AP-42 Section 11.23
Reference
Report Sect. 4
Reference 27

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RESULTS OF THE MARCH 28-31, 1989 AIR EMISSION COMPLIANCE TESTING AT THE USS PLANT IN MOUNTAIN IRON, MINNESOTA

Submitted to:

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KE/klq

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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 (°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/10^6BTU	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/DSCM	milligrams 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
ug	micrograms
v/v	percent by volume
w/w	percent by weight
<	≤ (when following a number)
VOC	VOLATILE ORGANIC COMPOUNDS

Standard conditions are defined as 68 °F (20 °C) and 29.92 IN. of mercury pressure.

1 INTRODUCTION

During the period March 28 - 31, 1989 Interpoll Laboratories personnel conducted a series of air emission compliance tests at the United States Steel (USS) Plant located near Mountain Iron, Minnesota. On-site testing was performed by J. Buresh, W. Drake and C. Mosser. Coordination between testing activities and plant operation was provided by Jim Weinert of USS. A portion of the tests was witnessed by Bob Beresford of the Minnesota Pollution Control Agency, Duluth office. The sources tested and pollutants measured are as follows:

Step III No. 6 Line Induration Furnace:	Particulates, CO, VOCs CO_2
Step III No. 7 Line Induration Furnace:	Particulates, NO_x CO_2
Primary Crusher:	Particulates
Step III No. 6 Line Pellet Cooler:	Particulates CO_2
Step III Turn Bin:	Particulates

The Step III Agglomerator Line 6 and 7 Induration Furnaces consist of traveling grates followed by rotary kilns. Each kiln is 21 feet in diameter and 130 feet long. The 3/8" pellets containing 1% bentonite binder are heated to 2400 ^{0}F in the kiln where they are hardened. After leaving the kiln, the pellets are air-cooled and loaded into railcars for shipment. During the testing, the No. 6 Line Induration Furnace was co-fired with coal and petroleum coke and the Line 7 Induration Furnace was fired with natural gas. Particulate emissions from the induration furnaces are controlled by individual wet scrubbers.

The Primary Crusher is a 5' by 9'-3" gyratory crusher set at 6-1/2". This is the first stage of crushing for the run-of-mine crude taconite. Particulate emissions are controlled by an Envirotech Baghouse. The Turn Bin Conveyor recycles the crushed ore that is too large to pass through the screen back to the crusher to be further size reduced. Particulate emissions from the Turn Bin Conveyor Transfer are controlled by a wet scrubber.

Particulate determinations were performed in accordance with EPA Methods 1-5, CFR Title 40, Part 60, Appendix A (revised July 1, 1987). A preliminary determination of the gas linear velocity profile was made before the first particulate determination at each test site to allow selection of 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 extract particulate samples by means of heated stainless steel or glass-lined probes. An all glass impinger assembly was used in the back half of the sampling train at the induration furnace and pellet cooler test sites to provide wet catch samples for chloroform diethyl ether extractions such that the condensible organic fraction could be reported.

Integrated flue gas samples were extracted simultaneously with each particulate 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. The integrated bag samples collected during the No. 6 Line Induration Furnace testing were also analyzed for carbon monoxide by NDIR (EPA Method 10).

Oxides of nitrogen samples were collected using the Method 7 absorbing reagent and analyzed as per Method 7A by ion chromatography as per the current EPA recommendation. This recommendation stems from recent experience by the EPA which indicates that the higher sulfuric acid content of the Method 7 reagent is required to eliminate the negative bias experienced with the low sulfuric acid content of Method 7A absorbing reagent.

VOC determinations were performed in accordance with EPA Method 25, CFR Title 40, Part 60, Appendix A (revised July 1, 1987). The VOC samples were collected with Nutech stainless steel traps and flasks using Nutech sampling trains with heated probes and filters. The samples were collected at a flow rate of 55 mL/min. Each of the three samples was collected over a one hour period. The traps to collect condensible VOCs were immersed in a dry ice bath during sampling. Five-liter stainless steel flasks were used to collect the noncondensible VOCs. After collection, the condensible samplers were stored over dry ice until analysis.

Particulate testing on each induration furnace stack was conducted from a set of four test ports oriented at 90^0. The test ports on each stack are located 2.8 diameters downstream of the nearest flow disturbance and 1.7 diameters upstream of the stack exit. A 24-point traverse was used at each test location to collect representative particulate samples. Each traverse point was sampled 2.5 minutes for a total sampling time of 60 minutes per run. The VOC and NO_x samples were collected using a 3-point traverse (1/6, 3/6, 5/6 dia.) from one test port.

Testing on the Pellet Cooler Stack was also conducted using four test ports oriented at 90^0. These test ports are located 3.8 diameters downstream of the breeching inlet and 1.8 diameters upstream of the stack exit. A 24-point/2.5 minutes per point traverse was used for a total sampling time of 60 minutes per run.

Testing on the Primary Crusher Dust Collector Stack was conducted from two test ports oriented at 90^0. The test ports are located 4.4 diameters downstream of the ID fan and 1.1 diameter upstream of the stack exhaust. A 24-point/2.5 minute per point traverse was used for a total sampling time of 60 minutes per run.

Testing on the Turn Bin Wet Scrubber Stack was performed from two test ports oriented at 90^0. The test ports are located 12.5 diameters downstream of the fan and 1.5 diameters upstream of the stack exhaust. A 12-point/5 minute per point traverse was used for a total sampling time of 60 minutes per run. Visible emission determinations could not be performed on any of the sources tested due to adverse weather conditions.

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 important results of the particulate compliance test are summarized in Tables 1-5. The average particulate concentrations and emission rates were as follows:

Source	Concentration (GR/DSCF)	Emission Rate (LB/HR)
No. 7 Line Induration Furnace	0.020	49
No. 6 Line Induration Furnace	0.022	61
No. 6 Line Pellet Cooler	0.12	86
Primary Crusher	0.013	3.5
Turn Bin	0.0047	1.3

In addition to the above particulate testing, CO and VOC emissions were measured on the No. 6 Furnace and NO_x on the No. 7 Furnace. The CO and VOC emission rates from the No. 6 Furnace were 40 and 24 LB/HR, respectively. The NO_x emissions from the No. 7 Furnace averaged 487 LB/HR.

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 reported herein are accurate and closely reflect the actual values which existed at the time the test was performed.

TABLE 1. Summary of the Results of the March 28, 1989 Particulate Emission Compliance Test on the Step III No. 6 Line Induration Furnace at the USS Plant Located in Mountain Iron, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		03-28-89	03-28-89	03-28-89
Time runs were done	(HRS)	955/1100	1132/1238	1253/1359
Process rate	(Long ton/HR)	468.0	468.0	469.0
Volumetric flow				
actual	(ACFM)	399405	406863	408493
standard	(DSCFM)	315683	322276	326539
Gas temperature	(DEG-F)	110	108	108
Moisture content	(%V/V)	8.26	8.35	7.45
Gas composition	(%V/V,dry)			
carbon dioxide		3.42	3.65	3.29
oxygen		17.98	17.75	17.94
nitrogen		78.60	78.60	78.77
Isokinetic variation	(%)	95.9	100.1	99.2
Particulate concentration				
actual	(GR/ACF)	.0173	.0152	.0199
standard	(GR/DSCF)	.0218	.0192	.0249
Part. emission rate	(LB/HR)	59.12	52.93	69.71

NOTE: Dry + organic wet catch
Coal/coke-firing

TABLE 2. Summary of the Results of the March 28, 1989 Particulate Emission Compliance Test on the Step III No. 6 Line Pellet Cooler at the USS Plant Located in Mountain Iron, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		03-28-89	03-28-89	03-28-89
Time runs were done	(HRS)	1547/1650	1706/1810	1824/1931
Process rate	(Long ton/HR)	472.0	482.0	483.0
Volumetric flow				
actual	(ACFM)	183767	183237	185925
standard	(DSCFM)	83513	86217	87924
Gas temperature	(DEG-F)	606	573	561
Moisture content	(%V/V)	1.33	1.03	1.68
Gas composition	(%V/V,dry)			
carbon dioxide		0.60	0.71	0.45
oxygen		20.40	20.39	20.45
nitrogen		79.00	78.90	79.10
Isokinetic variation	(%)	97.1	99.5	99.4
Particulate concentration				
actual	(GR/ACF)	.0529	.0492	.0602
standard	(GR/DSCF)	0.116	0.105	0.127
Part. emission rate	(LB/HR)	83.38	77.31	95.91

NOTE: Dry + organic wet catch

TABLE 3. Summary of the Results of the March 29 and 30, 1989 Particulate Emission Compliance Test on the Step III No. 7 Line Induration Furnace at the USS Plant Located in Mountain Iron, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		03-29-89	03-29-89	03-30-89
Time runs were done	(HRS)	857/1303	1326/1431	737/ 842
Process rate	(Long ton/HR)	440.0	406.0	409.0
Volumetric flow				
actual	(ACFM)	380730	373263	348803
standard	(DSCFM)	310879	302871	278589
Gas temperature	(DEG-F)	104	104	108
Moisture content	(%V/V)	7.26	7.83	8.69
Gas composition	(%V/V,dry)			
carbon dioxide		2.40	2.82	3.00
oxygen		18.40	17.81	17.64
nitrogen		79.20	79.37	79.36
Isokinetic variation	(%)	98.4	100.1	100.5
Particulate concentration				
actual	(GR/ACF)	.0125	.0136	.0214
standard	(GR/DSCF)	.0154	.0167	.0268
Part. emission rate	(LB/HR)	40.94	43.42	64.05

NOTE: Dry + organic wet catch
Natural gas-firing

TABLE 4. Summary of the Results of the March 30, 1989 Particulate Emission Compliance Test on the Primary Crusher Baghouse at the USS Plant Located in Mountain Iron, Minnesota.

ITEM		Run 1	Run 2	Run 3	
Date of test		03-30-89	03-30-89	03-30-89	
Time runs were done	(HRS)	1116/1218	1238/1418	1432/1703	1732.
Process rate *	(TOTAL TONS)	1659 T/HR	3737 / 7.66 : 2251 T/HR	4249 / 2.5	: 1700 T/HR
Volumetric flow					
actual	(ACFM)	33010	31765	30960	
standard	(DSCFM)	32396	31116	30313	
Gas temperature	(DEG-F)	43	44	44	
Moisture content	(%V/V)	0.64	0.67	0.68	
Gas composition	(%V/V,dry)				
carbon dioxide		0.03	0.03	0.03	
oxygen		20.90	20.90	20.90	
nitrogen		79.07	79.07	79.07	
Isokinetic variation	(%)	100.0	99.5	99.9	
Particulate concentration					
actual	(GR/ACF)	.0171	.0117	.00910	
standard	(GR/DSCF)	.0174	.0120	.00930	
Part. emission rate	(LB/HR)	4.85	3.20	2.42	

* See Process Rate Data - Appendix I

NOTE: Dry catch only

TABLE 5. Summary of the Results of the March 31, 1989 Particulate Emission Compliance Test on the Step III Turn Bin Wet Scrubber at the USS Plant Located in Mountain Iron, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		03-31-89	03-31-89	03-31-89
Time runs were done	(HRS)	840/ 949	1007/1109	1125/1226
Process rate	(Avg. LTON/HR)	3844.0 4305	3844.0	3844.0
Volumetric flow				
actual	(ACFM)	33279	33676	34182
standard	(DSCFM)	32593	32869	33313
Gas temperature	(DEG-F)	43	44	45
Moisture content	(%V/V)	0.92	1.04	1.04
Gas composition	(%V/V,dry)			
carbon dioxide		0.03	0.03	0.03
oxygen		20.90	20.90	20.90
nitrogen		79.07	79.07	79.07
Isokinetic variation	(%)	100.3	100.0	99.9
Particulate concentration				
actual	(GR/ACF)	.00560	.00453	.00363
standard	(GR/DSCF)	.00572	.00465	.00373
Part. emission rate	(LB/HR)	1.60	1.31	1.06

NOTE: Dry catch only

Table 6. Summary of the Results of the March 29 and 30, 1989 Oxides of Nitrogen Emission Compliance Test on the Step III No. 7 Induration Furnace at the USS Plant Located in Mountain Iron, Minnesota (Natural Gas-Fired)

Test/Run	Concentration (ppm.w)	Emission Rate (LB/HR)
4/1	238	571
4/2	196	462
4/3	195	428
Avg.	210	487

Table 7. Summary of the Results of the March 28, 1989 Carbon Monoxide Emission Compliance Test on the Step III No. 6 Induration Furnace at the USS Plant Located in Mountain Iron, Minnesota.

Test/Run	Concentration (ppm.d)	Emission Rate (LB/HR)
1/1	26	37
1/2	32	45
1/3	27	38
Avg.	28	40

Table 8. Summary of the Results of the March 28, 1989 VOC Emission Compliance Test on the Step III No. 6 Induration Furnace at the USS Plant Located in Mountain Iron, Minnesota.

Test/Run	Concentration (ppm.C)	Emission Rate (LB C/HR)	lb CH_4/HR
2/1	9	5.5	7.3
2/2	5	3.0	4.0
2/3	108	64	85.3
Avg.	41	24	

$\times \frac{16}{12}$

REPORT AS METHANE ?? YES

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 particulate, oxides of nitrogen and visible emission determinations. 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.

The particulate emission rate has been calculated using the product of the concentration times flow method (as recommended by the EPA) rather than the ratio of areas method.

3.1 Results of Orsat and Moisture Analyses

Test No. 1
Step III No. 6 Waste Gas Stack

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

	Run 1	Run 2	Run 3
Date of run	03-28-89	03-28-89	03-28-89
Dry basis (orsat)			
carbon dioxide............	3.42	3.65	3.29
oxygen...................	17.98	17.75	17.94
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	78.60	78.60	78.77
Wet basis (orsat)			
carbon dioxide............	3.14	3.35	3.04
oxygen...................	16.49	16.27	16.60
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	72.10	72.03	72.90
water vapor...............	8.26	8.35	7.45
Dry molecular weight........	29.27	29.29	29.24
Wet molecular weight........	28.34	28.35	28.41
Specific gravity............	0.979	0.979	0.981
Water mass flow......(LB/HR)	79769	82404	73743
FO	0.854	0.863	0.900

Test No. 3
Step III No. 6 Pellet Cooler Stack

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

	Run 1	Run 2	Run 3
Date of run	03-28-89	03-28-89	03-28-89
Dry basis (orsat)			
carbon dioxide............	0.60	0.71	0.45
oxygen....................	20.40	20.39	20.45
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	79.00	78.90	79.10
Wet basis (orsat)			
carbon dioxide............	0.59	0.70	0.44
oxygen....................	20.13	20.18	20.11
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	77.95	78.09	77.77
water vapor...............	1.33	1.03	1.68
Dry molecular weight........	28.91	28.93	28.89
Wet molecular weight........	28.77	28.82	28.71
Specific gravity............	0.994	0.995	0.992
Water mass flow......(LB/HR)	3156	2520	4203
FO	0.833	0.718	1.000

Test No. 4
Step III No. 7 Waste Gas Stack

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

	Run 1	Run 2	Run 3
Date of run	03-29-89	03-29-89	03-30-89
Dry basis (orsat)			
carbon dioxide............	2.40	2.82	3.00
oxygen....................	18.40	17.81	17.64
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	79.20	79.37	79.36
Wet basis (orsat)			
carbon dioxide............	2.23	2.60	2.74
oxygen....................	17.06	16.42	16.11
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	73.45	73.16	72.46
water vapor...............	7.26	7.83*	8.69*
Dry molecular weight........	29.12	29.16	29.19
Wet molecular weight........	28.31	28.29	28.21
Specific gravity............	0.978	0.977	0.975
Water mass flow......(LB/HR)	68238	73930	76991

* Free or condensed water in the gas stream.

FO	1.042	1.096	1.087

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Test No. 5
Primary Crusher Stack

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

	Run 1	Run 2	Run 3
Date of run	03-30-89	03-30-89	03-30-89
Dry basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen....................	20.90	20.90	20.90
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen....................	20.77	20.76	20.76
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	78.56	78.54	78.53
water vapor...............	0.64	0.67	0.68
Dry molecular weight........	28.84	28.84	28.84
Wet molecular weight........	28.77	28.77	28.77
Specific gravity............	0.994	0.994	0.994
Water mass flow......(LB/HR)	585	588	586
FO	0.000	0.000	0.000

Test No. 6
Step III Turn Bin Stack

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

	Run 1	Run 2	Run 3
Date of run	03-31-89	03-31-89	03-31-89
Dry basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen....................	20.90	20.90	20.90
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen....................	20.71	20.68	20.68
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	78.34	78.25	78.25
water vapor...............	0.92	1.04*	1.04
Dry molecular weight........	28.84	28.84	28.84
Wet molecular weight........	28.74	28.73	28.73
Specific gravity............	0.993	0.992	0.992
Water mass flow......(LB/HR)	853	979	979

* Free or condensed water in the gas stream.

