Tilden Mining Company, L.C.
1 Tilden Mine Road
P.O. Box 2000
Ishpeming, MI 49849-0901
Contact: Tom O'Brien
Telephone: (906) 475-3306
e-mail: thomas.obrien@clevelandcliffs.com

Performed at the:

Tilden Mine
National Mine, MI

Performed by

Network Environmental, Inc.
2629 Remico Street SW
Suite B
Grand Rapids, MI 49519
Contact: David D. Engelhardt
Telephone: (616) 530-6330
Fax: (616) 530-0001
E-mail: netenviro@aol.com

TABLE OF CONTENTS

	<u>Page</u>
I. Introduction	1
II. Presentation of Results	2-15
II.1 Table 1 – North NO _x (Lbs/Hr) Relative Accuracy	2
II.2 Table 2 – North SO ₂ (Lbs/Hr) Relative Accuracy	3
II.3 Table 3 – North NO _x (PPM) Relative Accuracy	4
II.4 Table 4 – North SO ₂ (PPM) Relative Accuracy	5
II.5 Table 5 – North O ₂ (%) Relative Accuracy	6
II.6 Table 6 – North Air Flow (KSCFH) Relative Accuracy	7
II.7 Table 7 – North Moisture (%) Relative Accuracy	8
II.8 Table 8 – South NO _x (Lbs/Hr) Relative Accuracy	9
II.9 Table 9 – South SO ₂ (Lbs/Hr) Relative Accuracy	10
II.10 Table 10 – South NO _x (PPM) Relative Accuracy	11
II.11 Table 11 – South SO ₂ (PPM) Relative Accuracy	12
II.12 Table 12 – South O ₂ (%) Relative Accuracy	13
II.13 Table 13 – South Air Flow (KSCFH) Relative Accuracy	14
II.14 Table 14 – South Moisture (%) Relative Accuracy	15
III. Discussion of Results	16-17
IV. CEMS Specifications	17
V. Sampling and Analytical Protocol	18-20
Figure 1 - NO _x , SO ₂ , O ₂ & CO ₂ Sampling Train	21
Figure 2 - Moisture Sampling Train	22
Figure 3 - Air Flow Sampling Train	23

Appendices

Reference Method DAS & Calibration Data	A
CEM Data	B
Reference Method Air Flow Data	C
Analyzer Specifications & Calibration Gas Certifications	D
Calculations	E
Raw Data	F

I. INTRODUCTION

Network Environmental, Inc. was retained by the Tilden Mining Company, L.C. of Ishpeming, Michigan to perform a relative accuracy test audit (RATA) at the Tilden Mine located in National Mine, Michigan.

The purpose of the testing was to conduct a Relative Accuracy Test Audit (RATA) on the Continuous Emission Monitoring System (CEMS) that services Unit 1. There are two (2) exhaust stacks (North & South) on Unit 1. Each exhaust stack has its own CEMS. The CEMS on Unit 1 is for Oxides of Nitrogen (NO_x), Sulfur Dioxide (SO₂), air flow rate, Oxygen (O₂) and moisture.

The RATA's were performed over the period of August 14-15, 2024. Stephan K. Byrd, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. conducted the RATA's in accordance with Part 60 of Title 40 of the Code of Federal Regulations. The following reference test methods were employed to conduct the RATA sampling:

- Air Flow Rates – U.S. EPA Methods 1-2
- Oxygen & Carbon Dioxide (O₂ & CO₂) – U.S. EPA Method 3A
- Moisture – U.S. EPA Method 4
- Sulfur Dioxide (SO₂) – U.S. EPA Method 6C
- Oxides of Nitrogen (NO_x) – U.S. EPA Method 7E

Assisting with the RATA's were Mr. Jason Sammon of CEMSOURCE and Mr. Dan McGrath of the Tilden Mine.

II. PRESENTATION OF RESULTS

II.1 TABLE 1
NO_x (LBS/HR) RELATIVE ACCURACY DETERMINATION
UNIT 1
NORTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 15, 2024

Run #	Time	REFERENCE METHOD			CEM	DIFF
		NO _x ⁽¹⁾	DSCFM ⁽²⁾	Lbs/Hr ⁽³⁾	Lbs/Hr ⁽³⁾	
1	10:45-11:10	89.2	236,292	150.57	153.10	-2.53
2	11:27-11:52	88.0	235,396	148.03	153.20	-5.17
3	12:12-12:37	86.3	237,097	146.14	149.50	-3.36
4	12:50-13:15	83.7	244,452	146.19	147.80	-1.61
5	13:31-13:56	90.2	239,886	154.57	157.40	-2.83
6	14:09-14:34	87.8	238,867	149.74	154.90	-5.16
7	19:02-19:27	111.9	240,977	192.60	195.30	-2.70
8	19:42-20:07	83.5	234,596	139.99	139.30	0.69
9	20:20-20:45	91.8	241,637	158.42	159.10	-0.68

