AP42 Section:	1.1
Reference:	62
Title:	Results of the September 10 and 11, 1991 Mercury Removal Tests on the Units 1 & 2, and Unit 3 Scrubber Systems at the NSP Sherco Plant in Becker, Minnesota. Interpoll Laboratories, Inc., Circle Pines, Minnesota. October 30, 1991.

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RESULTS OF THE SEPTEMBER 10 AND 11, 1991
MERCURY REMOVAL TESTS ON THE UNITS 1 & 2,
AND UNIT 3 SCRUBBER SYSTEMS AT THE NSP
SHERCO PLANT IN BECKER, MINNESOTA

interpoll

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RESULTS OF THE SEPTEMBER 10 AND 11, 1991 MERCURY REMOVAL TESTS ON THE UNITS 1 & 2, AND UNIT 3 SCRUBBER SYSTEMS AT THE NSP SHERCO PLANT IN BECKER, MINNESOTA

Submitted to:

NORTHERN STATES POWER COMPANY
414 Nicollet Mall
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Attention: Patty Boyce

Reviewed by:

Daniel J. Despen
Manager
Field Testing Support Group

Report Number 1-3409
October 30, 1991
SP/slp

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APPENDICES:

ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (^{0}F)	degrees Fahrenheit
DIA.	diameter
FP	finished product for plant
FT/SEC	feet per second
g	gram
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g/dscm	grams per dry standard cubic meter
HP	horsepower
HRS	hours
IN.	inches
IN.HG.	inches of mercury
IN.WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10^{6}BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
LTPD	long tons per day
MW	megawatt
mg/Nm^{3}	milligrams per dry standard cubic meter
ug/Nm^{3}	micrograms per dry standard cubic meter
microns (um)	micrometer
MIN.	minutes
ng	nanograms
ohm-cm	ohm-centimeter
PM	particulate matter
PPH	pounds per hour
PPM	parts per million
ppmC	parts per million carbon
ppm.d	parts per million, dry
ppm.w	parts per million, wet
ppt	parts per trillion
PSI	pounds per square inch
SQ.FT.	square feet
TPD	tons per day
ug	micrograms
v/v	percent by volume
w/w	percent by weight
<	$\leq$ (when following a number)

Standard conditions are defined as 68 ^{0}F (20 ^{0}C) and 29.92 IN. of mercury pressure.

Jeff Cole, RTI, says this is a dry bottom boiler, according to the UDI/EEI database. Jeff has been working with the NSP data for five years and, therefore, I am taking his word on this.

Jj

1 INTRODUCTION

On September 10 and 11, 1991, Interpoll Laboratories personnel conducted mercury removal tests on the Units 1 & 2 Scrubber System, and the Unit 3 Scrubber System at the Northern States Power (NSP) Sherburne County Generating Station located in Becker, Minnesota. On-site testing was performed by D. Van Hoever, E. Brennan, G. Hove and R. Aschenbach. Coordination between testing activities and plant operation was provided by Bob Catron of NSP. The tests were not witnessed by a member of the Minnesota Pollution Control Agency.

Units 1 & 2 are identical Combustion Engineering 750 megawatt boilers which came on line in 1976. During the test, both boilers were fired with 70% Wyoming and 30% Montana pulverized subbituminous coal. Emissions are controlled by a wet fgd scrubbing system which consists of twelve individual rod venturi scrubber spray towers. Cleaned flue gas is exhausted to the atmosphere by a 600-foot radial steel-lined concrete stack common to Units 1 & 2.

The Unit 3 is a Babcock and Wilcox 860 megawatt boiler which came on line in 1987. The boiler is fired with pulverized subbituminous coal (100% Montana (Westmoreland) coal). Particulate and sulfur dioxide emissions are controlled by a dry scrubber consisting of a spray dryer absorber (SDA) and baghouse. Scrubbed flue gas is exhausted to the atmosphere by a 650-foot high radial brick-lined concrete stack.

Evaluations were performed in accordance with EPA Methods 1 - 4 and 101A, CFR Title 40, Part 60, Appendix A (revised July 1, 1990). Previous data collected at this site was used to select the appropriate nozzle diameter required for isokinetic sample withdrawal. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to collect mercury samples by means of a heated glass-lined probe. The collected samples were analyzed by cold vapor atomic absorption (CV/AA).

An integrated flue gas sample was extracted simultaneously with each mercury sample using a specially designed gas sampling system. Integrated flue gas samples were collected in 44-liter Tedlar bags housed in a protective aluminum container. After sampling was complete, the bags were sealed and returned to the laboratory for Orsat analysis. Prior to sampling, the Tedlar bags are leak checked at 15 IN.HG. vacuum with an in-line rotameter. Bags with any detectable inleakage are discarded.

Testing at the Inlet to the Units 1 & 2 Scrubber System was performed at six of twelve scrubber modules (Modules 101, 104, 107, 201, 204, and 207). Testing was conducted from a horizontal row of 6 ports on each of the module inlets. Two inlets were sampled during each of the three test runs. A 24-point traverse was used to isokinetically collect representative mercury samples from each of the module inlets. Each point was sampled for 2.5 minutes for a total of 60 minutes per module, two modules were tested per run for a total of 120 minutes per run.

Testing at the Units 1 and 2 Common Stack was conducted from four test ports on the Stack oriented at 90 degrees. These test ports are located seven stack diameters downstream of the breaching inlet and eleven diameters upstream of the stack exit. A 16-point traverse was used to isokinetically extract representative mercury samples. Each traverse point was sampled eight minutes to give a total sampling time of 128 minutes per run.

Testing at the Inlet to the Unit 3 Scrubber System was conducted from a horizontal row of two test ports. A 24-point traverse was used to isokinetically extract representative mercury samples. Each traverse point was sampled for five minutes for a total of 120 minutes per run.

Testing at the Unit 3 Stack was conducted from four test ports oriented at 90 degrees. These test ports are located seven stack diameters downstream of the breaching inlet and eleven diameters upstream of the stack outlet. A 16-point traverse was used to isokinetically

extract representative mercury samples. Each traverse point was sampled eight minutes to give a total sampling time of 128 minutes per run.

The important results of the test are summarized in Section 2. Detailed results are presented in Section 3. Field data and all other supporting information are presented in the appendices.

2 SUMMARY AND DISCUSSION

The Units 1 & 2 mercury test results are summarized in Table 1. The mercury concentration and mass rate for the Units 1 & 2 Wet Scrubber Inlet averaged 11.6 ug/Nm^3 and 0.135 LB/HR respectively. The Scrubber Inlet mass rate was computed using the volumetric flow measured at the Stack (corrected for dilution), since this site is not plagued with large scale turbulence. The average concentration and mass rate at the Stack was 4.2 ug/Nm^3 and 0.053 LB/HR respectively. The mercury removal efficiency of this scrubber system was then computed from the Inlet and Stack mass rates. The average removal efficiency was 59.3%.

The Unit 3 mercury results are summarized in Table 2. The mercury concentration and mass rate for the Unit 3 Dry Scrubber Inlet averaged 13.4 ug/Nm^3 and .092 LB/HR respectively. The Scrubber Inlet mass rate was computed in an analogous manner to Units 1 & 2. The average concentration and mass rate for the Unit 3 Stack was 5.9 ug/Nm^3 and .042 LB/HR respectively. The average mercury removal efficiency of this scrubber system was 54.5%.

Summary of the Emission Factors for the Mercury Determinations Conducted September 10 and 11, 1991 on Units 1 & 2 and Unit 3 at the NSP Sherburne County Plant in Becker, Minnesota.

Run	Concentration (ug/Nm^3) (Inlet)	(Stack)	Oxygen (%v/v,d) (Inlet)	(Stack)	Emission Factor ($LB/10^6BTU$) (Inlet)	(Stack)
(Units 1 & 2)						
1	8.8	3.4	9.40	7.20	$9.76X10^{-6}$	$3.17X10^{-6}$
2	13.9	2.0	8.20	7.10	$1.40X10^{-5}$	$1.85X10^{-6}$
3	12.1	7.3	7.80	7.10	$1.18X10^{-5}$	$6.75X10^{-6}$
(Unit 3)						
1	11.3	5.3	6.70	6.30	$1.02X10^{-5}$	$4.63X10^{-6}$
2	14.7	6.0	5.60	6.20	$1.23X10^{-5}$	$5.21X10^{-6}$
3	14.1	6.4	7.00	6.00	$1.29X10^{-5}$	$5.48X10^{-6}$

Table 1. Summary of the Results of the September 10, 1991 Mercury Test on the Units 1 & 2 Wet Scrubber System at the NSP Sherburne County Generating Station.

	Concentration (ug/Nm^3)		Mass Rate (LB/HR)		Removal Eff.
Run	Inlet	Stack	Inlet	Stack	(%, w/w)
1	8.8	3.4	0.102	0.042	58.3
2	13.9	2.0	0.163	0.025	84.4
3	12.1	7.3	0.139	0.090	35.1
Avg.	11.6	4.2	0.135	0.053	59.3

Table 2. Summary of the Results of the September 11, 1991 Mercury Test on the Unit 3 Dry Scrubber System at the NSP Sherburne County Generating Station.

	Concentration (ug/Nm^3)		Mass Rate (LB/HR)		Removal Eff.
Run	Inlet	Stack	Inlet	Stack	(%, w/w)
1	11.3	5.3	0.081	0.038	52.8
2	14.7	6.0	0.105	0.043	59.4
3	14.1	6.4	0.091	0.044	51.4
Avg.	13.4	5.9	0.092	0.042	54.5

Table 3 presents mercury mass rates based on coal analyses. One sample of Units 1 & 2 coal and one sample of Unit 3 coal were analyzed for mercury content. Potential mercury mass rates from the Units 1 & 2 and Unit 3 boilers were computed based on the results of these coal analyses and the coal feed rates reported in the Plant logs (Appendix E). In the case of Unit 3 the coal did not contain a measurable quantity of mercury at a detection limit of 0.02 mg/Kg. This detection limit was used in computing the potential mass rate. It is important to note that an additional source of mercury exists for Unit 3, the lime additive used in the fgd scrubber. Lime from this scrubber was analyzed previously (March 1990) and found to contain 0.07 mg/Kg mercury. At an average lime feed rate of 4.0 LB/HR the lime contributes 0.001 LB/HR mercury for a total of 0.021 LB/HR. Excellent correlation is seen to exist between the potential mass rates calculated from the feed and the mass rates measured at the Scrubber Inlets (boiler outlets) for Units 1 & 2, the results for Unit 3 do not compare as well. The cause of the poor correlation for Unit 3 was investigated and no source for the discrepency was determined.

No difficulties were encountered in the field or in the laboratory evaluation of the samples. On the basis of this fact and a complete review of the entire data and results, it is our opinion that the results as qualified above are accurate and closely reflect the actual values which existed at the time the test was performed.

Table 3. Summary of Potential Mercury Mass Rates from the Units 1&2, and Unit 3 Boilers at the Northern States Power, Sherburne County Generating Station.

Run	Coal Feed (TPH)	Coal Feed (LB/HR)	Potential Mass Rate (LB/HR)
(Units 1&2)			
1	764	1528000	0.138
2	775	1550000	0.140
3	766	1532000	0.138
Avg.			0.138
(Unit 3)			
1	490	980000	0.020
2	494	988000	0.020
3	503	1006000	0.020
Avg.			0.020

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition (Orsat and moisture) are presented first followed by the computer printout of the mercury results. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on an IBM PC Computer using programs written in Extended BASIC specifically for source testing calculations. EPA-published equations have been used as the basis of the calculation techniques in these programs.

3.1 Results of Orsat and Moisture Analyses

Test No. 1
Units 1 & 2 Scrubber Inlets

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	09-10-91	09-10-91	09-10-91
Dry basis (orsat)			
carbon dioxide.....	10.30	11.30	11.70
oxygen.....	9.40	8.20	7.80
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	80.30	80.50	80.50
Wet basis (orsat)			
carbon dioxide.....	9.48	10.20	10.60
oxygen.....	8.65	7.41	7.07
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	73.91	72.70	72.96
water vapor.....	7.96	9.69	9.36
Dry molecular weight.....	30.02	30.14	30.18
Wet molecular weight.....	29.07	28.96	29.04
Specific gravity.....	1.004	1.000	1.003
Water mass flow.....(LB/HR)	0.00	0.00	0.00
FO	1.117	1.124	1.120

Test No. 1
Units 1 & 2 Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 09-10-91	Run 2 09-10-91	Run 3 09-10-91
Dry basis (orsat)			
carbon dioxide.....	12.20	12.40	12.40
oxygen.....	7.20	7.10	7.10
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	80.60	80.50	80.50
Wet basis (orsat)			
carbon dioxide.....	10.46	10.56	10.53
oxygen.....	6.17	6.05	6.03
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	69.10	68.54	68.34
water vapor.....	14.27	14.86	15.11
Dry molecular weight.....	30.24	30.27	30.27
Wet molecular weight.....	28.49	28.45	28.41
Specific gravity.....	0.984	0.983	0.981
Water mass flow.....(LB/HR)	0.00	0.00	0.00
FO	1.123	1.113	1.113

Test No. 2
Unit 3 Scrubber Inlet

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 09-11-91	Run 2 09-11-91	Run 3 09-11-91
Dry basis (orsat)			
carbon dioxide.....	12.60	13.60	12.40
oxygen.....	6.70	5.60	7.00
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	80.70	80.80	80.60
Wet basis (orsat)			
carbon dioxide.....	11.27	12.13	11.33
oxygen.....	5.99	4.99	6.40
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	72.20	72.07	73.67
water vapor.....	10.53	10.81	8.60
Dry molecular weight.....	30.28	30.40	30.26
Wet molecular weight.....	28.99	29.06	29.21
Specific gravity.....	1.001	1.004	1.009
Water mass flow.....(LB/HR)	0.00	0.00	0.00
FO	1.127	1.125	1.121

Test No. 2
Unit 3 Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 09-11-91	Run 2 09-11-91	Run 3 09-11-91
Dry basis (orsat)			
carbon dioxide.....	13.00	13.10	13.30
oxygen.....	6.30	6.20	6.00
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	80.70	80.70	80.70
Wet basis (orsat)			
carbon dioxide.....	11.17	11.17	11.39
oxygen.....	5.41	5.28	5.14
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	69.35	68.78	69.12
water vapor.....	14.07	14.77	14.34
Dry molecular weight.....	30.33	30.34	30.37
Wet molecular weight.....	28.60	28.52	28.59
Specific gravity.....	0.988	0.985	0.988
Water mass flow.....(LB/HR)	0.00	0.00	0.00
FO	1.123	1.122	1.120

3.2 Results of Mercury Sampling

Interpoll Labs Report No. 1-3409
Northern States Power Company
Becker, Minnesota

Test No. 1
Units 1 & 2 Scrubber Inlets

Results of Multi-Metal Modified Method 5 (4M5) Sampling.....

	Run 1	Run 2	Run 3
Date of run	09-10-91	09-10-91	09-10-91
Time run start/end.....(HRS)	0815-1030	1105-1340	1420-1643
Static pressure.....(IN.WC)	11.88	11.88	11.88
Cross sectional area (SQ.FT)	76.50	76.50	76.50
Pitot tube coefficient.....	0.840	0.840	0.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	94.0	113.0	99.0
desiccant.....(GRAMS)	13.0	15.0	11.0
total.....(GRAMS)	107.0	124.0	110.0
Gas meter coefficient.....	0.9990	0.9990	0.9990
Barometric pressure..(IN.HG)	29.20	29.20	29.20
Avg. orif.pres.drop..(IN.WC)	0.87	0.81	0.64
Avg. gas meter temp..(DEF-F)	86.2	84.0	87.3
Volume through gas meter....			
at meter conditions...(CF)	61.81	59.34	53.31
standard conditions.(DSCF)	58.35	56.24	50.20
standard conditions..(NM^3)	1.652	1.593	1.422
Total sampling time....(MIN)	120.00	120.00	120.00
Nozzle diameter.....(IN)	.187	.187	.187
Avg.stack gas temp ..(DEG-F)	287	290	282
Volumetric flow rate.....			
actual.....(ACFM)	323056	305628	274396
dry standard.....(DSCFM)	211365	195395	177838
Isokinetic variation.....(%)	92.3	96.3	94.4

Test No. 1
Units 1 & 2 Stack

Results of Multi-Metal Modified Method 5 (4M5) Sampling.....

	Run 1	Run 2	Run 3
Date of run	09-10-91	09-10-91	09-10-91
Time run start/end.....(HRS)	0815-1032	1105-1344	1420-1639
Static pressure.....(IN.WC)	-1.35	-1.35	-1.35
Cross sectional area (SQ.FT)	829.58	829.58	829.58
Pitot tube coefficient.....	0.840	0.840	0.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	297.0	330.0	340.0
desiccant.....(GRAMS)	36.0	24.0	15.0
total.....(GRAMS)	333.0	345.0	355.0
Gas meter coefficient.....	1.0058	1.0058	1.0058
Barometric pressure..(IN.HG)	28.77	28.77	28.77
Avg. orif.pres.drop..(IN.WC)	1.87	1.92	1.86
Avg. gas meter temp..(DEF-F)	79.8	80.2	81.7
Volume through gas meter....			
at meter conditions...(CF)	99.30	100.73	99.33
standard conditions.(DSCF)	94.35	95.65	94.04
standard conditions..(NM^3)	2.672	2.708	2.663
Total sampling time....(MIN)	128.00	128.00	128.00
Nozzle diameter.....(IN)	.184	.184	.184
Avg.stack gas temp ..(DEG-F)	182	181	181
Volumetric flow rate.....			
actual.....(ACFM)	4932744	5021238	4946260
dry standard.....(DSCFM)	3334932	3376641	3313486
Isokinetic variation.....(%)	99.4	99.5	99.7

Test No. 2
Unit 3 Scrubber Inlet

Results of Multi-Metal Modified Method 5 (4M5) Sampling.....

	Run 1	Run 2	Run 3
Date of run	09-11-91	09-11-91	09-11-91
Time run start/end.....(HRS)	0835-1042	1130-1336	1430-1635
Static pressure.....(IN.WC)	-17.00	-17.00	-17.00
Cross sectional area (SQ.FT)	1092.00	1092.00	1092.00
Pitot tube coefficient.....	0.840	0.840	0.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	190.0	109.0	83.0
desiccant.....(GRAMS)	6.0	6.0	5.0
total.....(GRAMS)	196.0	114.0	88.0
Gas meter coefficient.....	1.0066	1.0066	1.0066
Barometric pressure..(IN.HG)	29.04	29.04	29.04
Avg. orif.pres.drop..(IN.WC)	1.45	0.46	0.46
Avg. gas meter temp..(DEF-F)	80.9	84.2	85.9
Volume through gas meter....			
at meter conditions...(CF)	82.08	47.17	46.63
standard conditions.(DSCF)	78.53	44.75	44.10
standard conditions..(NM^3)	2.224	1.267	1.249
Total sampling time....(MIN)	120.00	120.00	120.00
Nozzle diameter.....(IN)	.251	.187	.187
Avg.stack gas temp ..(DEG-F)	268	275	279
Volumetric flow rate.....			
actual.....(ACFM)	3467717	3583209	3583699
dry standard.....(DSCFM)	2089932	2131208	2174653
Isokinetic variation.....(%)	99.6	100.2	96.8

Test No. 2
Unit 3 Stack

Results of Multi-Metal Modified Method 5 (4M5) Sampling.....

	Run 1	Run 2	Run 3
Date of run	09-11-91	09-11-91	09-11-91
Time run start/end.....(HRS)	0835-1054	1130-1346	1422-1632
Static pressure.....(IN.WC)	-0.46	-0.46	-0.46
Cross sectional area (SQ.FT)	683.49	683.49	683.49
Pitot tube coefficient.....	0.840	0.840	0.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	363.0	226.0	209.0
desiccant.....(GRAMS)	41.0	17.0	17.0
total.....(GRAMS)	404.0	243.0	226.0
Gas meter coefficient.....	1.0058	1.0058	1.0058
Barometric pressure..(IN.HG)	28.84	28.84	28.84
Avg. orif.pres.drop..(IN.WC)	2.84	0.92	0.86
Avg. gas meter temp..(DEF-F)	83.1	81.1	90.5
Volume through gas meter....			
at meter conditions...(CF)	122.59	69.76	68.31
standard conditions.(DSCF)	116.34	66.12	63.63
standard conditions..(NM^3)	3.294	1.872	1.802
Total sampling time....(MIN)	128.00	128.00	128.00
Nozzle diameter.....(IN)	.245	.184	.184
Avg.stack gas temp ..(DEG-F)	170	170	170
Volumetric flow rate.....			
actual.....(ACFM)	2754722	2773921	2680020
dry standard.....(DSCFM)	1909745	1908275	1850934
Isokinetic variation.....(%)	99.4	100.3	99.5

4 RESULTS OF FUEL ANALYSIS

INTERPOLL LABORATORIES, INC.
(612)786-6020

NSP/Sherco
Laboratory Log No. 4201

Results of Mercury Analysis

Laboratory Log No.	Sample Identification	Sample Type	Mercury,[1] (mg/Kg)
4201-55	Test 1 Composite, Units 1 & 2	Coal	0.09
4201-56	Test 2 Composite, Unit 3	Coal	< 0.02

[1]Digestion by ASTM Method D3684-78; analysis by EPA SW-846 Method 7470.

APPENDIX A

SAMPLING TRAIN CALIBRATION DATA

Interpoll Laboratories, Inc.
(612) 786-6060

UNITS 1 & 2

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job N.S.P. SHERCO STATION Date 9/9/91

Operator D. BRENNAN Module No. 2

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.84 in. Hg. Y_D = .999 ^H@ 1.90 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(721.00)	[redacted]	
2.5	722.92	89	79
5.0	724.86	93	80
7.5	726.80	95	81
10	728.72	96	82
[redacted]	V_m = 7.72	Avg (t_m) = 86.875°F	

ΔH 1.90

Calculate Y_{en} as follows:

$$Y_{en} = \frac{1.786}{Y_D V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{en} = \frac{1.786}{(.999)(7.72)}\left[\frac{546.875}{(86.875) + 460}{(28.84)}\right]^{0.5}$$

$$Y_{en} = 1.008$$

If Y_{en} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

BOX 9 B-13

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432R
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Interpoll Laboratories, Inc.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job SHERCO - NSP Date 9-11

Operator DVH Module No. 3

Instructions: Operate the control module at a flow rate equal to ΔH@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.84 in. Hg. Y = 1.0058 ΔH@ 1.82 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(560.9)	[redacted]	
2.5	562.82	83	85
5.0	564.77	86	83
7.5	566.70	84	83
10	568.64	86	83
[redacted]	V_m = 7.74	Avg (t_m) = 84.38 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{Y\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(1.0058)(7.74)}\left[\frac{(84.38) + 460}{(28.84)}\right]^{0.5}$$

$$Y_{cn} = .996$$

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

Interpoll Laboratories, Inc.
(612) 786-6060

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job NSP Sherco (Scrubber Inlet) Unit #3 Date 11 Sept 91

Operator Bob Module No. 9

Instructions: Operate the control module at a flow rate equal to ΔH@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.04 in. Hg. γ = 1.00666 ΔH@ 1.75 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	950.00	[redacted]	
2.5	957.88	72.0	72.0
5.0	959.78	74.6	72.6
7.5	961.69	76.4	73.0
10	963.58	77.8	73.2
[redacted]	V_m=7.58	Avg(t_m)=73.95 °F	

Calculate Y_{en} as follows:

$$Y_{en} = \frac{1.786}{\gamma\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

4.3038723

$$Y_{en} = \frac{1.786}{(1.0066)(7.58)}\left[\frac{(73.95) + 460}{(29.04)}\right]^{0.5}$$

2340752

533.95

7.630028

18.386708

Y_{en} = 1.0037

If Y_{en} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432R

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: October 14, 1991

Meter Box No. : 2 (Rockwell Dry Test Meter Serial No. 964549)

Date of Last Calibration: July 8, 1991
Calibration Technician: D. VanHoever
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
July 12, 1991	1-3347	149.10	292.50	143.40	143.40
July 15, 1991	1-3352	293.00	429.15	136.15	279.55
September 6, 1991	1-3405	434.00	715.87	281.87	561.42
September 9, 1991	1-3409	721.00	904.91	183.91	745.33

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: October 14, 1991

Meter Box No. : 3 (Rockwell Dry Test Meter Serial No. 35303)

Date of Last Calibration: August 23, 1991
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
September 10, 1991	1-3409	234.60	830.00	595.40	595.40

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: October 14, 1991

Meter Box No. : 9 (Rockwell Dry Test Meter Serial No. 949230)

Date of Last Calibration: August 14, 1991
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
August 28-29, 1991	1-3397	615.70	825.05	209.35	209.35
September 4, 1991	1-3401	827.30	953.58	126.28	335.63
September 11, 1991	1-3409	956.00	1141.36	185.36	520.99

* Total volume through meter since last calibration.

Date 7/8/91

Bar. Press. 29.22 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 2
Serial No. DTM 964549
Wet Test Meter No. AL-20
Technician D. Van Hoover

ΔH (in. WC)		Gas Volume Wet Test Meter (ft^3)	Cal. Index * θ (%)	Diff. Wet Test Meter * ΔP_w (in.WC)	Gas Volume Dry test meter (ft^3)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔHθ	C_f
							Wet Test	Dry Test					
nominal	actual				V_{d1}	V_{df}	t_w (°F)	t_{d1} (°F)	t_{do} (°F)				
0.6	.5	2	99.70	0.01	142.87	144.93	70.5	70	80	5:08	.9931	1.86	
1.2	1.2	2½	99.77	0.03	145.44	148.54	70.5	92	80	4:59	.9906	1.86	
2.0	2.0	3¼	99.87	0.05	119.97	124.03	70.5	90	76	5:14	1.0019	1.93	
3.3	3.3	5	100.00	0.08	126.55	131.62	70.5	92	77	5:06	1.0033	1.92	
4.7	4.7	5	100.20	0.11	132.13	137.20	70.5	94	79	4:18	1.0058	1.93	
	3	5	6	8	6	7	8	9	10	11/13	.9980	1.90	

Positive leak check performed by DVH
Meter was in tolerance ☒
Meter was not in tolerance ☐; readjusted linkage
Meter was not in tolerance ☐; changed dry test meters

Approved by Daniel G. Degen Date 7/8/91

• Based on AL-20 wet test meter calibration in August 1989 against Bell Prover (NBS Traceable) - Carl Poe Co.