FO	0.000	0.000	0.000

3.2 Results of Particulate Loading Determinations

Test No. 1
Step III No. 6 Waste Gas Stack

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	03-28-89	03-28-89	03-28-89
Time run start/end.....(HRS)	955/1100	1132/1238	1253/1359
Static pressure......(IN.WC)	-0.26	-0.26	-0.26
Cross sectional area (SQ.FT)	196.89	196.89	196.89
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	75.0	76.0	65.0
desiccant..........(GRAMS)	15.0	21.0	21.0
total..............(GRAMS)	90.0	97.0	86.0
Total particulate material.. ....collected(grams)	0.0667	0.0623	0.0813
Gas meter coefficient.......	1.0085	1.0085	1.0085
Barometric pressure..(IN.HG)	27.83	27.83	27.83
Avg. orif.pres.drop..(IN.WC)	2.20	2.44	2.48
Avg. gas meter temp..(DEF-F)	61.8	61.2	65.4
Volume through gas meter....			
at meter conditions...(CF)	49.36	52.48	53.10
standard conditions.(DSCF)	47.11	50.17	50.36
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter..........(IN)	.306	.306	.306
Avg.stack gas temp ..(DEG-F)	110	108	108
Volumetric flow rate........			
actual..............(ACFM)	399405	406863	408493
dry standard.......(DSCFM)	315683	322276	326539
Isokinetic variation.....(%)	95.9	100.1	99.2
Particulate concentration...			
actual............(GR/ACF)	0.01726	0.01517	0.01990
dry standard.....(GR/DSCF)	0.02185	0.01916	0.02491
Particle mass rate...(LB/HR)	59.12	52.93	69.71

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Test No. 6
Step III Turn Bin Stack

Results of Particulate Loading Determinations-------Method 5

Date of run	Run 1 03-31-89	Run 2 03-31-89	Run 3 03-31-89
Time run start/end.....(HRS)	840/ 949	1007/1109	1125/1226
Static pressure......(IN.WC)	-0.53	-0.53	-0.53
Cross sectional area (SQ.FT)	10.80	10.80	10.80
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	0.0	0.0	0.0
desiccant..........(GRAMS)	7.0	8.0	8.0
total..............(GRAMS)	7.0	8.0	8.0
Total particulate material.. ....collected(grams)	0.0131	0.0107	0.0087
Gas meter coefficient.......	1.0066	1.0066	1.0066
Barometric pressure..(IN.HG)	28.22	28.22	28.22
Avg. orif.pres.drop..(IN.WC)	1.13	1.16	1.20
Avg. gas meter temp..(DEF-F)	27.4	34.3	38.5
Volume through gas meter....			
at meter conditions...(CF)	34.30	34.95	35.71
standard conditions.(DSCF)	35.37	35.54	36.01
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	43	44	45
Volumetric flow rate........			
actual..............(ACFM)	33279	33676	34182
dry standard.......(DSCFM)	32593	32869	33313
Isokinetic variation.....(%)	100.3	100.0	99.9
Particulate concentration...			
actual...........(GR/ACF)	0.00560	0.00453	0.00363
dry standard.....(GR/DSCF)	0.00572	0.00465	0.00373
Particle mass rate...(LB/HR)	1.60	1.31	1.06

Test No. 4
Step III No. 7 Line Waste Gas Stack

Results of Opacity Observations - EPA Method 9*

Percent Opacity	Optical Density	Relative Frequency (%)

Test No. 5
Primary Crusher Stack

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	03-30-89	03-30-89	03-30-89
Time run start/end.....(HRS)	1116/1218	1238/1418	1432/1703
Static pressure......(IN.WC)	-0.06	-0.06	-0.06
Cross sectional area (SQ.FT)	27.11	27.11	27.11
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	0.0	0.0	0.0
desiccant..........(GRAMS)	5.0	5.0	5.0
total..............(GRAMS)	5.0	5.0	5.0
Total particulate material.. ....collected(grams)	0.0414	0.0272	0.0206
Gas meter coefficient.......	1.0066	1.0066	1.0066
Barometric pressure..(IN.HG)	28.16	28.16	28.16
Avg. orif.pres.drop..(IN.WC)	1.23	1.13	1.08
Avg. gas meter temp..(DEF-F)	33.4	39.4	37.4
Volume through gas meter....			
at meter conditions...(CF)	36.01	34.84	33.92
standard conditions.(DSCF)	36.61	34.99	34.19
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.306	.306	.306
Avg.stack gas temp ..(DEG-F)	43	44	44
Volumetric flow rate........			
actual..............(ACFM)	33010	31765	30960
dry standard.......(DSCFM)	32396	31116	30313
Isokinetic variation.....(%)	100.0	99.5	99.9
Particulate concentration...			
actual............(GR/ACF)	0.01712	0.01175	0.00910
dry standard.....(GR/DSCF)	0.01745	0.01200	0.00930
Particle mass rate...(LB/HR)	4.85	3.20	2.42

Test No. 6
Step III Turn Bin Stack

Results of Particulate Loading Determinations--------Method 5

	Run 1	Run 2	Run 3
Date of run	03-31-89	03-31-89	03-31-89
Time run start/end.....(HRS)	840/ 949	1007/1109	1125/1226
Static pressure......(IN.WC)	-0.53	-0.53	-0.53
Cross sectional area (SQ.FT)	10.80	10.80	10.80
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser..............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	0.0	0.0	0.0
desiccant..........(GRAMS)	7.0	8.0	8.0
total..............(GRAMS)	7.0	8.0	8.0
Total particulate material.. ....collected(grams)	0.0131	0.0107	0.0087
Gas meter coefficient.......	1.0066	1.0066	1.0066
Barometric pressure..(IN.HG)	28.22	28.22	28.22
Avg. orif.pres.drop..(IN.WC)	1.13	1.16	1.20
Avg. gas meter temp..(DEF-F)	27.4	34.3	38.5
Volume through gas meter....			
at meter conditions...(CF)	34.30	34.95	35.71
standard conditions.(DSCF)	35.37	35.54	36.01
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	43	44	45
Volumetric flow rate........			
actual..............(ACFM)	33279	33676	34182
dry standard.......(DSCFM)	32593	32869	33313
Isokinetic variation.....(%)	100.3	100.0	99.9
Particulate concentration...			
actual............(GR/ACF)	0.00560	0.00453	0.00363
dry standard.....(GR/DSCF)	0.00572	0.00465	0.00373
Particle mass rate...(LB/HR)	1.60	1.31	1.06

3.3 Results of Oxides of Nitrogen Determinations

Test No. 4
Step III No. 7 Line Waste Gas Stack

Results of Oxides of Nitrogen (NOx) Determinations----------Method 7

	Run 1A	Run 1B	Run 1C	Run 1D
Date of run.................	03-30-89	03-30-89	03-30-89	03-30-89
Time of run.............(HRS)	900	1215	1230	1245
Flask number................	7	8	9	10
Volume of flask.........(ML)	2081	2088	2080	2063
Data: time of sampling				
flask temperature..(DEG-F)	26.00	32.00	32.00	32.00
bar. press.........(IN.HG)	28.07	28.07	28.07	28.07
flask vacuum.......(IN.HG)	27.60	27.60	27.60	28.10
flask abs. press...(IN.HG)	0.47	0.47	0.47	-0.03
Data: Time of Flask Opening				
flask temperature..(DEG-F)	76.00	76.00	76.00	76.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	0.90	1.10	1.10	0.60
flask abs. press...(IN.HG)	29.86	30.06	30.06	29.56
Volume gas sampled....(DSML)	1985	2006	1998	1985
Moisture content......(%V/V)	7.26	7.26	7.26	7.26
Nitrate in gas sample...(uG)	1460.0	1510.0	1220.0	1080.0
NO2 in gas sample.......(uG)	1083.3	1120.4	905.2	801.3
<u>NOx Concentration</u>				
(GR/DSCF).................	0.2384	0.2441	0.1980	0.1764
(MG/DSCM).................	546	559	453	404
(PPM-DRY).................	285	292	237	211
(PPM-WET).................	265	271	220	196
NOX Emission rate....(LB/HR)	635.39	650.34	527.49	470.14

Test No. 4
Step III No. 7 Line Waste Gas Stack

Results of Oxides of Nitrogen (NOx) Determinations----------Method 7

	Run 3A	Run 3B	Run 3C	Run 3D
Date of run.................	03-31-89	03-31-89	03-31-89	03-31-89
Time of run............(HRS)	745	800	815	830
Flask number................	68	69	71	72
Volume of flask.........(ML)	2101	2069	2038	2092
Data: time of sampling				
flask temperature..(DEG-F)	44.00	44.00	44.00	44.00
bar. press.........(IN.HG)	28.07	28.07	28.07	28.07
flask vacuum.......(IN.HG)	27.60	27.60	27.60	27.55
flask abs. press...(IN.HG)	0.47	0.47	0.47	0.52
Data: Time of Flask Opening				
flask temperature..(DEG-F)	76.00	76.00	76.00	76.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	-0.80	-0.20	-0.30	-0.30
flask abs. press...(IN.HG)	28.16	28.76	28.66	28.66
Volume gas sampled....(DSML)	1890	1901	1866	1912
Moisture content......(%V/V)	8.97	8.97	8.97	8.97
Nitrate in gas sample...(uG)	1040.0	1040.0	1080.0	1020.0
NO2 in gas sample.......(uG)	771.7	771.7	801.3	756.8
<u>NOx Concentration</u>				
(GR/DSCF).................	0.1784	0.1774	0.1877	0.1730
(MG/DSCM).................	408	406	430	396
(PPM-DRY).................	214	212	225	207
(PPM-WET).................	194	193	204	188
NOX Emission rate....(LB/HR)	426.10	423.59	448.24	413.06

Test No. 1
Step III No. 6 Line Waste Gas Stack

Results of Opacity Observations - EPA Method 9*

Percent Opacity	Optical Density	Relative Frequency (%)
0	0.0000	
5	0.0223	
10	0.0458	
15	0.0706	
20	0.0969	
25	0.1249	
30	0.1549	
35	0.1871	
40	0.2219	
45	0.2596	
50	0.3010	
55	0.3468	
60	0.3979	
65	0.4559	
70	0.5229	
75	0.6021	
80	0.6990	
85	0.8239	
90	1.0000	
95	1.3010	
99	2.0000	
		Time Average

Observer: B. Drake
Cert Date: 10-20-88
Date of Observation: 3-28-89
Time of Observation:

* Unable to perform due to adverse weather conditions.

Interpoll Labs Report No. 9-2747
USS - A Division of USX
Mountain Iron, Minnesota

Test No. 3
Step III No. 6 Line Pellet Cooler Stack

Results of Opacity Observations - EPA Method 9*

Percent Opacity	Optical Density	Relative Frequency (%)
0	0.0000	
5	0.0223	
10	0.0458	
15	0.0706	
20	0.0969	
25	0.1249	
30	0.1549	
35	0.1871	
40	0.2219	
45	0.2596	
50	0.3010	
55	0.3468	
60	0.3979	
65	0.4559	
70	0.5229	
75	0.6021	
80	0.6990	
85	0.8239	
90	1.0000	
95	1.3010	
99	2.0000	

Time Average

Observer: B. Drake
Cert Date: 10-20-88
Date of Observation: 3-28-89
Time of Observation:

* Unable to perform due to adverse weather conditions.

Test No. 4
Step III No. 7 Line Waste Gas Stack

Results of Opacity Observations - EPA Method 9*

Percent Opacity	Optical Density	Relative Frequency (%)
0	0.0000	
5	0.0223	
10	0.0458	
15	0.0706	
20	0.0969	
25	0.1249	
30	0.1549	
35	0.1871	
40	0.2219	
45	0.2596	
50	0.3010	
55	0.3468	
60	0.3979	
65	0.4559	
70	0.5229	
75	0.6021	
80	0.6990	
85	0.8239	
90	1.0000	
95	1.3010	
99	2.0000	

Time Average

Observer: B. Drake
Cert Date: 10-20-88
Date of Observation: 3-29-89
Time of Observation:

* Unable to perform due to adverse weather conditions.

Interpoll Labs Report No. 9-2747
USS - A Division of USX
Mountain Iron, Minnesota

Test No. 5
Primary Crusher Baghouse Outlet

Results of Opacity Observations - EPA Method 9*

Percent Opacity	Optical Density	Relative Frequency (%)
0	0.0000	
5	0.0223	
10	0.0458	
15	0.0706	
20	0.0969	
25	0.1249	
30	0.1549	
35	0.1871	
40	0.2219	
45	0.2596	
50	0.3010	
55	0.3468	
60	0.3979	
65	0.4559	
70	0.5229	
75	0.6021	
80	0.6990	
85	0.8239	
90	1.0000	
95	1.3010	
99	2.0000	

Time Average

Observer: B. Drake
Cert Date: 10-20-88
Date of Observation: 3-30-89
Time of Observation:

* Unable to perform due to adverse weather conditions.

Interpoll Labs Report No. 9-2747
USS - A Division of USX
Mountain Iron, Minnesota

Test No. 6
Step III Turn Bin Stack

Results of Opacity Observations - EPA Method 9*

Percent Opacity	Optical Density	Relative Frequency (%)
0	0.0000	
5	0.0223	
10	0.0458	
15	0.0706	
20	0.0969	
25	0.1249	
30	0.1549	
35	0.1871	
40	0.2219	
45	0.2596	
50	0.3010	
55	0.3468	
60	0.3979	
65	0.4559	
70	0.5229	
75	0.6021	
80	0.6990	
85	0.8239	
90	1.0000	
95	1.3010	
99	2.0000	
		Time Average

Observer: B. Drake
Cert Date: 10-20-88
Date of Observation: 3-31-89
Time of Observation:

* Unable to perform due to adverse weather conditions.

APPENDIX A

RESULTS OF PRELIMINARY VOLUMETRIC FLOW RATE DETERMINATIONS

Test No. 1
Step III No. 6 Waste Gas Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	03-28-89
Time of Determination.......(HRS)	930
Barometric pressure.......(IN.HG)	27.83
Pitot tube coefficient...........	.84
Number of sampling ports.........	4
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	190
Duct area.................(SQ.FT)	196.89
Direction of flow................	UP
Static pressure...........(IN.WC)	-.26
Avg. gas temp.............(DEG-F)	110
Moisture content..........(% V/V)	8.26
Avg. linear velocity.....(FT/SEC)	33.9
Gas density..............(LB/ACF)	.06336
Molecular weight......(LB/LBMOLE)	29.27
Mass flow of gas..........(LB/HR)	1522619
Volumetric flow rate.............	
actual...................(ACFM)	400540
dry standard...........(DSCFM)	316372

Test No. 3
Step III No. 6 Pellet Cooler Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	03-28-89
Time of Determination.......(HRS)	1440
Barometric pressure.......(IN.HG)	27.83
Pitot tube coefficient...........	.84
Number of sampling ports.........	4
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	133.25
Duct area.................(SQ.FT)	96.84
Direction of flow................	UP
Static pressure...........(IN.WC)	-.17
Avg. gas temp.............(DEG-F)	605
Moisture content..........(% V/V)	1.33
Avg. linear velocity.....(FT/SEC)	31.2
Gas density..............(LB/ACF)	.03443
Molecular weight......(LB/LBMOLE)	28.91
Mass flow of gas..........(LB/HR)	374167
Volumetric flow rate.............	
actual...................(ACFM)	181111
dry standard............(DSCFM)	82368

Test No. 4
Step III No. 7 Waste Gas Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	03-29-89
Time of Determination.......(HRS)	810
Barometric pressure.......(IN.HG)	28.17
Pitot tube coefficient...........	.84
Number of sampling ports.........	4
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	190
Duct area.................(SQ.FT)	196.89
Direction of flow................	UP
Static pressure...........(IN.WC)	-.23
Avg. gas temp.............(DEG-F)	107
Moisture content..........(% V/V)	7.26
Avg. linear velocity.....(FT/SEC)	32.2
Gas density..............(LB/ACF)	.06442
Molecular weight......(LB/LBMOLE)	29.12
Mass flow of gas..........(LB/HR)	1472354
Volumetric flow rate.............	
actual...................(ACFM)	380897
dry standard............(DSCFM)	309529