Mean Reference Value = 154.0278

Absolute Value of the Mean of the Differences = 2.5944

Standard Deviation = 1.9136

Confidence Co-efficient = 1.4709

Relative Accuracy = 2.64% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of PPM by volume on a dry basis

(2) DSCFM = Dry Standard Cubic Feet Per Minute (Standard Temperature & Pressure = 68 °F & 29.92 in. Hg)

(3) Lbs/Hr = Pounds Per Hour

II.2 TABLE 2
SO₂ (LBS/HR) RELATIVE ACCURACY DETERMINATION
UNIT 1
NORTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 15, 2024

Run #	Time	REFERENCE METHOD			CEM	DIFF
		SO ₂ ⁽¹⁾	DSCFM ⁽²⁾	Lbs/Hr ⁽³⁾	Lbs/Hr ⁽³⁾	
1	10:45-11:10	6.1	236,292	14.35	14.6	-0.25
2	11:27-11:52	7.1	235,396	16.58	15.1	1.48
3	12:12-12:37	6.2	237,097	14.54	12.9	1.64
4	12:50-13:15	4.7	244,452	11.37	10.9	0.47
5	13:31-13:56	5.7	239,886	13.69	12.9	0.79
6	14:09-14:34	5.9	238,867	13.96	13.5	0.46
7	19:02-19:27	8.0	240,977	19.21	16.5	2.71
8	19:42-20:07	7.0	234,596	16.37	14.9	1.47
9	20:20-20:45	8.8	241,637	21.20	19.9	1.30

Mean Reference Value = 15.6967

Absolute Value of the Mean of the Differences = 1.1189

Standard Deviation = 0.8607

Confidence Co-efficient = 0.6616

Relative Accuracy = 11.34% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of PPM by volume on a dry basis

(2) DSCFM = Dry Standard Cubic Feet Per Minute (Standard Temperature & Pressure = 68 °F & 29.92 in. Hg)

(3) Lbs/Hr = Pounds Per Hour

II.3 TABLE 3
NO_x (PPM) RELATIVE ACCURACY DETERMINATION
UNIT 1
NORTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 15, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		NO _x ⁽¹⁾	NO _x ⁽¹⁾	
1	10:45-11:10	89.2	90.5	-1.3
2	11:27-11:52	88.0	90.2	-2.2
3	12:12-12:37	86.3	88.1	-1.8
4	12:50-13:15	83.7	84.7	-1.0
5	13:31-13:56	90.2	91.3	-1.1
6	14:09-14:34	87.8	89.7	-1.9
7	19:02-19:27	111.9	115.9	-4.0
8	19:42-20:07	83.5	85.0	-1.5
9	20:20-20:45	91.8	93.8	-2.0

Mean Reference Value = 90.2667

Absolute Value of the Mean of the Differences = 1.8667

Standard Deviation = 0.9000

Confidence Co-efficient = 0.6918

Relative Accuracy = 2.83% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of PPM by volume on a dry basis

II.4 TABLE 4
SO₂ (PPM) RELATIVE ACCURACY DETERMINATION
UNIT 1
NORTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 15, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		SO ₂ ⁽¹⁾	SO ₂ ⁽¹⁾	
1	10:45-11:10	6.1	6.2	-0.1
2	11:27-11:52	7.1	6.4	0.7
3	12:12-12:37	6.2	5.5	0.7
4	12:50-13:15	4.7	4.5	0.2
5	13:31-13:56	5.7	5.4	0.3
6	14:09-14:34	5.9	5.6	0.3
7	19:02-19:27	8.0	7.1	0.9
8	19:42-20:07	7.0	6.5	0.5
9	20:20-20:45	8.8	8.4	0.4

Mean Reference Value = 6.6111

Absolute Value of the Mean of the Differences = 0.4333

Standard Deviation = 0.3041

Confidence Co-efficient = 0.2338

Relative Accuracy = 10.09% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of PPM by volume on a dry basis

II.5 TABLE 5
O₂ (%) RELATIVE ACCURACY DETERMINATION
UNIT 1
NORTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 15, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		O ₂ ⁽¹⁾	O ₂ ⁽¹⁾	
1	10:45-11:10	19.0	18.8	0.2
2	11:27-11:52	19.0	18.9	0.1
3	12:12-12:37	19.0	18.9	0.1
4	12:50-13:15	19.0	18.9	0.1
5	13:31-13:56	19.0	18.9	0.1
6	14:09-14:34	19.0	19.0	0.0
7	19:02-19:27	18.6	18.6	0.0
8	19:42-20:07	18.8	18.8	0.0
9	20:20-20:45	18.7	18.7	0.0

Mean Reference Value = 18.9000

Absolute Value of the Mean of the Differences = 0.0667

Standard Deviation = 0.0707

Confidence Co-efficient = 0.0544

Relative Accuracy = 0.64% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of % by volume on a dry basis