S0102RR 5/90

Date 8-23-91
Bar. Press. 29.20 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 3
Serial No. DTM 35303
Wet Test Meter No. AL-20
Technician E Trawbridge

ΔH (in. WC) nominal	ΔH (in. WC) actual	Gas Volume Wet Test Meter (ft³)	* Cal. Index φ (%)	* Diff. Wet Test Meter ΔP_w (in.WC)	Gas Volume Dry test meter (ft³) V_{di}	Gas Volume Dry test meter (ft³) V_{df}	Gas temperatures Wet Test t_w (°F)	Gas temperatures Dry Test t_{di} (°F)	Gas temperatures Dry Test t_{do} (°F)	Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
0.5	.5	2	99.70	0.01	217.600	219.622	73	86	77	[illegible]	1.0085	1.77	
1.2	1.2	3	99.77	0.03	214.500	217.527	73	[illegible]	76	4/51	1.0085	1.79	
2.0	2.0	3	99.87	0.05	211.200	214.191	73	85	75	3/47	1.0096	1.82	
3.3	3.3	5	100.00	0.08	223.500	228.556	73	95	82	4/57	1.0090	1.84	
4.7	4.7	5	100.20	0.11	[illegible]	234.060	73	97	83	4/14	1.0094	1.88	
1	2	3	4	5	6	7	8	9	10	11/13	1.0058	1.82	

Positive leak check performed by ET
Meter was in tolerance ☒
Meter was not in tolerance ☐; readjusted linkage
Meter was not in tolerance ☐; changed dry test meters

Approved by Daniel Wagner Date 8/23/91

* Based on AL-20 wet test meter calibration in August 1989 against Bell Prover (NBS Traceable) - Carl Poe Co

SO102RR 5/90

Date 8-14-91

Bar. Press. 29.13 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 9
Serial No. DTM 949230
Wet Test Meter No. AL-20
Technician [signature]

ΔH (in. WC)		Gas Volume Wet Test Meter (ft^3)	* Cal. Index ♦ (%)	* Diff. Wet Test Meter ΔP_w (in. WC)	Gas Volume Dry test meter (ft^3)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
							Wet Test	Dry Test					
nominal	actual				V_{di}	V_{df}	t_w (°F)	t_{di} (°F)	t_{do} (°F)				
0.5	.5	2	99.70	0.01	587.500	589.489	73	77	74	4/53	1.0059	1.66	
1.2	1.2	3	99.77	0.03	584.000	587.288	73	75	73	4/47	1.0004	1.77	
2.0	2.0	3	99.87	0.05	590.000	592.990	73	82	76	3/44	1.0081	1.78	
3.3	3.3	5	100.00	0.08	593.500	598.499	73	87	78	4/51	1.0094	1.77	
4.7	4.7	6	100.20	0.11	599.000	605.000	73	88	79	4/55	1.0094	1.79	
	2	3	4	5	6	7	8	9	10	11/12	1.0066	1.75	

Positive leak check performed by ET

Meter was in tolerance ☒

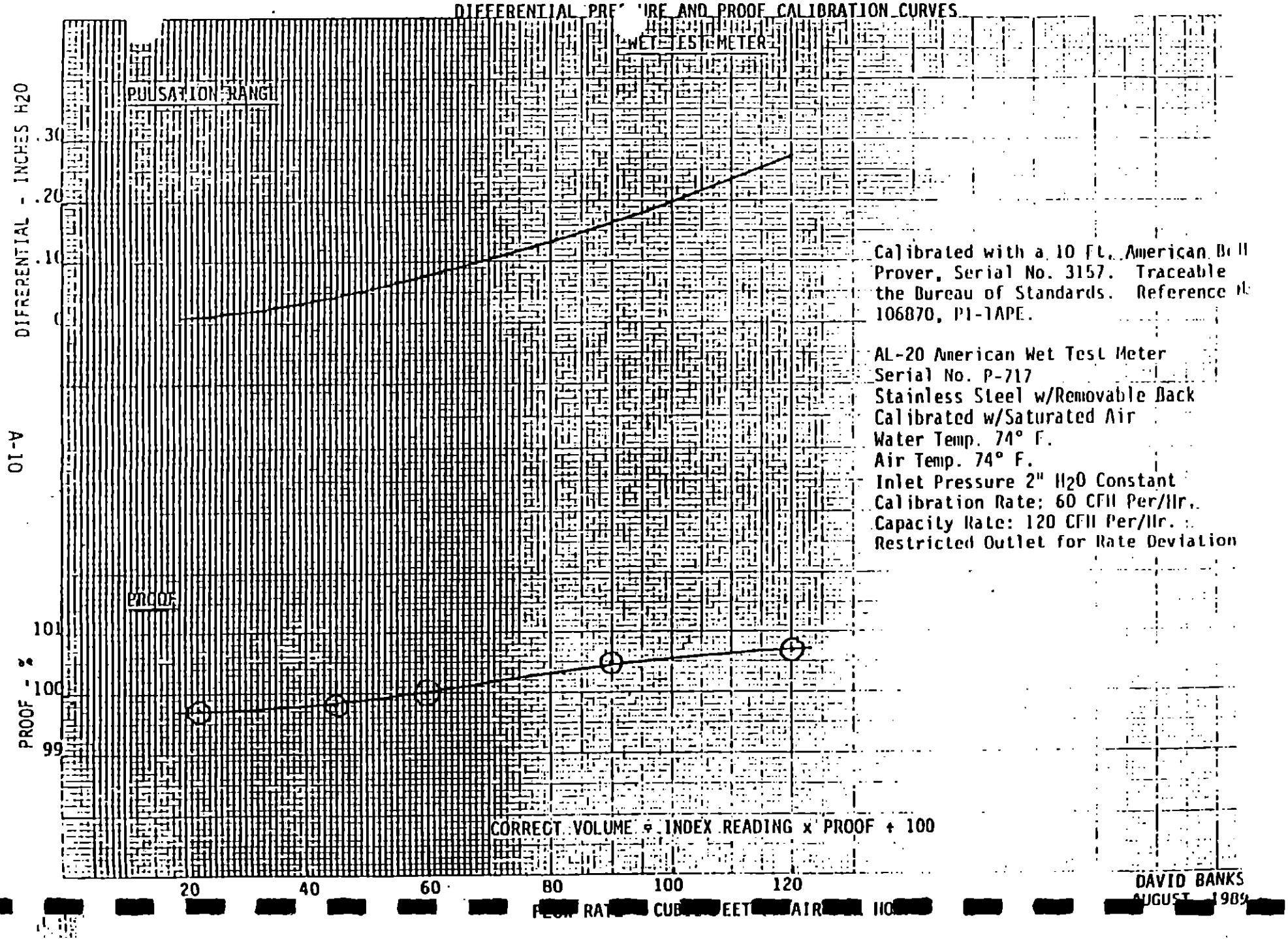
Meter was not in tolerance ☐; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Approved by [signature] Date 8/20/91

• Based on AL-20 wet test meter calibration in August 1989 against Bell Prover (NBS Traceable) - Carl Poe Co.

S0102RR 5/90


DIFFERENTIAL PRESSURE AND PROOF CALIBRATION CURVES
WET TEST METER
PULSATION RANGE
DIFFERENTIAL - INCHES H2O
.30
.20
.10
0
PROOF
PROOF - %
101
100
99
Calibrated with a 10 Ft. American Bell Prover, Serial No. 3157. Traceable the Bureau of Standards. Reference #106870, PI-1APE.
AL-20 American Wet Test Meter
Serial No. P-717
Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H2O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation
CORRECT VOLUME = INDEX READING x PROOF ÷ 100
20
40
60
80
100
120
DAVID BANKS
AUGUST 1984

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 9-10-91 Nozzle Number 2-1
Technician: Duke Brennan

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.187
2	.189
3	.186
Average:	.187

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 9-10-91 Nozzle Number 1-3

Technician: Duane VanHoever

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.187
2	.186
3	.180
Average:	.184

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 9-11-91 Nozzle Number 7-2

Technician: Duke Brennan

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.188
2	.186
3	.187
Average:	.187

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 9-11-91 Nozzle Number 7-3

Technician: Duke Brennan

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.251
2	.251
3	.251
Average:	.251

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 9-11-91 Nozzle Number 1-4
Technician: Duane Van Hoever

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.245
2	.243
3	.247
Average:	.245

Interpoll Laboratories, Inc.

Temperature Measurement Device Calibration Sheet

Unit under test:

Vendor Atkins

Model 39658-K — Serial Number PDT-3

Range -112 - 1999 °F — Thermocouple Type K

Date of Calibration 6-6-91 — Technician Mark Gaebler

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation Δt (°F)	Deviation (%)
0	0	-.04	.04	.01
100	100	96.5	3.5	.63
200	200	199.4	.6	.09
300	300	297	3	.39
400	400	393	7	.81
500	500	492	8	.83
600	600	594	6	.57
700	700	693	7	.60
800	800	797	3	.24
900	900	898	2	.15
1000	1000	1001	1	.07
1100	1100	1103	3	.19
1200	1200	1208	8	.48
1300	1300	1307	7	.40
1400	1400	1409	9	.48
1500	1500	1505	5	.26
1600	1600	1604	4	.19
1700	1700	1698	2	.09
1800	1800	1794	6	.27
1900	1900	1884	16	.68
2000	2000	1977	23	.93
2100				
		Averages:	5.91	0.40

OF = off scale response by unit under test (°F)

% dev = 100 Δt / (460 + t)

☒ Unit in tolerance

☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

S-433

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:

Vendor FLUKE

Model 51 Serial Number POT #15

Range -328 - 2498 °F °F Thermocouple Type K

Date of Calibration 7-17-91 Technician STEVE LOWES

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	1.6	1.6	0.35
100	100	98.2	1.8	0.32
200	200	200.6	0.6	0.09
300	300	299.4	0.6	0.08
400	400	397.8	2.2	0.26
500	500	498.6	1.4	0.15
600	600	600.6	0.6	0.06
700	700	698.6	1.4	0.12
800	800	800.6	0.6	0.05
900	900	898.8	1.2	0.09
1000	1000	1000.2	0.2	0.01
1100	1100	1099.8	0.2	0.01
1200	1200	1202.4	2.4	0.14
1300	1300	1299.2	0.8	0.05
1400	1400	1402.6	2.6	0.14
1500	1500	1500.0	0.0	0.00
1600	1600	1601.2	1.2	0.05
1700	1700	1699.8	0.2	0.01
1800	1800	1801.2	1.2	0.05
1900	1900	1899.0	1.0	0.04
2000	2000	2001.0	1.0	0.04
2100	2100	2098.2	1.8	0.07
		Averages:	1.12	0.09

OF = off scale response by unit under test (°F)
% dev = 100 Δt / (460 + t)

☒ Unit in tolerance
☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

S-433

(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 23-6

Pitot tube dimensions:

1. External tubing diameter (D_t) .313 IN.
2. Base to Side A opening plane (P_A) .464 IN.
3. Base to Side B opening plane (P_B) .465 IN.

Alignment:

4. α_1 <10° 0
5. α_2 <10° 0

6. β_1 < 5° 2
7. β_2 < 5° 2

8. Z <.125" .03
9. W <.0625" .03

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .758 IN.
11. Pitot to probe sheath 3.00 IN.
12. Pitot to thermocouple (parallel to probe) 3.00 IN.
13. Pitot to thermocouple (perpendicular to probe) .762 IN.

☒ Meets all EPA design criteria thus C_p = 0.84

☐ Does not meet EPA design criteria - thus calibrate in wind tunnel
C_p = _____

Date of Inspection: 2-14-94

Inspected by: [signature]

CFR Title 40 Part 60 Appendix A Method 2

S-348[illegible]1)

D.H.'s personal

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 7/8/91
Technician Duane Wm Hoever
Mercury Column Barometer No. 1
Aneroid Barometer No. Ultimeter series I # 8C1216

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.27	70	.11	29.16	29.17	-.01

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. No

Has problem been alleviated? Yes/No. How?

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 7-17-71

Technician STEVE LOUNES

Mercury Column Barometer No. NOVA-1

Aneroid Barometer No. S/N 560209

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29,13	86	0.150	28.98	29.08	0.10
LATITUDE		-.0001	28.98	29.08	0.10

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. NO

Has problem been alleviated? Yes/No. How? N/A

*Note

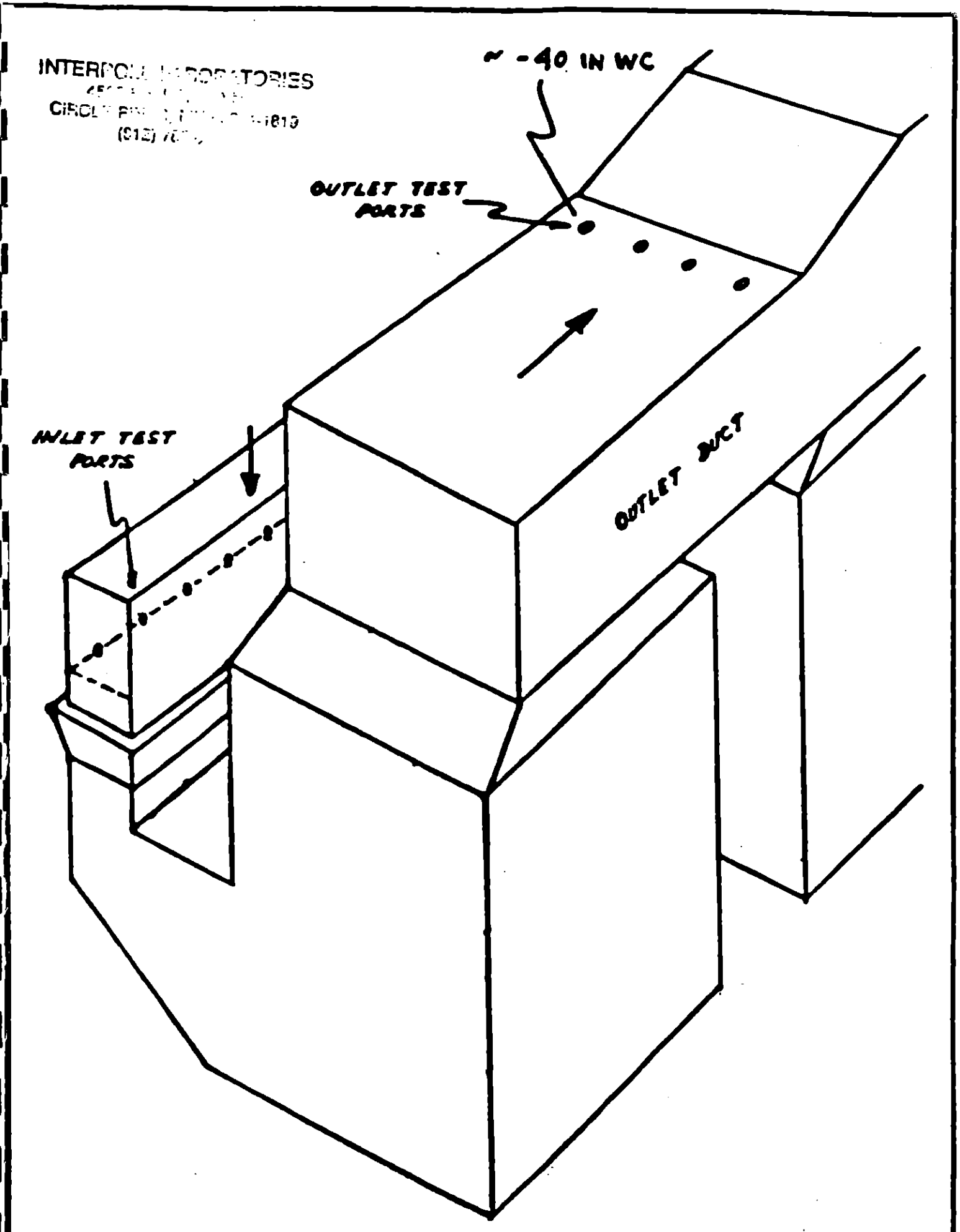
Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

S-312

APPENDIX B

LOCATION OF TEST PORTS

INTERPOL LABORATORIES
CIRCL[illegible]
(512) [illegible]



EPA Method 1 Specification

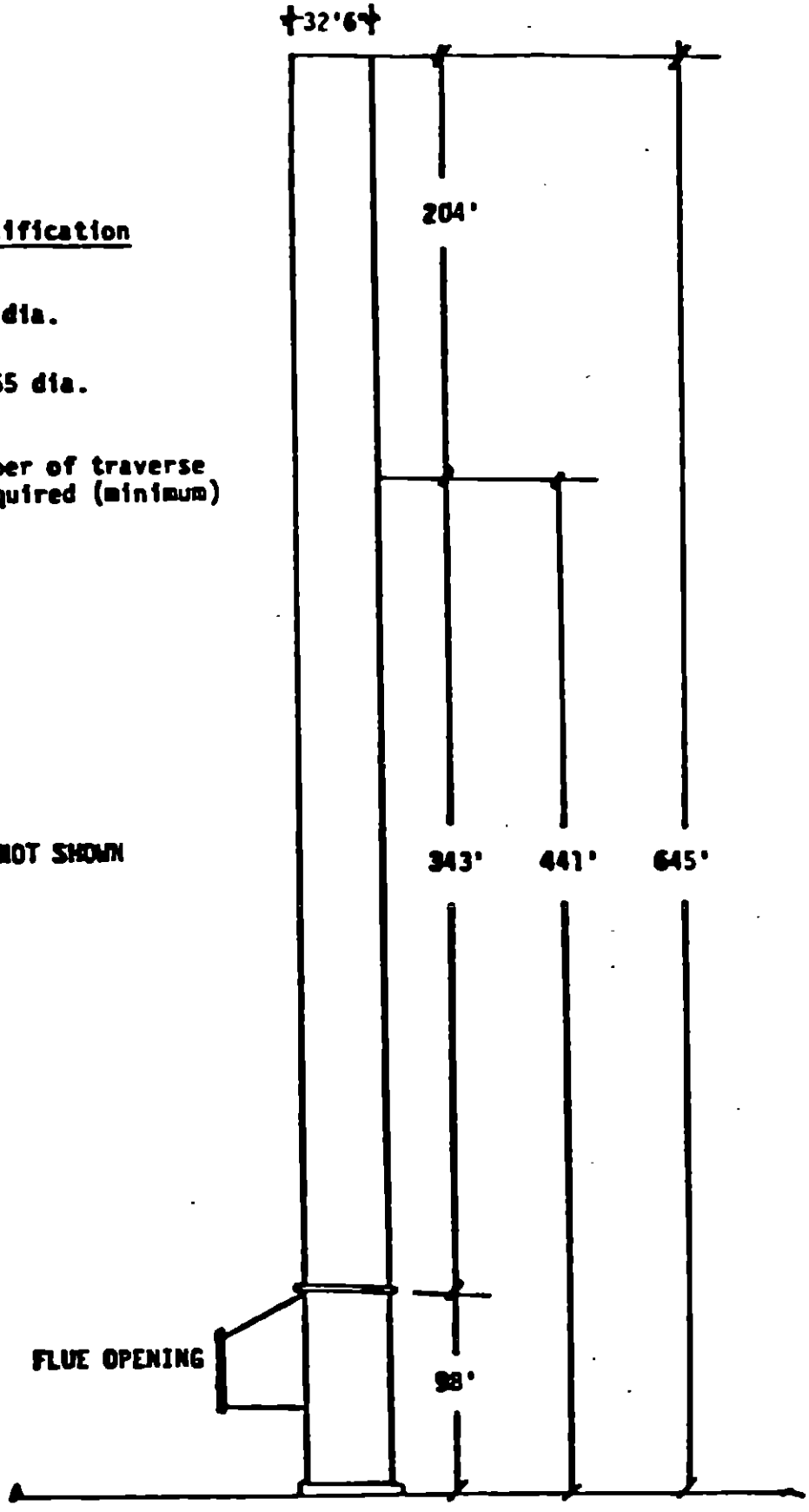
$A = \frac{204}{32.5} = 6.28$ dia.

$B = \frac{343}{32.5} = 10.55$ dia.

MN = Total number of traverse points required (minimum)

MN = 12

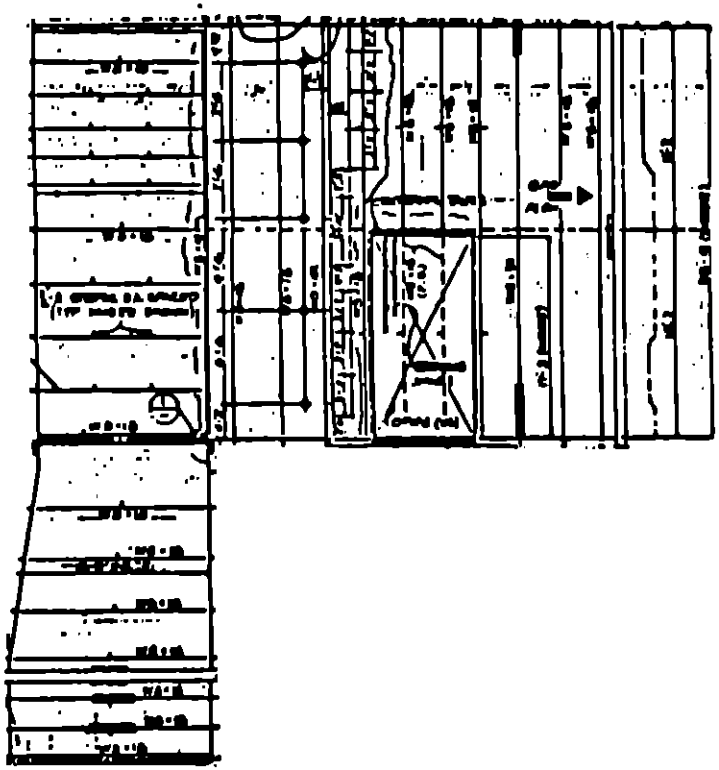
OUTER COLUMN NOT SHOWN



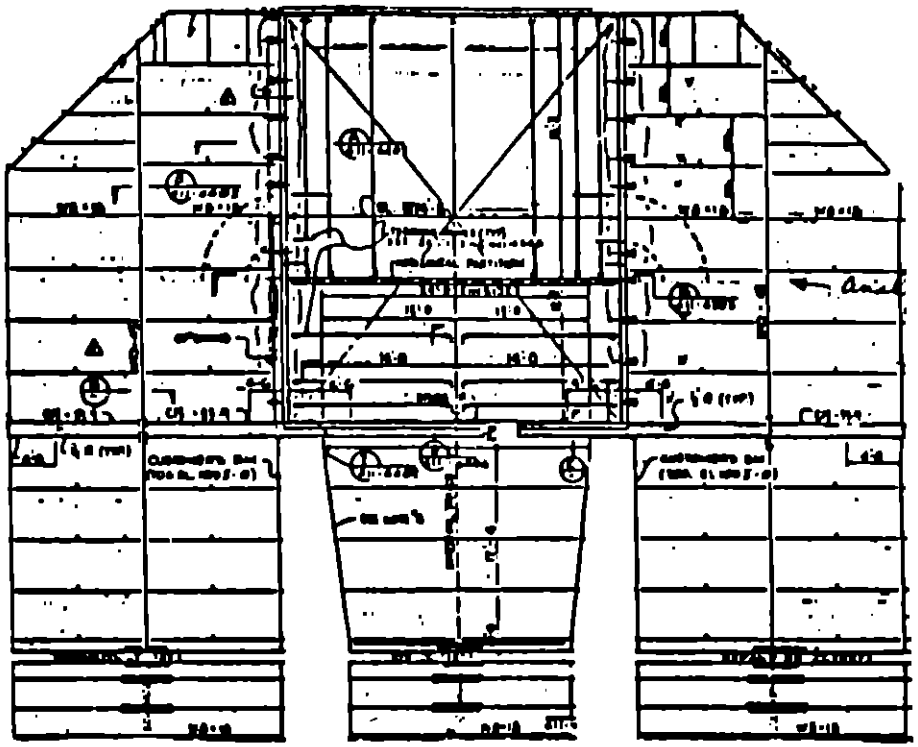
NSP SHERBURNE COUNTY GENERATING PLANT
UNITS 1&2 STACK

NOT TO SCALE

INTERPOLL INC.



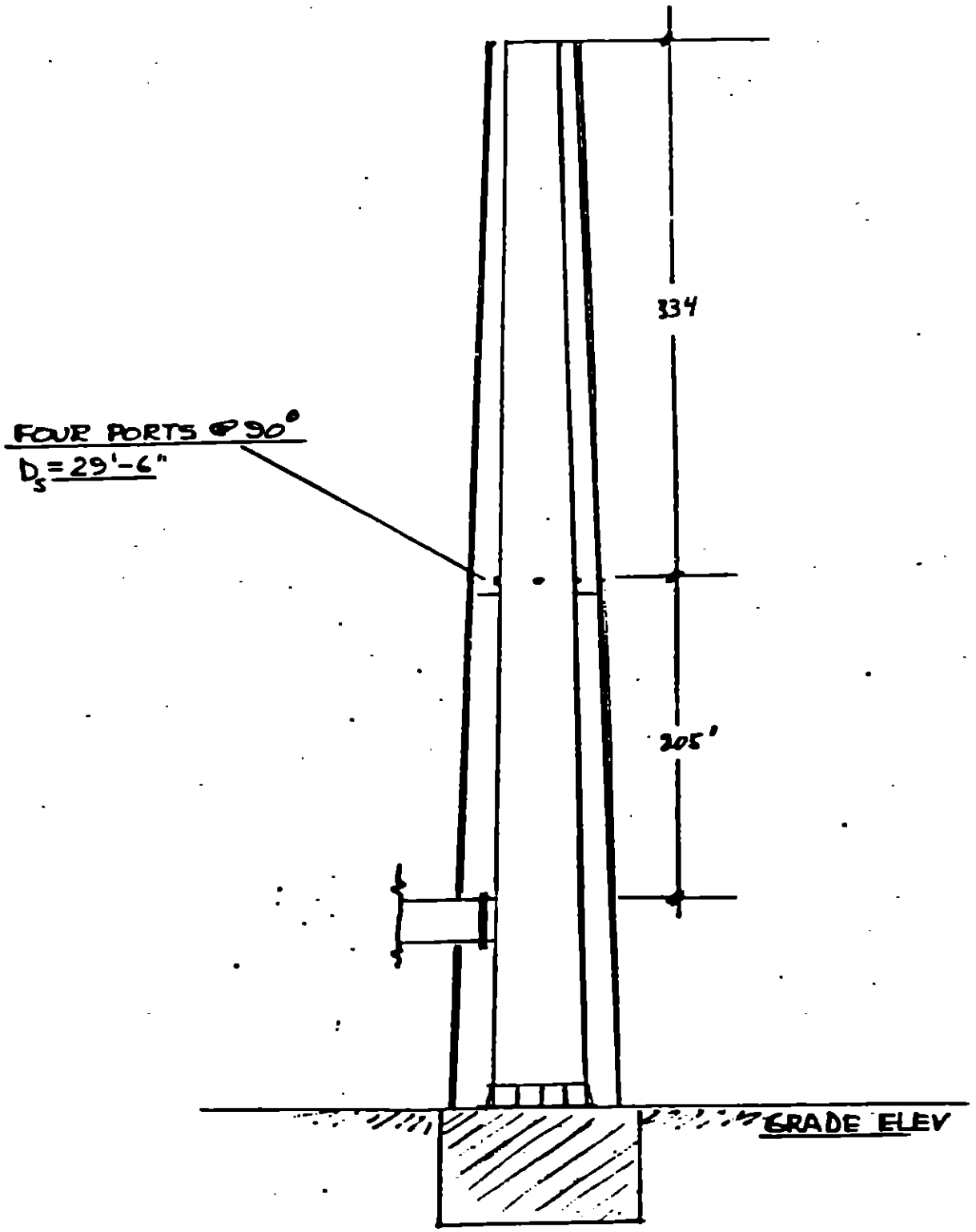
SIDE ELEVATION



FRONT ELEVATION

NSP SHERCO UNIT 3 AIR HEATER OUTLET TEST SITE

NSP SHERCO UNIT 3



NOT TO SCALE

LP 11/87
REV 3/88

APPENDIX C

FIELD DATA SHEETS

interpoll

INTERPOLL LABORATORIES, INC.
4500 BALL ROAD N.E.
CIRCLE PINES, MINNESOTA 55014-1819
TEL: 612/786-6020
FAX: 612/786-7854

May 27, 1992

Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401-1927

Attention: Patricia Boyce

Dear Patti:

Enclosed please find three (3) copies of the requested revised or corrected pages from Interpoll Laboratories Report No. 1-3409 entitled "Results of the September 10 and 11, 1991 Mercury Removal Tests on the Units 1 & 2, and Unit 3 Scrubber Systems at the NSP Sherco Plant in Becker, Minnesota". In addition, one complete copy of this report has also been enclosed as you requested.

If you have any questions, please call.

Sincerely,

INTERPOLL LABORATORIES, INC.

Kathy Eichstadt for

Daniel Despen,
Manager
Field Testing Support Group

DD:kce

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job U.S.P. SHINED

Source Units 1+2 Scrubber Inlets

Test – Run – Date 9/10/91

Stack dimen. 36" x 306" IN.

Dry bulb ____ °F Wet bulb ____ °F

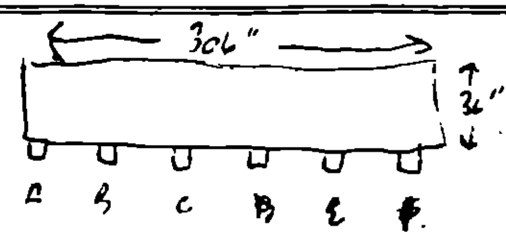
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 26.64 in Hg

Static pressure 11.88 in WC

Operators D.B.

Pitot No. 23-6 Cp .84



Schematic of Cross Section

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length:		in.	Time start:	hrs
1	1				.70	
	2				.63	
	3				.63	
3	4				1.0?	
4	1				.85	
	2				.92	
5	3				1.3	
	4				1.1	
6	1				1.5	
	2				1.5	
	3				.75	
	4				1.3	
Temp. meas. tool & S/N: PDT-15					Time end:	hrs

R or nothing= reg. manometer; S= expanded; E = electronic S-392.1

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P. SHERCO Date 9/12/91 Test 1 Run 1
Source SCRUBBER INLETS No. of traverse points 48
Method 101A Filter holder: N/A Filter type: N/A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac)
Postest: .00 cfm at 10 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: NONE

Recovery solvent(s)

☐ acetone
☒ other(s) 4% $KMnO_4$ in 10% H_2SO_4

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1	644	550	94.0
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1350	1337	13.0
Total			107.0

Integrated Gas Sampling Data:

Bag Pump No. B-13 Box No. 9 Bag No. 1

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: .00 cc/min at 15 in. Hg.

Time start: 915 (HRS) Time end: 1030 (HRS)

Sampling rate: 200 cc/min Operator: D.B.