Test No. 5
Primary Crusher Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	03-30-89
Time of Determination.......(HRS)	1100
Barometric pressure.......(IN.HG)	28.16
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	70.5
Duct area.................(SQ.FT)	27.11
Direction of flow................	UP
Static pressure...........(IN.WC)	-.06
Avg. gas temp.............(DEG-F)	43
Moisture content..........(% V/V)	0.64
Avg. linear velocity.....(FT/SEC)	20.9
Gas density..............(LB/ACF)	.07380
Molecular weight......(LB/LBMOLE)	28.84
Mass flow of gas..........(LB/HR)	150185
Volumetric flow rate.............	
actual....................(ACFM)	33915
dry standard.............(DSCFM)	33287

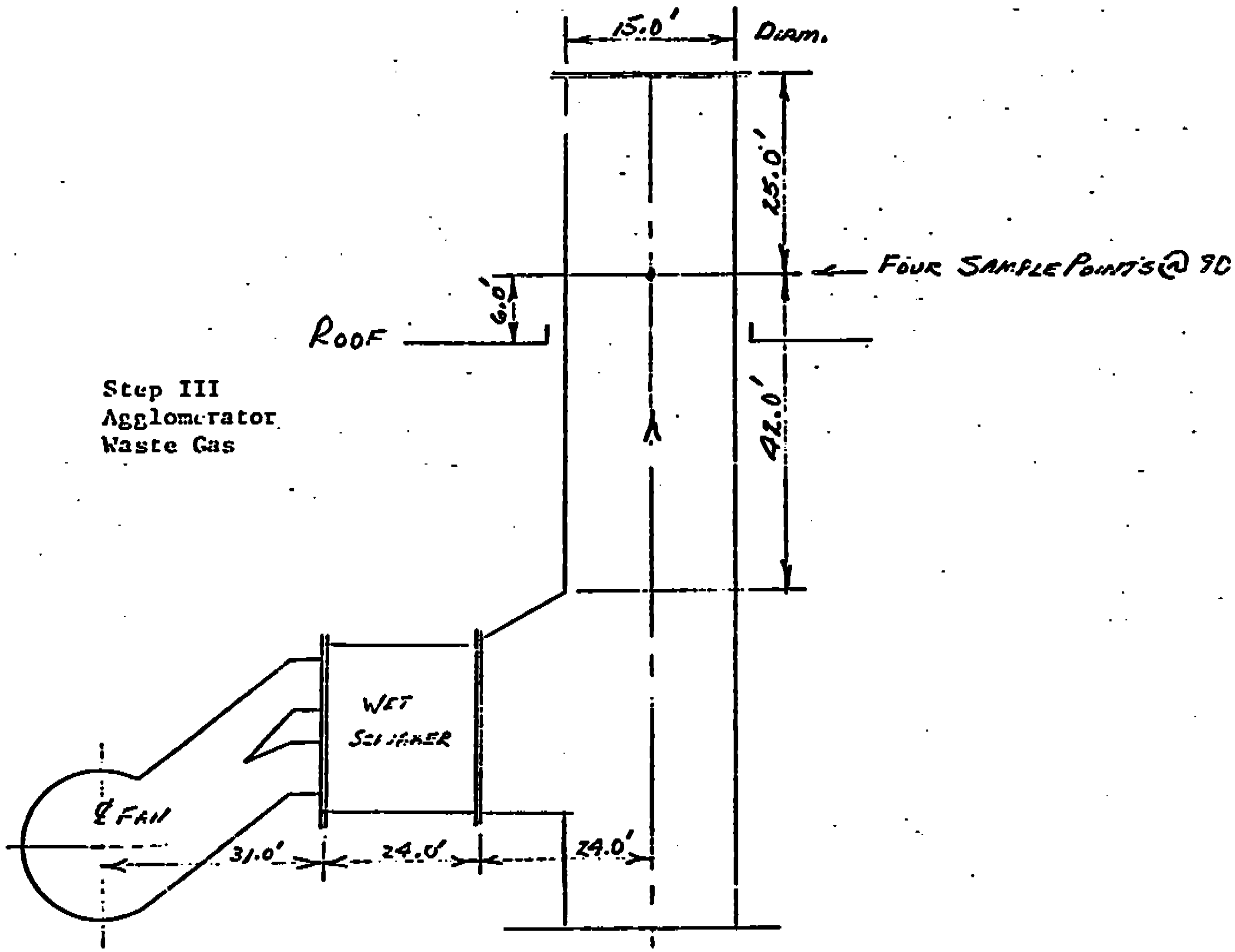
Test No. 6
Step III Turn Bin Stack

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	03-31-89
Time of Determination.......(HRS)	820
Barometric pressure.......(IN.HG)	28.22
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	12
Shape of duct....................	Round
Stack diameter...............(IN)	44.5
Duct area................(SQ.FT)	10.80
Direction of flow................	UP
Static pressure...........(IN.WC)	-.53
Avg. gas temp.............(DEG-F)	44
Moisture content..........(% V/V)	0.92
Avg. linear velocity.....(FT/SEC)	50.9
Gas density..............(LB/ACF)	.07365
Molecular weight......(LB/LBMOLE)	28.84
Mass flow of gas..........(LB/HR)	145779
Volumetric flow rate.............	
actual...................(ACFM)	32991
dry standard............(DSCFM)	32253

APPENDIX B

LOCATION OF TEST PORTS



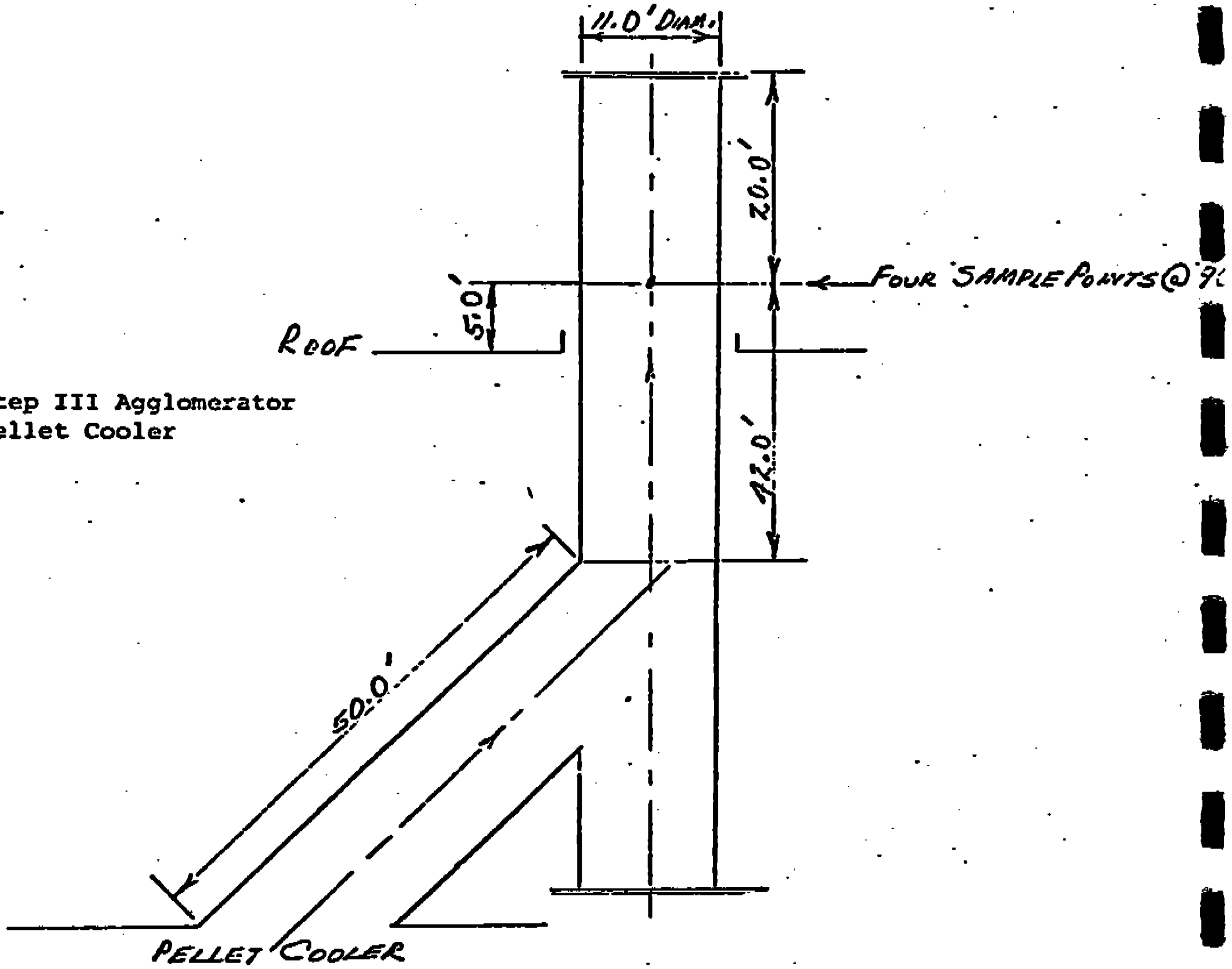
Step III
Agglomerator
Waste Gas

Elevation View

1. Emission Source Number - 8.41
2. " " Flow Sheet Number 247-6-2
3. Stack Diameter - 15.0'.
4. " Design Gas Velocity - 52 FPS
5. " " " Volume - 555,650 CFM
6. " " " Temperature - 125 to 150°F
7. Pollutant - Taconite Dust
8. Stack Loading - 0.024 GR./Cubic Ft
9. Traverse Points - 44

Step III Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, Minnesota

Revised 5-8-79



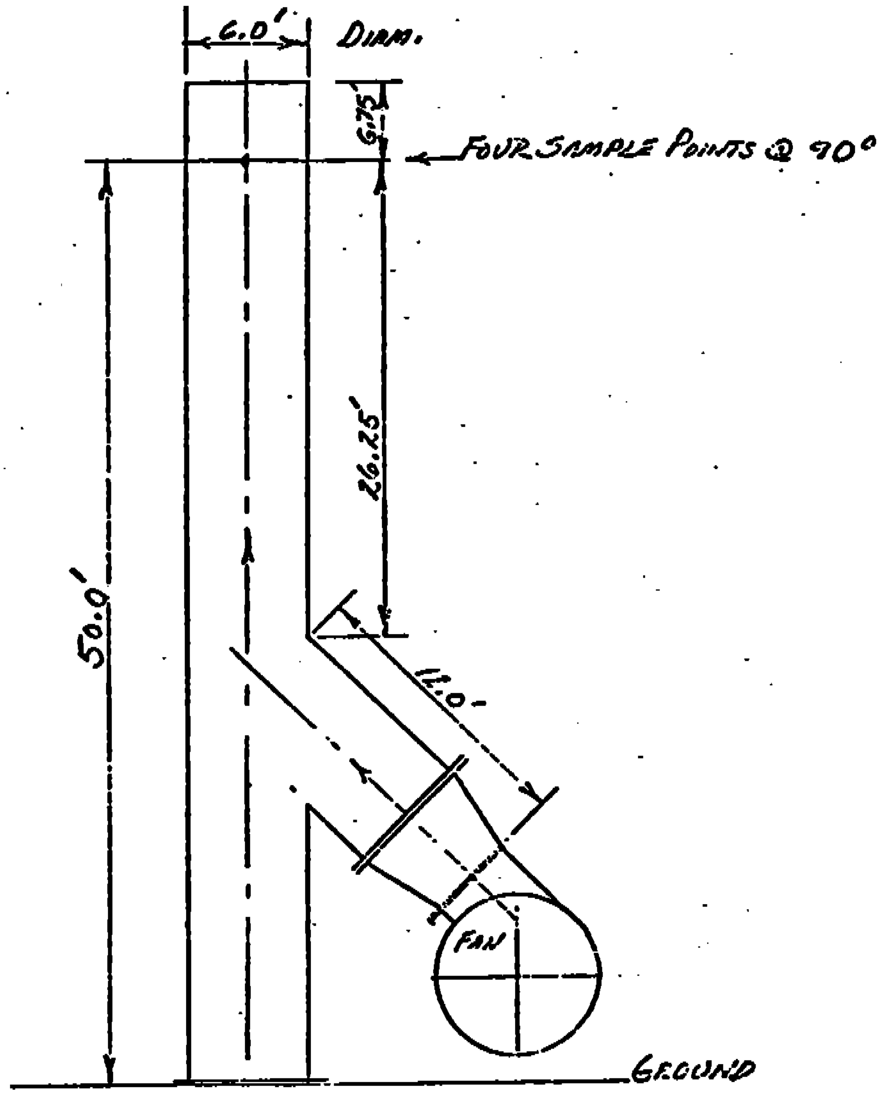
Step III Agglomerator
Pellet Cooler

Elevation View

1. Emission Source Number - 8.55.
2. " " Flow Sheet #262-06-1.
3. Stack Diamter - 11.0'.
4. " Design Gas Velocity - 31.6 FPS.
5. " " " Volume - 180,000 CFM.
6. " " " Temperature - 600-700°F.
7. Pollutant - Taconite Dust
8. Stack Loading - 0.0007 GR/Cubic ft.
9. Traverse Points - 38

Step III Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, Minnesota

Step III
Coarse Crusher
Dump Pocket

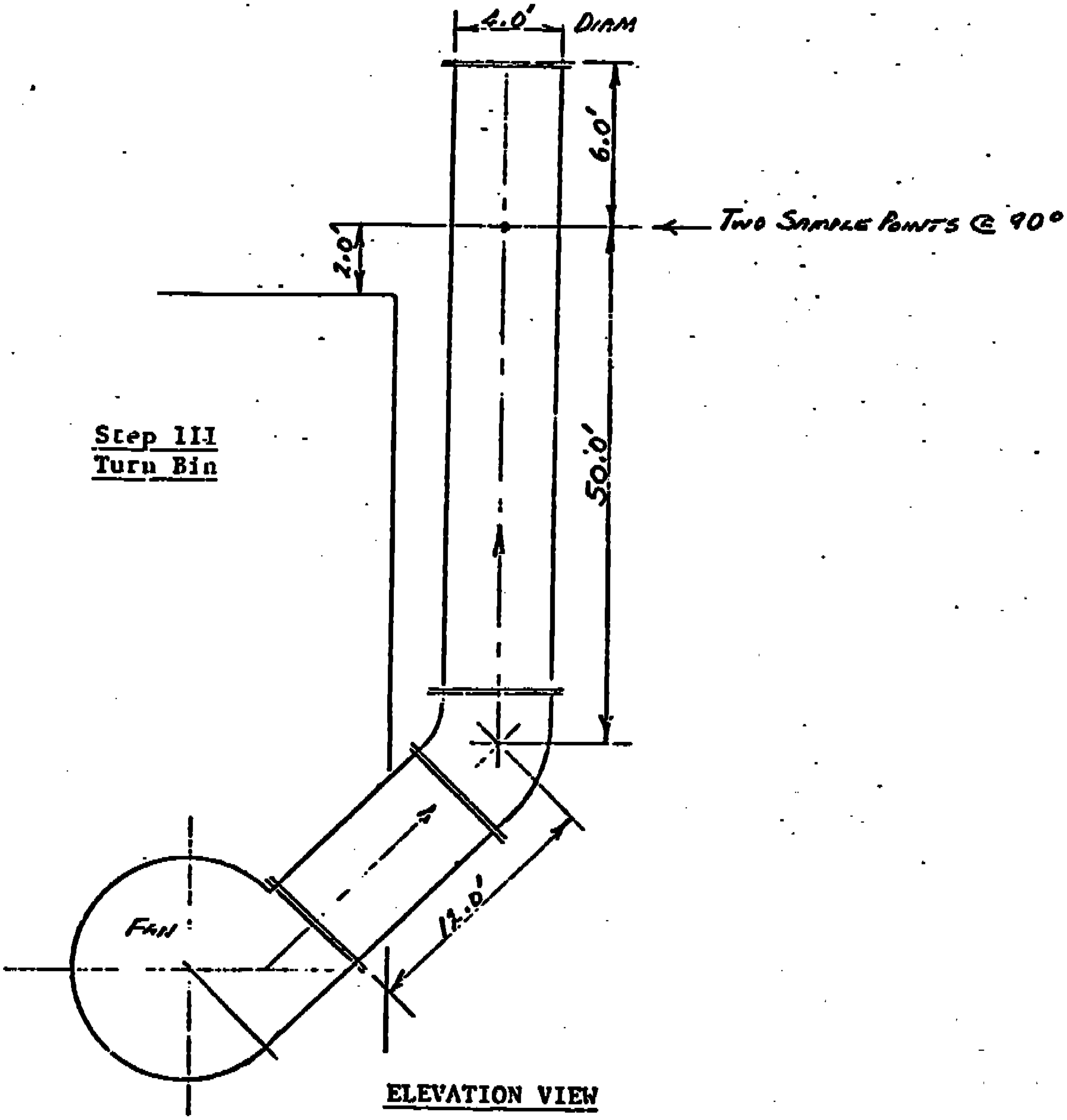


ELEVATION VIEW

1 - Emission source number - 4.6
2 - Emission source flow sheet no. - 058-03-1Cl.
3 - Stack diameter - 6.0'
4 - Stack design gas velocity - 45 FPS
5 - Stack design gas volume - 77,000 CFM.
6 - Stack design gas temperature - (-50 to 90°F).
7 - Pollutant - taconite dust.
8 - Stack loading - 0.0003 GR/Cubic Ft
9 - Traverse points - 36

Step III Coarse Crusher
Minnesota Ore Operations
Minntac, Mt. Iron, Minn.