II.6 TABLE 6
AIR FLOW (KSCFH) RELATIVE ACCURACY DETERMINATION
UNIT 1
NORTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 15, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		KSCFH ⁽¹⁾	KSCFH ⁽¹⁾	
1	10:46-11:03	15,551	15,548	3
2	11:28-11:43	15,510	15,540	-30
3	12:14-12:30	15,604	15,542	62
4	12:51-13:08	16,105	15,950	155
5	13:32-13:48	15,789	15,796	-7
6	14:10-14:27	15,741	15,841	-100
7	19:02-19:19	15,999	15,707	292
8	19:43-20:00	15,696	15,390	306
9	20:21-20:37	16,176	15,943	233

Mean Reference Value = 15,796.78

Absolute Value of the Mean of the Differences = 101.56

Standard Deviation = 149.66

Confidence Co-efficient = 115.04

Relative Accuracy = 1.37% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Thousand Standard Cubic Feet Per Hour

II.7 TABLE 7
MOISTURE (%) RELATIVE ACCURACY DETERMINATION
UNIT 1
NORTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 15, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		Moisture ⁽¹⁾	Moisture ⁽¹⁾	
1	10:45-11:10	8.83	9.1	-0.27
2	11:27-11:52	8.94	8.7	0.24
3	12:12-12:37	8.83	8.5	0.33
4	12:50-13:15	8.93	8.3	0.63
5	13:31-13:56	8.84	8.9	-0.06
6	14:09-14:34	8.95	8.8	0.15
7	19:02-19:27	9.63	10.1	-0.47
8	19:42-20:07	10.32	10.5	-0.18
9	20:20-20:45	10.37	10.6	-0.23

Mean Reference Value = 9.2933

Absolute Value of the Mean of the Differences = 0.0156

Standard Deviation = 0.3476

Confidence Co-efficient = 0.2672

Relative Accuracy = 3.04% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of % by volume on a dry basis

II.8 TABLE 8
NO_x (LBS/HR) RELATIVE ACCURACY DETERMINATION
UNIT 1
SOUTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 14, 2024

Run #	Time	REFERENCE METHOD			CEM	DIFF
		NO _x ⁽¹⁾	DSCFM ⁽²⁾	Lbs/Hr ⁽³⁾	Lbs/Hr ⁽³⁾	
1	09:34-09:59	256.4	436,908	800.15	779.6	20.55
2 ⁽⁴⁾	10:28-10:53	218.2	423,590	660.16	691.7	-31.54
3 ⁽⁴⁾	12:09-12:34	145.8	438,337	456.55	477.4	-20.85
4	13:00-13:25	166.0	449,789	533.23	538.2	-4.97
5	13:44-14:09	170.3	447,494	544.54	548.8	-4.26
6	14:23-14:48	161.9	444,352	513.88	510.6	3.28
7	15:06-15:31	164.3	439,553	515.80	517.0	-1.20
8	15:50-16:15	153.5	441,745	484.49	482.1	2.39
9	16:31-16:56	148.8	438,156	465.81	463.2	2.61
10	17:13-17:38	142.9	439120	448.12	465.6	-17.48
11	17:58-18:23	148.5	442507	469.56	470.4	-0.84

Mean Reference Value = 530.6200

Absolute Value of the Mean of the Differences = 0.0089

Standard Deviation = 9.9758

Confidence Co-efficient = 7.6680

Relative Accuracy = 1.45% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

- (1) Concentration in terms of PPM by volume on a dry basis
- (2) DSCFM = Dry Standard Cubic Feet Per Minute (Standard Temperature & Pressure = 68 °F & 29.92 in. Hg)
- (3) Lbs/Hr = Pounds Per Hour
- (4) Not used for relative accuracy calculation

II.9 TABLE 9
SO₂ (LBS/HR) RELATIVE ACCURACY DETERMINATION
UNIT 1
SOUTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 14, 2024

Run #	Time	REFERENCE METHOD			CEM	DIFF
		SO ₂ ⁽¹⁾	DSCFM ⁽²⁾	Lbs/Hr ⁽³⁾	Lbs/Hr ⁽³⁾	
1 ⁽⁴⁾	09:34-09:59	6.0	436,908	25.95	31.5	-5.55
2 ⁽⁴⁾	10:28-10:53	4.7	423,590	19.63	26.7	-7.07
3	12:09-12:34	4.6	438,337	20.14	20.1	0.04
4	13:00-13:25	4.6	449,789	20.57	21.5	-0.93
5	13:44-14:09	5.1	447,494	22.80	24.3	-1.50
6	14:23-14:48	4.9	444,352	21.72	23.3	-1.58
7	15:06-15:31	5.5	439,553	23.85	26.1	-2.25
8	15:50-16:15	6.1	441,745	26.73	26.8	-0.07
9	16:31-16:56	6.4	438,156	27.85	26.7	1.15
10	17:13-17:38	6.5	439120	28.34	28.5	-0.16
11	17:58-18:23	6.7	442507	29.47	29.7	-0.23