S/N of O_2 Analyzer used to monitor train outlet: N

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P. SHERCO
Source SCRUBBER INLETS (MODULES 101 + 107)
Date 9/10/91 Test 1 Run 1

Operators D.B.
Meter Box No. 2 ^H@ 1.90 IN WC
Gasmeter coeff. .999

Pitot No. 23-6 Cp .84
Bar. Press. 29.20 inHg H2O %
Nozzle No. ___ Nozzle Dia .187 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Cnsr/In	Cnsr/Out	Oxygen (%v/v)
	815	729.20											
A-1	2.5	730.36	.98	.72	730.39	3.5	312	240	250	48	78	76	6.6
2	5.0	731.41	.76	.54	731.42	3.0	309			47	79	78	6.7
3	7.5	732.52	.90	.64	732.51	3.5	310			46	80	77	6.5
4	10.0	733.662	.93	.66	733.67	4.0	310			46	81	77	6.5
B-1	12.5	734.77	.92	.66	734.80	4.0	310			46	84	78	6.5
2	15.0	735.92	.79	.55	735.85	3.5	307			46	84	78	6.3
3	17.5	737.02	1.05	.75	737.06	4.0	310			46	86	78	6.4
4	20.0	738.061	.70	.50	738.05	3.0	310			46	87	78	6.1
C-1	22.5	739.30	1.05	.76	739.27	4.0	306			45	87	79	6.5
2	25.0	740.45	.94	.68	740.42	4.0	310			45	88	79	6.3
3	27.5	741.63	1.03	.74	741.62	4.0	311			45	89	80	6.5
4	30.0	742.891	1.1	.79	742.87	4.0	311			45	90	80	6.8
D-1	32.5	743.79	.55	.40	743.76	3.0	305			45	89	80	9.0
2	35.0	744.98	1.0	.72	744.95	4.0	307			45	89	80	7.5
3	37.5	746.36	1.4	1.02	746.34	4.5	306			45	90	81	7.4
4	40.0	747.788	1.4	1.02	747.78	4.5	307			45	92	80	7.3
E-1	42.5	748.40	.25	.18	748.38	2.0	304			46	90	81	8.1
2	45.0	749.72	1.2	.88	749.69	4.0	300			46	91	81	7.8
3	47.5	751.08	1.3	.96	751.06	4.5	297			46	92	82	7.6
4	50.0	752.572	1.6	1.18	752.59	5.0	297			46	93	81	7.6
F-1	52.5	754.10	1.5	1.11	754.06	5.0	295			46	92	82	7.7
2	55.0	755.49	1.3	.97	755.45	4.5	286			47	92	82	7.6
3	57.5	756.50	.72	.54	756.48	3.5	283			47	93	83	7.8
4	60.0	757.903	1.4	1.06	757.93	5.0	282			47	92	83	7.7
	θ =	Vm =		^H =							Avg. =		

S-0037R

D865 1 of 2

TUE

CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P. SHERCO Source SCRUBBER INLET Date 9/10/91 Test 1 Run 1 (109)

Operators D.B. & R.A. Meter Box No. 2 ΔH@ 1.92 IN WC Gasmeter coeff. .999

Pitot No. 23-C Cp .84 Bar. Press. 29.20 inHg H2O % Nozzle No. 4-1 Nozzle Dia .183 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (%v/v)
	920	757.903											
G-1	2.5	758.92	.68	.52	758.94	3.0	275			47	90	83	7.8
2	5.0	760.06	.88	.67	760.09	3.5	268			47	91	83	6.6
3	7.5	761.49	1.35	1.04	761.52	5.0	267			47	92	82	6.3
4	10.0	763.063	1.6	1.22	763.07	5.0	270			47	93	83	6.1
H-1	12.5	764.71	1.7	1.32	764.18	5.5	262			48	93	83	6.2
2	15.0	766.17	1.4	1.07	766.14	5.0	270			48	93	83	6.3
3	17.5	767.64	1.5	1.15	767.64	5.0	272			49	93	83	6.4
4	20.0	768.938	1.15	.88	768.96	4.0	272			49	94	84	6.5
I-1	22.5	770.55	1.65	1.28	770.54	5.0	265			49	93	85	6.6
2	25.0	772.00	1.4	1.07	772.00	5.0	272			49	94	84	6.8
3	27.5	773.07	.78	.59	773.09	3.5	273			50	94	84	6.7
4	30.0	774.802	2.0	1.53	774.80	6.0	273			50	94	84	8.2
J-1	32.5	776.36	1.5	1.16	776.33	5.5	266			50	93	84	8.0
2	35.0	777.75	1.25	.96	777.71	4.5	268			50	94	84	6.6
3	37.5	778.99	1.05	.81	778.98	4.0	269			50	94	84	6.9
4	40.0	780.33	1.25	.96	780.35	4.5	269			50	94	84	6.9
K-1	42.5	781.81	1.35	1.05	781.79	4.5	264			51	94	84	6.4
2	45.0	783.17	1.3	1.00	783.26	4.5	268			51	94	85	6.0
3	47.5	784.46	1.1	.84	784.49	4.0	271			52	94	85	6.3
4	50.0	785.405	.53	.40	785.39	3.5	270			52	94	85	6.2
L-1	52.5	786.93	1.5	1.16	786.91	5.5	263			52	94	84	6.4
2	55.0	788.33	1.35	1.03	788.34	4.5	272			53	94	85	6.5
3	57.5	789.66	1.2	.92	789.68	4.0	275			53	94	86	6.2
4	60.0	791.006	1.15	.87	791.00	4.0	278			53	95	85	5.9
	1030												
	θ = 120	Vm = 61.806		ΔH = .87							Avg.	= 86.2	

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CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P. SHERCO
Source SCRUBBER INLETS MODULES (10) + 201
Date 9/10/91 Test 1 Run 2

Operator D.B.
Meter Box No. 2 ΔH@ 1.7? IN WC
Gasmeter coeff. .997

Pitot No. 73-6 Cp .84
Bar. Press. 29.21 inHg H2O
Nozzle No. 1 Nozzle Dia .187 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Con/In	Con/Out	Oxygen (%v/v)
	1105	791.403											
A-1	2.5	792.64	.75	.92	792.62	4	260			47	83	82	6.8
2	5.0	793.77	.85	.66	793.77	4	262			47	83	82	6.8
3	7.5	794.94	.93	.74	794.97	4	267			47	83	82	6.9
4	10.0	796.18	1.00	.79	796.22	4	268			47	82	82	7.2
B-1	12.5	797.66	1.30	1.03	797.64	4	265			47	83	80	7.0
2	15.0	798.835	.94	.74	798.84	5	271			48	84	81	7.0
3	17.5	800.06	1.00	.79	800.08	4	273			48	85	81	6.6
4	20.0	801.34	1.10	.87	801.38	4	273			48	85	81	7.6
C-1	22.5	802.54	.75	.59	802.46	4	269			47	87	80	6.8
2	25.0	803.88	1.30	1.03	803.96	4	273			47	87	81	4.6
3	27.5	805.14	1.10	.86	805.18	5	277			48	88	81	6.4
4	30.0	806.47	1.20	.94	806.54	5	276			48	90	81	6.0
D-1	32.5	808.15	1.50	1.21	808.08	6	261			46	90	82	5.6
2	35.0	809.39	1.10	.87	809.39	6	276			48	90	81	5.6
3	37.5	810.66	1.10	.86	810.69	5	278			48	90	81	5.5
4	40.0	812.11	1.40	1.11	812.17	5	269			48	92	81	7.3
E-1	42.5	813.62	1.50	1.19	813.70	6	272			48	91	81	6.0
2	45.0	815.09	1.40	1.12	815.19	6	268			48	91	82	5.7
3	47.5	816.44	1.15	.92	816.53	6	270			48	92	82	5.7
4	50.0	817.74	1.10	.88	817.85	6	267			48	92	82	5.7
F-1	52.5	819.20	1.20	.96	819.22	5	265			48	91	82	6.6
2	55.0	820.68	1.25	1.01	820.63	6	261			48	92	82	8.0
3	57.5	821.93	1.05	.86	821.93	7	254			47	92	82	7.8
4	60.0	823.55	1.65	1.35	823.56	6	254			47	92	82	7.0
	1205												
	θ =	Vm =		ΔH =							Avg. =		

C-6

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S-00378

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P. SHELCO Date 9/10/91 Test 1 Run 2
Source SCRUBBER INLETS No. of traverse points 48
Method 17A Filter holder: — Filter type: —

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac)
Postest: 00 cfm at 12 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: 0

Recovery solvent(s)
☐ acetone
☒ other(s) 4% $KMnO_4$ / 10% H_2SO_4

No. of probe wash bottles: 1
Sample recovered by: D.B.

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1	657	544	113
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant			
	1519	1504	15
Total			128

Integrated Gas Sampling Data:

Bag Pump No. B-13 Box No. 9 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 15 in. Hg.
Time start: 1105 (HRS) Time end: 1340 (HRS)
Sampling rate: 200 cc/min Operator: DB
S/N of O_2 Analyzer used to monitor train outlet: 8

CF-023

S-0046RR

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P. SHERCO Date 9/10/91 Test 1 Run 3
Source SCRUBBER INLETS MODULES (2 of 4 LA) No. of traverse points 48
Method 101A Filter holder: — Filter type: —

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac)
Posttest: .00 cfm at 11 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: 0

Recovery solvent(s)
☐ acetone
■ other(s) 4% KMnO$_4$ 10% H$_2$SO$_4$

No. of probe wash bottles: ______
Sample recovered by: ______

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impinger No. 1	646	547	99
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant		1385	
	1530	1519	11
Total			110

Integrated Gas Sampling Data:

Bag Pump No. B-13 Box No. 9 Bag No. 3

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: .00 cc/min at 15 in. Hg.

Time start: 1420 (HRS) Time end: 1643 (HRS)

Sampling rate: 200 cc/min Operator: D.B.

S/N of O$_2$ Analyzer used to monitor train outlet: 8

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: N.S.P. SHERCO
Source: SCRUBBER INLETS MODULES (10) (201)
Date: 9/10/91 Test 1 Run 2

Operators: D.B.
Meter Box No. 2 – .999 1.70 IN WC
Gasmeter coeff.

Pitot No. 23-6 Cp .84
Bar. Press. [illegible] inHg H2O %
Nozzle No. 1 Nozzle Dia .187 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Gas Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Imp.	Cnd/In	Cnd/Out	Oxygen (%v/v)
	1240	823.70											
G-1	2.5	824.75	.58	.73	824.63	5	285			47	80	80	4.3
2	5.0	825.67	.74	.55	825.67	5	315			47	82	80	4.2
3	7.5	826.54	.54	.40	826.55	5	320			47	83	80	3.8
4	10.0	827.50	.62	.46	827.50	5	320			47	84	80	3.6
H-1	12.5	828.64	.90	.67	828.64	5	315			47	84	80	3.6
2	15.0	829.77	.90	.67	829.78	5	318			48	85	80	3.4
3	17.5	830.55	.83	.62	830.58	5	315			47	86	80	3.3
4	20.0	831.55	.30	.22	831.55	5	316			47	87	80	3.5
I-1	22.5	833.04	1.4	1.05	832.98	7	312			47	86	80	3.5
2	25.0	834.34	1.3	.96	834.35	7	320			48	87	80	3.1
3	27.5	835.43	.83	.61	835.45	5	320			47	87	80	3.0
4	30.0	836.61	.95	.71	836.63	6	318			48	88	80	3.0
J-1	32.5	837.75	1.25	.93	837.98	6	316			47	87	81	3.1
2	35.0	839.20	1.05	.78	839.22	6	315			47	88	81	3.2
3	37.5	840.40	.98	.73	840.42	6	315			48	88	80	3.2
4	40.0	841.675	1.10	.82	841.47	6	315			48	88	80	3.2
K-1	42.5	843.14	1.35	1.01	843.09	8	316			48	87	80	3.6
2	45.0	844.55	1.50	1.13	844.58	8	309			47	88	81	3.4
3	47.5	845.96	1.35	1.02	845.99	8	310			48	88	80	3.4
4	50.0	847.24	1.10	.83	847.27	8	308			48	88	81	3.2
L-1	52.5	848.71	1.40	1.06	848.71	9	308			47	87	81	3.0
2	55.0	849.41	.53	.40	849.59	5	307			47	88	80	3.6
3	57.5	849.97	.10	.07	849.98	3	300			47	87	81	3.5
4	60.0	850.74	.40	.30	850.25	5	302			47	87	51	3.4
	(1340)												
	θ = 120	Vm = 59.337		ΔH = .81							Avg. = 84.0		

S-0037R

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: N.S.P. SHERCO
Source: Scrubber Inlets (2017 207)
Date: 9/10/91 Test: 1 Run: 3
Operators: D.B.
Meter Box No.: 2 ΔH@: 1.90 IN WC
Computer coeff.: .999
Pitot No.: 23-C Cp: .84
Bar. Press.: 29.20 inHg H2O: %
Nozzle No.: 2-1 Nozzle Dia: .183 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (%v/v)
	1420	851.60					273			47	82	80	5.8
A-1	2½	852.54	.56	.43	852.55	5	275			47	82	80	5.7
2	5.0	853.43	.56	.43	853.46	5	274			47	83	80	5.8
3	7.5	854.30	.48	.37	854.31	5	270			47	84	80	6.0
4	10.0	855.30	.65	.50	855.30	5	275			47	85	81	5.6
B-1	12.5	856.32	.67	.51	856.30	8	272			48	85	81	5.1
2	15.0	857.28	.63	.48	857.28	7	273			48	86	80	5.1
3	17.5	858.38	.79	.61	858.37	7	274			48	88	80	5.1
4	20.0	859.52	.95	.73	859.54	11	271			47	87	81	6.3
C-1	22.5	860.67	.82	.63	860.68	9	260			47	88	81	4.9
2	25.0	861.72	.71	.56	861.73	8	273			47	87	81	4.8
3	27.5	862.81	.80	.62	862.83	9	270			48	87	81	5.0
4	30.0	864.00	.92	.71	864.01	9	269			47	87	80	6.0
D-1	32.5	865.25	.99	.77	865.24	5	273			48	88	81	4.8
2	35.0	866.29	.74	.57	866.29	4	276			48	88	81	4.4
3	37.5	867.27	.65	.50	867.28	4	275			48	88	81	4.4
4	40.0	868.33	.77	.59	868.34	4	274			47	88	82	4.7
E-1	42.5	869.29	.57	.44	869.29	4	276			47	89	82	4.4
2	45.0	870.00	.56	.43	870.21	4	277			47	89	83	4.2
3	47.5	871.25	.73	.56	871.27	5	276			48	89	82	4.5
4	50.0	872.17	.51	.39	872.15	4	269			48	88	82	4.6
F-1	52.5	872.79	.27	.21	872.79	4	260			48	88	82	6.9
2	55.0	873.43	.28	.22	873.45	4	264			47	88	82	5.4
3	57.5	874.33	.53	.41	874.35	4	273			47	89	82	5.0
4	60.0	875.34	.65	.50	875.35	4							
	θ =	Vm =		ΔH =							Avg. =		

S-0037R

Pvs 1 of 2

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: N.S.P. SHERCO
Source: SCRUBBER EXHAUST (MODULES 201-207)
Date: 9/16/91 Test: 1 Run: [illegible]

Operator: D.B.
Meter Box No.: 2 ΔH@: 1.90 IN WC
Gasmeter coeff.: .999

Pitot No.: 23-C Cp: .84
Bar. Press.: 29.70 inHg H2O: ___ %
Nozzle No.: [illegible] Nozzle Dia: .183 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
		875.35								47	87	82	7.0
G-1	2.5	876.64	1.15	.85	876.64	6	302			47	88	82	7.2
2	5.0	877.86	1.05	.78	877.88	5	302			47	88	82	6.2
3	7.5	879.08	1.05	.78	879.12	5	300			48	89	82	5.5
4	10.0	880.36	1.05	.78	880.36	6	298			47	91	83	4.9
H-1	12.5	881.56	.99	.74	881.56	5	300			47	92	83	4.5
2	15.0	882.76	.98	.73	882.77	5	298			46	93	84	4.1
3	17.5	883.88	.83	.64	883.89	5	280			47	95	84	4.0
4	20.0	884.95	.75	.56	884.95	5	299			47	95	84	3.9
I-1	22.5	886.38	1.35	1.02	886.36	6	298			48	95	85	4.0
2	25.0	887.70	1.20	.90	887.70	6	305			48	97	85	3.8
3	27.5	888.82	.85	.63	888.82	5	306			47	98	85	3.6
4	30.0	889.80	.64	.48	889.80	4	295			47	98	85	6.5
J-1	32.5	891.20	1.30	.98	891.20	6	300			48	98	86	6.2
2	35.0	892.30	.81	.61	892.30	5	299			47	98	87	3.7
3	37.5	893.52	1.05	.80	893.52	5	289			48	98	87	4.3
4	40.0	894.62	.73	.56	894.62	5	285			47	99	87	4.2
K-1	42.5	896.09	1.40	1.08	896.09	6	282			48	100	88	3.8
2	45.0	897.32	.98	.76	897.32	6	282			47	100	88	3.7
3	47.5	898.52	.96	.74	898.54	5	285			48	100	87	3.8
4	50.0	899.72	.92	.71	899.73	5	285			47	100	88	3.9
L-1	52.5	901.21	1.40	1.10	901.21	6	275			48	100	89	4.6
2	55.0	902.55	1.20	.93	902.57	6	285			48	101	90	5.2
3	57.5	903.65	.78	.60	903.66	5	287			48	102	90	4.8
4	60.0	904.91	1.00	.77	904.91	5	286						
	1643												
	θ = 120	Vm = 53.31		ΔH = .64							Avg.	= 97.3	

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job N.S.P. SHERCO

Source UNITS 1 + 2 Stack

Test 1 Run 0 Date 9/10/91

Stack dimen. 390 IN.

Dry bulb ____ °F Wet bulb ____ °F

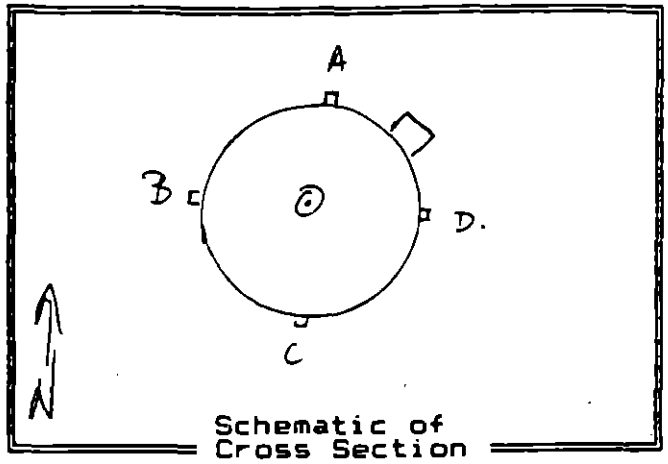
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.77 in Hg

Static pressure -1.35 in WC

Operators D. VanHoever & Gary Hove

Pitot No. V24-12 Cp .84



Schematic of Cross Section

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: 4.5 in.		Time start:	hrs
A 1	.032	12.87	17.38		
2	.105	40.95	45.5		
3	.194	75.66	80.13		
4	.323	126	130.5		
B 1					
2					
3					
4					
C 1					
2					
3					
4					
D 1					
2					
3					
4					
Temp. meas. tool & S/N: K,T				Time end:	hrs

R or nothing= reg. manometer; S= expanded; E = electronic S-392.1

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P. SHERCO Date 9/10/91 Test 1 Run 1
Source Units #1 & 2 Stack No. of traverse points 16
Method 5-1014 Filter holder: NA Filter type: none

Sample Train Leak Check:

Pretest: 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☐ acetone
☒ other(s) KMNO4 + 6N HCL

No. of probe wash bottles: 1
Sample recovered by: DHH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	547	250	297
Impinger No. 3			
Condenser			
Desiccant	1540	1504	36
Total			333

Integrated Gas Sampling Data:

Bag Pump No. B12 Box No. _____ Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 0820 (HRS) Time end: 1032 (HRS)
Sampling rate: 200 cc/min Operator: DHH
S/N of O_2 Analyzer used to monitor train outlet: 11

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P. SHERCO
Source U.1 + 2 Stack
Date 9/10/91 Test 1 Run 1

Operators DLM + EM
Meter Box No. 3 ΔH@ 1.82 IN WC
Coeff.: 1.00258

Pitot No. V34-12 Cp .84
Bar. Press. 25.27 inHg H2O 75 F
Nozzle No. 1-3 Nozzle Dia .487 IN.

ΔP Δ1t

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas In	Gas Out	Oxygen (dry)
	0815	242.20											
D 4	4	245.20	2.40	1.79	5.21	5	180	NA	NA	51	68	68	7.4
4	8	248.21	2.40	1.79	8.21	5	181				70	70	7.5
3	12	251.14	2.50	1.87	1.31	5	182				77	70	7.5
3	16	254.27	2.5	1.87	4.41	5	181				78	71	7.3
2	20	257.36	2.5	1.87	7.54	5	192			52	79	72	7.5
2	24	260.69	2.55	1.93	0.69	5	181				81	73	7.4
1	28	263.68	2.2	1.66	3.62	5	192				82	74	7.4
1	32	266.62	2.1	1.95	6.48	5	182				82	75	7.4
C 4	36	269.65	2.5	1.87	9.61	5	182			52	81	78	7.4
4	40	272.77	2.6	2.0	2.81		183				83	75	7.4
3	44	275.73	2.2	1.67	5.74	5	183				82	76	7.4
3	48	278.68	2.5	1.87	8.87	5	183				81	77	7.4
2	52	281.79	2.40	1.82	1.94	6	181			54	85	77	7.3
2	56	285.76	2.5	1.9	5.09	6	182				85	77	7.4
1	60	287.91	2.3	1.75	8.11	6	181				85	77	7.4
1	64	291.01	2.2	1.69	1.06	6	182				85	78	7.4
B 4	68	294.16	2.4	1.83	4.14	6	181			55	84	78	7.5
4	72	297.15	2.5	1.90	7.28	6	182				85	78	7.4
3	76	300.32	2.6	1.98	0.49	6	182				85	78	7.5
3	80	303.48	2.5	1.91	3.64	6	181				85	79	7.5
2	84	306.83	2.4	1.83	6.73	6	181			55	86	79	7.4
2	88	309.81	2.4	1.82	9.82	7	181				86	80	7.4
1	92	313.29	2.2	2.33	3.30	7	181				86	80	7.3
1	96	316.46	2.5	1.91	6.46	7	182				86	80	7.3
	θ =	Vs =		ΔH =							Avg. =		

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Pg 2 of 2

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: NSP SORCO
Source: UNITS 1 & 2 STACK 1
Date: 9-10-91 Test: 1 Run: 1

Operators: DJH CH
Meter Box No.: ____ ΔH@: ____ IN WC
Cassette coeff.: ____

Pitot No.: ____ Cp: ____
Bar. Press.: ____ inHg H2O ____ K
Nozzle No.: ____ Nozzle Dia.: ____ IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (%v/v)
A 4	100	319.59	2.5	1.91	9.61	6	181				85	80	7.4
4	104	322.71	2.5	1.91	2.76	6	182			55	86	80	7.4
3	108	325.91	2.5	1.9[illegible]	5.92	6	181				85	80	7.3
3	112	329.01	2.4	1.83	9.01	6	182				85	80	7.3
2	116	332.18	2.5	1.91	2.16	6	181			54	85	80	7.4
2	120	335.21	2.5	1.91	5.32	6	182				85	80	7.4
1	124	338.32	2.4	1.83	8.40	6	182				85	80	7.4
1	128	341.30	2.5	1.91	1.56	6	181			54	85	80	7.3
	(10:32)												
	θ = 128	Vm = 99/		ΔH = 1.87							Avg. = 79.8		

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S-0[redacted]R

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P. SHerco Date 9/10/91 Test 1 Run 2
Source Units 1 & 2 Stack No. of traverse points 16
Method 101A Filter holder: NA Filter type: NA

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☐ acetone
☒ other(s) $KMnO_4$ & 6N HCl

No. of probe wash bottles: 1
Sample recovered by: DWH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	580	250	330
Impinger No. 3			
Condenser			
Desiccant	1412	1388	24
Total			354

Integrated Gas Sampling Data: B

Bag Pump No. B/2 Box No. _____ Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 16 in. Hg.
Time start: 1110 (HRS) Time end: 1344 (HRS)
Sampling rate: 200 cc/min Operator: DWH
S/N of O_2 Analyzer used to monitor train outlet: 11

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P. SHERCO
Source Unit #2 Stack
Date 9/10/91 Test 1 Run 2

Operators DVA & GH
Meter Box No. 3 ΔH@ 1.82 IN WC
Gas meter coeff. 1.0038

Pitot No. V24-12 Cp .84
Bar. Press. 28.77 inHg H2O 15 %
Nozzle No. 7-3 Nozzle Dia .185 IN.

STOP TEST 12:11 RESTART 12:40

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Gas Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Cnd/In	Cnd/Out	Oxygen (%v/v)
	1105	341.80								54	75	75	7.5
A 4	4	344.87	2.50	1.90	4.93	6	182	NA	NA		77	75	7.3
4	8	348.13	2.75	2.07	8.19	6	182				80	76	7.3
3	12	351.39	2.60	1.96	1.37	6	182			53	82	77	7.4
3	16	354.57	2.60	1.96	4.56	6	180				83	77	7.4
2	20	357.71	2.45	1.87	7.67	5.5	180				83	77	7.3
2	24	360.80	2.45	1.87	0.78	5.5	180			55	84	78	7.4
1	28	363.84	2.30	1.75	3.79	5	180				85	78	7.3
1	32	366.98	2.30	1.76	6.81	5	180			60	86	79	7.3
B 4	36	369.95	2.5	1.91	9.96	5	180			58	85	78	7.3
4	40	373.28	2.6	1.99	3.18	5	180				86	78	7.2
3	44	376.52	2.7	2.06	6.45	5	181				85	78	7.3
3	48	379.72	2.5	1.91	9.61	5	180			55	85	78	7.3
2	52	382.92	2.6	1.98	2.82	5	181				87	78	7.4
2	56	385.95	2.5	1.91	5.96	5	181			'	87	81	7.3
1	60	389.26	2.5	1.91	9.12	5	181			55	87	81	7.3
1	64	392.32	2.4	1.84	2.22	5.5	181				87	81	7.3
C 4	68	395.38	2.4	1.84	5.32	6.0	181				87	80	7.3
4	72	398.50	2.7	2.07	8.61	6.0	180			54	75	75	7.3
D 3	76	401.85	2.7	2.07	1.89	6.0	181				78	76	7.4
3	80	405.09	2.6	1.96	5.06	6	180				81	76	7.4
2	84	408.15	2.5	1.90	8.19	6	180			54	82	77	7.4
2	88	411.32	2.6	1.98	1.38	6	180				83	77	7.4
1	92	414.44	2.6	1.98	4.58	6	181				83	78	7.3
1	96	417	2.1	1.6	7.46	6	181						
	θ	Vm =		ΔH =							Avg. =		

S-[illegible]R

011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job ____________ Operators ____________ Pitot No. ______ Cp ______

Source ____________ Meter Box No. ______ ^H@ ______ IN WC Bar. Press. ______ inHg H2O ______ %

Date ______ Test ______ Run ______ Gasmeter coeff. ______ Nozzle No. ______ Nozzle Dia ______ IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
0-4	100	420.50	2.5	1.91	0.60	6	181			53	80	77	7.4
4	104	423.69	2.5	1.89	3.72	6	180				82	77	7.3
3	108	426.74	2.6	1.98	6.91	6	181				84	77	7.2
3	112	430.00	2.5	1.91	0.06	6	181			54	84	77	7.3
2	116	433.05	2.5	1.91	3.20	6	181				85	77	7.3
2	120	436.24	2.5	1.91	6.35	6	180				85	79	7.3
1	124	439.40	2.5	1.91	9.50	6	180			55	86	79	7.2
1	128	442.53	2.4	1.83	2.57	6	180				86	79	7.4
	1344												
	θ = 128	Vm = 100.73		^H = 1.9							Avg. = 80.2		

S-0037R

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job NSP. SHERCO Date 9/10/91 Test 1 Run 3
Source Units 1+2 Stack No. of traverse points 16
Method 101A Filter holder: none Filter type: none

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☐
Postest: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☐ acetone
☒ other(s)

No. of probe wash bottles: 1
Sample recovered by: DGH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	590	250	340
Impinger No. 3			
Condenser			
Desiccant	1519	1504	15
Total			355

Integrated Gas Sampling Data:

Bag Pump No. B/2 Box No. _____ Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 4 in. Hg.
Time start: _____ (HRS) Time end: _____ (HRS)
Sampling rate: 200 cc/min Operator: DGH
S/N of O_2 Analyzer used to monitor train outlet: 1

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job NSP SHERCO
Source UNITS 1 & 2 STACK
Date _____ Test _____ Run 3

Operators
Meter Box No. 5 ΔH _____ ΔH @ _____
Barometer corr. 1.0056

Pitot No. _____ Cp _____
Bar. Press. 28.03 inHg H2O _____
Nozzle No. 1-3 Nozzle Dia .184 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dep. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Con/In	Con/Out	Oxygen (%v/v)
	1420	442.73											
D 4	4	445.64	2.5	1.91	5.88	5	180			51	75	74	7.3
4	8	448.73	2.5	1.89	8.99	5	180				77	74	7.2
3	12	452.00	2.4	1.81	2.04	5	183			52	79	75	7.3
3	16	455.06	2.5	1.89	5.16	5	181				81	75	7.2
2	20	458.09	2.5	1.89	8.39	5	182				82	76	7.2
2	24	461.35	2.5	1.90	1.43	5	182			56	83	77	7.3
1	28	464.35	2.4	1.83	4.51	5	180				83	77	6.7
1	32	467.63	2.5	1.90	7.44	6	182				84	78	7.3
C 4	36	470.85	2.5	1.90	0.79	6	182			57	84	78	7.3
4	40	473.93	2.5	1.91	3.93	6	181				84	78	7.3
3	44	477.15	2.5	1.90	7.07	6	182				84	78	7.2
3	48	480.13	2.5	1.90	0.22	6	182			53	85	78	7.2
2	52	483.30	2.5	1.91	3.37	6	180				85	78	7.3
2	56	486.49	2.5	1.91	6.51	6	182				88	79	7.3
1	60	489.52	2.5	1.92	9.67	6	181				86	79	7.3
1	64	492.83	2.5	1.91	2.83	6	181			54	86	80	7.2
B 4	68	496.00	2.55	1.96	6.02	6	180				86	80	7.3
4	72	499.24	2.50	1.91	9.17	6	182				86	79	7.4
3	76	502.38	2.5	1.91	2.33	6	182				86	80	7.3
3	80	505.50	2.5	1.91	5.48	6	182			53	86	80	7.5
2	84	508.64	2.4	1.83	8.67	6	182				87	80	7.4
2	88	511.64	2.4	1.84	1.67	6	181				87	80	7.4
1	92	514.65	2.2	1.69	4.64	6	180			53	86	80	7.5
1	96	517.53	2.1	1.61	7.53		181				86	80	
	θ =	Va =		ΔH =							Avg. =		

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S-0037R

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job NSP SHERCO
Source UNIT 1 & 2 STACK
Date 9-10-91 Test 1 Run 3

Operators DJH & GH
Meter Box No. ______ ΔH@ ______ IN WC
Gasmeter coeff. ______

Pitot No. ______ Cp ______
Bar. Press. ______ inHg ______ H2O ______ %
Nozzle No. ______ Nozzle Dia ______ IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Con/In	Con/Out	Oxygen (%v/v)
											87	81	7.1
H 4	100	520.79	2.3	1.76	0.56	6	180			54	87	81	7.4
4	104	523.04	2.45	1.88	3.70	6	181				87	81	7.4
3	108	526.89	2.5	1.92	6.86	6	181				87	81	7.4
3	112	529.89	2.3	1.76	9.88	6	180			54	87	81	7.2
2	116	533.00	2.5	1.92	3.04	6	180				87	81	7.2
2	120	536.05	2.3	1.77	6.08	6	180				87	81	7.3
1	124	539.09	2.4	1.84	9.18	6	182			55	87	82	7.3
1	128	542.06	2.2	1.69	2.14	6	182						
	1637												

[redacted] θ = [redacted] 128 [redacted] 90.33 ΔH = 1.86 Avg. = 81.7

[redacted] 5-0[redacted]

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job N.S.P. SHERCO

Source UNIT 3 SCRUBBER INLET

Test 2 Run ____ Date 9/11/91

Stack dimen. 360" X 436.8" IN.