REVISED 5-8-79



Step III Turn Bin

ELEVATION VIEW

1 - Emission source number - 5.4.
2 - Emission source flow sheet no. - 068-03-1G1.
3 - Stack diameter - 4.0'.
4 - Stack design gas velocity - 66 FPS.
5 - Stack design gas volume - 50,000 CFM.
6 - Stack design gas temperature - 50 to 70°F.
7 - Pollutant - taconite dust.
8 - Stack loading - 0.0008 GR/Cubic Feet.
9 - Traverse Points - 24

Step III Turn Bin
Minnesota Ore Operations
Minntac, Mt. Iron, Minn.

REVISED 5-8-79

APPENDIX C

METHODS 2 - 5 FIELD DATA SHEETS

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job Uss/ Minntac

Source No. STEP III Kiln Waste GAS STACK

Test 1 Run 1 Date 3-28-89

Stack dimen. 190" IN.

Dry bulb ____ °F Wet bulb ____ °F

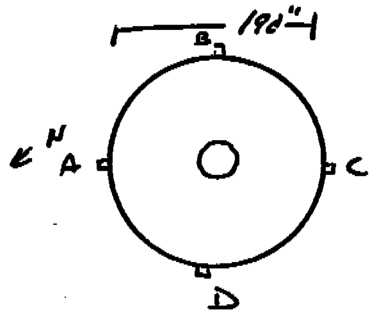
Manometer: ☑ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 27.83 in Hg

Static pressure -.26 in WC

Operators J BURESH & C. Masser

Pitot No. 8-U16 Cp .840



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: 5.5 in.		Time start: 0930 hrs	
A	1		3.99	9.49	.22	110
	2		12.73	18.23	.32	110
	3		22.47	27.92	.32	110
	4		33.63	39.13	.30	110
	5		47.50	53.0	.29	110
	6		67.64	75.14	.29	110
B	1				.35	110
	2				.38	110
	3				.36	110
	4				.34	110
	5				.32	110
	6				.28	110
C	1				.31	110
	2				.30	110
	3				.28	110
	4				.32	110
	5				.32	110
	6				.26	110
D	1				.29	110
	2				.36	110
	3				.32	110
	4				.32	110
	5				.27	110
	6				.30	110
Temp. meas. tool & S/N: PDT 3					Time end: 0949 hrs	

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

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job: USS/Minntac
Source:
Method: 5 Filter holder: Glass

Date: 3-28-8 Test: 1 Run: 1
No. of traverse points: 24
Filter type: Glass

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0 cfm at 7.9 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 826

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

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

Condensate Data:

Item	Weight (g) Final	Weight (g) Tare	Weight (g) Difference
Impinger No. 1	150	100	50
Impinger No. 2	125	100	25
Impinger No. 3			
Condenser			
Desiccant	1384	1369	15
Total			90

Integrated Gas Sampling Data:

Bag Pump No. B1 Box No. 12 Bag No. 1

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 0956 (HRS) Time end: 1059 (HRS)

Sampling rate: 400 cc/min Operator: JB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

CF-D11

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job USS/Minntac
Source Step III No.6 Waste Gas Stack
Date 3-29-87 Test 1 Run 1

Operators JB + CM
Meter Box No. 9 ΔH@ 1.86 IN WC
Gasmeter coeff. 1.0035

Pitot No. 8-V16 Cp .840
Bar. Press. 27.83 inHg H2O 11 x
Nozzle No. 4-5 Nozzle Dia .306 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (xv/v)
	0955	382.70											
A 6	2.5	384.72	.31	2.16	4.72	5.1	112	250	250	47	39	42	17.0
5	5	386.66	.29	2.01	6.66	4.5	112				44	42	16.9
4	7.5	388.48	.25	1.74	8.48	4.1	112				50	44	17.0
3	10	390.39	.27	1.91	0.39	4.2	109	250	250	47	53	44	17.1
2	12.5	392.40	.30	2.12	2.40	4.7	110				56	45	17.1
1	15	394.36	.28	1.99	4.36	4.6	110				57	45	17.2
B 6	17.5	396.32	.28	1.99	6.32	4.6	110				56	45	17.1
5	20	398.41	.32	2.27	8.41	5.1	109				60	46	17.1
4	22.5	400.57	.34	2.43	0.57	5.6	109	250	250	48	60	46	17.1
3	25	402.80	.36	2.57	2.80	6.0	109				62	46	17.1
2	27.5	405.09	.38	2.72	5.09	6.3	109				63	47	17.1
1	30	407.29	.35	2.51	7.29	6.1	109				64	48	17.1
D 6	32.5	409.34	.30	2.15	9.34	5.0	109				61	48	17.1
5	35	411.27	.27	1.93	1.27	4.6	109	250	250	48	64	49	17.0
4	37.5	413.39	.32	2.30	3.39	5.8	109				64	49	17.2
3	40	415.50	.32	2.30	5.50	5.8	109				64	50	17.2
2	42.5	417.74	.36	2.59	7.74	6.1	109				66	50	17.2
1	45	419.76	.29	2.09	9.76	6.0	109	250	250	46	67	50	17.4
C 6	47.5	421.68	.26	1.88	1.68	4.8	109				62	51	17.3
5	50	423.79	.32	2.30	3.79	5.4	109				65	51	17.2
4	52.5	425.91	.32	2.31	5.91	5.4	109				67	52	17.3
3	55	427.90	.28	2.02	7.90	5.0	110				68	52	17.3
2	57.5	429.96	.30	2.17	9.96	5.3	110	250	250	46	68	52	17.3
1	60	432.06	.31	2.24	2.06	5.5	110				69	52	17.4
	(1100)												
	θ = 60	Vm = 49.36		ΔH = 2.20							Avg. = 61.8		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS/Minntac Date 3-28-87 Test 1 Run 2
Source STEP III NO. 6 WASTE GAS STACK No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 10 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 827

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1	151	100	51
Impinger No. 2	125	100	25
Impinger No. 3			
Condenser			
Desiccant	1347	1326	21
Total			97

Integrated Gas Sampling Data:

Bag Pump No. 31 Box No. 12 Bag No. 2

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 1133 (HRS) Time end: 1237 (HRS)

Sampling rate: 400 cc/min Operator: J.B

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job USS/Minntac
Source STEP III NO.6 WASTE GAS STACK
Date 3-28-89 Test 1 Run 2

Operators JB&CM
Meter Box No. 9 ^H@ 1.86 IN WC
Gasmeter coeff. 1.005

Pitot No. 8-V16 Cp .840
Bar. Press. 28.83 inHg H2O 8.5 %
Nozzle No. 4-5 Nozzle Dia .306 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)
		(1132)	(432.30)											
C	6	2.5	434.52	.33	2.51	4.52	5.3	110	250	250	46	55	52	17.2
	5	5	436.67	.32	2.40	6.67	5.2	110				68	52	17.1
	4	7.5	438.69	.28	2.11	8.69	4.9	110				61	52	17.1
	3	10	440.89	.33	2.49	0.89	5.4	110				64	53	17.2
	2	12.5	443.03	.31	2.35	3.03	5.2	110	250	250	46	65	53	17.3
	1	15	444.88	.23	1.76	4.88	4.0	106				67	53	17.3
D	6	17.5	446.96	.29	2.21	6.96	5.1	107				63	53	17.3
	5	20	449.17	.33	2.50	9.17	5.4	108				67	54	17.1
	4	22.5	451.42	.34	2.59	1.42	5.9	108	250	250	46	69	54	17.1
	3	25	453.68	.34	2.60	3.68	6.0	108				69	54	17.1
	2	27.5	455.97	.35	2.67	5.97	6.1	108				69	54	17.2
	1	30	458.12	.31	2.37	8.12	5.7	108				69	54	17.1
A	6	32.5	460.28	.31	2.37	0.28	5.7	108	250	250	46	67	55	17.1
	5	35	462.50	.33	2.52	2.50	6.0	108				70	55	17.2
	4	37.5	464.66	.31	2.37	4.66	5.6	108				70	55	17.2
	3	40	466.72	.28	2.14	6.72	5.0	108				70	56	17.3
	2	42.5	468.91	.32	2.45	8.91	5.7	108	250	250	47	70	56	17.3
	1	45	471.14	.33	2.53	1.14	5.9	108				71	56	17.3
B	6	47.5	473.37	.33	2.53	3.37	5.9	108				70	57	17.3
	5	50	475.61	.33	2.54	5.61	6.0	105				71	57	17.2
	4	52.5	477.88	.34	2.62	7.88	6.2	105	250	250	47	71	58	17.3
	3	55	480.12	.33	2.55	0.12	6.0	105				72	58	17.3
	2	57.5	482.47	.36	2.78	2.47	6.5	105				72	58	17.4
	1	60	484.78	.35	2.70	4.78	6.4	105				72	58	17.2
		(1238)												
		θ = 60	Vm = 52.48		^H = 2.44							Avg. = 61.2		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS/Minntac Date 3-28-89 Test 1 Run 3
Source STEP III Line 6 WASTE GAS STACK No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 10 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 830

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	145	100	45
Impinger No. 2	120	100	20
Impinger No. 3			
Condenser			
Desiccant	1405	1384	21
Total			86

Integrated Gas Sampling Data:

Bag Pump No. B1 Box No. 12 Bag No. 3

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 1253 (HRS) Time end: 1358 (HRS)

Sampling rate: 400 cc/min Operator: JB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

CF-D11

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS / Minntac
Source: STEDIT NO.6 WASTE GAS STACK
Date: 3-28-89 Test: 1 Run: 3

Operators: JB + CM
Meter Box No.: 5 ^H@: 1.86 IN WC
Gasmeter coeff.: 1.0085

Pitot No.: B-V16 Cp: .840
Bar. Press.: 29.83 inHg H2O: 8.25%
Nozzle No.: 4-5 Nozzle Dia: .306 IN.

Traverse Point No.		Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Obs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (xv/v)
		(1253)	485.00											
B	6	2.5	487.15	.31	2.37	7.15	5.2	107	250	250	47	60	58	17.1
	5	5	489.59	.34	2.59	9.40	5.5	107				64	58	17.0
	4	7.5	491.45	.28	2.145	1.45	4.9	107				67	58	17.0
	3	10	493.68	.33	2.53	3.68	5.5	107				68	58	17.1
	2	12.5	495.84	.31	2.38	5.84	6.3	107	250	250	46	69	58	17.1
	1	15	497.97	.30	2.31	7.97	5.2	107				69	58	17.2
A	6	17.5	500.07	.29	2.23	0.07	4.9	107				67	58	17.2
	5	20	502.23	.31	2.37	2.23	6.3	108				69	58	17.3
	4	22.5	504.25	.27	2.07	4.25	5.0	108	250	250	46	70	58	17.4
	3	25	506.35	.29	2.23	6.35	5.2	108				70	58	17.4
	2	27.5	508.58	.33	2.53	8.58	5.8	108				71	59	17.5
	1	30	510.75	.31	2.38	0.75	5.6	108				72	59	17.5
D	6	32.5	512.99	.33	2.54	2.99	5.8	109	250	250	46	70	59	17.5
	5	35	515.22	.33	2.53	5.22	5.8	109				71	60	17.4
	4	37.5	517.43	.32	2.46	7.43	5.7	109				73	60	17.4
	3	40	519.77	.36	2.77	9.77	6.1	109				74	60	17.3
	2	42.5	522.05	.34	2.62	2.05	6.0	109				76	60	17.2
	1	45	524.39	.36	2.78	4.39	6.2	109	250	250	46	77	60	17.2
C	6	47.5	526.61	.32	2.47	6.61	5.6	109				71	61	17.1
	5	50	528.75	.30	2.31	8.75	6.3	109				76	61	17.2
	4	52.5	531.06	.35	2.70	1.06	6.0	109				77	62	17.2
	3	55	533.42	.36	2.79	3.42	6.0	109	250	250	46	78	62	17.2
	2	57.5	535.84	.38	2.94	5.84	6.9	109				78	62	17.2
	1	60	538.10	.33	2.56	8.10	5.7	109				78	62	17.2
		(1359)												
		θ = 60	Vm = 53.10		^H 2.49							Avg. = 65.4		

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job USS MINNTAC

Source Step III NO.6 Pellet cooler

Test 3 Run 1 Date 3-28-89

Stack dimen. 133.25 IN.

Dry bulb ____ °F Wet bulb ____ °F

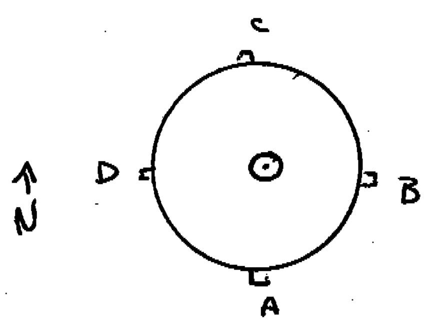
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 27.83 in Hg

Static pressure -.17 in WC

Operators JBURESH + CMOSSER

Pitot No. 8-U16 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: 8.25 in.		Time start: 1440 hrs	
A	1			11.05	.10	597
	2			17.18	.12	598
	3			23.97	.16	597
	4			31.84	.17	594
	5			41.56	.16	591
	6			55.69	.17	590
B	1				.11	605
	2				.12	615
	3				.15	615
	4				.15	615
	5				.16	615
	6				.13	615
C	1				.10	600
	2				.13	600
	3				.15	600
	4				.18	600
	5				.19	600
	6				.17	600
D	1				.10	605
	2				.13	606
	3				.16	608
	4				.17	610
	5				.15	620
	6				.10	625
Temp. meas. tool & S/N: PDT-3					Time end: 1449 hrs	

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

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS/Minntac
Source No. 6 Pellet Cooler
Method 5 Filter holder: Glass

Date 3-28-89 Test 3 Run 1
No. of traverse points 24
Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 5 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 829

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	100	100	0
Impinger No. 2	100	100	0
Impinger No. 3			
Condenser			
Desiccant	1245	1234	11
Total			11

Integrated Gas Sampling Data:

Bag Pump No. 31 Box No. 17 Bag No. 1

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 1547 (HRS) Time end: 1649 (HRS)

Sampling rate: 400 cc/min Operator: JLB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS/Minntac
Source: No. 6 Pellet Cooler
Date: 3-28-89 Test 3 Run 1

Operators: JB + cm
Meter Box No. 9 ΔH@ 1.86 IN WC
Gasmeter coeff. 1.0085

Pitot No. 5-V16 Cp .84
Bar. Press. 27.83 inHg H2O 4 %
Nozzle No. 4-6 Nozzle Dia .375 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 (xv/v)
	(1547)	(542.40											
A- 6	2.5	544.26	.16	1.68	4.26	3.3	597	250	250	46	100	102	20.6
5	5	546.17	.16	1.72	6.17	3.3	598				103	102	20.7
4	7.5	548.16	.17	1.86	8.16	3.5	580				104	102	20.9
3	10	550.01	.15	1.62	0.01	2.7	592				105	102	20.9
2	12.5	551.13	.14	1.51	1.13	2.5	594				106	103	20.9
1	15	553.47	.12	1.29	3.47	2.3	600	250	250	46	107	104	20.7
B 6	17.5	555.20	.13	1.40	5.20	2.5	600				108	104	20.9
5	20	557.09	.16	1.68	7.09	3.1	630				108	104	20.7
4	22.5	558.97	.15	1.64	8.97	3.1	685				108	105	20.8
3	25	560.86	.15	1.67	0.86	3.2	570				108	105	20.9
2	27.5	562.53	.12	1.32	2.53	3.0	585	250	250	47	108	105	20.9
1	30	564.14	.11	1.21	4.14	2.7	582				108	105	20.9
C 6	32.5	566.14	.17	1.87	6.14	3.5	580				108	106	20.9
5	35	568.18	.19	1.95	8.18	3.9	680				108	106	20.7
4	37.5	570.13	.18	1.78	0.13	3.7	700				108	106	20.7
3	40	571.94	.15	1.53	1.94	3.1	665	250	250	48	108	106	20.8
2	42.5	573.64	.13	1.34	3.64	3.0	650				108	106	20.9
1	45	575.17	.10	1.09	5.17	2.3	590				108	106	20.9
D 6	47.5	577.05	.15	1.65	7.05	3.1	580				106	106	20.9
5	50	579.06	.17	1.89	9.06	3.7	570	250	250	48	106	106	20.9
4	52.5	581.02	.17	1.80	1.02	3.6	620				105	106	20.9
3	55	582.91	.16	1.68	2.91	3.6	630				104	106	20.9
2	57.5	584.65	.13	1.41	4.65	3.0	694				104	106	20.9
1	60	586.19	.10	1.11	6.19	2.1	570	250	250	48	104	106	20.9
	(1650)												
	θ = 60	Vm = 43.79		ΔH = 1.57							Avg. = 105.5		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Minntac Date 3-28-89 Test 3 Run 2
Source #6 Pellet Cooler No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 5.5 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 831