Mean Reference Value = 24.6078

Absolute Value of the Mean of the Differences = 0.6144

Standard Deviation = 1.0418

Confidence Co-efficient = 0.8008

Relative Accuracy = 5.75% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

- (1) Concentration in terms of PPM by volume on a dry basis
- (2) DSCFM = Dry Standard Cubic Feet Per Minute (Standard Temperature & Pressure = 68 °F & 29.92 in. Hg)
- (3) Lbs/Hr = Pounds Per Hour
- (4) Not used in relative accuracy calculation

II.10 TABLE 10
NO_x (PPM) RELATIVE ACCURACY DETERMINATION
UNIT 1
SOUTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 14, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		NO _x ⁽¹⁾	NO _x ⁽¹⁾	
1 ⁽²⁾	09:34-09:59	256.4	250.6	5.8
2 ⁽²⁾	10:28-10:53	218.2	214.8	3.4
3	12:09-12:34	145.8	143.3	2.5
4	13:00-13:25	166.0	166.6	-0.6
5	13:44-14:09	170.3	170.3	0.0
6	14:23-14:48	161.9	161.3	0.6
7	15:06-15:31	164.3	163.2	1.1
8	15:50-16:15	153.5	153.2	0.3
9	16:31-16:56	148.8	146.9	1.9
10	17:13-17:38	142.9	147.3	-4.4
11	17:58-18:23	148.5	150.6	-2.1

Mean Reference Value = 155.7778

Absolute Value of the Mean of the Differences = 0.0778

Standard Deviation = 2.1094

Confidence Co-efficient = 1.6214

Relative Accuracy = 1.09% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of PPM by volume on a dry basis

(2) Not used in relative accuracy calculation

II.11 TABLE 11
SO₂ (PPM) RELATIVE ACCURACY DETERMINATION
UNIT 1
SOUTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 14, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		SO ₂ ⁽¹⁾	SO ₂ ⁽¹⁾	
1 ⁽²⁾	09:34-09:59	6.0	7.3	-1.3
2 ⁽²⁾	10:28-10:53	4.7	6.0	-1.3
3	12:09-12:34	4.6	4.3	0.3
4	13:00-13:25	4.6	4.8	-0.2
5	13:44-14:09	5.4	5.4	0.0
6	14:23-14:48	4.9	5.3	-0.4
7	15:06-15:31	5.5	5.9	-0.4
8	15:50-16:15	6.1	6.1	0.0
9	16:31-16:56	6.4	6.1	0.3
10	17:13-17:38	6.5	6.5	0.0
11	17:58-18:23	6.7	6.8	-0.1

Mean Reference Value = 5.6333

Absolute Value of the Mean of the Differences = 0.0556

Standard Deviation = 0.2555

Confidence Co-efficient = 0.1964

Relative Accuracy = 4.47% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of PPM by volume on a dry basis

(2) Not used in relative accuracy calculation

II.12 TABLE 12
O₂ (%) RELATIVE ACCURACY DETERMINATION
UNIT 1
SOUTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 14, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		O ₂ ⁽¹⁾	O ₂ ⁽¹⁾	
1 ⁽²⁾	09:34-09:59	17.3	17.2	0.1
2	10:28-10:53	17.4	17.4	0.0
3	12:09-12:34	17.5	17.5	0.0
4	13:00-13:25	17.4	17.3	0.1
5	13:44-14:09	17.2	17.2	0.0
6	14:23-14:48	17.2	17.3	-0.1
7	15:06-15:31	17.2	17.2	0.0
8	15:50-16:15	17.3	17.3	0.0
9	16:31-16:56	17.4	17.4	0.0
10	17:13-17:38	17.2	17.3	-0.1
11 ⁽²⁾	17:58-18:23	17.2	17.3	-0.1

Mean Reference Value = 17.3111

Absolute Value of the Mean of the Differences = 0.0111

Standard Deviation = 0.0601

Confidence Co-efficient = 0.0462

Relative Accuracy = 0.33% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of % by volume on a dry basis

(2) Not used in relative accuracy calculation

II.13 TABLE 13
AIR FLOW (KSCFH) RELATIVE ACCURACY DETERMINATION
UNIT 1
SOUTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 14, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		KSCFH ⁽¹⁾	KSCFH ⁽¹⁾	
1	09:38-09:55	30,191	29,648	543
2 ⁽²⁾	10:32-10:50	29,142	30,870	-1,728
3 ⁽²⁾	12:13-12:29	30,189	31,838	-1,649
4	13:02-13:18	30,984	30,970	14
5	13:45-14:03	30,816	30,665	151
6	14:26-14:42	30,536	30,380	156
7	15:09-15:27	30,373	30,114	259
8	15:52-16:11	30,427	29,883	544
9	16:34-16:52	30,239	29,896	343
10	17:15-17:32	30,312	30,131	181
11	18:00-18:18	30,507	29,751	756