Dry bulb — °F Wet bulb ____ °F

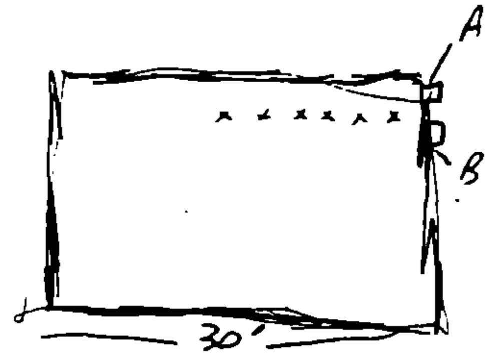
Manometer: ☐ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 29.04 in Hg

Static pressure -17.0 in WC

Operators D.B. & B.A.

Pitot No. TEFLON LINED PROBE Cp .84



Schematic of Cross Section

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: in.		Time start: hrs	
Temp. meas. tool & S/N: PDT-15					Time end: hrs	

R or nothing= reg. manometer; S= expanded; E = electronic S-392.1

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job NSP Sherco
Source Unit #3 Scrubber Inlet
Method 101 A Filter holder: N/A

Date 9/11/91 Test 2 Run 1
No. of traverse points 12
Filter type: N/A

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac)
Postest: .003 cfm at 22 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: 0

Recovery solvent(s)
☐ acetone
■ other(s) HNO_3 + HCl + DI. H_2O

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	710	520	190.0
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1392	1386	6.0
Total			196.0

Integrated Gas Sampling Data:

Bag Pump No. B13 Box No. 26 Bag No. 1

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: .00 cc/min at 15 in. Hg.

Time start: 835 (HRS) Time end: 1042 (HRS)

Sampling rate: 200 cc/min Operator: D.B.

S/N of O_2 Analyzer used to monitor train outlet: 4

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S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P. SHERCO
Source UNIT 3 SCR-BYPASS DUCT
Date 9/11/99 Test 01 Run 1

Operators B.B & B.A.
Meter Box No. 9 ΔH 1.75 IN WC
Coeff. 1.002

Pitot No. Yellow Line Cp .84
Bar. Press. 29.04 inHg H2O
Nozzle No. 3-3 Nozzle Dia .251 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Cyc/In	Cyc/Out	Oxygen (%v/v)
	835	963.80											
B 1-1	5	967.24	.63	1.46	967.28	4.0	272			59°	72	72	5.3
2	10	970.75	.65	1.48	970.77	4.0	274			56°	76	74	5.0
2-1	15	974.05	.58	1.32	974.08	4.0	276			55°	79	74	5.2
2	20	977.44	.60	1.38	977.46	4.0	274			55°	81	75	4.9
3-1	25	980.70	.54	1.25	980.68	4.0	272			55°	82	76	5.0
2	30	983.95	.54	1.25	983.90	4.0	272			55°	84	77	5.0
4-1	35	987.96	.96	2.00	987.98	6.0	271			54°	85	78	5.1
2	40	991.98	.83	1.94	992.00	6.0	268			54°	86	77	4.8
5-1	45	994.55	.34	.79	994.59	3.0	267			54°	86	79	4.8
2	50	997.26	.37	.87	997.29	3.5	265			54	86	79	4.6
6-1	55	999.10	.16	.38	999.07	2.0	260			54°	85	79	4.6
2	60	1000.974	.18	.42	1000.97	2.5	259			54°	85	80	4.6
A B-1-1	5	4.77	.76	1.79	4.81	6.5	273			55°	86	80	5.2
2	10	8.65	.78	1.81	8.70	7.5	275			53°	87	80	4.9
2-1	15	12.23	.65	1.52	12.27	7.5	272			53°	87	81	4.8
2	20	15.88	.67	1.56	15.89	8.5	272			52°	87	80	4.8
3-1	25	19.15	.54	1.27	19.16	8.0	268			52°	87	81	5.1
2	30	22.70	.52	1.22	22.36	8.5	266			52°	87	81	4.9
4-1	35	26.48	.87	2.05	26.51	14.0	265			54°	86	81	5.0
2	40	30.52	.84	1.97	30.57	20.0	266			55°	85	79	4.8
5-1	45	34.48	.79	1.86	34.52	20.0	262			55°	83	80	4.9
2	50	38.44	.80	1.88	38.48	21.0	262			55°	81	81	5.2
6-1	55	42.20	.72	1.70	42.25	21.0	261			55°	80	80	5.0
2	60	1045.877	.69	1.62	45.92	21.0	261			55°	80	80	5.0
	1012												
	θ = 120	Vm = 82.077		ΔH = 1.45							Avg.	80.9	

STATIC -17.0

S-0037R

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P. SHIELD
Source UNIT #3 SCRUBBER INLET
Method 101 A Filter holder: N/A

Date 9/11/91 Test 2 Run 2
No. of traverse points 12
Filter type: N/A

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac)
Postest: .00 cfm at 10 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: 0

Recovery solvent(s)

☐ acetone
☐ other(s)

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1	648	539	109
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant		~~1366~~	
	1458	1452	6.0
Total			115.0

Integrated Gas Sampling Data:

Bag Pump No. B-13 Box No. 26 Bag No. 2

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: .00 cc/min at 15 in. Hg.

Time start: 1330 (HRS) Time end: 1336 (HRS)

Sampling rate: 200 cc/min Operator: D.B.

S/N of O_2 Analyzer used to monitor train outlet: 4

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: NSP Sherco
Source: Unit 3
Date: 9-1-91 Test: 2 Run: 2

Operators: DB, BA
Meter Box No.: 9 ΔH@: 1.25 IN WC
Gasmeter coeff.: 1.0066

Pitot No.: Teflon lined pulse Cp:
Bar. Press.: 29.04 inHg H2O: %
Nozzle No.: 1-1 Nozzle Dia: .185 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1130	46.80											
1-1	5	48.85	.69	.50	48.87	3	272			51	81	79	5.9
-2	10	50.93	.73	.51	50.95	2	281			51	83	79	5.3
2-1	15	53.025	.75	.53	53.06	2	283			51	84	80	5.0
-2	20	55.17	.74	.52	55.15	2	283			50	85	80	5.1
3-1	25	56.74	.43	.30	56.76	2	277			50	86	81	5.1
-2	30	58.50	.50	.36	58.50	2	275			50	86	81	5.1
4-1	35	60.09	.41	.29	60.08	2	274			51	86	82	5.1
-2	40	61.78	.48	.34	61.77	2	274			50	86	82	5.1
5-1	45	63.36	.41	.29	63.36	2	275			50	86	82	5.0
-2	50	65.70	.84	.64	65.70	2	268			49	87	82	4.9
6-1	55	67.77	.66	.48	67.71	2	269			49	87	82	5.1
-2	60	69.60	.57	.41	69.58	2	266			49	88	83	4.8
1-1	5	71.50	.60	.43	71.50	2	272			49	85	81	5.0
-2	10	73.44	.63	.45	73.44	2	279			48	86	82	5.1
2-1	15	75.25	.55	.39	75.26	2	280			48	87	83	4.9
-2	20	77.05	.53	.37	77.05	2	282			48	87	83	5.0
3-1	25	78.86	.54	.38	78.85	2	279			49	87	83	4.9
-2	30	80.65	.54	.38	80.66	2	278			49	88	83	5.0
4-1	35	83.02	.93	.67	83.04	2	277			48	88	83	5.1
-2	40	85.42	.93	.67	85.42	2	277			48	88	83	5.1
5-1	45	87.54	.75	.54	87.55	2	276			49	89	84	5.1
-2	50	89.67	.74	.53	89.68	2	274			48	89	84	4.9
6-1	55	91.83	.75	.54	91.83	2	270			48	89	84	4.9
-2	60	93.97	.75	.54	93.98	2	269			48	89	84	4.9
	(1336)												
	θ = 120	Vm = 47.17		ΔH = .46							Avg.	84.2	

S-0037R

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USP Sherco
Source UNIT #3 SCRUBBER INLET
Method 101A Filter holder: —

Date 9-11-91 Test 2 Run 3
No. of traverse points 12
Filter type: N/A

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac)
Postest: .00 cfm at 8 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: _____

Recovery solvent(s)
☐ acetone
☐ other(s) _____

No. of probe wash bottles: _____
Sample recovered by: _____

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		~~539~~	
Impinger No. 2	622	539	83
Impinger No. 3			
Condenser			
Desiccant		~~738~~	
	1495	1490	5.0
Total			88.0

Integrated Gas Sampling Data:

Bag Pump No. B13 Box No. 26 Bag No. 3

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: .00 cc/min at 15 in. Hg.

Time start: 1430 (HRS) Time end: 1635 (HRS)

Sampling rate: 200 cc/min Operator: B.B.

S/N of O_2 Analyzer used to monitor train outlet: 4

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job U.S.P. SHERLD
Source UNIT #3 SCRUBBER EXHAUST
Date 9/11/91 Test 2 Run 3

Operators D.R. + B.A.
Meter Box No. 9 ΔH@ 1.75 IN WC
Gasmeter coeff. 1.002

Pitot No. TEFLON LINED PROBE 15' Cp .84
Bar. Press. 29.04 inHg H2O
Nozzle No. 2-2 Nozzle Dia .153 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Gas Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Imp.	Con/In	Con/Out	Oxygen (%v/v)
	1430	94.73											
B-1-1	5	95.96	.55	.39	95.95	2.0	285				83	83	5.3
2	10	97.80	.56	.39	97.78	2.0	283				84	81	5.1
2-1	15	99.64	.57	.40	99.62	2.0	283				86	82	5.0
2	20	101.49	.58	.41	101.48	2.0	284				86	82	4.9
3-1	25	103.23	.52	.37	103.25	2.0	284				86	82	5.3
2	30	104.97	.49	.35	104.96	2.0	282				87	82	5.0
4-1	35	107.19	.84	.60	107.21	3.0	280				88	83	4.9
2	40	109.48	.87	.62	109.51	3.0	280				89	83	5.1
5-1	45	111.59	.74	.53	111.63	2.5	277				89	83	5.0
2	50	113.75	.75	.54	113.77	2.5	276				89	83	4.9
6-1	55	115.93	.78	.56	115.96	2.5	272				89	84	5.1
2	60	118.115	.77	.56	118.13	2.5	272				89	84	4.8
A-1-1	5	120.17	.71	.50	120.20	2.0	283				88	84	5.2
2	10	122.25	.70	.49	122.26	2.0	286				88	84	5.1
2-1	15	124.37	.74	.52	124.37	2.0	284				89	84	5.1
2	20	126.24	.57	.41	126.23	2.0	278				90	84	5.2
3-1	25	128.11	.58	.41	128.11	2.0	279				89	85	5.0
2	30	129.94	.55	.39	129.94	2.0	280				90	85	5.0
4-1	35	131.35	.32	.23	131.34	2.0	278				90	85	5.0
2	40	133.25	.60	.43	133.26	2.0	277				88	85	5.0
5-1	45	135.38	.75	.54	135.40	2.0	274				90	84	5.1
2	50	137.51	.77	.53	137.52	2.0	273				90	85	4.9
6-1	55	139.55	.66	.48	139.54	2.0	270				90	85	5.1
2	60	141.36	.53	.38	141.75	2.0	268				90	85	5.1
	(1635)												
	θ = 120	Vm = 46.63		ΔH = .46							Avg. =	85.9	

S-0037R

Job N.S.P. Sheria

Source Unit #3 Stack

Test 2 Run 0 Date 9/11/91

Stack dimen. 354 IN.

Dry bulb ____ °F Wet bulb ____ °F

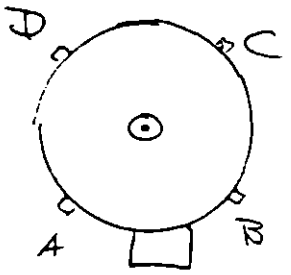
Manometer: ☐ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.44 in Hg

Static pressure -.46 in WC

Operators D. VanHoever & C. Mosser

Pitot No. V34-12 Cp .84



Schematic of Cross Section

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: 40 in.		Time start:	hrs
A 1	.032	11.33	51.33		
2	.105	37.17	77.17		
3	.194	68.68	108.68		
4	.323	114.34	154.34		
B 1					
2					
3					
4					
C 1					
2					
3					
4					
D 1					
2					
3					
4					
Temp. meas. tool & S/N:				Time end:	hrs

R or nothing= reg. manometer; S= expanded; E = electronic S-392.1

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job NSP SHERCO Date 9/11/91 Test 2 Run 1
Source Unit #3 Stack No. of traverse points 16
Method 10LA Filter holder: none Filter type: NA

Sample Train Leak Check:

Pretest: 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☐ acetone
☒ other(s) KMNO4 6N HCL

No. of probe wash bottles: 1
Sample recovered by: DUST

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	613	250	363
Impinger No. 3			
Condenser			
Desiccant	1525	1484	41
Total			404

Integrated Gas Sampling Data:

Bag Pump No. B12 Box No. 2 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 0840 (HRS) Time end: 1054 (HRS)
Sampling rate: 200 cc/min Operator: DUST
S/N of O_2 Analyzer used to monitor train outlet: 11

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P. SHERCO
Source Unit #3 Stack
Date 9/11/91 Test 2 Run 2

Operators DUH + GH
Meter Box No. 2 ΔH@ 1.82 IN WC
Gasmeter coeff. 1.0058

Pitot No. V24-11 Cp .84
Bar. Press. 28.84 inHg H2O 70 %
Nozzle No. 1-4 Nozzle Dia .245 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (%v/v)
	0835	568.64											
D 4	4	572.44	1.30	3.0	2.58	9	172	NA	NA	50	81	81	5.7
4	8	576.33	1.1	2.73	6.33	9	172				84	81	5.9
3	12	580.02	1.2	2.98	0.26	10	172				84	81	5.8
3	16	584.11	1.2	2.98	4.19	10	172			50	84	81	5.7
2	20	587.84	1.1	2.74	7.95	10	172				84	81	5.7
2	24	591.69	1.2	2.98	1.88	10	172				84	81	5.6
1	28	595.31	.92	2.29	5.33	8	172				85	81	5.5
1	32	598.86	.96	2.41	8.86	8	168			49	86	82	5.5
A 4	36	602.56	1.05	2.63	2.55	9	170				86	81	5.5
4	40	606.26	1.05	2.63	6.25	9	169				87	81	5.5
3	44	609.98	1.05	2.63	9.95	9	169				87	82	5.6
3	48	613.88	1.1	2.76	3.73	9	169			52	89	82	5.6
2	52	617.72	1.2	3.02	7.69	10	168				88	82	5.9
2	56	621.47	1.1	2.77	1.49	9	168				88	82	5.7
1	60	625.23	1.1	2.77	5.28	9	168				88	82	5.9
1	64	628.88	.99	2.49	8.88	8	168			53	88	82	5.8
B 4	68	632.84	1.2	3.02	2.84	9	167				85	81	5.8
4	72	636.70	1.2	3.00	6.78	9	170				87	81	5.8
3	76	640.80	1.25	3.13	0.80	10	170			55	87	81	5.8
3	80	644.60	1.25	3.13	4.83	10	170				87	81	5.7
2	84	648.77	1.2	3.0	8.77	10	170			—	87	80	5.7
2	88	652.55	1.1	2.75	2.55	9	170			56	86	80	5.7
1	92	656.34	1.1	2.75	6.32	9	170				87	80	5.8
1	96	660.01	1.05	2.63	0.01	9	170				86	80	5.7
	θ =	Vm =		ΔH =							Avg. =		

Temperatures (°F) columns: Stack, Probe, Oven, Imp., Gas/In, Gas/Out.

S-0023R

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: SHEACO-NSP
Source: UNIT 3 STACK
Date: 9-11-91 Test: 2 Run: 1

Operators: DVH + CH
Meter Box No.: 2 ^H@: 1.8[illegible] IN WC
Counter coeff.: 1.0058

Pitot No.: V-24-14 Cp: .84
Bar. Press.: ____ inHg H2O ____ %
Nozzle No.: ____ Nozzle Dia: ____ IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Obs. Vol. (cf)	VAC. inHg	Stack (°F)	Probe (°F)	Oven (°F)	Impg. (°F)	Cnd/In (°F)	Cnd/Out (°F)	Oxygen (%v/v)
		660.01											
C 4 4	100	663.95	1.2	3.00	3.95	10	170			54	84	79	5.8
4 4	104	667.88	1.2	2.99	7.88	10	170				85	79	5.8
3 3	108	671.81	1.2	2.99	1.81	10	171				85	79	5.7
3 3	112	675.73	1.2	2.99	5.73	10	171			54	85	79	5.6
2	116	679.60	1.1	2.74	9.50	10	170				85	79	5.8
2	120	683.43	1.2	2.99	3.43	10	171				85	79	5.9
1	124	687.56	1.2	2.99	7.36	10	171			54	85	78	5.5
1	128	691.23	1.2	2.98	1.28	10	171				85	78	5.5
	1054												
	θ = 128	Vm = [illegible]		^H 2.8[illegible]							Avg. = 83.1		

S-0037R

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P Shorco
Source Unit #3 Stack
Method 101A Filter holder: NA

Date 9/11/91 Test 2 Run 2
No. of traverse points 16
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 7 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: _____

Recovery solvent(s)

☐ acetone
☒ other(s) KMnO4 & 6 N HCl

No. of probe wash bottles: 1
Sample recovered by: Duff

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		250	
Impinger No. 2	476		226
Impinger No. 3			
Condenser			
Desiccant	1444	1427	17
Total			243

Integrated Gas Sampling Data:

Bag Pump No. B,2 Box No. 2 Bag No. 2

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: 0 cc/min at 14 in. Hg.

Time start: 1134 (HRS) Time end: 1346 (HRS)

Sampling rate: 200 cc/min Operator: Duff

S/N of O_2 Analyzer used to monitor train outlet: 41

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job N.S.P Sherco
Source Unit #3 Stack
Date 9/11/91 Test 2 Run 2

Operators DUH & G.H
Meter Box No. 3 ΔH 1.82 IN WC
Coeffic. 1.0055

Pitot No. V24-12 Cp .84
Bar. Press. 28.54 inHg H2O 0 IN.
Nozzle No. 1-3 Nozzle Dia .182 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Cen/In	Cen/Out	Oxygen (v/v)
	1130	691.45											
4	4	693.70	1.25	.99	3.72	2.5	170			52	74	74	5.8
4	8	695.99	1.25	.98	5.96	2.5	170				80	75	5.6
3	12	698.23	1.25	.98	8.22	2.5	171				82	76	5.7
3	16	700.52	1.25	.99	0.45	2.5	171			53	83	76	5.5
2	20	702.76	1.25	.99	2.74	2.5	171				84	77	5.5
2	24	705.07	1.25	.99	5.01	2.5	171				84	77	5.5
1	28	707.05	1.05	.83	7.09	2.5	169			53	85	77	5.5
1	32	709.37	1.1	.87	9.32	2.5	170				85	77	5.6
4	36	711.54	1.2	.95	1.44	2.5	170				84	78	5.7
4	40	713.79	1.3	1.03	3.76	2.5	170			54	84	78	5.8
3	44	716.01	1.3	1.03	6.07	2.5	170				84	78	5.7
3	48	718.34	1.3	1.03	8.39	3.0	169				84	78	5.8
2	52	720.5	1.3	1.03	0.71	1.5	169			54	84	78	5.7
2	56	723.02	1.3	1.03	3.02	3.0	170				84	78	5.8
1	60	725.35	1.3	1.03	5.33	3.0	170				83	77	5.7
1	64	727.49	1.1	.87	7.46	2.5	170			52	83	77	5.7
4	68	729.69	1.1	.87	9.59	2.5	170				83	77	5.7
4	72	731.77	1.1	.87	1.71	2.5	169				85	78	5.7
3	76	733.88	1.1	.87	3.85	2.5	170			52	85	78	5.8
3	80	735.91	1.1	.87	5.98	2.5	170				85	78	5.8
2	84	738.21	1.2	.95	8.81	2.5	169				86	78	5.6
2	88	740.31	1.05	.83	0.89	2.5	170			52	85	78	5.7
1	92	742.38	1.05	.83	2.38	2.5	170				85	78	5.8
1	96	744.49	1.05	.83	4.46	2.0	172				85	78	5.7
	θ =	Vs =		ΔH =							Avg. =		

C-33

S-0037R

CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: SherCo
Source: STACK UNIT 3
Date: ______ Test: 2 Run: 2

Operators: DVH CH
Meter Box No. ______ ΔH@ ______ IN WC
Computer coeff. ______

Pitot No. ______ Cp ______
Bar. Press. ______ inHg H2O ______ %
Nozzle No. ______ Nozzle Dia ______ IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm Vol. (cf)	VAC. inHg	Stack (°F)	Probe (°F)	Oven (°F)	Impg. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (%v/v)
4	100	746.59	1.1	.87	6.59	2.5	170			58	86	79	5.6
4	104	748.69	1.05	.84	8.68	2.5	169				86	79	5.8
3	108	750.82	1.1	.88	0.82	2.5	168				87	79	5.8
3	112	752.99	1.05	.84	2.91	2.5	168			53	87	79	5.8
2	116	755.07	1.05	.84	5.00	2.5	169				87	80	5.8
2	120	757.18	1.1	.88	7.14	2.5	169				87	80	5.6
1	124	759.18	1.1	.88	9.28	2.5	170				87	80	5.6
1	128	761.21	1.05	.84	1.37		170			54	88	80	5.6
	(1346)												
	Θ = 128	Vm = 69.76		ΔH = .92							Avg. = 81.1		

S-0[redacted]

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job N.S.P. Sherco Date 9/11/91 Test 2 Run 3
Source Unit #3 Stack No. of traverse points 16
Method 101A Filter holder: NA Filter type: NA

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 7 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☒ acetone
☒ other(s) KMnO4 & N HCl

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	459	250	209
Impinger No. 3			
Condenser			
Desiccant	1507	1490	17
Total			226

Integrated Gas Sampling Data:

Bag Pump No. B12 Box No. 2 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 1425 (HRS) Time end: 1632 (HRS)
Sampling rate: 200 cc/min Operator: DAH
S/N of O_2 Analyzer used to monitor train outlet: 11

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: NSP SHERCO
Source: UNIT 2 STACK
Date: 9-11-91 Test 2 Run 3

Operators: DVH GH
Meter Box No. 2 ΔH@ ___ IN WC
Gasmeter coeff. 1.0058

Pitot No. U-24-14 Cp .84
Bar. Press. 28.84 inHg H2O ___ K
Nozzle No. 1.3 Nozzle Dia .165 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Cnd/In	Cnd/Out	Oxygen (%v/v)
	1422	761.69								51	79	77	7.3
4	4	763.19	1.2	.94	3.89	2.5	172				83	78	5.8
4	8	765.99	1.1	.85	5.99	2.5	171				83	78	5.7
3	12	768.11	1.1	.86	8.11	2.0	170			52	86	79	5.7
3	16	770.17	1.1	.86	0.22	2.0	170				89	80	5.7
2	20	772.43	1.2	.94	2.43	2.5	171				91	81	5.8
2	24	774.56	1.2	.94	4.66	2.5	170				92	82	5.5
1	28	776.79	1.1	.86	6.79	2.5	170				87	81	5.6
1	32	778.88	1.05	.83	8.88	2.5	170			52	92	83	5.7
4	36	781.01	1.1	.86	1.01	2.5	170				93	84	5.7
4	40	783.10	1.05	.83	3.10	2.0	171				94	84	5.7
3	44	785.19	1.1	.87	5.24	2.0	170				95	85	5.6
3	48	787.39	1.1	.87	7.39	2.5	170			51	95	85	5.6
2	52	789.45	1.1	.87	9.54	2.0	170				96	86	5.7
2	56	791.61	1.05	.83	1.64	2.0	171				97	87	5.6
1	60	793.65	1.0	.80	3.69	2.0	170				98	88	5.6
1	64	795.75	1.0	.80	5.75	2.5	170			.51	97	88	5.5
4	68	797.91	1.1	.88	7.91	2.0	170				98	89	5.6
4	72	800.10	1.1	.88	0.07	2.5	171				99	89	5.6
3	76	802.24	1.1	.88	2.24	3.0	171				99	90	5.7
3	80	804.42	1.1	.88	4.40	2.0	170			52	99	90	5.6
2	84	806.58	1.2	.96	6.67	8.0	170				99	90	5.7
2	88	808.80	1.1	.88	8.83	2.0	171				99	90	5.7
1	92	810.99	1.1	.88	1.00	2.0	171				99	91	
1	96	813.01	1.0	.80	3.06		171						
	θ =	Vm =		ΔH =							Avg. =		

0-00[illegible]

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: SHERCO
Source: STACK - UNIT 3
Date: 9-11-91 Test: 2 Run: 3

Operators: DUH & GH
Meter Box No. ______ ^Hθ ______ IN WC
Computer coeff. ______

Pitot No. ______ Cp ______
Bar. Press. ______ inHg H2O ______ %
Nozzle No. ______ Nozzle Dia ______ IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm. Vol. (cf)	VAC. (inHg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (%v/v)
4	100	815.10	1.0	.80	5.13	3.0	171			52	99	91	5.7
4	104	817.20	1.0	.80	7.20	3.0	171				99	91	5.7
3	108	819.21	1.0	.80	9.21	2.0	170				98	91	5.7
3	112	821.35	1.1	.88	1.44	2.0	170			51	98	91	5.7
2	116	823.61	1.1	.88	3.60	2.0	170				99	91	5.7
2	120	825.79	1.1	.88	5.77	3.0	170				99	91	5.8
1	124	827.84	1.0	.80	7.84	2.5	171				99	91	5.8
1	128	830.00	1.0	.80	9.91	2.5	171			52	99	91	
	(1632)												
	θ = 128	Vm = 68.31		^H = .86							Avg. = 90.5		