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1	100	100	0
Impinger No. 2	100	100	0
Impinger No. 3			
Condenser			
Desiccant	1356	1347	9
Total			9

Integrated Gas Sampling Data:

Bag Pump No. 84 Box No. 17 Bag No. 2

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 1707 (HRS) Time end: 1809 (HRS)

Sampling rate: 400 cc/min Operator: JB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: #6 Pellet Cooler
Date: 3-28-89 Test 3 Run 2
Operators: JB + CW
Meter Box No. 9 ΔH@ 1.86 IN WC
Gasmeter coeff. 1.0085
Pitot No. S-U16 Cp .84
Bar. Press. 28.83 inHg H2O ~ x
Nozzle No. 4-6 Nozzle Dia .375 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 (xv/v)
	(1706)	586.40											
D 6	2.5	588.33	.15	1.75	8.33	3.6	570	250	250	48	104	104	20.9
5	5	590.29	.16	1.81	0.29	3.7	600				104	104	20.9
4	7.5	592.26	.17	1.82	2.26	3.7	660				104	104	20.9
3	10	594.10	.15	1.59	4.10	3.1	670				104	104	20.9
2	12.5	595.89	.13	1.51	5.89	3.0	670	250	250	48	104	104	20.9
1	15	597.48	.10	1.18	7.48	2.7	560				104	104	20.9
C 6	17.5	599.33	.14	1.62	9.33	3.3	575				104	105	20.7
5	20	601.43	.18	2.06	1.43	4.1	590				104	105	20.9
4	22.5	603.55	.18	2.12	3.55	4.1	560	250	250	47	105	105	20.9
3	25	605.38	.14	1.58	5.38	3.3	608				106	105	20.8
2	27.5	607.06	.12	1.32	7.06	3.0	625				106	105	20.6
1	30	608.59	.10	1.09	8.59	2.4	640				106	106	20.5
B 6	32.5	610.57	.17	1.84	0.57	3.8	650	250	250	47	106	106	20.3
5	35	612.59	.16	1.90	2.59	3.9	552				106	106	20.9
4	37.5	614.60	.16	1.90	4.60	3.9	553				106	106	20.9
3	40	616.61	.16	1.89	6.61	3.9	558				106	106	20.9
2	42.5	618.68	.17	2.02	8.68	4.0	555				106	106	20.9
1	45	620.34	.11	1.29	0.34	3.0	570	250	250	47	106	106	20.9
A 6	47.5	622.44	.18	2.07	2.44	4.1	585				105	105	20.9
5	50	624.54	.17	2.07	4.54	4.1	500				105	105	20.9
4	52.5	626.75	.18	2.28	6.75	4.5	488				105	105	20.9
3	55	628.78	.15	1.96	8.78	4.0	460				105	105	20.9
2	57.5	630.90	.17	2.12	0.90	4.2	504				105	105	20.9
1	60	632.66	.12	1.45	2.66	3.3	535	250	250	47	105	105	20.9
	(1810)												
	θ = 60	Vm = 46.26		ΔH = 1.7							Avg. = 105.0		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS / Mintec Date 3-28-89 Test 3 Run 3
Source #6 Pellet cooler No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Posttest: 0.00 cfm at 5.7 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 879

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

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

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impinger No. 1	100	100	0
Impinger No. 2	100	100	0
Impinger No. 3			
Condenser			
Desiccant	1230	1245	15
Total			15

Integrated Gas Sampling Data:

Bag Pump No. B1 Box No. 17 Bag No. 2

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 1825 (HRS) Time end: 1930 (HRS)

Sampling rate: 400 cc/min Operator: JB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: No. 6 Pellet Cooler
Date: 3-28-89 Test 3 Run 3

Operators: JB + BD
Meter Box No. 7 ^H@ 1.66 IN WC
Gasmeter coeff. 1.0085

Pitot No. S-V16 Cp .84
Bar. Press. 29.83 inHg H2O 1 %
Nozzle No. 4-6 Nozzle Dia .375 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Obs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Cond/In	Cond/Out	Oxygen (%v/v)
	(1824)	633.10											
A 6	2.5	635.29	.18	2.27	5.29	4.0	490	250	250	47	105	105	20.9
5	5	637.44	.18	2.16	7.44	3.9	540				105	105	20.9
4	7.5	639.62	.19	2.24	9.62	4.0	560				105	105	20.9
3	10	641.80	.19	2.24	1.80	4.0	560				105	106	20.9
2	12.5	643.85	.17	1.98	3.85	3.4	570				105	105	20.9
1	15	645.76	.15	1.71	5.76	3.3	595	250	250	47	105	106	20.9
B 6	17.5	647.80	.17	1.95	7.80	3.6	590				105	106	209
5	20	649.84	.17	1.95	9.84	3.6	590				105	106	209
4	22.5	651.92	.17	2.04	1.92	3.7	540				105	106	20.9
3	25	654.00	.17	2.02	4.00	3.7	550	250	250	47	105	106	20.9
2	27.5	656.03	.17	1.95	6.03	3.6	590				104	104	20.9
1	30	657.74	.12	1.37	7.74	2.6	590				103	104	20.9
C 6	32.5	659.84	.18	2.06	9.84	3.7	585				103	104	20.9
5	35	661.81	.15	1.83	1.81	3.5	520	250	250	47	102	103	20.9
4	37.5	663.83	.16	1.93	3.83	4.0	530				102	103	20.9
3	40	665.80	.15	1.82	5.80	3.7	526				102	103	20.9
2	42.5	667.59	.13	1.51	7.59	2.8	570				102	103	20.9
1	45	669.16	.10	1.16	9.16	2.5	570				102	103	20.9
D 6	47.5	671.15	.16	1.86	1.15	2.5	570				103	104	20.9
5	50	673.13	.15	1.82	3.13	2.5	530	250	250	46	103	104	20.9
4	52.5	674.98	.15	1.64	4.98	3.2	535				103	104	20.9
3	55	676.83	.14	1.61	6.83	3.2	535				103	104	20.9
2	57.5	678.63	.13	1.53	8.63	3.0	560				103	104	20.9
1	60	680.36	.12	1.41	0.36	2.9	560				103	104	20.9
	(1931)												
	θ = 60	Vm = 47.26		^H = 1.84							Avg. =	106.5	

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job USS Minntac

Source STEP III NO. 7 WASTE GAS LINE

Test 4 Run 1 Date 3-29-89

Stack dimen. 170 IN.

Dry bulb ____ °F Wet bulb ____ °F

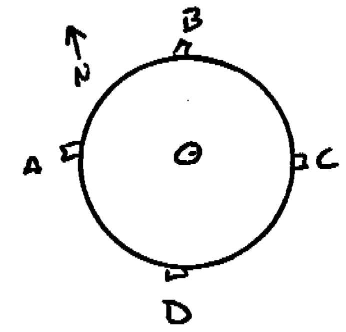
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.17 in Hg

Static pressure -.23 in WC

Operators JBunsh + C MOSSER

Pitot No. 8-V16 Cp .840



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: 5.5 in.		Time start: 0810 hrs	
A	1		3.99	9.49	.33	107
	2		12.73	18.23	.35	107
	3		22.47	27.92	.35	107
	4		33.63	39.13	.32	107
	5		47.50	53.00	.32	107
	6		67.64	75.14	.28	107
B	1				.32	107
	2				.33	107
	3				.28	107
	4				.26	107
	5				.26	107
	6				.31	107
C	1				.30	107
	2				.27	107
	3				.31	107
	4				.25	107
	5				.25	107
	6				.25	107
D	1				.26	107
	2				.26	107
	3				.25	107
	4				.23	107
	5				.22	107
	6				.27	107
Temp. meas. tool & S/N: PDT-3					Time end: 0829 hrs	

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

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Minntac
Source StepIII NO.7 WASTE GAS LINE
Method 5 Filter holder: Glass

Date 3-21-89 Test 4 Run 1
No. of traverse points 24
Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.005 cfm at 7 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 880

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

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

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impinger No. 1	140	100	40
Impinger No. 2	120	100	20
Impinger No. 3			
Condenser			
Desiccant	1226	1207	19
Total			79

Integrated Gas Sampling Data:

Bag Pump No. B-1 Box No. 19 Bag No. 1

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 0858 (HRS) Time end: 1302 (HRS)

Sampling rate: 400 cc/min Operator: JB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

S-0046RR

CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: Step 3 No. 7 Waste 5.7s Stack
Date: 3-24-87 Test: 4 Run: 1

Operators: JB + BD + CM
Meter Box No.: 5 ^H@: 1.86 IN WC
Gasmeter coeff.: 1.0185

Pitot No.: 8-V16 Cp: .84
Bar. Press.: 29.17 inHg H2O: 8.5%
Nozzle No.: 4-5 Nozzle Dia: .306 IN.

Down at 1:15
Up at 1200

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Stack (°F)	Probe (°F)	Oven (°F)	Impg. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (xv/v)
	(0257)	680.60											
A- 6	2.5	682.77	.38	2.66	2.77	7.0	107	250	250	44	21	20	17.2
5	5	684.78	.32	2.25	4.78	6.0	107				24	20	17.3
4	7.5	686.79	.32	2.26	6.79	6.0	106				28	20	17.5
3	10	688.90	.35	2.48	8.90	6.3	107				30	21	17.7
2	12.5	691.02	.35	2.48	1.02	6.3	107				31	21	17.3
1	15	693.07	.33	2.34	3.07	6.0	107	250	250	47	33	22	17.1
B 6	17.5	695.11	.32	2.28	5.11	5.0	107				31	24	17.3
5	20	696.91	.25	1.75	6.91	4.0	107				35	25	17.4
4	22.5	698.79	.26	1.88	8.76	4.5	102				37	25	17.5
3	25	700.72	.29	2.10	0.72	4.9	103				40	25	17.4
2	27.5	702.81	.33	2.39	2.81	5.9	104	250	250	48	40	25	17.5
1	30	704.93	.32	2.32	4.87	5.7	103				40	25	17.5
C 6	32.5	706.65	.24	1.74	6.65	4.9	103				37	25	17.6
5	35	708.51	.26	1.88	8.51	4.3	103				39	26	17.5
4	37.5	710.33	.25	1.81	0.33	4.2	103				40	27	17.3
3	40	712.40	.32	2.32	2.40	5.5	103	250	250	47	40	28	17.4
2	42.5	714.90	.27	1.96	4.30	5.1	103				40	28	17.4
1	45	716.27	.29	2.11	6.27	5.2	103				40	28	17.5
D 6	47.5	717.98	.22	1.60	7.98	4.5	103				40	28	17.5
5	50	719.74	.23	1.67	9.74	4.4	103				40	28	17.4
4	52.5	721.50	.23	1.67	1.50	4.6	103	250	250	46	40	28	17.5
3	55	723.29	.24	1.75	3.29	4.6	103				41	28	17.5
2	57.5	725.16	.26	1.89	5.16	4.8	103				41	28	17.5
1	60	726.95	.24	1.75	6.95	4.7	103				41	28	17.5
	(1303)												
	θ = 60	Vm = 46.35		^H = 2.06							Avg. = 30.6		

2:45

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS/Minntac Date 3-29-89 Test 4 Run 2
Source STEP III NO. 3 WASTE GAS LINE No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.014 cfm at 6.3 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 881

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

No. of probe wash bottles: 1
Sample recovered by: J BURESH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1	139	100	39
Impinger No. 2	130	100	30
Impinger No. 3			
Condenser			
Desiccant	1498	1480	18
Total			87

Integrated Gas Sampling Data:

Bag Pump No. B-1 Box No. 19 Bag No. 2

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 1327 (HRS) Time end: 1431 (HRS)

Sampling rate: 400 cc/min Operator: JB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

CF-011

Job USS Minntac
Source STEP III No.7 WASTE GAS STACK
Date 3-24-89 Test 4 Run 2

Operators JB + CM + DD
Meter Box No. 9 ΔH@ 1.86 IN WC
Gasmeter coeff. 1.0035

Pitot No. 8-V16 Cp .840
Bar. Press. 29.7 inHg H2O 7.5 %
Nozzle No. 45 Nozzle Dia .306 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgm Vol. (cf)	VAC. inHg	Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
							Temperatures (°F)						
	1326	727.20											
D 6	2.5	729.03	.25	1.84	9.03	4.5	103	250	250	43	32	27	17.6
5	5	730.75	.22	1.61	0.75	3.8	103				39	28	17.6
4	7.5	732.52	.23	1.71	2.52	3.9	103				41	28	17.7
3	10	734.34	.25	1.85	4.34	4.2	103	250	250	43	43	28	17.7
2	12.5	736.36	.29	2.15	6.36	4.8	103				44	28	17.8
1	15	738.32	.28	2.08	8.32	4.9	103				44	29	17.6
C 6	17.5	740.21	.26	1.94	0.21	4.4	103				48	29	17.6
5	20	742.22	.29	2.16	2.22	5.1	104				48	30	17.9
4	22.5	744.19	.28	2.09	4.19	6.0	104	250	250	44	50	31	17.9
3	25	746.23	.30	2.25	6.23	5.3	104				51	33	17.6
2	27.5	748.35	.32	2.40	8.35	5.8	104				51	33	17.3
1	30	750.22	.25	1.87	0.22	4.4	106				52	33	17.1
B 6	32.5	752.20	.28	2.10	2.20	5.1	106	250	250	45	48	34	17.5
5	35	754.24	.30	2.24	4.24	5.1	106				50	34	17.4
4	37.5	756.26	.29	2.17	6.26	5.1	105				50	34	17.4
3	40	758.37	.32	2.40	8.37	5.8	105				50	35	17.7
2	42.5	760.55	.34	2.55	0.55	6.0	105	250	250	45	51	35	17.8
1	45	762.74	.34	2.55	2.74	6.0	105				51	36	17.8
A 6	47.5	764.61	.25	1.88	4.61	4.8	105				47	36	17.4
5	50	766.41	.23	1.72	6.41	4.3	105				49	36	17.3
4	52.5	768.25	.24	1.80	8.25	4.4	106	250	250	45	50	36	17.5
3	55	770.12	.25	1.88	0.12	4.6	105				50	36	17.6
2	57.5	772.07	.27	2.03	2.07	5.0	105				51	36	17.7
1	60	773.99	.26	1.96	3.98	4.9	105				51	37	17.8
	(1431)												
	θ = 60	Vm = 46.79		ΔH 2.05							Avg. = 40.1		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Minntac Date 3-30-89 Test 4 Run 3
Source STEP III NO.7 WASTE GAS Line No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: ≤ 0.03 cfm at 7 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 896

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

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

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impinger No. 1	150	100	50
Impinger No. 2	120	100	20
Impinger No. 3			
Condenser			
Desiccant	1347	1326	21
Total			91

Integrated Gas Sampling Data:

Bag Pump No. B-1 Box No. 19 Bag No. 3

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

Pretest leak check: 0.00 cc/min at 15 in. Hg.

Time start: 0738 (HRS) Time end: 0841 (HRS)

Sampling rate: 400 cc/min Operator: JB

S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

CF-D11

Job USS Minntac
Source STEP ?? No. 7 Line WASTEGAS
Date 5-30-89 Test 4 Run 3
Operators JB +CM+BD
Meter Box No. 9 ΔH@ 1.60 IN WC
Gasmeter coeff. 1.0005
Pitot No. 8-V16 Cp .840
Bar. Press. 28.17 inHg H2O 7.5 %
Nozzle No. 4-5 Nozzle Dia .316 IN.