Mean Reference Value = 30,487.22

Absolute Value of the Mean of the Differences = 327.44

Standard Deviation = 240.36

Confidence Co-efficient = 184.75

Relative Accuracy = 1.68% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Thousand Standard Cubic Feet Per Hour

(2) Not used in relative accuracy calculation

II.14 TABLE 14
MOISTURE (%) RELATIVE ACCURACY DETERMINATION
UNIT 1
SOUTH WASTE GAS STACK
CLEVELAND CLIFFS, INC.
TILDEN MINING COMPANY, L.C.
NATIONAL MINE, MICHIGAN
AUGUST 14, 2024

Run #	Time	REFERENCE METHOD	CEM	DIFF
		Moisture ⁽¹⁾	Moisture ⁽¹⁾	
1	09:34-09:59	13.17	12.4	0.77
2	10:28-10:53	12.79	12.3	0.49
3	12:09-12:34	12.88	11.9	0.98
4	13:00-13:25	12.90	12.1	0.80
5	13:44-14:09	12.87	12.1	0.77
6	14:23-14:48	12.69	12.2	0.49
7	15:06-15:31	13.17	12.2	0.97
8	15:50-16:15	12.89	12.0	0.89
9 ⁽²⁾	16:31-16:56	13.06	11.9	1.16
10 ⁽²⁾	17:13-17:38	13.08	12.0	1.08
11	17:58-18:23	12.97	12.0	0.97

Mean Reference Value = 12.9256

Absolute Value of the Mean of the Differences = 0.7922

Standard Deviation = 0.1910

Confidence Co-efficient = 0.1468

Relative Accuracy = 7.26% of the mean of the reference method

Relative Accuracy Needs To Be Less Than 20% Of Reference Method

(1) Concentration in terms of % by volume on a dry basis

(2) Not used in relative accuracy calculation

III. DISCUSSION OF RESULTS

The results of the RATA's are presented in Tables 1 through 14 (Section II.1 through II.14) as follows:

North

- Table 1 – NO_x Lbs/Hr
- Table 2 – SO₂ Lbs/Hr
- Table 3 – NO_x PPM
- Table 4 – SO₂ PPM
- Table 5 – O₂ %
- Table 6 – Air Flow
- Table 7 – Moisture

South

- Table 8 – NO_x Lbs/Hr
- Table 9 – SO₂ Lbs/Hr
- Table 10 – NO_x PPM
- Table 11 – SO₂ PPM
- Table 12 – O₂ %
- Table 13 – Air Flow
- Table 14 – Moisture

The results of the RATA's are summarized as follows:

Source	Parameter	EPA Performance Specification	Actual Performance	RATA Frequency
Unit 1 North	NO _x – Lbs/Hr	≤20% of RM	2.64% of RM	Annual
	SO ₂ – Lbs/Hr	≤20% of RM	11.34% of RM	Annual
	NO _x – PPM	≤20% of RM	2.83% of RM	Annual
	SO ₂ – PPM	≤20% of RM	10.09% of RM	Annual
	O ₂ – %	≤20% of RM or ±1.0% Diff	0.64% RM 0.07 Avg. Diff	Annual
	Air Flow – KSCFH	≤20% of RM	1.37% of RM	Annual
	Moisture – %	≤20% of RM	3.04% of RM	Annual

Source	Parameter	EPA Performance Specification	Actual Performance	RATA Frequency
Unit 1 South	NO _x – Lbs/Hr	≤20% of RM	1.45% of RM	Annual
	SO ₂ – Lbs/Hr	≤20% of RM	5.75% of RM	Annual
	NO _x – PPM	≤20% of RM	1.09% of RM	Annual
	SO ₂ – PPM	≤20% of RM	4.47% of RM	Annual
	O ₂ – %	≤20% of RM or ±1.0% Diff	0.33% RM 0.01 Avg. Diff	Annual
	Air Flow – KSCFH	≤20% of RM	1.68% of RM	Annual
	Moisture – %	≤20% of RM	7.26% of RM	Annual

IV. CEMS SPECIFICATIONS

Location	Parameter	Manufacturer / Model #	Serial #
Unit 1 North	NO _x / O ₂	Teledyne Monitor Labs / T200H/O ₂	148
	SO ₂	Teledyne Monitor Labs / T100H	146
	Air Flow	Teledyne Monitor Labs / UF150	1501325
Location	Parameter	Manufacturer / Model #	Serial #
Unit 1 South	NO _x / O ₂	Teledyne Monitor Labs / T200H/O ₂	149
	SO ₂	Teledyne Monitor Labs / T100H	147
	Air Flow	Teledyne Monitor Labs / UF150	1501324

V. SAMPLING AND ANALYTICAL PROTOCOL

The RATA's were performed in accordance with 40 CFR Part 60. Sampling was performed on the 161" ID North stack and the 233" ID South stack. Twenty-Four (24) point traverses were used on all stacks for the air flow determinations. The actual sampling point dimensions for the velocity traverses can be found in Appendix F.