S-0037R

APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

TABLE OF CONTENTS

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job NSP/Sherco
Team Leader DB
Date Submitted 9-11-91
Test No. 1
Date of Analysis 9-11-91

Source Scrubber Inlet
Test Site Modules
Date of Test 9-10-91
No. of Runs Completed 3
Technician R. C[illegible]

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
1/1	4201-13	1	0.00	10.30	19.70	10.30	9.40	1.12
		2	0.00	10.30	19.70	10.30	9.40	1.12
	☑ B ☐ F	Avg				10.30	9.40	
1/2	-14	1	0.00	11.30	19.50	11.30	8.20	1.12
		2	0.00	11.30	19.50	11.30	8.20	1.12
	☑ B ☐ F	Avg				11.30	8.20	
1/3	-15	1	0.00	11.70	19.50	11.70	7.80	1.12
		2	0.00	11.70	19.50	11.70	7.80	1.12
	☑ B ☐ F	Avg				11.70	7.80	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☑ Orsat Analyzer System Leak Check
☑ F_o Within EPA M-3 Guidelines for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.120

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job NSP/Shenco
Team Leader DVD
Date Submitted 9-11-91
Test No. 1
Date of Analysis 9-11-91

Source Units 1&2
Test Site Stack
Date of Test 9-10-91
No. of Runs Completed 3
Technician A. [illegible]

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
1/1	4201-24	1	0.00	12.20	19.40	12.20	7.20	1.12
		2	0.00	12.20	19.40	12.20	7.20	1.12
	☑ B ☐ F	Avg				12.20	7.20	
1/2	-25	1	0.00	12.40	19.50	12.40	7.10	1.11
		2	0.00	12.40	19.50	12.40	7.10	1.11
	☑ B ☐ F	Avg				12.40	7.10	
1/3	-26	1	0.00	12.40	19.50	12.40	7.10	1.11
		2	0.00	12.40	19.50	12.40	7.10	1.11
	☑ B ☐ F	Avg				12.40	7.10	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☑ F_o Within EPA M-3 Guidelines for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

LSC-04-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job NSP/Sherco
Team Leader OR
Date Submitted 9-12-91
Test No. 2
Date of Analysis 9-12-91

Source Unit #3
Test Site Scrubber Inlet
Date of Test 9-11-91
No. of Runs Completed 3
Technician R. Cohen

Test/Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
2/1	4201-37	1	0.00	12.60	19.30	12.60	6.70	1.13
		2	0.00	12.60	19.30	12.60	6.70	1.13
	☑ B ☐ F	Avg				12.60	6.70	
2/2	-38	1	0.00	13.60	19.20	13.60	5.60	1.13
		2	0.00	13.60	19.20	13.60	5.60	1.13
	☑ B ☐ F	Avg				13.60	5.60	
2/3	-39	1	0.00	12.40	19.40	12.40	7.00	1.12
		2	0.00	12.40	19.40	12.40	7.00	1.12
	☑ B ☐ F	Avg				12.40	7.00	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☑ Orsat Analyzer System Leak Check
☑ F_o Within EPA M-3 Guidelines for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553

F=Flask (250 cc all glass)

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job NSP/Shecco
Team Leader DVH
Date Submitted 9-12-91
Test No. 2
Date of Analysis 9-12-91

Source Unit #3
Test Site Stack
Date of Test 9-11-91
No. of Runs Completed 3
Technician R Gulun

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
			Zero Pt.	After CO_2	After O_2			
2/1	4201-49	1	0.00	13.00	19.30	13.00	6.30	1.12
		2	0.00	13.00	19.30	13.00	6.30	1.12
	☑ B ☐ F	Avg				13.00	6.30	
2/2	-50	1	0.00	13.10	19.30	13.10	6.20	1.12
		2	0.00	13.10	19.30	13.10	6.20	1.12
	☑ B ☐ F	Avg				13.10	6.20	
2/3	-51	1	0.00	13.30	19.30	13.30	6.00	1.12
		2	0.00	13.30	19.30	13.30	6.00	1.12
	☑ B ☐ F	Avg				13.30	6.00	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☑ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

LSC-04-BR

INTERPOLL LABORATORIES, INC.
(612)786-6020

NSP/Sherco
Laboratory Log No. 4201

Results of Mercury Analysis

Test: 1
Source: Units 1 & 2 Scrubber Inlet
Sample Type: Method 101A Sampling Train

		Total Mass in Sample (ug)			
	Method	Field Blank	Run 1	Run 2	Run 3
(Log No.)		(4201-09)	(4201-10)	(4201-11)	(4201-12)
Mercury	SW-846, 7470	< 0.1	14.5	22.1	17.2

Test: 1
Source: Units 1 & 2 Stack
Sample Type: Method 101A Sampling Train

		Total Mass in Sample (ug)			
	Method	Field Blank	Run 1	Run 2	Run 3
(Log No.)		(4201-27)	(4201-28)	(4201-29)	(4201-30)
Mercury	SW-846, 7470	1.34	10.4	6.79	20.7

INTERPOLL LABORATORIES, INC.
(612)786-6020

NSP/Sherco
Laboratory Log No. 4201

Results of Mercury Analysis

Test: 2
Source: Unit 3 Scrubber Inlet
Sample Type: Method 101A Sampling Train

		Total Mass in Sample (ug)		
	Method	Run 1	Run 2	Run 3
(Log No.)		(4201-40)	(4201-41)	(4201-42)
Mercury	SW-846, 7470	25.2	18.6	17.6

Test: 2
Source: Unit 3 Stack
Sample Type: Method 101A Sampling Train

		Total Mass in Sample (ug)		
	Method	Run 1	Run 2	Run 3
(Log No.)		(4201-52)	(4201-53)	(4201-54)
Mercury	SW-846, 7470	18.9	12.5	12.8

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job N.S.P. SHERCO
Team Leader D. BRENNAN
Date Submitted 9/10/91
Test No. #1 RUNS (1-3)

Source SCRUBBER INLETS
Test Site MODULES (101-104)(107-201)(204-207)
Date of Test 9/10/91
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
4	Probe Wash: ☐ Acetone ☐ D.I. Water	☐ As per EPA M-5 ☐ Other ____	
	Filter: ☐ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☐ As per EPA M-5 ☐ As per EPA M-17 ☐ Other ____	
4 ×3 + RINSES + BLANK	Impinger Catch: ☐ D.I. Water ☐ 3% H_2O_2 ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ■ Other KMNO4	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ■ Other MERCURY	Impinger & RINSE BOTTLES for EACH RUN
3	Integrated Gas sample	■ As per EPA M-3 ☐ As per EPA M-10 ☐ Other ____	
	Oxides of Nitrogen (NO_x)	☐ As per EPA M-7A ☐ Other ____	Date ____ Time (HRS) ____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other ____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other ____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other ____	

Source Information

1) Type of Source: ■ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer
☐ Other ____
2) Fuel: ■ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other ____
3) Is sample combustible? ■ No ☐ Yes
4) Does sample need special handling? ■ No ☐ Yes If yes, explain ____

S-0785000

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job NSP SHERCO
Team Leader DUH
Date Submitted 9/10/91
Test No. 1

Source Units 1 & 2
Test Site Stack
Date of Test 9/10/91
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
4	Probe Wash: ☐Acetone ☐D.I. Water	☐As per EPA M-5 ☒Other KMnO4 & 6N HCl Rinse	
	Filter: ☐4" G.F. ☐S.S. Thimble ☐2.5" G.F. ☐47 mm G.F.	☐As per EPA M-5 ☐As per EPA M-17 ☐Other	
4	Impinger Catch: ☐D.I. Water ☐3% H_2O_2 ☒4M5 Hg Only ☐4M5 Metals ☐1.0 N NaOH ☐Other	☐MN Protocol ☐WI Protocol ☐EPA M-6 or 8 ☐Acid Gases ☐Formaldehyde ☐Metals ☒Other Hg Method	for A
3	Integrated Gas sample	☒As per EPA M-3 ☐As per EPA M-10 ☐Other	
	Oxides of Nitrogen (NO_x)	☐As per EPA M-7A ☐Other	Date Time(HRS)
	☐ Fuel Sample ☐ Aggregate	☐Attached fuel Form #S-0163RRR	
	Particle Size	☐X-Ray Sedigraph ☐Bahco Method ☐Other	
	Audit Samples ☐Sulfur Dioxide ☐Oxides of Nit. ☐Other	☐As per EPA M-6 ☐As per EPA M-7A ☐Other	

Source Information

1) Type of Source: ☒ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer ☐ Other
2) Fuel: ☒ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other
3) Is sample combustible? ☒ No ☐ Yes
4) Does sample need special handling? ☒ No ☐ Yes If yes, explain

S-279RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job N.S.P. SHERCO
Team Leader D. BRENNAN
Date Submitted 9/11/91
Test No. 2 (RUNS 1-3)

Source UNIT #3 SCRUBBER INLET
Test Site SCRUBBER IN
Date of Test 9/11/91
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3	Probe Wash: ☐Acetone ☐D.I. Water (Rinse)	☐As per EPA M-5 ☒Other MERCURY	
0	Filter: ☐4" G.F. ☐S.S. Thimble ☐2.5" G.F. ☐47 mm G.F.	☐As per EPA M-5 ☐As per EPA M-17 ☐Other	
3	Impinger Catch: ☐D.I. Water ☐3% H_2O_2 ☐4M5 Hg Only ☐4M5 Metals ☐1.0 N NaOH ☒Other $KMnO_4$ (4%) (10%) H_2SO_4	☐MN Protocol ☐WI Protocol ☐EPA M-6 or 8 ☐Acid Gases ☐Formaldehyde ☐Metals ☒Other MERCURY	
3	Integrated Gas sample	☒As per EPA M-3 ☐As per EPA M-10 ☐Other	
—	Oxides of Nitrogen (NO_x)	☐As per EPA M-7A ☐Other	Date Time(HRS)
—	☐ Fuel Sample ☐ Aggregate	☐Attached fuel Form #S-0163RRR	
—	Particle Size	☐X-Ray Sedigraph ☐Bahco Method ☐Other	
—	Audit Samples ☐Sulfur Dioxide ☐Oxides of Nit. ☐Other	☐As per EPA M-6 ☐As per EPA M-7A ☐Other	

Source Information

1) Type of Source: ● Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer ☐ Other
2) Fuel: ● Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other
3) Is sample combustible? ● No ☐ Yes
4) Does sample need special handling? ● No ☐ Yes If yes, explain

S-278RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job N.S.P. SHERCO
Team Leader DK
Date Submitted 9/11/91
Test No. 2

Source Unit #3
Test Site Stack
Date of Test 9/11/91
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3	Probe Wash: ☐Acetone ☐D.I. Water	☐As per EPA M-5 ☒Other Hg	
	Filter: ☐4" G.F. ☐S.S. Thimble ☐2.5" G.F. ☐47 mm G.F.	☐As per EPA M-5 ☐As per EPA M-17 ☐Other	
3	Impinger Catch: ☐D.I. Water ☐3% H_2O_2 ☐4M5 Hg Only ☒4M5 Metals ☐1.0 N NaOH ☐Other	☐MN Protocol ☐WI Protocol ☐EPA M-6 or 8 ☐Acid Gases ☐Formaldehyde ☐Metals ☒Other Hg 101a	
3	Integrated Gas sample	☒As per EPA M-3 ☐As per EPA M-10 ☐Other	
	Oxides of Nitrogen (NO_x)	☐As per EPA M-7A ☐Other	Date Time(HRS)
32	☒Fuel Sample ☐Aggregate	☐Attached fuel Form #S-0163RRR	Mercury ASTM D 3684
	Particle Size	☐X-Ray Sedigraph ☐Bahco Method ☐Other	As per proposal
	Audit Samples ☐Sulfur Dioxide ☐Oxides of Nit. ☐Other	☐As per EPA M-6 ☐As per EPA M-7A ☐Other	

Source Information

1) Type of Source: ☒ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer ☐ Other
2) Fuel: ☒ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other
3) Is sample combustible? ☒ No ☐ Yes
4) Does sample need special handling? ☒ No ☐ Yes If yes, explain

S-278RRRR

APPENDIX E

UNITS 1,2 & 3 TREND LOGS

[redacted]

TREND LOG 33 CAT SCRUBBER TEST SPECIAL LOG

COL	POINT		COL	POINT	
1	GE704	SHERCO UNIT 1 MW	15	BA707	STACK OPACITY
2	BP704	FRONT DRUM P	16	ZP701	BAROMETRIC PRESS
3	BT892	ECON OUT TEMP	17	BF708	TOTAL AIR FLOW
4	BP703	AP GAS OUT P	18	BP702	FLU GAS TO ID FAN P
5	BT889	FLU GAS TO STACK T	19	MC346	THROTTLE STEAM
6	SF702	MAIN STEAM FLOW	20	MC307	TURB THR PRESS AVG N
7	BA702	SO2 GAS TO SCRB EAST	21	XXXXX	
8	BA704	SO2 STACK EMISS EAST	22	XXXXX	
9	BA703	SO2 GAS TO SCRB WEST	23	XXXXX	
10	BA705	SO2 STACK EMISS WEST	24	XXXXX	
11	FC340	TOTAL COAL FLOW	25	XXXXX	
12	BA706	FLU GAS 02 0/0	26	XXXXX	
13	BC302	SPARE C.V.	27	XXXXX	
14	SC302	NO MODULES IN SERVCE	28	XXXXX	

INSTRUCTIONS: TO CHANGE ASSIGNMENT, ENTER (OR BLANK OUT) POINT NO ON COLUMN DESIRED, AND PRESS GO

0709 STOP TREND LOG LOG 33 FREQ 1000

0710.30 10/SE/91 SHERCO UNIT #1 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG

	GE704	BP704	SC715	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	BC302	SC302	BA707	ZP701	BF708	BP702	MC346	MC307				
0710.30	635.1	2510	643.6	-19.12	183.4	4209	398.4	91.6	426.7	68.1	363	3.49
	*******	10	37.4	29.15	5249	-38.98	985.1	2287				

0710 START TREND LOG 33 FREQ 500

0715.30 10/SE/91 SHERCO UNIT #1 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG

	GE704	BP704	SC715	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	BC302	SC302	BA707	ZP701	BF708	BP702	MC346	MC307				
0715.30	649.7	2566	645.1	-19.13	180.9	4312	398.1	91.6	436.6	72.3	368	3.83
	*******	10	38.2	29.15	5272	-38.75	974.9	2348				
0720.30	655.2	2567	641.6	-20.14	181.8	4359	401.0	93.6	458.1	74.5	376	3.40
	*******	10	38.2	29.15	5310	-40.11	969.1	2347				
0725.30	661.0	2562	643.7	-20.30	183.3	4376	399.3	91.6	435.1	71.6	373	3.18
	*******	10	37.8	29.15	5403	-40.68	979.3	2358				
0730.30	668.7	2607	644.4	-21.19	183.3	4417	418.6	94.8	446.6	74.3	385	3.40
	*******	10	36.8	29.16	5518	-42.33	982.7	2383				
0735.30	675.9	2639	645.8	-20.92	182.8	4471	418.7	94.9	446.6	74.3	374	3.37
	*******	10	38.0	29.15	5419	-41.95	979.3	2413				
0740.30	679.8	2622	645.2	-21.74	183.2	4508	392.8	92.9	437.8	70.8	391	3.34
	*******	10	39.5	29.16	5556	-43.38	973.7	2393				
0745.30	683.9	2657	649.2	-21.36	183.3	4513	422.7	96.3	453.6	72.7	371	3.19
	*******	10	38.5	29.15	5510	-42.40	978.3	2425				
0750.30	681.0	2659	646.2	-21.32	183.6	4505	422.6	96.2	453.6	72.8	379	3.47
	*******	10	37.6	29.15	5465	-42.56	966.9	2433				
0755.30	684.7	2635	645.7	-21.98	183.2	4535	401.8	96.0	432.8	75.3	389	3.34
	*******	10	37.6	29.15	5512	-43.79	968.2	2402				
0800.30	689.8	2657	645.6	-22.37	183.3	4543	421.8	100.5	455.9	81.0	374	3.27
	*******	10	38.5	29.16	5557	-44.15L	975.3	2424				
0805.30	686.9	2667	643.6	-21.19	183.1	4519	430.7	98.8	449.1	79.2	380	3.43
	*******	10	38.4	29.15	5444	-42.36	969.9	2441				

0820.30	691.0	2666	644.5	-21.65	183.4	4546	417.6	91.4	507.2	72.4	382	3.37
	*******	10	37.5	29.16	5537	-43.40	966.0	2436				
0825.30	691.7	2677	645.5	-20.90	183.3	4542	390.6	90.3	432.8	70.5	372	3.31
	*******	10	37.3	29.16	5465	-42.21	959.1	2448				
0830.30	689.7	2660	644.1	-21.34	183.3	4550	390.4	90.2	432.6	70.5	384	3.37
	*******	10	35.7	29.16	5455	-42.96	954.2	2431				
0835.30	10/SE/91 SHERCO UNIT #1 TREND LOG # 33					CAT SCRUBBER TEST		SPECIAL LOG				
	GE704	BP704	SC715	BP703	B1889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	BC302	SC302	BA707	ZP701	BF708	BP702	MC346	MC307				
0835.30	692.8	2662	646.9	-22.05	183.1	4555	405.3	95.3	443.8	73.6	381	3.14
	*******	10	36.0	29.17	5543	-44.06L	962.3	2426				
0840.30	689.6	2676	647.0	-21.36	183.3	4531	386.9	100.9	417.8	77.7	378	3.26
	*******	10	36.1	29.16	5497	-42.97	964.5	2449				
0845.30	690.8	2665	646.4	-21.42	183.0	4551	377.6	100.7	419.9	77.7	380	3.28
	*******	10	36.5	29.16	5490	-43.02	964.1	2434				
0850.30	691.6	2677	647.9	-21.85	183.3	4548	374.3	105.7	430.8	82.5	378	3.36
	*******	10	36.1	29.18	5529	-43.71	963.6	2448				
0855.30	691.2	2669	647.8	-21.77	183.0	4552	374.4	105.8	430.9	82.5	380	3.28
	*******	10	36.1	29.18	5517	-43.52	963.9	2438				
0900.30	693.1	2680	648.4	-21.67	182.9	4554	354.9	107.3	399.5	63.6	371	3.22
	*******	10	35.6	29.18	5529	-43.44	965.2	2448				
0905.30	688.7	2686	647.9	-21.23	182.9	4529	355.7	105.6	396.2	86.8	375	3.31
	*******	10	36.0	29.17	5476	-42.56	960.8	2459				
0910.30	689.0	2667	647.7	-22.31	183.1	4536	358.3	103.6	390.3	84.1	379	3.26
	*******	10	35.7	29.18	5522	-44.30L	960.5	2436				
0915.30	691.9	2691	650.1	-22.04	182.9	4556	352.8	105.8	388.2	81.6	376	3.26
	*******	10	35.7	29.17	5544	-43.92L	961.5	2448				
0920.30	689.5	2679	650.1	-21.84	183.4	4532	352.5	105.7	388.2	81.6	377	3.30
	*******	10	35.8	29.18	5548	-43.77L	965.6	2449				
0925.30	690.3	2680	650.1	-21.70	183.2	4539	351.6	104.5	377.3	80.9	375	3.30
	*******	10	35.6	29.18	5524	-43.50	963.6	2451				
0930.30	690.1	2669	650.2	-22.12	183.4	4544	335.7	103.7	364.2	80.8	385	3.45
	*******	10	35.5	29.18	5608	-44.15L	962.3	2439				
0935.30	695.6	2679	652.4	-22.17	183.4	4574	327.2	103.8	362.9	80.8	379	3.30
	*******	10	36.0	29.18	5594	-44.33L	966.9	2446				
0940.30	690.3	2664	651.0	-22.27	183.6	4551	322.6	105.6	360.2	82.8	389	3.48
	*******	10	36.0	29.18	5548	-44.50L	963.7	2434				
0945.30	694.0	2662	652.1	-23.09	183.4	4560	322.7	105.7	360.2	82.8	388	3.34
	*******	10	36.1	29.18	5559	-45.90L	968.8	2425				
0950.30	688.3	2657	648.9	-23.36	183.7	4540	363.7	113.3	388.9	90.0	397	3.62
	*******	10	35.5	29.18	5593	-44.81L	971.1	2428				
0955.30	10/SE/91 SHERCO UNIT #1 TREND LOG # 33					CAT SCRUBBER TEST		SPECIAL LOG				
	GE704	BP704	SC715	BP703	B1889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	BC302	SC302	BA707	ZP701	BF708	BP702	MC346	MC307				
0955.30	694.2	2647	649.4	-23.21	183.4	4556	342.6	100.9	366.6	86.6	404	3.24
	*******	10	35.5	29.18	5624	-46.37L	980.2	2404				
1000.30	698.3	2752	650.4	-20.71	183.8	4554	342.6	100.9	366.8	86.6	343	3.14
	*******	10	35.8	29.19	5336	-41.41	987.6	2527				
1005.30	685.5	2701	640.5	-21.00	183.7	4525	348.6	106.0	391.3	90.0	382	3.51
	*******	10	36.5	29.19	5379	-42.30	952.8	2485				
1010.30	674.4	2631	645.0	-22.29	183.3	4409	342.6	107.0	394.9	86.1	398	3.11
	*******	10	35.9	29.19	5539	-44.64L	973.8	2399				
1015.30	698.0	2663	648.4	-20.98	183.1	4598	350.0	107.2	396.0	86.1	371	3.24
	*******	10	35.4	29.19	5446	-42.62	988.2	2418				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	*******	10	35.0	29.19	5458	-43.43	973.3	2427				

	*******	10	34.7	29.19	5495	-43.99L	1966.9	2427						
1030.30	683.0	2652	647.8	-20.71	183.3	4499	345.8	108.8	386.3	92.7	378	3.26		
	*******	10	35.7	29.19	5422	-42.00	968.4	2422						
1035.30	693.4	2672	649.0	-21.56	183.1	4571	343.9	107.9	394.3	90.6	370	3.22		
	*******	10	35.4	29.19	5433	-42.90	973.8	2437						
1040.30	688.6	2658	648.4	-22.31	183.3	4532	343.8	107.8	394.2	90.5	377	3.37		
	*******	10	35.1	29.19	5440	-44.25L	970.6	2426						
1045.30	688.3	2662	649.8	-21.57	183.1	4527	332.7	104.5	384.4	86.3	379	3.27		
	*******	10	35.8	29.19	5480	-43.39	973.5	2431						
1050.30	689.3	2660	649.4	-21.15	183.3	4543	347.9	105.4	379.9	85.4	380	3.28		
	*******	10	35.7	29.20	5377	-42.48	972.9	2427						
1055.30	689.1	2669	651.3	-21.84	183.1	4519	349.7	105.4	382.3	85.4	372	3.08		
	*******	10	35.7	29.20	5377	-43.46	975.2	2437						
1100.30	689.8	2662	648.9	-22.29	183.3	4547	343.8	105.6	380.4	90.4	379	3.28		
	*******	10	35.8	29.19	5474	-44.20L	971.1	2431						
1105.30	688.0	2662	651.3	-22.08	183.2	4522	344.1	105.7	380.4	90.4	379	3.17		
	*******	10	36.5	29.20	5494	-44.06L	973.1	2430						
1110.30	687.4	2662	651.0	-21.13	183.4	4521	353.3	108.5	397.4	96.5	381	3.25		
	*******	10	35.6	29.20	5390	-42.69	973.2	2432						
1115.30	10/SE/91 SHERCO UNIT #1 TREND LOG # 33				CAT SCRUBBER TEST				SPECIAL LOG					
	GE704	BP704	SC715	BP703	BT809	SF702	BA702	BA704	BA703	BA705	FC340	BA706		
	BC302	SC302	BA707	ZP701	BF708	BP702	MC346	MC307						
1115.30	688.3	2665	651.4	-21.64	183.3	4527	363.5	109.8	406.6	92.0	378	3.25		
	*******	10	35.5	29.20	5415	-43.27	972.9	2432						
1120.30	687.7	2657	650.8	-21.93	183.6	4524	363.3	109.8	406.6	92.0	382	3.23		
	*******	10	36.0	29.20	5452	-43.95	970.0	2424						

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TIME 11:28:00    DATE 23/AU/91

ERROR NUMBER= 304; "SET TIME
REGISTER CONTENTS
L=718B T=50A0 X=0008 B=744A E=0003 A=0000
1125.30 10/SE/91 SHERCO UNIT #1 TREND LOG # 33     CAT SCRUBBER TEST  SPECIAL LOG
            GE704    BP704    SC715    BP703    BT889    SF702    BA702    BA704    BA703    BA705    FC340    BA706
         BC302    SC302    BA707    ZP701    BF708    BP702    MC346    MC307
1125.30     686.5     2663    652.1   -22.21    183.4     4610    356.3    112.6    405.3     96.3      377     3.13
        *******       10     35.4     29.20     5463   -44.43L    972.2     2430
1130.30     690.6     2663    651.2   -21.75    183.6     4546    367.6    108.8    412.0     88.2      381     3.28
        *******       10     35.6     29.20     5404   -43.63     969.4     2429
1135.30     688.4     2664    652.8   -21.73    183.3     4513    385.1    108.9    414.3     88.1      376     3.10
        *******       10     35.8     29.20     5387   -43.34     968.3     2432
1140.30     695.4     2667    650.6   -22.10    183.4     4584    373.6    123.8    424.2    103.9      379     3.32
        *******       10     33.9     29.20     5457   -43.99L    964.0     2433
1145.30     682.6     2655    652.6   -21.86    183.0     4477    373.7    123.8    424.2    103.8      384     3.25
        *******       10     34.8     29.20     5453   -43.99     963.1     2425
1150.30     692.6     2669    652.6   -21.35    183.4     4561    384.8    118.1    437.8     98.6      382     3.19
        *******       10     34.5     29.20     5422   -43.13     966.8     2437
1155.30     683.2     2657    652.1   -22.00    183.0     4482    372.8    123.3    414.7    105.6      388     3.21
        *******       10     34.4     29.20     5432   -43.76     963.3     2425
1200.30     692.4     2670    652.5   -21.78    183.3     4559    372.6    123.3    414.8    105.6      384     3.24
        *******       10     34.2     29.20     5454   -43.82     966.2     2436
1205.30     686.1     2660    652.4   -21.38    182.9     4506    394.4    124.7    421.2    102.8      385     3.08
        *******       10     35.3     29.19     5375   -42.97     961.4     2429
1210.30     692.1     2668    652.2   -22.49    183.1     4567    386.0    124.6    436.3    107.0      381     3.21
        *******       10     34.6     29.19     5443   -44.57L    958.3     2434
1215.30     680.1     2653    652.9   -21.69    183.0     4463    386.9    124.8    431.9    107.0      393     3.28
        *******       10     34.7     29.19     5432   -43.78     957.6     2424
1220.30     686.4     2655    652.1   -21.64    183.2     4539    401.3    122.2    430.9    107.7      394     3.34
        *******       10     35.8     29.19     5404   -43.35     957.1     2423
1225.30     691.5     2674    654.6   -22.29    183.4     4549    401.5    122.3    430.8    108.3      383     3.07
        *******       10     35.9     29.19     6388   -44.79L    962.4     2441
1230.30     680.5     2648    648.0   -22.34    183.6     4466    394.8    124.1    449.1    111.0      399     3.36
        *******       10     36.1     29.19     5470   -44.71L    961.0     2421
1235.30     700.4     2680    653.0   -22.01    183.4     4606    393.6    126.3    448.7    108.9      378     3.12
        *******       10     36.0     29.19     5435   -44.17L    968.7     2441
1240.30     686.9     2657    647.5   -22.31    183.3     4505    393.3    126.2    448.8    108.9      387     3.18
        *******       10     36.2     29.19     5477   -44.60L    958.4     2424
1245.30 10/SE/91 SHERCO UNIT #1 TREND LOG # 33     CAT SCRUBBER TEST  SPECIAL LOG
            GE704    BP704    SC715    BP703    BT889    SF702    BA702    BA704    BA703    BA705    FC340    BA706
         BC302    SC302    BA707    ZP701    BF708    BP702    MC346    MC307
1245.30     690.4     2669    650.8   -21.57    182.9     4550    379.2    122.5    422.8    106.1      384     3.25
        *******       10     36.9     29.19     5419   -43.48     968.1     2435
1250.30     683.4     2654    649.9   -21.87    183.3     4489    392.8    126.1    424.3    103.9      391     3.30
        *******       10     36.3     29.18     5465   -43.86     956.6     2422
1255.30     687.6     2664    652.2   -21.89    183.2     4535    387.3    126.2    419.8    103.9      389     3.32
        *******       10     35.1     29.18     5445   -43.86     969.7     2431
1300.30     692.3     2669    651.9   -21.77    183.4     4562    402.5    130.9    461.4    113.1      382     3.15
        *******       10     35.1     29.18     5418   -43.54     960.4     2436
1305.30     682.4     2652    650.9   -21.97    183.2     4490    402.6    131.1    461.4    113.0      390     3.26
        *******       10     35.2     29.18     5457   -44.09L    956.5     2421
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[redacted]