Traverse Point No.		Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgs. Vol. (cf)	VAC. inHg	Stack (°F)	Probe (°F)	Oven (°F)	Impg. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (v/v)
		0737	774.90											
A	6	2.5	776.85	.30	2.14	6.85	5.4	108	250	250	45	36	33	17.3
	5	5	778.80	.28	2.06	8 80	5.0	108				40	33	17.1
	4	7.5	780.62	.24	1.77	0.62	4.2	107				42	34	16.9
	3	10	782.58	.28	2.07	2.58	4.9	109				44	34	17.3
	2	12.5	784.65	.31	2.30	4.65	5.5	108	250	250	46	46	34	17.2
	1	15	786.62	.28	2.08	6.62	6.0	108				46	34	17.2
B	6	17.5	788.66	.30	2.23	8.66	5.2	108				46	35	17.4
	5	20	790.76	.32	2.38	0.76	5.7	108				48	35	17.3
	4	22.5	792.84	.31	2.31	2.84	5.7	108	250	250	47	51	36	17.3
	3	25	794.96	.32	2.39	4.96	5.8	108				52	36	17.2
	2	27.5	796.88	.26	1.95	6.88	4.9	108				52	37	17.0
	1	30	798.43	.17	1.27	8.43	3.1	108				53	37	16.8
C	6	32.5	799.94	.16	1.20	9.94	3.0	108	250	250	48	49	38	16.7
	5	35	801.49	.17	1.27	1.49	3.1	108				52	38	16.7
	4	37.5	803.29	.23	1.73	3.29	4.2	108				53	38	17.0
	3	40	805.45	.33	2.48	5.45	6.0	108				54	39	17.2
	2	42.5	807.06	.18	1.36	7.06	3.5	108	250	250	49	55	40	16.9
	1	45	809.11	.15	1.58	9.11	4.0	108				55	40	17.1
D	6	47.5	810.58	.15	1.13	0.58	3[illegible]	108				51	40	17.0
	5	50	812.09	.16	1.20	2.09	3.0	109				54	41	17.0
	4	52.5	813.55	.15	1.13	3.55	3.0	108	250	250	50	55	41	17.0
	3	55	815.37	.23	1.74	5.37	4.0	108				56	42	17.0
	2	57.5	817.27	.25	1.89	7.27	4.4	108				57	42	16.8
	1	60	819.20	.26	1.97	9.20	4.7	108						
		(0842)												
		θ = 60	Vm = 44.30		ΔH = 1.80							Avg. = 52.2		

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job USS Minntac

Source Primary Crusher

Test 5 Run 1 Date 3-30-89

Stack dimen. 70.5 IN.

Dry bulb ____ °F Wet bulb ____ °F

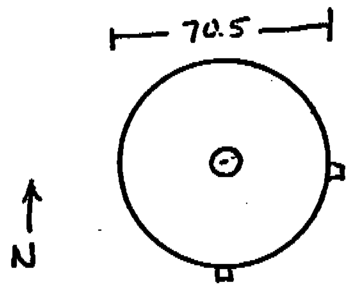
Manometer: ☑ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.16 in Hg

Static pressure -.06 in WC

Operators JBURESH + CMOSSER

Pitot No. 6-U16 Cp .840



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 in.		Time start: 1103 hrs	
A	1		1.48	5.48	.11	43
	2		4.72	8.72	.13	43
	3		8.32	12.32	.14	43
	4		12.48	16.48	.15	43
	5		17.63	21.63	.16	43
	6		25.10	29.10	.14	43
	7		45.40	49.40	.14	43
	8		52.88	56.88	.15	43
	9		58.02	62.02	.14	43
	10		62.18	66.18	.15	43
	11		65.78	69.78	.13	43
	12		69.02	73.02	.12	43
B	1				.09	43
	2				.10	43
	3				.15	43
	4				.16	43
	5				.16	43
	6				.19	43
	7				.12	43
	8				.12	43
	9				.13	43
	10				.15	43
	11				.14	43
	12				.11	43
Temp. meas. tool & S/N: PDT-3					Time end: 1113 hrs	

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

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Minntac
Date 3-30-89 Test 5 Run 1
Source Primary Crusher
No. of traverse points 24
Method 5 Filter holder: Glass
Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 6 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 897

Recovery solvent(s): ☑ acetone ☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: J BURESH

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1370	1365	5
Total			5

Integrated Gas Sampling Data: Ambient O_2 = 20.9% CO_2 = 7.01%

Bag Pump No. ______ Box No. ______ Bag No. ______

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

Pretest leak check: ______ cc/min at ______ in. Hg.

Time start: ______ (HRS) Time end: ______ (HRS)

Sampling rate: ______ cc/min Operator: ______

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

CF-023

CF-D11

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: Primary Crusher
Date: 3-30-89 Test 5 Run 1

Operators: JBURESH
Meter Box No. 2 ^H@ 1.86 IN WC
Gasmeter coeff. 1.0066

Pitot No. 6-U16 Cp .840
Bar. Press. 28.16 inHg H2O .5 %
Nozzle No. 4-5 Nozzle Dia .366 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.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1116)	931.60											
A- 6 12	2.5	933.09	.13	1.22	3.09	1.0	43	250	250	42	30	28	20.9
5 11	5	934.70	.15	1.41	4.70	1.0	43				32	28	20.9
4 10	7.5	936.26	.14	1.32	6.26	1.0	43				33	28	20.9
3 9	10	937.64	.11	1.04	7.64	.9	43				33	28	20.9
2 8	12.5	939.14	.13	1.22	9.14	.8	43	250	250	42	35	28	20.9
7	15	940.59	.12	1.13	0.59	.9	43				37	28	20.9
6	17.5	942.09	.13	1.23	2.09	1.0	43				37	29	20.9
5	20	943.54	.12	1.14	3.54	.9	43				37	29	20.9
4	22.5	944.93	.11	1.04	4.93	.8	43				37	29	20.9
3	25	946.38	.12	1.14	6.38	.9	43	250	250	43	36	29	20.9
2	27.5	947.95	.14	1.32	7.95	.8	43				36	29	20.9
1	30	949.27	.10	.95	9.27	.8	43				36	30	20.9
B 12	32.5	950.66	.11	1.04	0.66	.8	43				36	30	20.9
11	35	952.17	.13	1.23	2.17	.9	42	250	250	43	36	30	20.9
10	37.5	953.79	.15	1.42	3.79	1.0	42				36	30	20.9
9	40	955.36	.14	1.33	5.36	1.0	42				36	30	20.9
8	42.5	956.81	.12	1.14	6.81	.9	42				36	30	20.9
7	45	958.32	.13	1.23	8.32	1.0	42	250	250	43	36	30	20.9
6	47.5	960.14	.19	1.80	0.14	1.4	44				36	30	20.9
5	50	961.76	.15	1.42	1.76	1.0	44				40	31	20.9
4	52.5	963.44	.16	1.52	3.44	1.1	44				42	32	20.9
3	55	965.07	.15	1.43	5.07	1.0	44	250	250	43	44	32	20.9
2	57.5	966.34	.09	.86	6.34	.5	44				46	33	20.9
1	60	967.61	.09	.86	7.61	.5	44				47	33	20.9
	(1218)												
	θ = 60	Vm = 37.01		^H = 1.25							Avg. = 33.4		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Minntac Date 3-30-89 Test 5 Run 2
Source Primary crusher No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 7 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 898

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1330	1325	5
Total			5

Integrated Gas Sampling Data: Ambient composition 20.9% O_2 > .01% CO_2

Bag Pump No. ____ Box No. ____ Bag No. ____

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

Pretest leak check: ____ cc/min at ____ in. Hg.

Time start: ____ (HRS) Time end: ____ (HRS)

Sampling rate: ____ cc/min Operator: ____

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

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: Primary Crusher
Date: 3-30-89 Test 5 Run 2

Operators: JB + CM
Meter Box No.: 2 ^H@ 1.80 IN WC
Gasmeter coeff.: 1.0066

Pitot No.: 6-U16 Cp .84
Bar. Press.: 29.16 inHg H2O .5 %
Nozzle No.: 4-5 Nozzle Dia .306 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Obs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	12 38	967.70											
B- 12	2.5	969.21	.13	1.23	9.21	1	43	250	250	42	38	34	20.9
11	5	970.72	.13	1.24	0.72	1	43				43	34	20.9
10	7.5	972.19	.12	1.15	2.19	1	43				45	34	20.9
9	10	973.72	.13	1.25	3.72	1	43				46	34	20.9
8	12.5	975.13	.11	1.05	5.13	1	44	250	250	43	37	34	20.9
7	15	976.52	.11	1.04	6.52	1	44				40	34	20.9
6	17.5	977.85	.10	.95	7.85	1	44				42	35	20.9
5	20	979.38	.13	1.24	9.38	1	44				43	35	20.9
4	22.5	980.90	.13	1.24	0.90	1	44	250	250	43	44	35	20.9
3	25	982.43	.13	1.24	2.43	1	44				45	35	20.9
2	27.5	983.90	.12	1.15	3.90	1	44				46	35	20.9
1	30	985.31	.11	1.06	5.31	1	44				47	35	20.9
B 12	32.5	986.84	.13	1.25	6.84	1	44	250	250	43	45	35	20.9
11	35	988.37	.13	1.25	8.37	1	44				46	36	20.9
10	37.5	989.90	.13	1.25	9.90	1	44				40	36	20.9
9	40	991.42	.13	1.24	1.42	1	44				44	36	20.9
8	42.5	992.89	.12	1.15	2.89	1	44	250	250	43	44	36	20.9
7	45	994.23	.11	.96	4.23	1	44				45	36	20.9
6	47.5	995.52	.10	.87	5.52	.9	44				46	36	20.9
5	50	996.86	.11	.96	6.86	1	44				46	36	20.9
4	52.5	998.39	.13	1.25	8.39	1	44	250	250	43	41	36	20.9
3	55	999.79	.11	1.05	9.79	.09	44				43	36	20.9
2	57.5	1001.20	.11	1.05	1.20	.09	44				45	36	20.9
1	60	1002.54	.10	.96	2.54	.08	44				45	36	20.9
	(1418)												
	θ = 60	Vm = 34.84		^H = 1.13							Avg. = 39.4		

CRUSHER Down 1248 → up 1313

CRUSHER Down 1339 → up 1345

CRUSHER Down 1400 → up 1407

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Minntac Date 3-30-89 Test 5 Run 3
Source Primary CRUSHER No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 10 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 399

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1375	1370	5
Total			5

Integrated Gas Sampling Data: O_2 20.9% CO_2 > 0.0% Ambient.

Bag Pump No. ____ Box No. ____ Bag No. ____

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

Pretest leak check: ____ cc/min at ____ in. Hg.

Time start: ____ (HRS) Time end: ____ (HRS)

Sampling rate: ____ cc/min Operator: ____

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

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: PRIMARY CRUSHER
Date: 3-30-89 Test 5 Run 3

Operators: JB + CM
Meter Box No. 2 ΔH@ 1.66 IN WC
Gasmeter coeff. 1.0066

Pitot No. 6-U16 Cp .84
Bar. Press. 29.16 inHg H2O 1.5 %
Nozzle No. 1.5 Nozzle Dia .300 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)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (%v/v)
	(1432)	02.70											
A- 12	2.5	04.05	.12	1.06	4.05	1	44	250	250	42	44	36	20.9
11	5.	05.43	.11	1.05	5.46	1	44				44	36	20.9
NO TRAINS 1443 → 10	7.5	06.87	.11	1.05	6.89	1	44				44	36	20.9
9	10	08.28	.11	1.06	8.28	1	44	250	250	43	46	36	20.9
up 1505 8	10.5	09.75	.12	1.15	9.75	1	44				43	35	20.9
7	15	11.22	.12	1.15	1.22	1	44				44	36	20.9
down 514 → 6	17.5	12.69	.12	1.15	2.69	1	44				45	36	20.9
up 524 5	20	14.16	.12	1.15	4.16	1	44	250	250	43	40	36	20.9
down 4	22.5	15.56	.11	1.05	5.56	1	44				41	36	20.9
1535 3	25	17.02	.12	1.15	7.02	1	44				42	36	20.9
2	27.5	18.43	.11	1.05	8.43	1	44				43	36	20.9
→ 1	30	19.55	.07	.67	9.55	7	44				44	36	20.9
up 1633 B 12	32.5	21.02	.12	1.15	1.02	1	44	250	250	44	32	31	20.9
11	35	22.52	.13	1.23	2.52	1	44				33	31	20.9
10	37.5	23.97	.12	1.13	3.97	1	44				35	31	20.9
9	40	25.36	.11	1.04	5.36	1	44				37	31	20.9
8	42.5	26.68	.10	.95	6.68	1	44	250	250	44	38	31	20.9
7	45	28.07	.11	1.04	8.07	1	44				39	31	20.9
6	47.5	29.53	.12	1.14	9.53	1	44				40	31	20.9
5	50	31.23	.13	1.23	1.04	1	44				42	31	20.9
4	52.5	32.56	.12	1.14	2.50	1	44	250	250	44	43	32	20.9
3	55	34.02	.13	1.24	4.02	1	44				43	32	20.9
2	57.5	35.36	.10	.95	5.36	1	44				43	32	20.9
1	60	36.62	.09	.86	6.62	1	44				43	32	20.9
	(1703)												
	θ =	Vm = 33.92		ΔH = 1.08							Avg. = 37.4		

C-28

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job USS Minntac

Source STEP III TURBIN

Test 6 Run 1 Date 3-31-99

Stack dimen. 44.5 IN.

Dry bulb ______ °F Wet bulb ______ °F

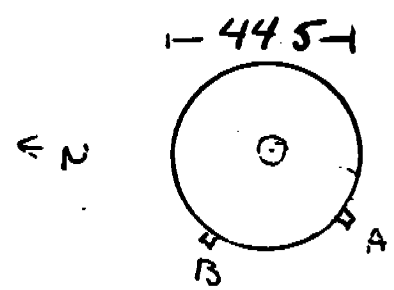
Manometer: ☑ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.22 in Hg

Static pressure -.53 in WC

Operators JBURESH

Pitot No. 4-V16 Cp .840



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: 3.5 in.		Time start: 0820 hrs	
A	1		1.96	5.46	.56	44
	2		6.50	10.00	.67	44
	3		13.17	16.67	.80	44
	4		31.33	34.83	.84	44
	5		38.00	41.50	.95	44
	6		42.54	46.04	.93	44
B	1				.51	44
	2				.91	44
	3				.88	44
	4				.90	44
	5				.95	44
	6				.88	44
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 USS Minntac Date 3-31-99 Test 6 Run 1
Source ______ No. of traverse points 24
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 6 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 900
Recovery solvent(s)
☑ acetone
☐ other(s)

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1381	1374	7
Total			

Integrated Gas Sampling Data: NOT APPLICABLE Ambient gas stream 20.9% O_2 >.00

Bag Pump No. ______ Box No. ______ Bag No. ______

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

Pretest leak check: ______ cc/min at ______ in. Hg.

Time start: ______ (HRS) Time end: ______ (HRS)

Sampling rate: ______ cc/min Operator: ______

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

CF-023

S-0046RR

CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: STEP III Thru Bi
Date: 3-31-89 Test 6 Run 1

Operators: JB + CM
Meter Box No. 2 ^H@ 1.66 IN WC
Gasmeter coeff. 1.0066

Pitot No. 4-V16 Cp .84
Bar. Press. 28.22 inHg H2O .5 %
Nozzle No. 4-3 Nozzle Dia .189 IN.

Down for Bin, opened Port.

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 (xv/v)
	(0840)	36.80											
A - 6	5	39.93	.98	1.34	9.93	1.7	44	250	250	38	23	20	20.9
5	10	43.02	.99	1.33	3.02	1.7	43				24	20	20.9
4	15	46.03	.93	1.25	6.03	1.5	43				28	21	20.9
3	20	48.97	.88	1.19	8.97	1.3	43				25	22	20.9
2	25	51.64	.73	.99	1.64	1.0	43	250	250	41	30	22	20.9
1	30	53.75	.45	.61	3.75	.8	43				33	22	20.9
B 6	35	56.66	.85	1.16	6.66	1.3	43				32	23	20.9
5	40	59.75	.96	1.31	9.75	2.0	43				36	23	20.9
4	45	62.77	.91	1.24	2.77	1.5	43				38	24	20.9
3	50	65.74	.88	1.21	5.74	1.5	43	250	250	41	38	25	20.9
2	55	68.78	.91	1.25	8.78	1.6	43				39	25	20.9
1	60	71.10	.53	.73	1.10	.9	43				40	26	20.9
	(0949)												
	θ = 60	Vm = 34.30		^H = 1.13							Avg. = 27.4		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Mintac Date 3-31-89 Test 6 Run 2
Source STEP III TURN BIN No. of traverse points 12
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: ____ cfm at ____ 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: JB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1332	1324	8
Total			8

Integrated Gas Sampling Data: N/A Ambient

Bag Pump No. ____ Box No. ____ Bag No. ____

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

Pretest leak check: ____ cc/min at ____ in. Hg.