The sampling methods used for the reference method determinations were as follows:

V.1 Oxides of Nitrogen – The NO_x sampling was conducted in accordance with U.S. EPA Reference Method 7E. A Thermo Environmental Model 42H gas analyzer was used to monitor the exhaust stacks. A heated Teflon sample line was used to transport the exhaust gases to a gas conditioner to remove moisture and reduce the temperature. From the gas conditioner stack gases were passed to the analyzer. The analyzer produces instantaneous readouts of the NO_x concentrations (PPM).

The analyzer was calibrated by direct injection prior to the testing. A span gas of 484.0 PPM was used to establish the initial instrument calibration. Calibration gases of 251.0 PPM and 122.8 PPM were used to determine the calibration error of the analyzer. The sampling system (from the back of the stack probe to the analyzer) was injected, using the 251.0 PPM gas to determine the system bias. After each sample, a system zero and system injection of 251.0 PPM were performed to establish system drift and system bias during the test period. All calibration gases were EPA Protocol 1 Certified. A 46.8 PPM NO₂ gas was used to determine conversion efficiency for the analyzer. The conversion efficiency was 94.66%.

The analyzer was calibrated to the output of the data acquisition system (DAS) used to collect the data from the unit. All reference method data was corrected using Equation 7E-5 from U.S. EPA Method 7E. A schematic diagram of the sampling train is shown in Figure 1.

V.2 Sulfur Dioxide – The SO₂ sampling was conducted in accordance with U.S. EPA Reference Method 6C. A Bovar Model 721M gas analyzer was used to monitor the exhausts. Sample gas was extracted through a heated probe. A heated teflon sample line was used to transport the exhaust gases to a gas conditioner to remove moisture and reduce the temperature. From the gas conditioner stack gases were passed to the analyzer. The analyzer produces instantaneous readouts of the SO₂ concentrations (PPM).

The analyzer was calibrated by direct injection prior to the testing. A span gas of 95.2 PPM was used to establish the initial instrument calibration. A calibration gas of 50.2 PPM was used to determine the calibration error of the analyzer. The sampling system (from the back of the stack probe to the analyzer) was injected using the 50.2 PPM gas to determine the system bias. After each sample, a system zero and system injection of 50.2 PPM were performed to establish system drift and system bias during the test period. All calibration gases were EPA Protocol 1 Certified.

The analyzer was calibrated to the output of the data acquisition system (DAS) used to collect the data from the unit. All reference method data was corrected using Equation 7E-5 from U.S. EPA Method 7E. A schematic diagram of the sampling train is shown in Figure 1.

V.3 Oxygen – The O₂ sampling was conducted in accordance with U.S. EPA Reference Method 3A. A heated Teflon sample line was used to transport the exhaust gases from the exhaust stacks to a gas conditioner to remove moisture and reduce the temperature. From the gas conditioner the stack gases were passed to a Servomex Series 1400 O₂ analyzer. This analyzer produces instantaneous readouts of the oxygen concentrations (%).

The analyzer was calibrated by direct injection prior to the testing. A span gas of 21.0% was used to establish the initial instrument calibration. Calibration gases of 6.05% and 11.8% were used to determine the calibration error of the analyzer. The sampling system (from the back of the stack probe to the analyzer) was injected using the 11.8% gas to determine the system bias. After each sample, a system zero and system injection of 11.8% were performed to establish system drift and system bias during the test period. All calibration gases were EPA Protocol 1 Certified.

The analyzer was calibrated to the output of the data acquisition system (DAS) used to collect the data. All reference method data was corrected using Equation 7E-5 from U.S. EPA Method 7E. A schematic diagram of the sampling train is shown in Figure 1.

V.4 Carbon Dioxide - The CO₂ sampling was conducted in accordance with U.S. EPA Reference Method 3A. A heated Teflon sample line was used to transport the exhaust gases from the exhaust stacks to a gas conditioner to remove moisture and reduce the temperature. From the gas conditioner the stack gases were passed to a Servomex Series 1400 CO₂ analyzer. This analyzer produces instantaneous readouts of the carbon dioxide concentrations (%).

The analyzer was calibrated by direct injection prior to the testing. A span gas of 21.05% was used to establish the initial instrument calibration. Calibration gases of 5.94% and 11.7% were used to determine the calibration error of the analyzer. The sampling system (from the back of the stack probe to the analyzer) was injected using 5.94% gas to determine the system bias. After each sample, a system zero and system injection of 5.94% were performed to establish system drift and system bias during the test period. All calibration gases were EPA Protocol 1 Certified.

The analyzer was calibrated to the output of the data acquisition system (DAS) used to collect the data. All reference method data was corrected using Equation 7E-5 from U.S. EPA Method 7E. A schematic diagram of the sampling train is shown in Figure 1.