	*******	10	34.5	29.18	5433	-44.09L	959.0	2426					
1320.30	687.3	2667	654.3	-22.18	183.4	4517	388.3	125.1	427.1	108.1	386	3.31	
	*******	10	34.6	29.16	5434	-44.53L	963.2	2434					
1325.30	682.0	2652	650.7	-21.99	183.4	4485	419.6	133.3	448.7	118.0	391	3.29	
	*******	10	34.6	29.18	5439	-43.95L	955.9	2420					
1330.30	688.2	2670	654.4	-21.86	183.7	4534	390.4	126.8	435.9	111.6	387	3.36	
	*******	10	34.7	29.16	5446	-43.68	960.8	2436					
1335.30	679.7	2652	653.2	-21.97	183.2	4463	399.3	126.8	433.0	111.6	393	3.22	
	*******	10	35.8	29.16	5410	-44.13L	959.1	2423					
1340.30	694.7	2674	655.2	-22.12	183.6	4586	435.0	142.0	504.6	124.1	381	3.26	
	*******	10	35.6	29.16	5431	-44.12L	965.1	2437					
1345.30	682.0	2655	654.6	-21.99	183.1	4475	435.1	142.3	504.6	116.8	390	3.25	
	*******	10	35.9	29.16	5425	-43.96L	960.4	2424					
1350.30	691.0	2668	654.9	-22.03	183.4	4560	401.3	133.0	455.4	112.3	386	3.27	
	*******	10	36.1	29.16	5435	-44.35L	962.4	2433					
1355.30	685.3	2663	655.2	-21.91	183.1	4501	422.3	133.7	466.5	110.8	384	3.12	
	*******	10	36.1	29.16	5415	-43.92L	961.0	2431					
1400.30	688.9	2667	654.6	-22.09	183.1	4539	421.9	133.6	466.5	110.8	387	3.23	
	*******	10	36.1	29.16	5435	-44.03L	960.8	2434					
1405.30 10/SE/91 SHERCO UNIT #1 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG													
	GE704	BP704	SC715	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706	
	BC302	SC302	BA707	ZP701	BF708	BP702	MC346	MC307					
1405.30	681.9	2655	655.4	-22.33	183.0	4482	405.3	134.3	453.5	115.9	392	3.22	
	*******	10	37.7	29.16	5422	-44.51L	961.4	2423					
1410.30	688.1	2666	656.3	-22.06	183.6	4538	414.5	130.2	444.6	112.3	387	3.26	
	*******	10	37.0	29.16	5396	-44.46L	967.0	2433					
1415.30	690.4	2671	657.7	-22.20	183.4	4538	420.9	130.3	447.3	112.3	381	3.08	
	*******	10	36.7	29.16	5421	-44.52L	969.6	2435					
1420.30	691.4	2663	655.7	-22.13	183.7	4561	424.1	136.1	477.5	121.7	386	3.26	
	*******	10	36.1	29.15	5430	-44.38L	963.6	2428					
1425.30	687.0	2663	657.3	-22.22	183.4	4517	424.3	136.2	477.6	117.2	383	3.24	
	*******	10	36.3	29.16	5428	-44.45L	964.2	2429					
1430.30	687.7	2668	656.3	-22.10	183.4	4530	400.3	132.7	455.6	114.6	382	3.17	
	*******	10	36.3	29.16	5410	-44.25L	962.6	2434					
1435.30	685.5	2656	656.4	-22.05	183.1	4513	421.2	139.2	473.8	120.3	386	3.26	
	*******	10	37.0	29.16	5410	-44.03L	962.6	2423					
1440.30	685.9	2663	658.2	-22.23	183.4	4512	421.0	138.2	473.7	120.3	386	3.28	
	*******	10	37.0	29.15	5467	-44.55L	966.8	2429					
1445.30	689.3	2670	658.1	-22.26	183.3	4532	407.3	133.6	450.0	117.2	384	3.22	
	*******	10	37.3	29.15	5418	-44.53L	966.3	2433					
1450.30	689.4	2666	657.3	-22.14	183.4	4539	444.5	138.3	476.2	118.8	383	3.17	
	*******	10	37.4	29.15	5387	-44.32L	962.4	2432					
1455.30	685.6	2657	654.9	-22.63	183.3	4506	434.2	138.4	476.5	118.8	386	3.23	
	*******	10	37.8	29.15	5445	-44.93L	964.0	2424					
1500.30	689.7	2668	654.6	-22.37	183.4	4533	415.3	132.3	448.8	116.7	383	3.20	
	*******	10	37.1	29.14	5442	-44.69L	963.8	2434					
1505.30	686.0	2657	651.4	-22.16	183.4	4502	415.5	132.3	448.8	112.7	388	3.15	
	*******	10	37.7	29.15	5437	-44.44L	960.9	2424					
1510.30	690.0	2667	652.9	-22.50	183.7	4519	413.9	135.2	456.8	109.9	383	3.18	
	*******	10	37.0	29.15	5435	-44.75L	965.2	2433					
1515.30	691.3	2668	650.2	-22.24	183.8	4537	416.5	132.4	438.5	115.9	383	3.06	
	*******	10	36.6	29.15	5478	-44.56L	959.9	2435					
1520.30	686.8	2655	649.6	-22.30	183.7	4503	416.4	132.3	438.5	115.9	390	3.15	
	*******	10	37.0	29.15	5472	-44.81L	965.6	2423					
1525.30 10/SE/91 SHERCO UNIT #1 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG													

1625.30	695.2	12678	649.1	-22.36	183.8	4562	446.3	133.9	470.3	119.2	379	3.14
	*******	10	39.0	29.15	5440	-45.04L	959.6	2439				
1630.30	686.7	2656	646.8	-22.53	184.1	4508	419.4	124.3	442.1	108.1	387	3.16
	*******	10	37.2	29.16	5476	-45.14L	951.1	2424				
1635.30	689.3	2663	646.0	-22.66	183.6	4524	422.4	124.4	438.1	108.2	384	3.23
	*******	10	37.6	29.15	5510	-45.40L	955.9	2430				
1640.30	689.5	2666	646.9	-22.54	183.9	4520	414.8	128.4	482.1	111.4	382	3.18
	*******	10	38.4	29.15	5461	-45.33L	952.6	2432				
1645.30	690.3	2666	647.4	-22.13	183.4	4532	414.8	128.5	482.1	105.6	383	3.23
	*******	10	38.0	29.15	5440	-44.87L	951.8	2432				
1650.30	685.4	2667	643.1	-22.59	183.9	4518	418.2	121.5	480.7	107.6	380	3.19
	*******	10	37.7	29.13	5493	-45.37L	952.9	2432				
1655.30	685.1	2663	640.1	-22.54	183.4	4522	397.5	123.5	422.4	112.2	384	3.31
	*******	10	39.2	29.15	5475	-45.51L	949.2	2429				
1600.30	693.0	2677	643.5	-21.92	183.3	4573	397.3	123.4	422.4	112.3	374	3.25
	*******	10	38.3	29.13	5425	-44.06L	954.8	2440				
1605.30	680.2	2653	643.8	-21.89	182.9	4466	390.5	117.8	435.1	102.6	384	3.27
	*******	10	38.3	29.15	5467	-44.30L	953.8	2421				
1610.30	687.8	2669	645.2	-21.44	183.2	4531	404.3	129.1	442.4	116.6	377	3.19
	*******	10	37.5	29.13	5447	-43.36	960.1	2435				
1615.30	687.1	2659	645.6	-22.06	183.1	4526	411.4	129.2	441.9	115.5	379	3.27
	*******	10	37.8	29.13	5472	-44.30L	956.3	2425				
1620.30	687.9	2662	646.5	-21.39	183.6	4522	413.9	123.1	456.3	103.7	379	3.16
	*******	10	37.5	29.13	5372	-43.35	962.2	2429				
1625.30	688.3	2668	646.9	-21.73	183.3	4526	414.1	123.2	456.3	104.3	378	3.28
	*******	10	37.5	29.13	5425	-43.79	960.4	2436				

TREND LOG 33 CAT SCRUBBER TEST SPUCIAL LOG

COL	POINT		COL	POINT	
1	GE704	SHERCO UNIT 2 MW	15	BA707	STACK OPACITY
2	BP704	FRONT DRUM P	16	ZP701	BAROMETRIC PRESS
3	BT892	ECON OUT TEMP	17	XXXXX	
4	BP703	AP GAS OUT P	18	BP702	FLU GAS TO ID FAN P
5	BT889	FLU GAS TO STACK T	19	XXXXX	
6	SF702	MAIN STEAM FLOW	20	XXXXX	
7	BA702	SO2 GAS TO SCRB EAST	21	XXXXX	
8	BA704	SO2 STACK EMISS EAST	22	XXXXX	
9	BA703	SO2 GAS TO SCRB WEST	23	XXXXX	
10	BA705	SO2 STACK EMISS WEST	24	XXXXX	
11	FC340	TOTAL COAL FLOW	25	XXXXX	
12	BA706	FLU GAS O2 O/O	26	XXXXX	
13	SC301	SCRUBBER AF RESERVE	27	XXXXX	
14	SC302	NO MODULES IN SERVCE	28	XXXXX	

INSTRUCTIONS: TO CHANGE ASSIGNMENT, ENTER (OR BLANK OUT) POINT NO ON COLUMN DESIRED, AND PRESS GO

0710.20 10/SE/91 SHERCO UNIT #2 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG

	GE704	BP704	BT892	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	SC301	SC302	BA707	ZP701	BP702							
0710.20	646.0	2604	647.6	-20.29	186.4	4218	373.9	71.3	423.6	89.6	350	3.23
	610H	10	37.6	29.13	-37.56							

0710 START TREND LOG 33 FREQ 600

0715.18 10/SE/91 SHERCO UNIT #2 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG

	GE704	BP704	BT892	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	SC301	SC302	BA707	ZP701	BP702							
0715.18	657.8	2624	648.7	-20.59	184.9	4330	373.9	71.3	423.6	89.6	364	3.27
	690H	10	38.4	29.14	-37.69							
0720.18	669.8	2622	650.4	-21.76	185.6	4422	380.3	67.6	421.6	88.1	393	3.28
	523	10	38.4	29.15	-38.72							
0725.18	686.4	2645	654.4	-23.58	184.3	4603	382.3	73.0	436.8	87.3	385	3.29
	302	10	38.0	29.14	-42.31							
0730.18	700.2	2663	655.8	-24.30L	184.9	4692	382.3	73.0	436.8	87.3	391	3.32
	296	10	37.0	29.14	-43.51							
0735.18	699.8	2669	656.3	-23.83L	184.4	4594	377.3	80.3	423.1	98.7	388	3.20
	326	10	38.2	29.14	-42.47							
0740.18	702.3	2667	657.2	-24.60L	186.2	4611	381.6	78.4	426.4	97.7	400	3.20
	275	10	39.6	29.14	-44.39L							
0745.18	704.5	2680	657.0	-25.21L	186.3	4605	381.9	75.2	416.4	92.3	385	3.25
	207	10	38.6	29.13	-45.44L							
0750.18	700.4	2683	656.4	-24.30L	185.2	4590	376.8	73.2	426.1	87.3	385	3.19
	314	10	37.7	29.13	-43.86							
0755.18	699.8	2676	655.1	-24.59L	185.9	4585	376.7	73.2	426.0	87.4	392	3.21
	300	10	37.8	29.13	-44.42L							
0800.18	701.8	2680	656.8	-24.62L	185.4	4696	379.3	76.3	418.2	90.5	390	3.33
	309	10	38.6	29.13	-44.74L							
0805.18	700.4	2676	657.3	-24.38L	185.1	4578	378.4	86.1	420.3	100.4	365	3.18
	308	10	38.6	29.13	-43.69							

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        302        10     38.0     29.15              -45.00L
0820.18     695.8     2668     654.3    -24.35L   185.0        4556    379.2    72.3    418.6    95.1    387    3.20
        360        10     37.7     29.15               -43.60
0825.18     694.1     2682     655.9    -23.98L   185.3        4565    382.4    74.5    427.5    96.4    386    3.32
        341        10     37.5     29.15               -43.58
0830.18     698.9     2676     655.2    -23.96L   185.4        4575    379.8    77.0    421.8    96.5    386    3.17
        353        10     35.9     29.16               -43.75
                                                    CAT SCRUBBER TEST  SPECIAL LOG
0835.18 10/SE/91 SHERCO UNIT #2 TREND LOG # 33    BT889    SF702    BA702    BA704    BA703    BA705    FC340    BA706
           GE704      BP704     BT892     BP703              BP702
        SC301      SC302     BA707     ZP701
0835.18     696.0     2677     656.3    -23.81    185.3        4557    379.9    77.0    421.9    96.5    386    3.33
        354        10     36.1     29.15               -42.75
0840.18     695.5     2679     656.1    -23.98    184.4        4567    386.9    79.8    416.9    107.4    386    3.29
        379        10     36.2     29.07               -42.74
0845.18     695.3     2672     655.9    -23.63    185.1        4559    366.0    88.9    414.3    102.7    385    3.21
        411        10     36.6     29.15               -42.00
0850.18     694.7     2679     657.6    -23.67    184.6        4561    366.0    88.9    414.3    102.8    388    3.18
        397        10     36.3     29.16               -42.29
0855.18     696.6     2681     656.9    -23.90    185.3        4567    366.9    84.2    394.3    103.4    388    3.23
        381        10     36.2     29.16               -42.75
0900.18     695.2     2671     657.1    -23.70    184.2        4563    364.7    83.7    394.4    105.4    387    3.21
        359        10     35.8     29.16               -42.59
0905.18     696.2     2683     659.1    -23.80L   185.4        4564    362.1    84.8    384.7    105.2    376    3.24
        374        10     36.2     29.16               -42.24
0910.18     694.2     2675     656.9    -23.75    184.9        4554    353.4    81.3    394.4    103.8    389    3.19
        390        10     35.8     29.16               -42.72
0915.18     691.5     2682     659.4    -23.97L   184.6        4570    353.4    81.3    394.3    103.8    380    3.24
        354        10     35.9     29.16               -43.51
0920.18     692.0     2668     657.9    -24.01L   185.2        4543    354.4    80.5    382.3    96.1    387    3.22
        390        10     36.0     29.16               -42.70
0925.18     696.6     2681     659.7    -23.94L   185.7        4572    339.0    80.8    381.5    102.7    385    3.27
        370        10     35.8     29.16               -43.27
0930.18     696.8     2674     658.8    -24.06L   185.1        4562    339.0    80.8    381.5    102.7    387    3.16
        356        10     35.6     29.16               -43.54
0935.18     696.6     2677     659.5    -24.22L   185.4        4563    349.3    82.6    377.6    94.5    383    3.21
        375        10     36.2     29.16               -42.89
0940.18     691.7     2684     660.1    -24.29L   185.4        4578    350.8    82.6    376.9    100.0    383    3.24
        368        10     36.2     29.16               -43.16
0945.18     694.9     2670     659.0    -24.28L   185.3        4557    350.5    83.3    380.7    101.4    390    3.19
        378        10     36.3     29.16               -43.17
0950.18     696.0     2684     660.5    -24.26L   184.6        4578    346.4    81.6    385.9    99.6    383    3.38
        338        10     35.7     29.16               -43.27
                                                    CAT SCRUBBER TEST  SPECIAL LOG
0955.18 10/SE/91 SHERCO UNIT #2 TREND LOG # 33    BT689    SF702    BA702    BA704    BA703    BA705    FC340    BA706
           GE704      BP704     BT892     BP703              BP702
        SC301      SC302     BA707     ZP701
0955.18     695.6     2677     659.6    -24.41L   185.1        4561    346.3    81.6    385.8    99.6    379    3.06
        375        10     35.6     29.16               -43.30
1000.18     695.4     2679     660.8    -23.96L   185.2        4572    348.1    85.8    379.9    106.8    389    3.25
        379        10     36.0     29.16               -42.12
1005.18     695.9     2674     661.0    -24.68L   184.6        4567    366.6    93.3    401.8    108.5    387    3.22
[redacted]
1010.18     695.7     2673     661.2
                   10     36.0     29.16               -43.62
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Time	GE704 / SC301	BP704 / SC302	BT892 / BA707	BP703 / ZP701	BT889 / BP702	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	346	10	34.9	29.18	-43.84L							
1030.18	696.5	2678	662.1	-24.66L	185.6	4567	364.9	94.3	403.4	108.6	383	3.17
	359	10	35.8	29.18	-44.06L							
1035.18	698.0	2677	662.4	-24.29L	185.0	4590	364.9	94.3	403.4	108.6	365	3.26
	381	10	35.6	29.18	-43.08							
1040.18	696.2	2678	663.6	-24.82L	185.6	4559	356.8	95.6	401.8	111.0	385	3.19
	359	10	35.3	29.18	-43.73							
1045.18	697.1	2675	662.5	-24.54L	185.3	4574	370.6	97.3	413.8	109.6	389	3.24
	354	10	36.0	29.18	-43.32							
1050.18	697.4	2675	664.0	-24.79L	184.7	4573	370.6	97.3	413.9	109.7	384	3.28
	327	10	35.9	29.18	-43.77							
1055.18	697.8	2680	664.0	-24.76L	186.8	4563	369.7	103.5	407.4	114.3	383	3.20
	350	10	35.8	29.18	-43.70							
1100.18	697.8	2663	663.4	-24.54L	184.7	4560	384.7	99.2	414.7	108.3	385	3.20
	366	10	36.0	29.18	-43.42							
1105.18	698.3	2675	661.6	-24.92L	185.5	4666	388.0	102.5	410.1	108.4	386	3.26
	347	10	36.6	29.18	-44.42L							
1110.18	698.8	2676	660.3	-24.47L	185.4	4573	387.9	99.6	419.8	113.6	383	3.25
	372	10	35.8	29.18	-44.14L							

1115.18 10/SE/91 SHERCO UNIT #2 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG

	GE704	BP704	BT892	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	SC301	SC302	BA707	ZP701	BP702							
1115.18	697.0	2676	657.1	-24.69L	185.5	4573	387.9	99.8	419.8	113.7	385	3.19
	392	10	35.7	29.18	-44.05L							
1120.18	697.2	2683	657.1	-24.75L	185.0	4573	390.1	99.1	429.9	108.0	383	3.24
	390	10	36.2	29.18	-43.50							
1125.18	705.5	2698	658.2	-25.33L	185.8	4622	396.8	96.8	426.6	110.9	389	3.26
	302	10	35.6	29.18	-45.19L							
1130.18	701.1	2680	656.4	-24.82L	184.6	4602	396.6	96.5	425.6	111.0	393	3.16
	346	10	35.8	29.18	-44.57L							
1135.18	703.9	2689	658.6	-25.01L	186.8	4609	390.6	95.0	432.0	111.0	389	3.29
	306	10	36.0	29.18	-44.91L							
1140.18	700.8	2682	657.6	-21.39L	185.2	4598	400.1	104.5	430.1	115.7	396	3.19
	423	10	34.1	29.18	-44.78L							
1145.18	701.1	2686	658.1	-24.74L	186.1	4580	399.3	102.3	431.1	114.0	391	3.29
	335	10	34.9	29.18	-45.58L							
1150.18	698.4	2682	657.8	-24.04L	185.1	4574	398.4	100.7	436.1	114.1	393	3.20
	432	10	34.6	29.18	-44.25L							
1155.18	699.3	2687	657.9	-24.64L	185.7	4576	398.4	100.7	436.1	114.2	392	3.27
	351	10	34.5	29.18	-44.76L							
1200.18	696.5	2684	657.1	-24.27L	185.4	4561	414.8	104.3	443.8	119.2	391	3.18
	411	10	34.4	29.18	-43.82L							
1205.18	699.4	2688	657.6	-24.06L	185.4	4585	404.9	113.4	443.8	126.3	387	3.19
	431	10	35.4	29.18	-43.34							
1210.18	695.0	2677	657.6	-24.43L	184.7	4557	404.9	113.4	443.9	126.3	394	3.20
	355	10	34.6	29.18	-44.49L							
1215.18	693.8	2681	658.8	-24.23L	185.8	4549	420.6	105.8	437.1	122.4	390	3.22
	409	10	34.9	29.18	-43.92L							
1220.18	695.8	2677	657.9	-24.11L	184.8	4559	422.8	114.4	455.8	129.6	395	3.20
	419	10	36.0	29.18	-42.97							
1225.18	696.4	2695	659.9	-24.37L	186.4	4577	417.4	113.3	448.5	127.2	388	3.19
	360	10	36.1	29.18	-44.10L							
1230.18	697.7	2681	658.1	-24.36L	186.6	4573	419.7	117.7	449.9	131.8	391	3.14
	382	10	36.2	29.17	-43.63							

1235.18 10/SE/91 SHERCO UNIT #2 TREND LOG # 33 CAT SCRUBBER TEST SPECIAL LOG

	332	10	36.0	29.18	-43.49								
1240.18	695.8	2682	660.2	-24.34L	185.0	4561	414.9	114.8	462.5	129.3	395	3.22	
	407	10	36.2	29.17	-43.27								
1245.18	695.9	2689	659.7	-25.10L	185.7	4566	464.4	117.5	460.4	131.3	386	3.18	
	362	10	37.1	29.17	-44.18L								
1250.18	696.3	2687	656.8	-24.81L	185.1	4561	454.4	117.5	460.4	131.3	389	3.19	
	388	10	36.5	29.16	-44.12L								
1255.18	698.0	2684	656.8	-24.49L	185.4	4567	449.4	117.7	464.6	134.1	387	3.12	
	399	10	36.2	29.16	-45.00L								
1300.18	697.3	2683	657.2	-24.86L	185.3	4563	441.1	120.5	502.8	139.7	388	3.26	
	380	10	36.2	29.16	-45.47L								
1305.18	696.4	2682	655.2	-24.07L	186.3	4567	437.6	116.0	507.5	132.0	392	3.21	
	402	10	35.5	29.16	-43.92L								
1310.18	696.5	2683	655.4	-23.89L	186.7	4560	449.6	110.3	478.2	126.3	388	3.22	
	390	10	35.1	29.16	-44.20L								
1315.18	696.4	2686	654.9	-23.66	186.0	4569	449.6	110.3	478.2	128.3	384	3.25	
	439	10	34.6	29.16	-43.49								
1320.18	694.8	2682	654.9	-23.66	185.0	4557	450.9	119.1	479.6	136.8	388	3.19	
	447	10	34.8	29.15	-43.27								
1325.18	691.9	2673	654.9	-23.77	186.3	4541	440.2	113.6	470.7	127.7	394	3.25	
	422	10	34.7	29.15	-43.39								
1330.18	697.5	2688	656.3	-23.61	185.6	4570	440.3	113.6	470.7	127.6	390	3.27	
	428	10	34.8	29.15	-43.08								
1335.18	692.3	2676	655.2	-23.93	184.7	4543	433.9	120.4	484.4	128.2	392	3.14	
	407	10	36.0	29.15	-42.79								
1340.18	696.4	2687	656.7	-23.68	185.6	4575	451.3	126.8	492.9	136.4	389	3.27	
	441	10	35.9	29.14	-42.43								
1345.18	692.8	2682	656.4	-23.88	185.3	4562	447.9	122.2	490.3	137.8	384	3.12	
	371	10	36.3	29.16	-43.21								
1350.18	696.9	2688	656.9	-23.88	184.8	4577	440.4	123.6	489.1	131.6	387	3.26	
	413	10	36.1	29.15	-42.67								
1355.18	10/SE/91 SHERCO UNIT #2 TREND LOG # 33				CAT SCRUBBER TEST SPECIAL LOG								
	GE704	BP704	BT892	BP703	BT889	SP702	BA702	BA704	BA703	BA705	FC340	BA706	
	SC301	SC302	BA707	ZP701	BP702								
	692.8	2681	657.6	-23.70L	184.7	4552	440.2	123.6	489.1	131.7	387	3.16	
	417	10	36.3	29.15	-42.82								
1400.18	695.3	2681	657.4	-23.53	186.6	4569	442.7	118.2	477.7	131.7	393	3.22	
	464	10	36.3	29.15	-42.81								
1405.18	693.9	2676	658.1	-23.72L	184.6	4550	453.6	129.1	938.1	140.1	395	3.23	
	439	10	37.9	29.13	-42.50								
1410.18	695.4	2689	658.9	-24.15L	185.3	4569	453.7	129.1	938.0	140.0	383	3.23	
	425	10	37.2	29.15	-43.54								
1415.18	694.4	2677	657.7	-23.97L	184.8	4553	456.3	120.6	960.3	133.2	392	3.22	
	410	10	36.8	29.14	-43.18								
1420.18	696.1	2685	659.8	-24.18L	185.7	4564	456.2	124.7	485.4	138.8	384	3.23	
	401	10	36.3	29.13	-43.54								
1425.18	694.7	2679	658.1	-24.09L	185.3	4560	447.1	122.4	477.7	136.6	389	3.20	
	436	10	36.4	29.15	-43.46								
1430.18	695.4	2685	660.6	-24.15L	185.3	4566	464.8	123.8	498.2	142.0	385	3.27	
	420	10	36.4	29.14	-43.51								
1435.18	695.3	2676	658.6	-24.32L	186.6	4556	464.7	123.8	498.2	142.0	390	3.19	
	419	10	37.2	29.15	-43.04								
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
	386	10	37.1	29.14	-43.55								
1445.18	696.1	2685	660.6	-24.35L	184.7	4566	459.1	128.4	484.4	142.3	387	3.18	

[redacted]												
1500.18	696.3	2676	660.6	-24.34L	184.6	4567	442.9	120.9	471.9	136.9	390	3.19
	424	10	37.2	29.13	-43.24							
1505.18	695.2	2681	662.3	-24.59L	185.0	4554	449.4	124.5	472.5	135.1	387	3.25
	386	10	37.9	29.12	-43.46							
1510.18	696.1	2680	661.5	-24.29L	185.6	4564	427.7	120.6	474.3	133.2	394	3.22
	421	10	37.0	29.13	-43.54							
1515.18	10/SE/91 SHERCO UNIT #2 TREND LOG # 33				CAT SCRUBBER TEST SPECIAL LOG							
	GE704	BP704	BT892	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	SC301	SC302	BA707	ZP701	BP702							
1515.18	696.6	2683	662.1	-24.87L	185.6	4566	427.6	120.5	474.3	133.3	391	3.31
	385	10	36.7	29.13	-44.18L							
1520.18	695.8	2661	662.3	-24.60L	184.8	4562	429.5	112.9	470.1	129.3	393	3.21
	403	10	37.1	29.13	-43.29							
1525.18	695.0	2682	662.4	-24.88L	185.6	4562	425.6	118.4	470.1	137.5	399	3.21
	413	10	38.6	29.13	-44.27L							
1530.18	696.0	2690	655.6	-23.77L	185.6	4579	425.6	118.4	470.1	137.5	392	3.23
	336	10	37.6	29.13	-44.77L							
1535.18	674.5	2642	652.8	-23.19	185.9	4452	432.6	107.8	458.1	125.1	391	3.12
	541	10	37.7	29.13	-42.41							
1540.18	678.1	2669	653.9	-23.05	184.4	4463	418.6	109.2	456.3	123.7	366	3.34
	523	10	38.5	29.13	-40.81							
1545.18	677.3	2666	653.3	-22.47	185.3	4461	417.3	109.3	450.3	126.4	374	3.16
	611H	10	38.2	29.13	-39.97							
1550.18	675.9	2662	654.6	-22.49	183.4	4458	431.9	108.8	455.4	122.6	376	3.34
	525	10	37.8	29.12	-40.14							
1555.18	670.3	2669	654.9	-23.29	183.9	4420	431.9	108.8	455.4	122.6	381	3.22
	578H	10	39.5	29.12	-41.18							
1600.18	672.6	2673	657.1	-23.18	184.6	4466	421.8	116.7	502.8	125.1	374	3.29
	587	10	38.5	29.12	-41.76							
1605.18	668.1	2653	655.9	-22.96	184.4	4402	408.3	107.4	460.2	123.8	387	3.12
	553	10	38.4	29.13	-41.11							
1610.18	675.2	2669	657.8	-21.86	183.6	4464	408.3	107.3	460.2	123.8	376	3.37
	568	10	37.6	29.11	-39.86							
1615.18	676.8	2661	656.9	-22.68	183.6	4465	411.9	101.1	458.9	121.3	370	3.20
	537	10	37.8	29.12	-40.65							
1620.18	678.2	2670	658.0	-22.25	184.6	4463	402.6	101.5	460.9	121.3	366	3.28
	584	10	37.7	29.12	-40.05							
1625.18	675.9	2668	655.0	-22.08	185.2	4438	407.1	105.0	456.0	121.0	371	3.22
	592H	10	37.7	29.12	-40.00							
1630.18	674.1	2655	654.1	-22.20	185.3	4438	394.5	102.2	444.5	122.1	376	3.27
	590H	10	37.9	29.12	-39.83							
1635.18	10/SE/91 SHERCO UNIT #2 TREND LOG # 33				CAT SCRUBBER TEST SPECIAL LOG							
	GE704	BP704	BT892	BP703	BT889	SF702	BA702	BA704	BA703	BA705	FC340	BA706
	SC301	SC302	BA707	ZP701	BP702							
1635.18	674.9	2669	655.8	-22.30	185.4	4429	394.5	102.2	444.4	122.1	368	3.21
	588	10	38.2	29.12	-39.55							
1640.18	675.1	2664	653.9	-22.08	185.7	4441	399.1	103.7	449.4	124.6	375	3.15
	593H	10	39.1	29.11	-38.61							