Time start: ____ (HRS) Time end: ____ (HRS)

Sampling rate: ____ cc/min Operator: ____

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

CF-023

CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minnta
Source: STEP III TURN Dia
Date: 3-31-89 Test 6 Run 2

Operator: JB + CM
Meter Box No. 2 ^H@ ____ IN WC
Geometer coeff. 1.0006

Pitot No. 4-V16 Cp .84
Bar. Press. 28.22 inHg H2O ____ %
Nozzle No. 4-3 Nozzle Dia. .192 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Obs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1007	71.30											
B-6	5	74.23	.87	1.18	4.23	1.2	43	250	260	43	32	27	20.9
5	10	77.28	.94	1.28	7.28	1.5	43				35	27	20.9
4	15	80.33	.93	1.26	0.33	1.5	44				38	27	20.9
3	20	83.36	.91	1.24	3.36	1.6	44				39	27	20.9
2	25	86.40	.92	1.26	6.40	1.6	44	250	250	43	40	28	20.9
1	30	88.89	.61	.82	8.89	.8	44				41	29	20.9
A 6	35	91.99	.95	1.30	1.99	1.6	44				40	29	20.9
5	40	95.14	.98	1.34	5.14	1.7	45				42	29	20.9
4	45	98.21	.93	1.27	8.21	1.7	45				43	30	20.9
3	50	101.16	.85	1.17	1.16	1.4	45	250	250	43	43	30	20.9
2	55	103.96	.77	1.06	3.96	1.3	45				44	30	20.9
1	60	106.25	.51	.70	6.25	.8	45				44	30	20.9
	(1109)												
	θ = 60	Vm = 34.95		^H = 1.16							Avg. = 34.3		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job USS Minntac Date 3-31-89 Test 6 Run 3
Source STEP III TURN BIN No. of traverse points 12
Method 5 Filter holder: Glass Filter type: Glass Fiber

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☑
Postest: 0.00 cfm at 6 in. Hg. (vac) ☑

Particulate Catch Data:

No.s of filters used: 885

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1389	1381	8
Total			8

Integrated Gas Sampling Data: N/A Ambient 20.9% O_2 >0.01% CO_2

Bag Pump No. ____ Box No. ____ Bag No. ____

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

Pretest leak check: ____ cc/min at ____ in. Hg.

Time start: ____ (HRS) Time end: ____ (HRS)

Sampling rate: ____ cc/min Operator: ____

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

CF-023

CF-D11

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: USS Minntac
Source: Step III Turn 3IN
Date: 3-31-84 Test: 6 Run: 3

Operators: JB + CM
Meter Box No.: 2 ^H@: 1.86 IN WC
Gasmeter coeff.: 1.0066

Pitot No.: 4-V16 Cp: .84
Bar. Press.: 29.22 inHg H2O: 1 %
Nozzle No.: 4-3 Nozzle Dia: .187 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgs. Vol. (cf)	VAC. inHg	Stack (°F)	Probe (°F)	Oven (°F)	Impg. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (%v/v)
	1125	106.40											
A - 6	5	109.52	.97	1.32	9.52	2.0	45	250	250	44	36	32	20.9
5	10	112.74	1.03	1.40	2.74	1.7	45				42	32	20.9
4	15	115.87	.96	1.32	5.87	1.7	45				43	32	20.9
3	20	118.87	.88	1.21	8.87	1.3	45				43	32	20.9
2	25	121.70	.78	1.07	1.70	1.2	45				45	32	20.9
1	30	123.99	.51	.70	3.99	1.1	45	250	250	44	45	32	20.9
B 6	35	126.94	.85	1.17	6.94	1.3	45				44	33	20.9
5	40	130.06	.95	1.31	0.06	1.5	45				46	33	20.9
4	45	133.18	.94	1.30	3.18	1.5	45				46	34	20.9
3	50	136.22	.90	1.24	6.22	1.4	45	250	250	44	47	34	20.9
2	55	139.33	.93	1.28	9.33	1.5	45				47	34	20.9
1	60	142.11	.75	1.04	2.11	1.0	45				48	34	20.9
	(1226)												
	θ = 60	Vm = 35.61		^H = 1.20							Avg. = 38.5		

APPENDIX D

METHOD 7 FIELD DATA SHEETS

Interpoll Laboratories
(612)786-6020

EPA Method 7 Sample Collection
Field Data Sheet

28.07 3/30/8

Job USS MINNTAC Date 3-29-88 & 3-30-89 Bar. Pressure 28.17 IN.HG.
Test Location STEP III No. 7 WASTE GAS STACK Fuel Type NATURAL GAS Sample Train No. NOx
Technician C V Mosser Pump No. 1 & 2

	No.	Test Run Point	Flask No.	Time (HRS)	Vacuum (IN.HG.)	Flask Temp. (^{o}F)	Leak Rate <0.4 IN.HG./MIN.
	1	4-1-A	7	0900	27.60	26	☑ Yes ☐ No
3hR DELAY	2	4-1-B	8	1215	27.60	32	☑ Yes ☐ No
	3	4-1-C	9	1230	27.60	32	☑ Yes ☐ No
	4	4-1-D	10	1245	28.10	32	☑ Yes ☐ No
	5	4-2-A	11	1330	28.05	45	☑ Yes ☐ No
	6	4-2-B	12	1345	28.00	45	☑ Yes ☐ No
	7	4-2-C	66	1400	28.00	45	☑ Yes ☐ No
	8	4-2-D	67	1415	27.60	45	☑ Yes ☐ No
3-30	9	4-~~2~~3-A	68	0745	27.60	44	☑ Yes ☐ No
	10	4-3-B	69	0800	27.60	44	☑ Yes ☐ No
	11	4-3-C	71	0815	27.60	44	☑ Yes ☐ No
	12	4-3-D	72	0830	27.55	44	☑ Yes ☐ No
BLANKS IN	13						☐ Yes ☐ No
BOX 13	14						☐ Yes ☐ No
	15						☐ Yes ☐ No
	16						☐ Yes ☐ No
	17						☐ Yes ☐ No
	18						☐ Yes ☐ No
	19						☐ Yes ☐ No
	20						☐ Yes ☐ No
	21						☐ Yes ☐ No
	22						☐ Yes ☐ No
	23						☐ Yes ☐ No
	24						☐ Yes ☐ No
	25						☐ Yes ☐ No
	26						☐ Yes ☐ No
	27						☐ Yes ☐ No

S-263R

APPENDIX E

METHOD 9 FIELD DATA SHEETS

Interpoll Laboratories
(612)786-6020

USS / Minntac

Visible Emissions Form

SOURCE NAME: Step III No. 6 Waste Gas Stack

ADDRESS

CITY: Mountain Iron | STATE: MN | ZIP

PHONE | SOURCE ID NUMBER

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT
START | STOP

HEIGHT ABOVE GROUND LEVEL: START | STOP
HEIGHT RELATIVE TO OBSERVER: START | STOP

DISTANCE FROM OBSERVER: START | STOP
DIRECTION FROM OBSERVER: START | STOP

DESCRIBE EMISSIONS
START | STOP

EMISSION COLOR: START | STOP
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☐ YES ☐
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START | STOP

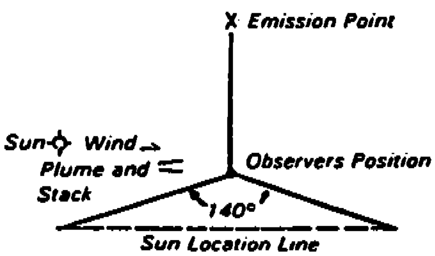
DESCRIBE BACKGROUND
START | STOP

BACKGROUND COLOR: START | STOP
SKY CONDITIONS: START | STOP

WIND SPEED: START 25 | STOP
WIND DIRECTION: START | STOP

AMBIENT TEMP: START | STOP
WET BULB TEMP. | RH, percent

Source Layout Sketch | Draw North Arrow



OBSERVATION DATE: 3-28-89 | START TIME | STOP TIME

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD | NUMBER OF READINGS ABOVE % WERE

RANGE OF OPACITY READINGS: MINIMUM | MAXIMUM

OBSERVER'S NAME (PRINT): William J. Drake

OBSERVER'S SIGNATURE: William J. Drake | DATE: 3-28-89

ORGANIZATION: Interpoll Laboratories

COMMENTS: Unable to determine opacity due to adverse weather conditions.

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SIGNATURE

TITLE | DATE

CERTIFIED BY: MPCA | DATE: 10-20-88

VERIFIED BY | DATE

S-0079R

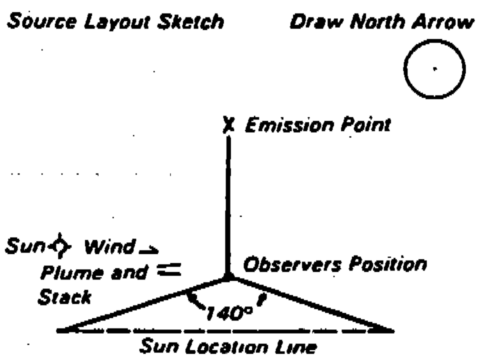
Interpoll Laboratories
(612)786-6020

Visible Emissions Form

USS/Minntac

SOURCE NAME: Step III No.6 Pellet Cooler Stack	OBSERVATION DATE: 3-28-89
START TIME:	STOP TIME:
ADDRESS:	
CITY: Mountain Iron	STATE: MN
ZIP:	PHONE:
SOURCE ID NUMBER:	
PROCESS EQUIPMENT:	OPERATING MODE:
CONTROL EQUIPMENT:	OPERATING MODE:
DESCRIBE EMISSION POINT: START	STOP
HEIGHT ABOVE GROUND LEVEL: START / STOP	HEIGHT RELATIVE TO OBSERVER: START / STOP
DISTANCE FROM OBSERVER: START / STOP	DIRECTION FROM OBSERVER: START / STOP
DESCRIBE EMISSIONS: START	STOP
EMISSION COLOR: START / STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START	STOP
DESCRIBE BACKGROUND: START	STOP
BACKGROUND COLOR: START / STOP	SKY CONDITIONS: START / STOP
WIND SPEED: START / STOP	WIND DIRECTION: START / STOP
AMBIENT TEMP: START / STOP	WET BULB TEMP: / RH, percent:

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				



AVERAGE OPACITY FOR HIGHEST PERIOD:	NUMBER OF READINGS ABOVE % WERE:
RANGE OF OPACITY READINGS: MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): William J. Drake	
COMMENTS: Unable to determine opacity due to adverse weather conditions.	OBSERVER'S SIGNATURE: William J. Drake — DATE: 3-28-89
	ORGANIZATION: Interpoll Laboratories
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS SIGNATURE:	CERTIFIED BY: MPCA — DATE: 10-20-88
TITLE: — DATE:	VERIFIED BY: — DATE:

S-0079R

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

USS / Minntac

SOURCE NAME: Step III No. 7 Waste Gas Stack

OBSERVATION DATE: 3-29-89

START TIME

STOP TIME

ADDRESS

CITY: Mountain Iron

STATE: MN

ZIP

PHONE

SOURCE ID NUMBER

PROCESS EQUIPMENT

OPERATING MODE

CONTROL EQUIPMENT

OPERATING MODE

DESCRIBE EMISSION POINT
START STOP

HEIGHT ABOVE GROUND LEVEL
START STOP

HEIGHT RELATIVE TO OBSERVER
START STOP

DISTANCE FROM OBSERVER
START STOP

DIRECTION FROM OBSERVER
START STOP

DESCRIBE EMISSIONS
START STOP

EMISSION COLOR
START STOP

PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☐ YES ☐

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START STOP

DESCRIBE BACKGROUND
START STOP

BACKGROUND COLOR
START STOP

SKY CONDITIONS
START STOP

WIND SPEED
START STOP

WIND DIRECTION
START STOP

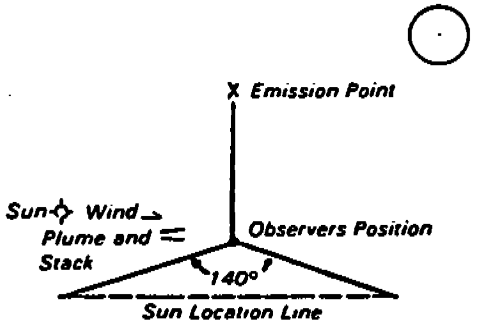
AMBIENT TEMP.
START STOP

WET BULB TEMP.

RH, percent

Source Layout Sketch

Draw North Arrow



SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE

RANGE OF OPACITY READINGS
MINIMUM MAXIMUM

OBSERVER'S NAME (PRINT): William J. Drake

OBSERVER'S SIGNATURE: William J. Drake

DATE: 3-29-89

ORGANIZATION

COMMENTS: Unable to determine opacity due to adverse weather conditions.

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TITLE

DATE

CERTIFIED BY: MPCA

DATE: 10-20-88

VERIFIED BY

DATE

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Interpoll Laboratories
(612)786-6020

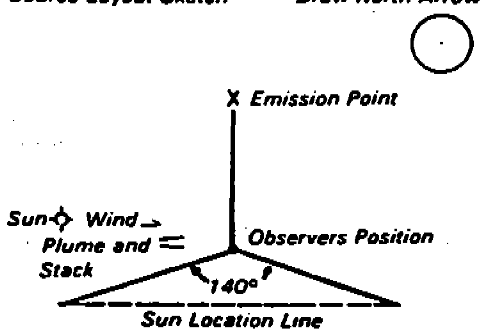
Visible Emissions Form

USS/Minntac

SOURCE NAME Primary Crusher Baghouse Outlet	OBSERVATION DATE 3-30-89
	START TIME
	STOP TIME
ADDRESS	
CITY Mountain Iron	STATE MN
ZIP	
PHONE	SOURCE ID NUMBER
PROCESS EQUIPMENT	OPERATING MODE
CONTROL EQUIPMENT	OPERATING MODE
DESCRIBE EMISSION POINT START	STOP
HEIGHT ABOVE GROUND LEVEL START STOP	HEIGHT RELATIVE TO OBSERVER START STOP
DISTANCE FROM OBSERVER START STOP	DIRECTION FROM OBSERVER START STOP
DESCRIBE EMISSIONS START	STOP
EMISSION COLOR START STOP	PLUME TYPE. CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	STOP
DESCRIBE BACKGROUND START	STOP
BACKGROUND COLOR START STOP	SKY CONDITIONS START STOP
WIND SPEED START STOP	WIND DIRECTION START STOP
AMBIENT TEMP. START STOP	WET BULB TEMP. / RH.percent

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Source Layout Sketch   Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT) William J. Drake	
OBSERVER'S SIGNATURE William J. Drake	DATE 3-30-89
ORGANIZATION	
CERTIFIED BY MPCA	DATE 10-20-88
VERIFIED BY	DATE

COMMENTS unable to determine opacity due to adverse weather conditions.

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SIGNATURE

TITLE	DATE

S-0079R

Interpoll Inc.
(612)786-6020

USS / Minntac

Visible Emissions Form

SOURCE NAME: Step III Turn Bin Stack

ADDRESS

CITY: Mountain Iron | STATE: MN | ZIP

PHONE | SOURCE ID NUMBER

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT
START . STOP

HEIGHT ABOVE GROUND LEVEL
START STOP

HEIGHT RELATIVE TO OBSERVER
START STOP

DISTANCE FROM OBSERVER
START STOP

DIRECTION FROM OBSERVER
START STOP

DESCRIBE EMISSIONS
START STOP

EMISSION COLOR
START STOP

PLUME TYPE: CONTINUOUS ☐
FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT:
NO ☐ YES ☐

IF WATER DROPLET PLUME:
ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START STOP

DESCRIBE BACKGROUND
START STOP

BACKGROUND COLOR
START STOP

SKY CONDITIONS
START STOP

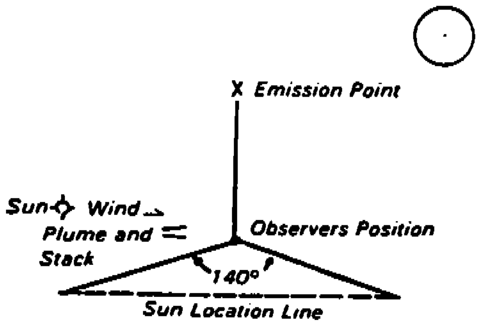
WIND SPEED
START STOP

WIND DIRECTION
START STOP

AMBIENT TEMP.
START STOP

WET BULB TEMP. | RH.percent

Source Layout Sketch | Draw North Arrow



OBSERVATION DATE: 3-31-89 | START TIME | STOP TIME

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD | NUMBER OF READINGS ABOVE % WERE

RANGE OF OPACITY READINGS
MINIMUM MAXIMUM

OBSERVER'S NAME (PRINT): William J. Drake

OBSERVER'S SIGNATURE: William J. Drake | DATE: 3-31-89

ORGANIZATION: Interpoll Laboratories

CERTIFIED BY: MPCA | DATE: 10-20-89

VERIFIED BY | DATE

COMMENTS: Unable to determine opacity due to adverse weather conditions

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SIGNATURE

TITLE | DATE

S-0079R

APPENDIX F

METHOD 25 FIELD DATA SHEETS

Interpoll Laboratories
(612)786-6020

VOC Method 25
Train Preparation Field Data Sheet

Job USS / Minntac Tank No. 73 Trap No. LN
Source STEP III Train No. 807
Date 3-28-89 Test No. 2 Run No. 1

INITIAL TANK EVACUATION

Attach clean tank to pump-manometer system, evacuate and close pump valve.