V.5 Moisture - Moisture samples were collected in accordance with U.S. EPA Method 4. Samples were withdrawn from the stack and passed through a condensing coil with drop out before being passed through pre-weighed silica gel. The water collected was measured to the nearest 0.5 g and the silica gel was re-weighed to the nearest 0.5 g. The moisture collected along with the sample volume was used to determine the percent moisture in the exhaust. Each sample was twenty five (25) minutes in duration and had a minimum sample volume of twenty-one (21) standard cubic feet. A diagram of the moisture sampling train is shown in Figure 2.

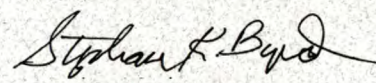
V.6 Air Flows - The air flow rates were determined in conjunction with the other sampling by employing U.S. EPA Reference Methods 1 and 2. Sampling was performed on the 161" ID North stack and the 233" ID South stack. Twenty-Four (24) point traverses were used on all the stacks. The actual sampling point dimensions for the velocity traverses can be found in Appendix F.

Velocity pressures were determined using an S-Type pitot tube. Temperatures were measured using a Type K thermocouple. A diagram of the air flow sampling train is shown in Figure 3.

This report was prepared by:


David D. Engelhardt
Vice President

This report was reviewed by:


Stephan K. Byrd
President

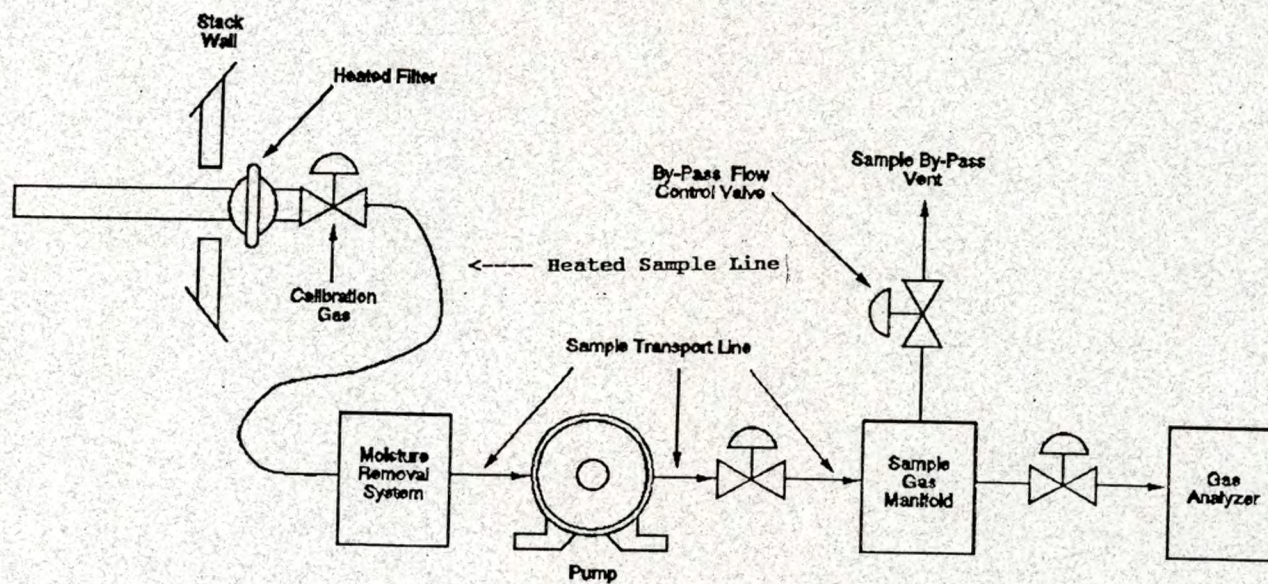


Figure 1
 NO_x , SO_2 , O_2 & CO_2
Sampling Train

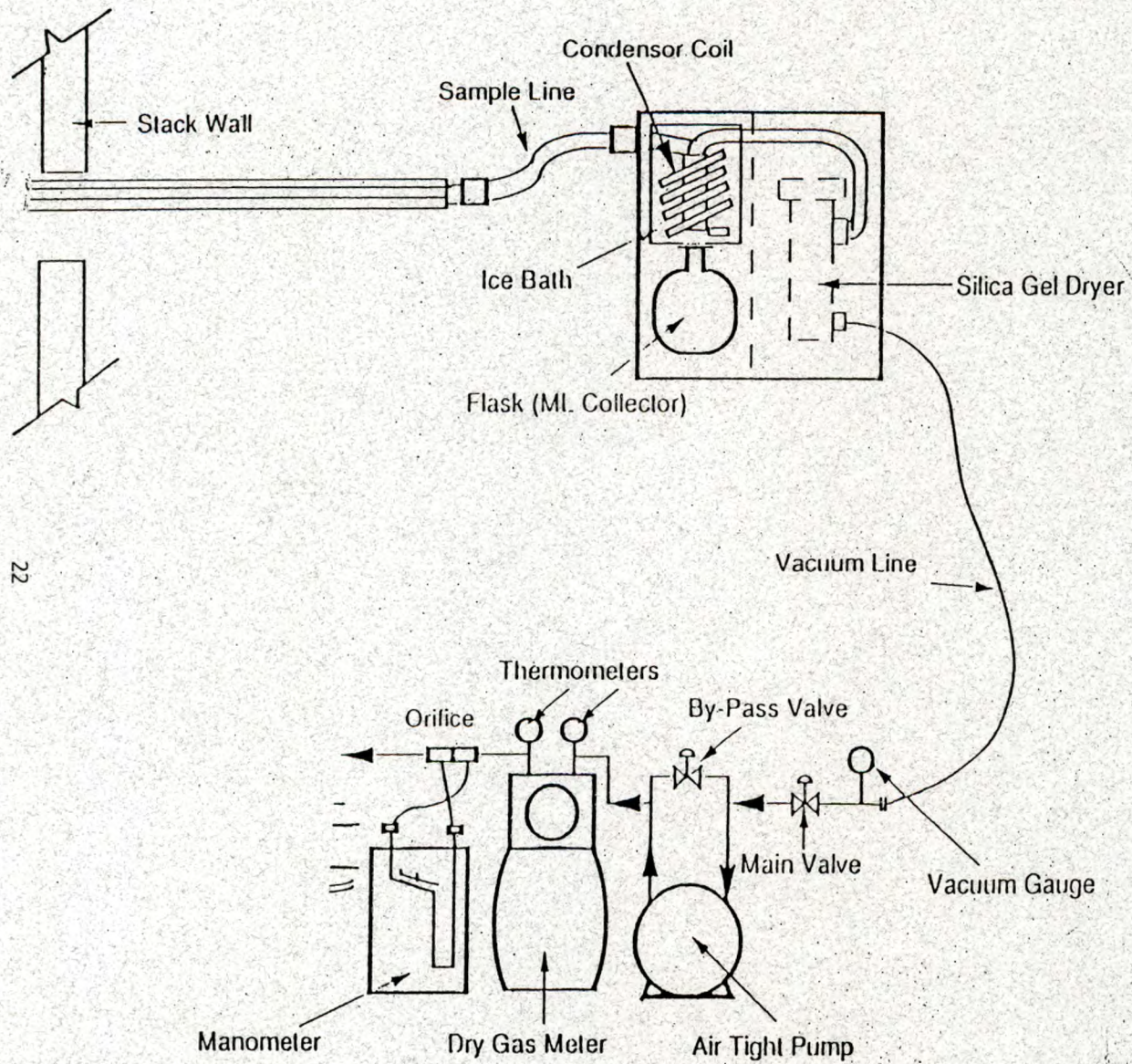


Figure 2
Moisture
Sampling Train

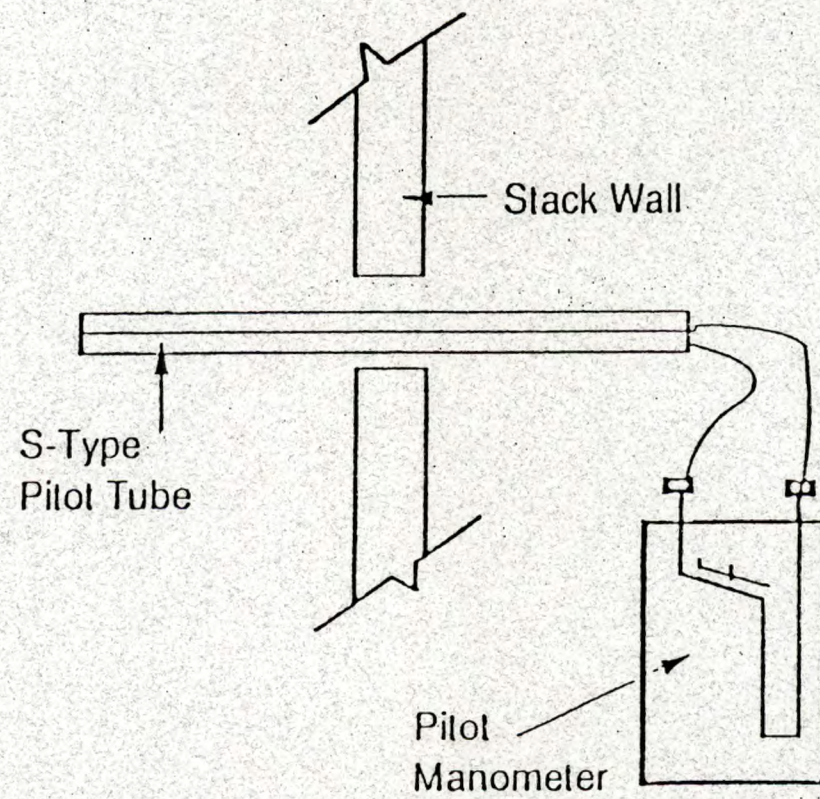


Figure 3

**Air Flow
Sampling Train**