UNIT 3 DATA SHEETS

:53.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS
MC514	DEGREE F	MAIN STEAM TEMPERATURE
BP502	PSIG	31 STEAM DRUM PRESSURE
DC524	KLBS/HR	TOTAL BOILER AIR FLOW
SC571		SPRAY ABSORBERS SPRAYING
MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
LC502	TONS/HR	COAL FLOW TOTAL
DC566	PERCENT	MAX1 AVERAGE FLUE GAS O2
SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP525	BP502	LC502	DC524	DC566	SC571	SC572
0755.36	873.9	6167.6	992.3	2509.6	2741.4	499.492	8562	3.476	6	270.23
0800.36	879.4	6212.8	1000.3	2527.1	2756.0	487.412	8593	3.434	6	271.34
0805.36	873.4	6176.3	1001.6	2534.8	2762.6	482.152	8328	3.293	6	269.84
0810.36	871.4	6132.7	998.5	2519.6	2748.6	487.315	8373	3.251	6	270.00
0815.36	878.1	6130.3	997.9	2516.4	2744.4	491.485	8407	3.292	6	270.53
0820.36	879.4	6169.7	999.3	2520.0	2751.0	489.677	8569	3.446	6	271.31
0825.36	874.2	6085.7	1000.8	2519.6	2747.3	487.057	8389	3.177	6	271.80
0830.36	874.7	6194.0	1002.7	2517.1	2743.9	493.459	8626	3.436	6	272.98
0835.36	878.3	6111.8	1006.8	2526.8	2755.2	485.044	8459	3.338	6	272.63
0840.36	874.8	6123.3	1004.1	2526.6	2755.2	486.812	8601	3.416	6	272.69
0845.36	872.9	6103.5	1006.8	2521.1	2751.4	486.439	8606	3.478	6	272.59
0850.36	875.0	6130.6	1008.2	2520.8	2751.4	489.977	8570	3.486	6	272.83

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS
JC504	IN WC	32 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS
DA505	PERCENT	STACK OPACITY
YC501	IN HG	BAROMETRIC PRESSURE
JC520		FAB FLTR COMPARTMENTS IN SERVICE
JC509	IN WC	31 FABRIC FILTER DIFF PRESS
DC546	DEGREE F	FLUE GAS TO STACK TEMP
YT501	DEGREE F	AMBIENT AIR TEMPERATURE

TIME	SC508	JC520	JC504	JC509	JC516	DC546	DA505	YT501	YC501
0755.36	3.63	44	3.9	4.1	3.9	168	0.573	58.2	29.167
0800.36	3.63	44	3.9	4.1	4.0	168	0.660	58.3	29.167
0805.36	3.55	44	3.7	3.9	3.8	168	0.608	58.2	29.167
0810.36	3.39	45	3.6	3.9	3.8	167	0.469	58.2	29.167
0815.36	3.59	44	3.8	4.0	3.8	167	0.486	58.0	29.167
0820.36	3.77	45	3.8	3.8	3.8	168	0.573	58.2	29.172
0825.36	3.50	44	4.0	4.1	3.9	167	0.556	58.2	29.155
0830.36	4.38	44	4.0	3.9	4.0	169	0.556	58.2	29.172
0835.36	3.77	44	3.9	4.0	4.0	170	0.573	58.2	29.174
0840.36	3.68	44	4.0	4.1	4.1	170	0.573	58.0	29.154
0845.36	3.68	44	3.9	4.0	4.0	170	0.556	58.0	29.172
0850.36	4.02	45	3.9	3.9	4.0	170	0.660	57.7	29.154

53.__ .1/SE./1 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAXI AVERAGE FLUE GAS O2
SC571		SPRAY ABSORBERS SPRAYING	SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP525	BP502	LC502	DC524	DC566	SC571	SC572
0855.36	878.0	6079.5	1008.1	2532.4	2758.5	484.745	8527	3.361	6	273.25
0900.36	872.6	6168.6	1005.3	2525.7	2755.2	486.514	8436	3.339	6	272.36
0905.36	875.4	6141.3	1006.1	2516.0	2745.1	490.871	8495	3.290	6	272.34
0910.36	880.1	6169.7	1006.1	2529.7	2759.3	487.562	8513	3.282	6	271.64
0915.36	873.4	6152.4	1004.0	2529.7	2756.4	485.325	8424	3.242	6	270.77
0920.36	876.1	6186.6	1003.3	2519.7	2749.8	488.910	8491	3.233	6	270.47
0925.36	885.4	6193.0	1004.0	2516.4	2750.6	494.675	8772	3.423	6	270.28
0930.36	886.8	6163.6	1002.7	2530.4	2764.0	488.007	8634	3.248	6	269.38
0935.36	876.9	6183.0	1001.3	2524.2	2756.4	485.877	8440	3.297	6	269.27
0940.36	884.9	6213.9	1003.2	2514.1	2746.4	498.607	8486	3.085	6	269.95
0945.36	887.5	6192.9	1004.6	2527.0	2760.2	489.271	8593	3.380	6	270.34
0950.36	886.0	6277.0	1004.3	2527.4	2760.2	491.905	8583	3.367	6	270.09

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC520		FAB FLTR COMPARTMENTS IN SERVICE
JC504	IN WC	32 FABRIC FILTER DIFF PRESS	JC509	IN WC	31 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS	DC546	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT501	DEGREE F	AMBIENT AIR TEMPERATURE
YC501	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC520	JC504	JC509	JC516	DC546	DA505	YT501	YC501
0855.36	3.57	45	3.9	4.1	4.0	169	0.556	57.8	29.171
0900.36	3.74	44	4.3	4.0	4.0	169	0.660	58.2	29.171
0905.36	3.69	45	3.8	4.0	4.0	169	0.625	57.8	29.166
0910.36	3.88	43	3.9	4.2	4.1	168	0.677	58.1	29.167
0915.36	3.54	44	3.9	4.2	4.1	168	0.660	58.1	29.168
0920.36	3.61	44	3.9	4.2	4.1	168	0.660	58.1	29.163
0925.36	3.88	44	4.1	4.2	4.1	168	0.660	58.2	29.163
0930.36	3.74	45	3.9	3.8	3.8	168	0.556	58.1	29.163
0935.36	3.51	44	3.9	3.8	3.9	168	0.660	58.2	29.162
0940.36	3.56	45	4.0	4.0	3.9	168	0.556	58.2	29.162
0945.36	3.77	44	4.2	4.1	4.2	168	0.556	58.2	29.159
0950.36	3.76	44	4.0	4.1	4.1	168	0.469	58.2	29.156

03.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAXI AVERAGE FLUE GAS O2
SC571		SPRAY ABSORBERS SPRAYING	SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP525	BP502	LC502	DC524	DC566	SC571	SC572
0955.36	884.8	6192.8	1005.0	2522.8	2757.3	489.908	8694	3.631	6	271.13
1000.36	886.4	6208.2	1005.6	2529.8	2764.0	486.619	8651	3.594	6	271.44
1005.36	881.5	6219.5	1001.4	2519.4	2760.3	494.741	8521	3.351	6	270.03
1010.36	881.1	6237.4	1003.3	2515.8	2760.3	492.588	8562	3.343	6	272.22
1015.36	887.1	6282.3	1009.3	2526.3	2760.7	494.226	8618	3.265	6	271.80
1020.36	885.4	6201.0	1004.0	2523.2	2757.3	490.965	8590	3.356	6	271.56
1025.36	884.2	6270.3	1004.6	2522.5	2764.0	490.089	8659	3.378	6	272.80
1030.36	887.9	6233.3	1003.7	2526.8	2761.0	491.105	8550	3.296	6	271.81
1035.36	886.7	6211.4	999.7	2523.2	2757.9	491.202	8495	3.180	6	271.80
1040.36	885.1	6210.6	999.7	2516.5	2748.1	495.527	8533	3.420	6	271.94
1045.36	886.9	6204.4	997.3	2513.1	2748.1	495.368	8712	3.578	6	272.88
1050.36	888.4	6200.1	998.0	2516.4	2752.2	495.364	8580	3.464	6	272.98

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC620		FAB FLTR COMPARTMENTS IN SERVICE
JC504	IN WC	32 FABRIC FILTER DIFF PRESS	JC609	IN WC	31 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS	DC546	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT501	DEGREE F	AMBIENT AIR TEMPERATURE
YC501	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC620	JC504	JC609	JC516	DC546	DA505	YT501	YC501
0955.36	3.69	43	4.2	4.2	4.2	168	0.799	58.2	29.132
1000.36	3.49	44	4.1	4.3	4.3	168	0.451	58.4	29.132
1005.36	3.79	44	3.9	4.3	4.1	168	0.469	58.4	29.129
1010.36	3.84	45	3.9	4.1	4.2	168	0.608	58.4	29.129
1015.36	3.62	45	3.9	4.1	4.0	168	0.451	58.5	29.129
1020.36	3.65	44	4.1	4.3	4.2	168	0.434	58.4	29.129
1025.36	3.63	45	3.9	4.2	4.1	168	0.451	58.5	29.129
1030.36	3.64	43	4.1	4.3	4.2	168	0.451	59.0	29.129
1035.36	3.56	44	3.9	4.0	4.6	168	0.486	59.0	29.113
1040.36	3.63	43	4.0	4.6	4.0	168	0.590	59.0	29.117
1045.36	3.76	44	4.1	4.1	4.1	168	0.469	58.7	29.134
1050.36	4.09	44	3.9	3.8	4.0	168	0.573	59.0	29.134

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3.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP526	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAXI AVERAGE FLUE GAS O2
SC571		SPRAY ABSORBERS SPRAYING	SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP526	BP502	LC502	DC524	DC566	SC571	SC572
055.36	887.3	6204.3	1000.1	2519.7	2765.5	492.949	8714	3.651	6	274.53
100.36	887.1	6320.4	998.8	2533.0	2768.9	492.888	8494	3.380	6	273.59
105.36	881.8	6272.7	989.8	2519.2	2764.3	489.930	8620	3.220	6	274.16
110.36	882.7	6251.7	991.4	2514.5	2764.3	493.234	8764	3.609	6	274.28
115.36	886.2	6279.1	993.7	2522.0	2761.5	493.726	8635	3.416	6	273.81
120.36	887.1	6290.6	994.3	2520.1	2768.1	495.660	8697	3.407	6	274.41
125.36	887.3	6234.5	997.1	2516.1	2764.9	494.910	8633	3.329	6	274.66
130.36	891.6	6255.4	999.9	2523.6	2761.9	492.078	8603	3.323	6	275.19
135.36	890.3	6217.0	997.2	2520.0	2765.2	497.422	8686	3.361	6	276.80
140.36	888.9	6276.1	1001.2	2520.0	2768.6	497.132	8673	3.447	6	277.88
145.36	889.7	6232.7	1002.1	2523.5	2762.4	496.958	8734	3.318	6	277.59
150.36	892.0	6228.9	1002.7	2530.5	2769.0	492.654	8734	3.387	6	277.39

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC620		FAB FLTR COMPARTMENTS IN SERVICE
JC604	IN WC	32 FABRIC FILTER DIFF PRESS	JC609	IN WC	31 FABRIC FILTER DIFF PRESS
JC616	IN WC	33 FABRIC FILTER DIFF PRESS	DC546	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT601	DEGREE F	AMBIENT AIR TEMPERATURE
YC601	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC620	JC604	JC609	JC616	DC546	DA505	YT601	YC601
055.36	3.84	44	4.0	4.0	4.1	168	0.503	59.4	29.114
100.36	3.49	45	3.7	4.0	4.0	169	0.469	59.6	29.123
105.36	3.64	44	3.9	4.3	4.2	168	0.469	59.3	29.122
110.36	3.62	44	3.9	4.3	4.1	168	0.469	59.3	29.122
115.36	3.63	43	3.9	4.1	4.1	168	0.656	59.7	29.122
120.36	3.74	44	4.0	4.3	4.3	168	0.451	59.8	29.122
125.36	3.74	44	4.0	4.2	4.1	168	0.638	59.4	29.123
130.36	3.62	44	3.9	4.1	4.0	168	0.573	59.7	29.123
135.36	3.97	45	4.0	4.3	4.1	168	0.638	59.5	29.123
140.36	3.82	44	4.2	4.4	4.1	168	0.451	59.6	29.123
145.36	3.53	45	4.1	4.2	4.2	168	0.469	59.9	29.123
150.36	3.83	43	4.2	4.4	4.0	168	0.656	59.9	29.126

1253.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC626	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAX1 AVERAGE FLUE GAS O2
SC571		SPRAY ABSORBERS SPRAYING	SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC626	MC514	MP525	BP502	LC502	DC524	DC566	SC571	SC572
1155.36	889.5	6329.6	1002.3	2527.3	2768.6	494.834	8647	3.372	6	276.98
1200.36	890.3	6249.1	1000.8	2520.9	2762.0	492.125	8655	3.422	6	276.28
1205.36	893.6	6294.1	1003.6	2523.1	2765.6	498.560	8714	3.465	6	277.47
1210.36	893.0	6226.0	1006.4	2526.5	2765.1	490.398	8737	3.515	6	276.88
1215.36	893.3	6204.0	1005.2	2519.8	2758.6	494.928	8755	3.556	6	276.19
1220.36	893.6	6180.6	1002.6	2515.3	2758.2	496.331	8707	3.428	6	275.92
1225.36	895.5	6199.1	1007.6	2525.5	2763.1	496.908	8753	3.520	6	277.19
1230.36	895.7	6235.4	1008.1	2526.0	2766.5	494.193	8683	3.444	6	277.09
1235.36	891.9	6267.1	1007.7	2522.3	2759.9	494.619	8708	3.478	6	277.48
1240.36	892.5	6161.0	1011.4	2525.6	2763.1	495.083	8834	3.672	6	277.19
1245.36	892.2	6276.1	1009.1	2530.2	2769.8	493.903	8673	3.441	6	276.97
1250.36	889.5	6222.1	1007.9	2526.5	2763.1	490.510	8660	3.343	*******	*******

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC520		FAB FLTR COMPARTMENTS IN SERVICE
JC504	IN WC	32 FABRIC FILTER DIFF PRESS	JC509	IN WC	31 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS	DC546	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT501	DEGREE F	AMBIENT AIR TEMPERATURE
YC501	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC520	JC504	JC509	JC516	DC546	DA505	YT501	YC501
1155.36	3.85	44	4.1	4.1	3.9	168	0.469	59.7	29.125
1200.36	3.86	44	4.0	4.2	4.1	168	0.556	60.0	29.125
1205.36	3.64	44	4.1	4.2	4.1	169	0.556	60.0	29.125
1210.36	4.08	44	4.0	4.0	4.1	169	0.469	60.0	29.125
1215.36	3.99	45	4.0	4.1	4.1	168	0.451	60.1	29.125
1220.36	3.78	45	4.0	4.2	4.1	168	0.486	60.1	29.109
1225.36	3.90	44	4.3	4.3	4.4	169	0.469	60.1	29.099
1230.36	3.97	44	4.0	4.1	4.2	169	0.365	60.1	29.102
1235.36	3.87	43	4.1	4.3	4.3	169	0.469	60.2	29.102
1240.36	4.04	44	4.3	4.5	4.5	169	0.365	60.4	29.102
1245.36	3.83	44	4.1	4.2	4.3	169	0.538	60.3	29.102
1250.36	*******	*******	*******	*******	*******	*******	*******	60.4	29.102

353.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAXI AVERAGE FLUE GAS O2
SC571		SPRAY ABSORBERS SPRAYING	SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP525	BP502	LC502	DC524	DC566	SC571	SC572
1255.36	889.7	6192.1	1008.1	2626.4	2763.1	491.180	8616	3.369	*******	*******
1300.36	888.9	6273.1	1008.1	2526.6	2766.5	488.040	8613	3.453	*******	*******
1305.36	886.3	6269.1	1008.1	2523.2	2759.7	492.308	8734	3.618	6	276.62
1310.36	887.5	6238.8	1006.8	2521.6	2756.5	496.083	8745	3.488	6	277.22
1315.36	888.2	6244.6	1006.3	2525.2	2759.8	491.212	8609	3.317	6	276.75
1320.36	889.9	6224.4	1003.3	2522.3	2756.5	493.356	8642	3.346	6	276.38
1325.36	888.0	6250.8	1001.9	2518.2	2753.2	492.668	8623	3.404	6	276.48
1330.36	888.9	6206.8	1003.3	2515.0	2753.2	494.137	8636	3.509	6	277.22
1335.36	888.3	6267.5	1002.8	2522.0	2757.3	492.696	8635	3.436	6	277.39
1340.36	888.3	6260.7	1001.4	2515.5	2750.5	495.335	8660	3.388	6	277.63
1345.36	889.5	6195.9	1001.4	2513.8	2750.5	496.184	8675	3.244	6	277.91
1350.36	889.2	6207.1	1002.3	2514.1	2747.3	497.217	8606	3.204	6	279.03

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC520		FAB FLTR COMPARTMENTS IN SERVICE
JC504	IN WC	32 FABRIC FILTER DIFF PRESS	JC509	IN WC	31 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS	DC546	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT501	DEGREE F	AMBIENT AIR TEMPERATURE
YC501	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC520	JC504	JC509	JC516	DC546	DA505	YT501	YC501
1255.36	*******	*******	*******	*******	*******	*******	*******	60.6	29.102
1300.36	*******	*******	*******	*******	*******	*******	*******	60.8	29.102
1305.36	3.90	44	4.1	4.0	4.1	169	0.469	60.7	29.102
1310.36	3.64	44	4.2	4.3	4.2	169	0.660	60.9	29.102
1315.36	3.63	44	4.0	4.2	4.1	169	0.556	60.9	29.086
1320.36	3.68	44	4.1	4.1	4.2	169	0.538	61.2	29.086
1325.36	3.62	44	4.1	4.1	4.2	169	0.538	61.1	29.086
1330.36	3.73	44	4.0	4.1	4.2	169	0.660	61.0	29.086
1335.36	3.84	45	4.0	4.1	4.1	169	0.556	61.2	29.070
1340.36	3.66	45	4.0	4.1	4.1	169	0.608	60.9	29.084
1345.36	3.70	44	4.3	4.3	4.3	169	0.556	61.3	29.084
1350.36	3.66	45	4.0	4.2	4.2	169	0.642	61.3	29.084

153.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAX1 AVERAGE FLUE GAS O2
SC671		SPRAY ABSORBERS SPRAYING	SC672	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP525	BP502	LC502	DC524	DC566	SC671	SC672
1355.36	890.1	6219.4	1004.2	2514.9	2750.6	499.468	8647	3.141	6	278.56
1400.36	890.8	6186.7	1005.3	2521.6	2753.9	495.635	8635	3.260	6	279.46
1405.36	888.9	6223.0	1007.0	2514.5	2750.5	501.205	8647	3.359	6	279.59
1410.36	892.8	6218.5	1010.1	2524.9	2757.5	499.974	8629	3.424	6	279.36
1415.36	890.8	6218.2	1005.7	2521.7	2757.2	497.779	8743	3.612	6	279.56
1420.36	889.0	6256.6	1004.0	2519.5	2754.7	499.130	8735	3.563	6	278.91
1425.36	890.2	6246.2	1006.6	2522.7	2754.7	500.788	8793	3.620	6	278.69
1430.36	892.5	6211.7	1002.7	2532.3	2766.1	490.735	8691	3.509	6	277.81
1435.36	886.8	6273.4	992.6	2525.7	2761.8	497.493	8639	3.452	6	277.69
1440.36	882.4	6312.2	991.8	2515.0	2761.8	500.660	8658	3.378	6	277.28
1445.36	885.9	6244.1	992.8	2518.3	2755.7	501.250	8757	3.606	6	277.92
1450.36	885.3	6271.3	992.5	2522.0	2759.1	500.271	8704	3.598	6	277.77

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC520		FAB FLTR COMPARTMENTS IN SERVICE
JC504	IN WC	32 FABRIC FILTER DIFF PRESS	JC509	IN WC	31 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS	DC546	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT501	DEGREE F	AMBIENT AIR TEMPERATURE
YC501	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC520	JC504	JC509	JC516	DC546	DA505	YT501	YC501
1355.36	3.84	43	4.0	4.4	4.2	169	0.660	61.0	29.084
1400.36	3.78	44	4.1	4.3	4.3	169	0.638	61.0	29.084
1405.36	3.83	44	4.1	4.5	4.2	169	0.660	60.9	29.084
1410.36	3.66	44	4.0	4.3	4.1	169	0.660	61.1	29.084
1415.36	3.86	45	4.1	4.0	4.0	169	0.556	61.3	29.066
1420.36	4.19	44	4.2	4.0	4.1	169	0.660	61.2	29.066
1425.36	3.89	45	4.0	3.9	4.1	170	0.660	60.9	29.066
1430.36	3.76	44	4.2	4.2	4.2	169	0.660	61.4	29.051
1435.36	3.47	44	4.1	4.1	4.1	169	0.694	61.4	29.051
1440.36	3.84	43	4.0	4.2	4.2	169	0.764	61.2	29.051
1445.36	3.93	44	4.1	4.2	4.3	169	0.799	61.4	29.051
1450.36	3.85	44	3.9	4.2	4.2	169	0.746	61.6	29.037

1553.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAX1 AVERAGE FLUE GAS O2
SC571		SPRAY ABSORBERS SPRAYING	SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP525	BP502	LC502	DC524	DC566	SC571	SC572
1455.36	885.4	6290.9	993.1	2521.9	2759.2	500.584	8679	3.506	6	277.84
1500.36	882.9	6245.1	992.5	2511.1	2749.1	503.814	8758	3.462	6	278.44
1505.36	888.2	6271.6	999.9	2521.0	2756.5	502.990	8662	3.289	6	278.06
1510.36	890.7	6197.7	1001.4	2521.9	2764.2	501.271	8683	3.361	6	277.98
1515.36	889.6	6210.7	1001.5	2519.0	2757.6	502.937	8762	3.490	6	278.56
1520.36	889.9	6231.6	1002.9	2518.9	2757.2	506.510	8740	3.403	6	278.00
1525.36	890.5	6194.4	1002.8	2518.3	2756.7	502.915	8672	3.420	6	278.39
1530.36	890.6	6183.7	1002.2	2518.2	2756.8	502.622	8815	3.505	6	279.48
1535.36	893.7	6242.9	1002.4	2522.0	2760.2	506.489	8758	3.463	6	279.11
1540.36	895.4	6221.2	1002.4	2518.2	2756.8	506.740	8799	3.527	6	279.66
1545.36	897.3	6216.8	1003.7	2518.3	2760.0	508.169	8762	3.429	6	279.56
1550.36	897.9	6217.5	1005.0	2521.1	2762.6	507.158	8820	3.519	6	281.22

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC520		FAB FLTR COMPARTMENTS IN SERVICE
JC504	IN WC	32 FABRIC FILTER DIFF PRESS	JC509	IN WC	31 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS	DC646	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT501	DEGREE F	AMBIENT AIR TEMPERATURE
YC501	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC520	JC504	JC509	JC516	DC646	DA505	YT501	YC501
1455.36	3.83	44	3.9	4.1	4.1	169	0.660	61.4	29.053
1500.36	4.09	45	4.0	4.1	4.2	170	0.660	61.1	29.038
1505.36	3.87	44	4.0	4.3	4.3	170	0.677	61.4	29.038
1510.36	3.92	45	4.0	4.1	4.2	169	0.656	61.6	29.038
1515.36	3.79	43	4.1	4.2	4.3	170	0.660	61.8	29.038
1520.36	3.89	44	4.2	4.2	4.5	170	0.642	61.6	29.038
1525.36	4.14	44	4.2	4.7	4.1	170	0.764	61.9	29.038
1530.36	3.87	44	4.2	4.1	4.1	170	0.469	61.5	29.033
1535.36	3.81	44	4.1	4.1	4.1	170	0.764	61.7	29.026
1540.36	3.71	45	4.3	4.2	4.2	170	0.694	61.8	29.026
1545.36	3.93	45	4.1	4.2	4.2	170	0.660	61.5	29.025
1550.36	3.82	44	5.0	4.5	4.4	170	0.660	61.8	29.025

1638.06 11/SE/91 LOG 16 STACK COMPLIANCE TREND LOG

GE504	MW	3 GENERATOR GROSS MEGAWATTS	MC526	KLBS/HR	BOILER SUPRHTR OUTLET STEAM FLOW
MC514	DEGREE F	MAIN STEAM TEMPERATURE	MP525	PSIG	MAIN STEAM STOP VLV INLET PRESS
BP502	PSIG	31 STEAM DRUM PRESSURE	LC502	TONS/HR	COAL FLOW TOTAL
DC524	KLBS/HR	TOTAL BOILER AIR FLOW	DC566	PERCENT	MAX1 AVERAGE FLUE GAS O2
SC571		SPRAY ABSORBERS SPRAYING	SC572	DEGREE F	SPRAY ABSORBERS INLET TEMP

TIME	GE504	MC526	MC514	MP525	BP502	LC502	DC524	DC566	SC571	SC572
1540.36	896.4	6221.2	1002.4	2518.2	2756.8	506.740	8799	3.527	6	279.66
1545.36	897.3	6216.8	1003.7	2518.3	2760.0	508.169	8762	3.429	6	279.56
1550.36	897.9	6217.5	1005.0	2521.1	2762.6	507.158	8820	3.519	6	281.22
1555.36	895.2	6201.1	1004.8	2529.4	2769.3	500.938	8737	3.417	6	280.75
1600.36	888.5	6305.4	1008.5	2532.4	2769.3	498.504	8729	3.487	6	280.44
1605.36	887.1	6223.4	1008.2	2524.5	2762.2	504.247	8703	3.460	6	280.00
1610.36	886.6	6247.9	1006.0	2528.1	2765.5	499.655	8654	3.441	6	279.42
1615.36	883.6	6257.8	1006.6	2521.9	2758.8	501.429	8685	3.450	6	279.28
1620.36	884.4	6223.0	1006.6	2525.2	2758.8	503.339	8750	3.543	6	278.69
1625.36	885.5	6210.2	1007.1	2521.6	2758.1	502.725	8716	3.574	6	278.83
1630.36	883.4	6198.7	1006.1	2525.4	2758.1	499.277	8766	3.620	6	278.78
1635.36	884.0	6219.8	1004.8	2522.1	2754.7	502.815	8712	3.541	6	278.75

SC508	IN WC	SPRAY ABSORBERS DIFF PRESS	JC520		FAB FLTR COMPARTMENTS IN SERVICE
JC504	IN WC	32 FABRIC FILTER DIFF PRESS	JC509	IN WC	31 FABRIC FILTER DIFF PRESS
JC516	IN WC	33 FABRIC FILTER DIFF PRESS	DC546	DEGREE F	FLUE GAS TO STACK TEMP
DA505	PERCENT	STACK OPACITY	YT501	DEGREE F	AMBIENT AIR TEMPERATURE
YC501	IN HG	BAROMETRIC PRESSURE			

TIME	SC508	JC520	JC504	JC509	JC516	DC546	DA505	YT501	YC501
1540.36	3.71	45	4.3	4.2	4.2	170	0.694	61.8	29.026
1545.36	3.93	45	4.1	4.2	4.2	170	0.660	61.5	29.025
1550.36	3.82	44	6.0	4.5	4.4	170	0.660	61.8	29.025
1555.36	3.88	44	4.1	4.4	4.3	170	0.712	61.8	29.025
1600.36	3.73	43	4.1	4.3	4.3	170	0.660	61.6	29.025
1605.36	3.92	44	4.2	4.4	4.5	170	0.656	61.9	29.025
1610.36	3.57	44	4.1	4.4	4.2	170	0.746	62.0	29.025
1615.36	3.86	44	4.0	4.2	4.2	169	0.660	62.0	29.024
1620.36	3.93	45	4.1	4.2	4.3	169	0.677	61.9	29.009
1625.36	3.88	44	4.3	4.4	4.2	169	0.673	61.8	29.010
1630.36	3.70	45	4.1	4.2	4.2	169	0.660	61.4	29.009
1635.36	3.88	44	4.4	4.4	4.0	169	0.660	61.5	29.009

APPENDIX F

PROCEDURES

METHOD 101A—DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM SEWAGE SLUDGE INCINERATORS METH. 101A

Introduction

This method is similar to Method 101, except acidic potassium permanganate solution is used instead of acidic iodine monochloride for collection.

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of particulate and gaseous mercury (Hg) emissions from sewage sludge incinerators and other sources as specified in the regulations.

1.2 Principle. Particulate and gaseous Hg emissions are withdrawn isokinetically from the source and collected in acidic potassium permanganate ($KMnO_4$) solution. The Hg collected (in the mercuric form) is reduced to elemental Hg, which is then aerated from the solution into an optical cell and measured by atomic absorption spectrophotometry.

2. *Range and Sensitivity*

2.1 Range. After initial dilution, the range of this method is 20 to 800 ng Hg/ml. The upper limit can be extended by further dilution of the sample.

2.2 Sensitivity. The sensitivity of the method depends on the recorder/spectrophotometer combination selected.

3. *Interfering Agents*

3.1 Sampling. Excessive oxidizable organic matter in the stack gas prematurely depletes the $KMnO_4$ solution and thereby prevents further collection of Hg.

3.2 Analysis. Condensation of water vapor on the optical cell windows causes a positive interference.

4. *Precision*

Based on eight paired-train tests, the within-laboratory standard deviation was estimated to be 4.8 μg Hg/ml in the concentration range of 50 to 130 μg Hg/m^3.

5. *Apparatus*

5.1 Sampling Train and Sample Recovery. Same as Method 101, Sections 5.1 and 5.2, respectively, except for the following variations:

5.1.1 Probe Liner. Same as Method 101, Section 5.1.2, except that if a filter is used ahead of the impingers, the tester must use the probe heating system to minimize the condensation of gaseous Hg.

5.1.2 Filter Holder (Optional). Borosilicate glass with a rigid stainless-steel wire-screen filter support (do not use glass frit supports) and a silicone rubber or Teflon gasket, designed to provide a positive seal against leakage from outside or around the filter. The filter holder must be equipped with a filter heating system capable of maintaining a temperature around the filter holder of 120 ± 14° C (248 ± 25° F) during sampling to minimize both water and gaseous Hg condensation. The tester may use a filter in cases where the stream contains large quantities of particulate matter.

5.2 Analysis. The apparatus needed for analysis is the same as Method 101, Sections 5.3 and 5.4, except as follows:

5.2.1 Volumetric Pipets. Class A; 1-, 2-, 3-, 4-, 5-, 10-, and 20-ml.

5.2.2 Graduated Cylinder. 25-ml.

5.2.3 Steam Bath.

6. *Reagents*

Use ACS reagent-grade chemicals or equivalent, unless otherwise specified.

6.1 Sampling and Recovery. The reagents used in sampling and recovery are as follows:

6.1.1 Water. Deionized distilled, meeting ASTM Specifications for Type I Reagent Water—ASTM Test Method D1193-77 (incorporated by reference—see § 61.18). If high concentrations of organic matter are not expected to be present, the analyst may eliminate the $KMnO_4$ test for oxidizable organic matter. Use this water in all dilutions and solution preparations.

6.1.2 Nitric Acid (HNO_3), 50 Percent (V/V). Mix equal volumes of concentrated HNO_3 and deionized distilled water, being careful to slowly add the acid to the water.

6.1.3 Silica Gel. Indicating type, 6- to 16-mesh. If previously used, dry at 175° C (350° F) for 2 hr. The tester may use new silica gel as received.

6.1.4 Filter (Optional). Glass fiber filter, without organic binder, exhibiting at least 99.95 percent efficiency on 0.3 μm dioctyl phthalate smoke particles. The tester may use the filter in cases where the gas stream contains large quantities of particulate matter, but he should analyze blank filters for Hg content.

6.1.5 Sulfuric Acid (H_2SO_4), 10 Percent (V/V). Add and mix 100 ml of concentrated H_2SO_4 with 900 ml of deionized distilled water.

6.1.6 Absorbing Solution, 4 Percent $KMnO_4$ (W/V). Prepare fresh daily. Dissolve 40 g of $KMnO_4$ in sufficient 10 percent H_2SO_4 to make 1 liter. Prepare and store in glass bottles to prevent degradation.

6.2 Analysis. The reagents needed for analysis are listed below:

6.2.1 Tin (II) Solution. Prepare fresh daily and keep sealed when not being used. Competely dissolve 20 g of tin (II) chloride [or 25 g of tin (II) sulfate] crystals (Baker Analyzed reagent grade or any other brand that will give a clear solution) in 25 ml of concentrated HCl. Dilute to 250 ml with deionized distilled water. Do not substitute HNO_3, H_2SO_4, or other strong acids for the HCl.

6.2.2 Sodium Chloride—Hydroxylamine Solution. Dissolve 12 g of sodium chloride and 12 g of hydroxylamine sulfate (or 12 g of hydroxylamine hydrochloride) in deionized distilled water and dilute to 100 ml.

6.2.3 Hydrochloric Acid (HCl), 8 N. Dilute 67 ml of concentrated HCl to 100 ml with deionzed distilled water (slowly add the HCl to the water).

6.2.4 Nitric Acid, 15 Percent (V/V). Dilute 15 ml of concentrated HNO_3 to 100 ml with deionized distilled water.

6.2.5 Mercury Stock Solution, 1 mg Hg/ml. Prepare and store all mercury standard solutions in borosilicate glass containers. Completely dissolve 0.1354 g of mercury (II) chloride in 75 ml of deionized distilled water. Add 100 ml of concentrated HNO_3, and adjust the volume to exactly 100 ml with deionized distilled water. Mix thoroughly. This solution is stable for at least 1 month.

6.2.6 Intermediate Mercury Standard Solution, 10 μg Hg/ml. Prepare fresh weekly. Pipet 5.0 ml of the mercury stock solution (Section 6.2.5) into a 500-ml volumetric flask and add 20 ml of 15 percent HNO_3 solution. Adjust the volume to exactly 500 ml with deionized distilled water. Thoroughly mix the solution.

6.2.7 Working Mercury Standard Solution, 200 ng Hg/ml. Prepare fresh daily. Pipet 5.0 ml from the "Intermediate Mercury Standard Solution" (Section 6.2.6) into a 250-ml volumetric flask. Add 5 ml of 4 percent $KMnO_4$ absorbing solution and 5 ml of 15 percent HNO_3. Adjust the volume to exactly 250 ml with deionized distilled water. Mix thoroughly.

6.2.8 Potassium Permanganate, 5 Percent (W/V). Dissolve 5 g of $KMnO_4$ in deionized distilled water and dilute to 100 ml.

6.2.9 Filter. Whatman No. 40 or equivalent.

7. *Procedure*

7.1 Sampling. The sampling procedure is the same as Method 101, except for changes due to the use of $KMnO_4$ instead of ICl absorbing solution and the possible use of a filter. These changes are as follows:

7.1.1 Preliminary Determinations. The preliminary determinations are the same as those given in Method 101, section 7.1.2, except for the absorbing solution depletion sign. In this method, high oxidizable organic content may make it impossible to sample for the desired minimum time. This problem is indicated by the complete bleaching of the purple color of the $KMnO_4$ solution. In these cases, the tester may divide the sample run into two or more subruns to insure that the absorbing solution would not be depleted. In cases where an excess of water condensation is encountered, collect two runs to make one sample.

7.1.2 Preparation of Sampling Train. The preparation of the sampling train is the same as that given in Method 101, section 7.1.3, except for the cleaning of the glassware [probe, filter holder (if used), impingers, and connectors] and the charging of the first three impingers. In this method, clean all the glass components by rinsing with 50 percent HNO_3, tap water, 8 N HCl, tap water, and finally deionized distilled water. Then place 50 ml of 4 percent $KMnO_4$ in the first impinger and 100 ml in each of the second and third impingers.

If a filter is used, use a pair of tweezers to place the filter in the filter holder. Be sure to center the filter and place the gasket in proper position to prevent the sample gas stream from by-passing the filter. Check the filter for tears after assembly is completed. Be sure also to set the filter heating system at the desired operating temperature after the sampling train has been assembled.

7.1.3 Sampling Train Operation. In addition to the procedure given in Method 101, section 7.1.5, maintain a temperature around the filter (if applicable) of 120°±14° C (248°±25° F).

7.2 Sample Recovery. Begin proper cleanup procedure as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool. When it can be safely handled, wipe off any external particulate matter near the tip of the probe nozzle and place a cap over it. Do not cap off the probe tip tightly while the sampling train is cooling because the resultant vacuum would draw liquid out from the impingers.

Before moving the sample train to the cleanup site, remove the probe from the train, wipe off the silicone grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the silicone grease from the impinger. Use either ground-glass stoppers, plastic caps, or serum caps to close these openings.

Transfer the probe, impinger assembly, and (if applicable) filter assembly to a cleanup area that is clean, protected from the wind, and free of Hg contamination. The ambient air in laboratories located in the immediate vicinity of Hg-using facilities is not normally free of Hg contamination.

Inspect the train before and during assembly, and note any abnormal conditions. Treat the sample as follows:

7.2.1 Container No. 1 (Impinger, Probe, and Filter Holder). Use a graduated cylinder; measure the liquid in the first three impingers to within ±1 ml. Record the volume of liquid present (e.g., see Figure 5-3 of Method 5 in part 60 of 40 CFR). This information is needed to calculate the moisture content of the effluent gas. (Use only graduated cylinder and glass storage bottles that

have been precleaned as in section 7.1.2.) Place the contents of the first three impingers into a 1000-ml glass sample bottle.

(NOTE: If a filter is used, remove the filter from its holder, as outlined under "Container No. 3" below.)

Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover the Hg (and any condensate) from the probe nozzle, probe fitting, probe liner and front half of the filter holder (if applicable) as follows: Rinse these components with a total of 250 to 400 ml of fresh 4 percent $KMnO_4$ solution; add all washings to the 1000-ml glass sample bottle; remove any residual brown deposits on the glassware using the minimum amount of 8 N HCl required; and add this HCl rinse to this sample container.

After all washings have been collected in the sample container, tighten the lid on the container to prevent leakage during shipment to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Label the container to clearly identify its contents.

7.2.2. Container No. 2 (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal. The tester may use as aids a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. It is not necessary to remove the small amount of particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If a balance is available in the field, weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g; record this weight.

7.2.3 Container No. 3 (Filter). If a filter was used, carefully remove it from the filter holder, place it in a 100-ml glass sample bottle, and add 20 to 40 ml of 4 percent $KMnO_4$. If it is necessary to fold the filter, be sure that the particulate cake is inside the fold. Carefully transfer to the 150-ml sample bottle any particulate matter and filter fibers that adhere to the filter holder gasket by using a dry Nylon bristle brush and a sharp-edged blade. Seal the container. Label the container to clearly identify its contents. Mark the height of the fluid level to determine whether leakage occurs during transport.

7.2.4 Container No. 4 (Filter Blank). If a filter was used, treat an unused filter from the same filter lot used for sampling in the same manner as Container No. 3.

7.2.5 Container No. 5 (Absorbing Solution Blank). For a blank, place 500 ml of 4 percent $KMnO_4$ absorbing solution in a 1000-ml sample bottle. Seal the container.

7.3 Sample preparation. Check liquid level in each container to see if liquid was lost during transport. If a noticeable amount of leakage occurred, either void the sample or use methods subject to the approval of the Administrator to account for the losses. Then follow the procedures below.

7.3.1 Containers No. 3 and No. 4 (Filter and Filter Blank). If a filter was used, place the contents, including the filter, of Containers No. 3 and No. 4 in separate 250-ml beakers and heat the beakers on a steam bath until most of the liquid has evaporated. Do not take to dryness. Add 20 ml of concentrated HNO_3 to the beakers, cover them with a glass, and heat on a hot plate at 70° C for 2 hours. Remove from the hot plate and filter the solution through Whatman No. 40 filter paper. Save the filtrate for Hg analysis. Discard the filter.

7.3.2 Container No. 1 (Impingers, Probe, and Filter Holder). Filter the contents of Container No. 1 through Whatman 40 filter paper to remove the brown MnO_2 precipitate. Wash the filter with 50 ml of 4 percent $KMnO_4$ absorbing solution and add this wash to the filtrate. Discard the filter. Combine the filtrates from Containers No. 1 and No. 3 (if applicable), and dilute to a known volume with deionized distilled water. Mix thoroughly.

7.3.3 Container No. 5 (Absorbing Solution Blank). Treat this container as described in section 7.3.2. Combine this filtrate with the filtrate with Container No. 4 and dilute to a known volume with deionized distilled water. Mix thoroughly.

7.4 Analysis. Calibrate the spectrophotometer and recorder and prepare the calibration curve as described in sections 8.1 and 8.2. Then repeat the procedure used to establish the calibration curve with appropriately sized aliquots (1 to 10 ml) of the samples (from sections 7.3.2 and 7.3.3) until two consecutive peak heights agree within ±3 percent of their average value. If the 10-ml sample is below the detectable limit, use a larger aliquot (up to 20 ml), but decrease the volume of water added to the aeration cell accordingly to prevent the solution volume from exceeding the capacity of the aeration bottle. If the peak maximum of a 1.0-ml aliquot is off scale, further dilute the original sample to bring the Hg concentration into the calibration range of the spectrophotometer. If the Hg content of the absorbing solution and filter blank is below the working range of the analytical method, use zero for the blank.

Run a blank and standard at least after every five samples to check the spectrophotometer calibration; recalibrate as necessary.

It is also recommended that at least one sample from each stack test be checked by the Method of Standard Additions to confirm that matrix effects have not interfered in the analysis.

8. *Calibration and Standards*

The calibration and standards are the same as Method 101, Section 8, except for the following variations:

8.1 Optical Cell Heating System Calibration. Same as Method 101, Section 8.2, except use a 25-ml graduated cylinder to add 25 ml of deionized distilled water to the bottle section of the aeration cell.

8.2 Spectrophotometer and Recorder Calibration. The mercury response may be measured by either peak height or peak area. (NOTE: The temperature of the solution affects the rate at which elemental Hg is released from a solution and, consequently, it affects the shape of the absorption curve (area) and the point of maximum absorbance (peak height). To obtain reproducible results, all solutions must be brought to room temperature before use.) Set the spectrophotometer wave length at 253.7 nm and make certain the optical cell is at the minimum temperature that will prevent water condensation.

Then set the recorder scale as follows: Using a 25-ml graduated cylinder, add 25 ml of deionized distilled water to the aeration cell bottle and pipet 5.0 ml of the working mercury standard solution into the aeration cell. (NOTE: Always add the Hg-containing solution to the aeration cell after the 25 ml of deionized distilled water.) Place a Teflon-coated stirring bar in the bottle. Add 5 ml of the 4 percent $KMnO_4$ absorbing solution followed by 5 ml of 15 percent HNO_3 and 5 ml of 5 percent $KMnO_4$ to the aeration bottle and mix well. Now, attach the bottle section to the bubbler section of the aeration cell and make certain that (1) the aeration cell exit arm stopcock (Figure 101-3 of Method 101) is closed (so that Hg will not prematurely enter the optical cell when the reducing agent is being added) and (2) there is no flow through the bubbler. Add 5 ml of sodium chloride hydroxylamine in 1-ml increments until the solution is colorless. Now add 5 ml of tin (II) solution to the aeration bottle through the side arm, and immediately stopper the side arm. Stir the solution for 15 seconds, turn on the recorder, open the aeration cell exit arm stopcock, and immediately initiate aeration with continued stirring. Determine the maximum absorbance of the standard and set this value to read 90 percent of the recorder full scale.

9. *Calculations*

9.1 Dry Gas Volume, Volume of Water Vapor and Moisture Content, Stack Gas Velocity, Isokinetic Variation and Acceptable Results, and Determination of Compliance. Same as Method 101, sections 9.1, 9.2, 9.3, 9.6, and 9.7, respectively, except use data obtained from this test.

9.2 Total Mercury. For each source sample, correct the average maximum absorbance of the two consecutive samples whose peak heights agreed within ±3 percent of their average for the contribution of the field blank. Then calculate the total Hg content in μg in each sample. Correct for any dilutions made to bring the sample into the working range of the spectrophotometer.

9.3 Mercury Emission Rate. Calculate the Hg emission rate R in g/day for continuous operations using Equation 101A-1. For cyclic operations, use only the time per day each stack is in operation. The total Hg emission rate from a source will be the summation of results from all stacks.

$$R = K \frac{m_{a_s} v_s A_s (86{,}400 \times 10^{-6})}{[V_{m(std)} + V_{w(std)}](T_s/P_s)}$$

Eq. 101A-1

Where:

m_{a_s} = Total Hg content in each sample, μg.
v_s = Average stack gas velocity, m/sec (fps).
A_s = Stack cross-sectional area, m^2 (ft^2).
86,400 = Conversion factor, sec/day.
10^{-6} = Conversion factor, g/μg.
$V_{m(std)}$ = Dry gas sample volume at standard conditions, corrected for leakage (if any), m^3 (ft^3).
$V_{w(std)}$ = Volume of water vapor at standard conditions, m^3 (ft^3).
T_s = Absolute average stack gas temperature, °K (°R).
P_s = Absolute stack gas pressure, mm Hg (in. Hg).
K = 0.3858 °K/mm Hg for metric units.
= 17.64 °R/in. Hg for English units.

10. *Bibliography*

1. Same as Method 101, Section 10.

2. Mitchell, W. J., M. R. Midgett, J. C. Suggs, and D. Albrinck. Test Methods to Determine the Mercury Emissions from Sludge Incineration Plants. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. Publication No. EPA-600/4-79-058. September 1979.

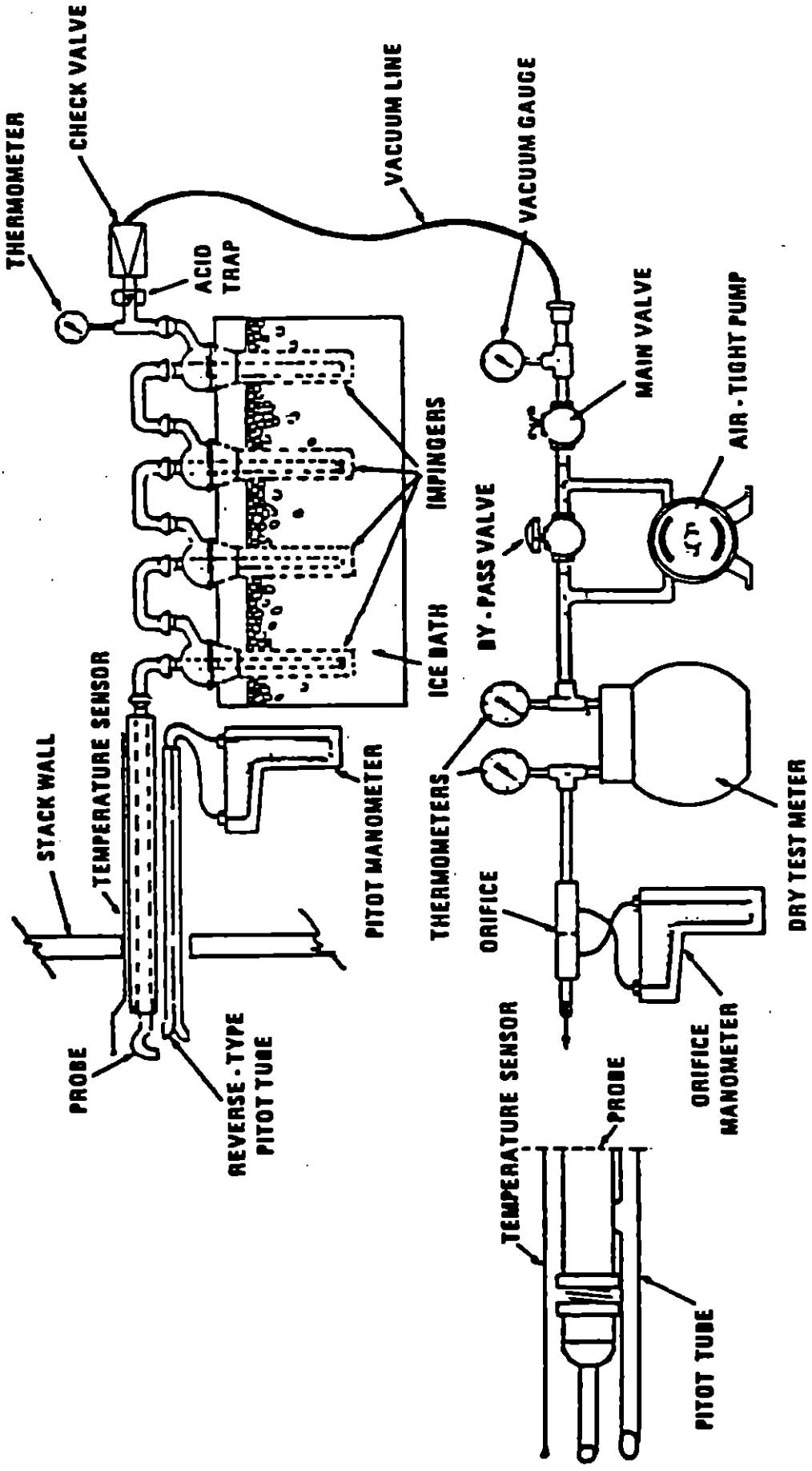

Figure 101-1 Mercury sampling train.

APPENDIX G

CALCULATION EQUATIONS

CALCULATION EQUATIONS

METHOD 2

$$\bar{V}_s = 85.48\ C_p\ (\sqrt{\Delta p})_{avg}\ \sqrt{\frac{T_{s(avg)}}{P_s\ M_s}}$$

$$Q_{s,d} = 60(1 - B_{ws})\ \bar{V}_s\ A\ \left(\frac{528}{T_{s(avg)}}\right)\ \left(\frac{P_s}{29.92}\right)$$

$$Q_a = 60\ \bar{V}_s\ A$$

$$\dot{m}_g = \frac{4.995\ Q_{s,d}\ G_d}{1 - B_{ws}}$$

$$RH^* = 100\ (vp_{twb}\ 0.0003641\ P_s\ (T_{db} - T_{wb}))/vp_{tdb}$$

$$B^*_{ws} = RH(vp_{tdb})/P_s$$

$$= \frac{4.585 \times 10^{-2}\ P_s M_s}{T_{s\ (avg)}}$$

*Alternate equations for calculating moisture content from wet bulb and dry buld data.

SYMBOLS

A	=	Cross sectional area of stack, SQ. FT.
A_n	=	Cross sectional area of nozzle, SQ. FT.
B_{ws}	=	Water vapor in gas stream, proportion by volume
C_p	=	Pitot tube coefficient, dimensionless
C_a	=	Concentration of particulate matter in stack gas, wet basis, GR/ACF
C_s	=	Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF
EA	=	Excess air, percent by volume
γ	=	Dry test meter correction factor, dimensionless
G_d	=	Specific gravity (relative to air), dimensionless
I	=	Isokinetic variation, percent by volume
M_d	=	Molecular weight of stack gas, dry basis, g/g - mole.
$\dot{m}_g$	=	Mass flow of wet flue gas, LB/HR
$\dot{m}_p$	=	Particulate mass flow, LB/HR
M_s	=	Molecular weight of stack gas, wet basis, g/g, mole.
M_p	=	Total amount of particulate matter collected, g
P_{bar}	=	Atmospheric pressure, IN. HG. (uncompensated)
P_g	=	Stack static gas pressure, IN. WC.

P_s = Absolute pressure of stack gas, IN.HG.

P_{std} = Standard absolute pressure, 29.92 IN. HG.

A_a = Actual volumetric stack gas flow rate, ACFM

$Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM

RH = Relative humidity, %

T_{db} = Dry bulb temperature of stack gas, ^{o}F

T_{wb} = Wet bulb temperature of stack gas, ^{o}F

$T_{m(avg)}$ = Absolute average dry gas meter temperature, ^{o}R

$T_{s(avg)}$ = Absolute average stack temperature, ^{o}F

T_{std} = Standard absolute temperature, 528 ^{o}F (68 ^{o}F)

θ = Total sampling time, min.

V_{lc} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of gas sample as measured by dry gas meter, CF

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF

$V_{w(std)}$ = Volume of water vapor in the gas sample corrected to standard conditions, SCF

$\overline{V}_s$ = Average actual stack gas velocity, FT/SEC

vP_{tdb} = Vapor pressure at T_{db}, IN. HG.

VP_{twb} = Vapor pressure at T_{wb}, IN. HG

$\overline{\Delta H}$ = Average pressure differential across the orifice meter, IN. WC.

ΔP = Velocity pressure of stack gas, IN. WC.

γ = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

CALCULATION EQUATIONS

METHOD 3

$$\%EA = \frac{100(\%O_2 -).5\%\ CO)}{0.264\%\ N_2 - \%O_2 + 0.5\%\ CO}$$

$$M_d = 0.44(\%CO_2) + 0.32\ (\%O_2) + 0.28\ (\%N_2 + \%CO)$$

$$M_s = M_d\ (I - B_{ws}) + 0.18\ B_{ws}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

CALCULATION EQUATIONS

METHOD 5

$$V_{m(std)} = 17.65\ V_m\ Y\ \left(\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}}\right)$$

$$V_{w(std)} = 0.0472\ V_{Is}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$I = 0.0944\ \left(\frac{T_{s(avg)}\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1 - B_{ws})}\right)$$

$$C_s = \frac{15.43\ M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3\ M_p\ P_s}{T_{s(avg)}\ (V_{w(std)} + V_{m(std)})}$$

$$(\dot{m}_p)_1 = 8.5714 \times 10^{-3}\ C_s\ Q_{s,d}$$

$$(\dot{m}_p)_2 = \frac{1.3228 \times 10^{-1}\ M_p\ A}{\theta\ A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

SYMBOLS

A = Cross sectional area of stack, SQ. FT.

A_n = Cross sectional area of nozzle, SQ. FT.

B_{ws} = Water vapor in gas stream, proportion by volume

C_p = Pitot tube coefficient, dimensionless

C_a = Concentration of particulate matter in stack gas, wet basis, GR/ACF

C_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF

EA = Excess air, percent by volume

γ = Dry test meter correction factor, dimensionless

G_d = Specific gravity (relative to air), dimensionless

I = Isokinetic variation, percent by volume

M_d = Molecular weight of stack gas, dry basis, g/g - mole.

$\dot{m}_g$ = Mass flow of wet flue gas, LB/HR

$\dot{m}_p$ = Particulate mass flow, LB/HR

M_s = Molecular weight of stack gas, wet basis, g/g, mole.

M_p = Total amount of particulate matter collected, g

P_{bar} = Atmospheric pressure, IN. HG. (uncompensated)

P_g = Stack static gas pressure, IN. WC.

P_s = Absolute pressure of stack gas, IN.HG.

P_{std} = Standard absolute pressure, 29.92 IN. HG.

A_a = Actual volumetric stack gas flow rate, ACFM

$Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM

RH = Relative humidity, %

T_{db} = Dry bulb temperature of stack gas, ^{o}F

T_{wb} = Wet bulb temperature of stack gas, ^{o}F

$T_{m(avg)}$ = Absolute average dry gas meter temperature, ^{o}R

$T_s(avg)$ = Absolute average stack temperature, ^{o}F

T_{std} = Standard absolute temperature, 528 ^{o}F (68 ^{o}F)

θ = Total sampling time, min.

V_{lc} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of gas sample as measured by dry gas meter, CF

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF

$V_{w(std)}$ = Volume of water vapor in the gas sample corrected to standard conditions, SCF

$\bar{V}_s$ = Average actual stack gas velocity, FT/SEC

v_{Ptdb} = Vapor pressure at T_{db}, IN. HG.

vp_{twb} = Vapor pressure at T_{wb}, IN. HG

$\overline{\Delta H}$ = Average pressure differential across the orifice meter, IN. WC.

ΔP = Velocity pressure of stack gas, IN. WC.

γ = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

Mercury Mass Balance

NSP - SHERCO

Units 1&2 Run	Coal Feed TPH	Coal Feed LB/HR	Potential Hg Emission Rate LB/HR
1	764	1528000	0.138
2	775	1550000	0.140
3	766	1532000	0.136

Unit 3 Run	Coal Feed TPH	Coal Feed LB/HR	Potential Hg Emission Rate LB/HR
1	490	980000	0.0882
2	494	988000	0.0889
3	503	1006000	0.0905

Mercury in Coal Sample 0.09 ug/kg 9.00E-08 lb/lb