Tank No. 73 Date 3-28-89
Leak check (<0.1 IN.HG. in 10 min) P_b 28.83 IN.HG.
INITIAL 27.50 IN.HG. Tank temp. 40 °F
FINAL 27.50 IN.HG. Init. abs. tank pressure .33 IN.HG.
Performed by JBURESH

TRAIN ASSEMBLY, LEAK CHECKS AND PRETEST P & T MEASUREMENTS

a. Attach an evacuated tank to the train tank port and a trap to the trap port. Record the train, tank and trap numbers above.

b. Open the train valves but not the tank valve. Attach the pump-manometer line to the probe and evacuate the front half (no dry ice). Then close the pump valve.

c. Front half leak check (optional: <0.2 IN.HG. in 2 min)

Initial 27.50 IN.HG.
Final 27.50 IN.HG.

d. Now open the pump valve, open the tank valve and evacuate the full train to less than 0.4 IN.HG.

e. Full train leak check (mandatory <0.1 IN.HG. in 10 min)

P_b 27.83 IN.HG.
Initial 27.50 IN.HG.
Final 27.50 IN.HG.
Performed by JBURESH & C.MOSER

- Pretest absolute tank pressure (P_i) .33 IN.HG.
- Pretest tank temperature (t_i) 39 °F

Interpoll Laboratories
VOC Method 25 Sampling and Post Test Field Data Sheet

Job USS Minntac
Source STEP III NO. 6 WASTE GAS STACK
Date 3-28-89

Tank No. 73 Trap No. LN
Train No.
Test No. 2 Run No. 1

SAMPLING

a. Add crushed dry ice before the start of the test. Attach a probe filter (lightly wrench tighten) and insert into the port. Open the tank valve and set the flow control valve to the appropriate flow rate for the selected test duration ($Q(cc/min) = 3600/\theta$, where θ = test duration in minutes).
b. Adjust the flow control valve as necessary throughout the test to maintain the flow rate constant. Record data at five minute intervals. Excessive flow rate drop is usually due to ice blockage (raise trap from dry ice bath slightly).
c. At the end of the test, turn off the tank valve, remove the filter and cap off the probe end.
d. Remove the used quartz wool from the filter holder and discard. If filter holder is clean, it may be used again after repacking.

Sampling Time (min.)	Flow Rate (cc/min)	Vacuum (in. Hg.)	Stack Temp. (°F)	Comments
(1029)				
5	55	27.50	110	None
10	55	25.20	109	sampled
15	55	22.90	109	normally
20	55	20.60	109	through
25	55	18.30	110	Run
30	55	16.00	110	
35	55	13.70	110	
40	55	11.40	109	
45	55	9.10	109	
50	55	6.80	110	
55	55	4.60	110	
60 (1129)	55	1.95	110	

POST TEST LEAK CHECK AND TANK P & T MEASUREMENTS

a. Verify that the tank valve is off, connect pump-manometer line to the probe end with the pump valve off. Open the tank valve for two minutes or until pressure stabilizes. Close tank valve.
b. Final train leak check (mandatory < 0.1 IN.HG. in 5 min)

Initial 1.95 IN.HG.

Final 1.95 IN.HG.

c. Remove the trap and quickly seal both ends. Store on dry ice. Now attach the pump-manometer line (with pump and tank valves off) to the tank. Open the tank. Record final vacuum and tank temperature:

P_b 28.73 IN.HG.

Tank vacuum 1.95 IN.HG.

- Final absolute tank pressure (P_f) 26.78 IN.HG.
- Final tank temperature (t_f) 42 ~~DEG.~~ °F

Interpoll Laboratories
(612)786-6020

VOC Method 25
Train Preparation Field Data Sheet

Job USS Minntac Tank No. 84 Trap No. MA
Source STEP III NO.6 WASTE GAS STACK Train No. ______
Date 3-28-89 Test No. 2 Run No. 2

INITIAL TANK EVACUATION

Attach clean tank to pump-manometer system, evacuate and close pump valve.

Tank No. 84 Date 3-28-89
Leak check (<0.1 IN.HG. in 10 min) P_b 27.83 IN.HG.
INITIAL 27.75 IN.HG. Tank temp. 41 °F
FINAL 27.75 IN.HG. Init. abs. tank pressure 0.08 IN.HG.
Performed by C. MOSSER

TRAIN ASSEMBLY, LEAK CHECKS AND PRETEST P & T MEASUREMENTS

a. Attach an evacuated tank to the train tank port and a trap to the trap port. Record the train, tank and trap numbers above.

b. Open the train valves but not the tank valve. Attach the pump-manometer line to the probe and evacuate the front half (no dry ice). Then close the pump valve.

c. Front half leak check (optional: <0.2 IN.HG. in 2 min)

Initial ______ IN.HG.
Final ______ IN.HG.

d. Now open the pump valve, open the tank valve and evacuate the full train to less than 0.4 IN.HG.

e. Full train leak check (mandatory <0.1 IN.HG. in 10 min)

P_b 27.83 IN.HG.
Initial -27.75 IN.HG. VAC
Final -27.75 IN.HG.
Performed by C. Mosser

- Pretest absolute tank pressure (P_i) 0.08 IN.HG.
- Pretest tank temperature (t_i) 40 °F

Interpoll Laboratories

VOC Method 25 Sampling and Post Test Field Data Sheet

Job USS Minntac Tank No. 84 Trap No. MA

Source STEP III #6 WASTE GAS STACK Train No. 807

Date 3-31-89 Test No. 2 Run No. 2

SAMPLING

a. Add crushed dry ice before the start of the test. Attach a probe filter (lightly wrench tighten) and insert into the port. Open the tank valve and set the flow control valve to the appropriate flow rate for the selected test duration ($Q(cc/min) = 3600/\theta$, where θ = test duration in minutes).

b. Adjust the flow control valve as necessary throughout the test to maintain the flow rate constant. Record data at five minute intervals. Excessive flow rate drop is usually due to ice blockage (raise trap from dry ice bath slightly).

c. At the end of the test, turn off the tank valve, remove the filter and cap off the probe end.

d. Remove the used quartz wool from the filter holder and discard. If filter holder is clean, it may be used again after repacking.

Sampling Time (min.)	Flow Rate (cc/min)	Vacuum (in. Hg.)	Stack Temp. (°F)	Comments
(1213)				
5	55	27.75	108	SAMPLING
10	55	25.30	108	Occured
15	55	22.85	108	without
20	55	20.40	105	Incident
25	55	17.95	105	
30	55	15.50	105	
35	55	13.05	105	
40	55	10.60	107	
45	55	8.15	107	
50	55	5.70	107	
55	55	3.20	107	
(1313)	55	0.70	107	

POST TEST LEAK CHECK AND TANK P & T MEASUREMENTS

a. Verify that the tank valve is off, connect pump-manometer line to the probe end with the pump valve off. Open the tank valve for two minutes or until pressure stabilizes. Close tank valve.

b. Final train leak check (mandatory < 0.1 IN.HG. in 5 min)

Initial 0.7 IN.HG.

Final 0.7 IN.HG.

c. Remove the trap and quickly seal both ends. Store on dry ice. Now attach the pump-manometer line (with pump and tank valves off) to the tank. Open the tank. Record final vacuum and tank temperature:

P_b ~~27~~.83 IN.HG.

Tank vacuum .7 IN.HG.

- Final absolute tank pressure (P_f) 27.13 IN.HG.
- Final tank temperature (t_f) 40 ~~IN.HG.~~ °F

Interpoll Laboratories
(612)786-6020

VOC Method 25
Train Preparation Field Data Sheet

Job Uss - minntac Tank No. 118 Trap No. HQ
Source STEP III NO.6 WASTE GAS LINE Train No. ______
Date 3-28-89 Test No. 2 Run No. 3

INITIAL TANK EVACUATION

Attach clean tank to pump-manometer system, evacuate and close pump valve.

Tank No. 118 Date 3-28
Leak check (<0.1 IN.HG. in 10 min) P_b ______ IN.HG.
INITIAL 27.75 IN.HG. Tank temp. 41 °F
FINAL 27.75 IN.HG. Init. abs. tank pressure 0.08 IN.HG.
Performed by C. MOSSER

TRAIN ASSEMBLY, LEAK CHECKS AND PRETEST P & T MEASUREMENTS

a. Attach an evacuated tank to the train tank port and a trap to the trap port. Record the train, tank and trap numbers above.

b. Open the train valves but not the tank valve. Attach the pump-manometer line to the probe and evacuate the front half (no dry ice). Then close the pump valve.

c. Front half leak check (optional: <0.2 IN.HG. in 2 min)

Initial 27.75 IN.HG.
Final 27.75 IN.HG.

d. Now open the pump valve, open the tank valve and evacuate the full train to less than 0.4 IN.HG.

e. Full train leak check (mandatory <0.1 IN.HG. in 10 min)

P_b 27.83 IN.HG.
Initial 27.75 IN.HG.
Final 27.75 IN.HG.
Performed by C MOSSER

- Pretest absolute tank pressure (P_i) 0.08 IN.HG.
- Pretest tank temperature (t_i) 41 °F

Interpoll Laboratories
VOC Method 25 Sampling and Post Test Field Data Sheet

Job USS/minntac Tank No. 118 Trap No. HQ
Source STEP III NO.6 WASTE GAS STACK Train No. 807
Date 3-28-89 Test No. 2 Run No. 3

SAMPLING

a. Add crushed dry ice before the start of the test. Attach a probe filter (lightly wrench tighten) and insert into the port. Open the tank valve and set the flow control valve to the appropriate flow rate for the selected test duration ($Q(cc/min) = 3600/\theta$, where θ = test duration in minutes).
b. Adjust the flow control valve as necessary throughout the test to maintain the flow rate constant. Record data at five minute intervals. Excessive flow rate drop is usually due to ice blockage (raise trap from dry ice bath slightly).
c. At the end of the test, turn off the tank valve, remove the filter and cap off the probe end.
d. Remove the used quartz wool from the filter holder and discard. If filter holder is clean, it may be used again after repacking.

Sampling Time (min.)	Flow Rate (cc/min)	Vacuum (in. Hg.)	Stack Temp. (°F)	Comments
(1542)				
5	55	27.75	107	SAMPLING
10	55	25.35	107	occurred
15	55	22.95	107	normally
20	55	20.55	107	
25	55	18.15	107	
30	55	15.75	107	
35	55	13.35	108	
40	55	10.95	108	
45	55	8.55	108	
50	55	6.15	107	
55	55	3.80	107	
60 (1642)	55	1.5	107	

POST TEST LEAK CHECK AND TANK P & T MEASUREMENTS

a. Verify that the tank valve is off, connect pump-manometer line to the probe end with the pump valve off. Open the tank valve for two minutes or until pressure stabilizes. Close tank valve.
b. Final train leak check (mandatory < 0.1 IN.HG. in 5 min)

Initial 1.5 IN.HG.
Final 1.5 IN.HG.

c. Remove the trap and quickly seal both ends. Store on dry ice. Now attach the pump-manometer line (with pump and tank valves off) to the tank. Open the tank. Record final vacuum and tank temperature:

P_b 27.83 IN.HG.
Tank vacuum 1.5 IN.HG.

- Final absolute tank pressure (P_f) 26.33 IN.HG.
- Final tank temperature (t_f) 42 ~~IN.HG.~~ °F

APPENDIX G

LABORATORY DATA SHEETS

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job: USS / Minntac
Source: Stp III kiln
Team Leader: J BURESH
Test Site:
Date Submitted: 3-31-89
Date of Test: 3-28-89
Test No.: 1
No. of Runs Completed: 3

No. of Samples	Type of Sample	Analysis Required	Comments
3 + 1	Probe Wash: ☑ Acetone ☐ D.I. Water	☑ As per EPA M-5 ☐ Other ____	Blanks Are for All Tests
3 + 1	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 + 1	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 ____	" "
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 COKE
3) Is sample combustible? ☑ No ☐ Yes
4) Does sample need special handling? ☑ No ☐ Yes If yes, explain ____

S-278RRRR

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job USS/MINNTAC
Team Leader JB
Date Submitted 3-31-89
Test No. 1
Date of Analysis 4-4-89

Source Step III No. 6 Gas Waste Line
Test Site Stack
Date of Test 3-28-89
No. of Runs Completed 3
Technician JD

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	7560-07	1	0.00	3.42	21.40	3.42	17.98	0.85
		2	0.00	3.42	21.40	3.42	17.98	0.85
	☒ B ☐ F	Avg				3.42	17.98	
1/2	-11	1	0.00	3.65	21.45	3.65	17.75	0.86
		2	0.00	3.65	21.45	3.65	17.75	0.86
	☒ B ☐ F	Avg				3.65	17.75	
1/3	-15	1	0.00	3.29	21.23	3.29	17.94	0.90
		2	0.00	3.29	21.23	3.29	17.94	0.90
	☒ B ☐ F	Avg				3.29	17.94	
		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

Box 12

LSC-04-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 1
Date of Analysis 4-3-89

Source Step III No. 6 Waste Gas Line
Test Site Stack
Date of Test 3-28-89
No. of Runs Completed 3
Technician Mark Koehler

0	Test 1 Run 0 Field Blank Log Number 7560-03 Comments	Dish No. 8 Dish Tare Wt. 48.7005 g Dish+Sample Wt. 48.7005 g Sample Wt. 0.0000 g
1	Test 1 Run 1 Log Number -06 Comments	Dish No. 47 Dish Tare Wt. 50.0392 g Dish+Sample Wt. 50.0427 g Sample Wt. 0.0035 g
2	Test 1 Run 2 Log Number -10 Comments	Dish No. 52 Dish Tare Wt. 49.8069 g Dish+Sample Wt. 49.8089 g Sample Wt. 0.0020 g
3	Test 1 Run 3 Log Number -14 Comments	Dish No. 62 Dish Tare Wt. 46.3768 g Dish+Sample Wt. 46.3798 g Sample Wt. 0.0030 g
4	Test Run Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g

Blank Solvent Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
0.0000	0.0035	0.0020	0.0030		

LSC-03.GR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job USS MinnTac
Team Leader J.B.
Date Submitted
Test No. 1
Date of Analysis 4-3-89
Transport Leakage [X] None [ ] ______ ml

Source Taconite Plant
Test Site Stack
Date of Test 3-28-89
No. of Runs Completed 3
Technician B.S.L.
Solvent Acetone

0	Test 1-6 Run 0 Field Blank Log Number 7560-01 Vol. of Solvent 140 ml *Solvent Residue 0.7 ug/ml	Dish No. 32 Dish Tare Wt. 50.7790 g Dish+Sample Wt. 50.7791 g Sample Wt. 0.0001 g
1	Test 1 Run 1 Vol. of Solvent 160 ml Log Number -04 Comments	Dish No. 51 Dish Tare Wt. 47.8810 g Dish+Sample Wt. 47.9025 g Sample Wt. 0.0215 g
2	Test 1 Run 2 Vol. of Solvent 150 ml Log Number -08 Comments	Dish No. 82 Dish Tare Wt. 60.7689 g Dish+Sample Wt. 60.7906 g Sample Wt. 0.0217 g
3	Test 1 Run 3 Vol. of Solvent 160 ml Log Number -12 Comments	Dish No. 89 Dish Tare Wt. 77.1812 g Dish+Sample Wt. 77.2211 g Sample Wt. 0.0399 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number Comments	Dish No. Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number Comments	Dish No. Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

*Solvent Residue 0.7 ug/ml=[(Sample Wt. 0.0001 g)(10⁶)]/Vol. of Sol. 140 ml
EPA-M5 Acetone Residue Blank Spec. ≤7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	6-4 Run 3	Run 4	Run 5
	0.0214	0.0216	0.0398		

LSC-01YF

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 1
Date of Analysis 4-3-89

Source Taconite Plant
Test Site Stack
Date of Test 3-28-89
No. of Runs Completed 3
Technician Mark Kachler

0	Test 1 Run 0 Field Blank Log Number 7560-02 Comments	Filter No. 0883 Filter Type 4" Filter Tare Wt. 0.8977 g Filter+Sample Wt. 0.8979 g Sample Wt. 0.0002 g
1	Test 1 Run 1 Log Number -05 Comments	Filter No. 0826 Filter Type 4" Filter Tare Wt. 0.8896 g Filter+Sample Wt. 0.9314 g Sample Wt. 0.0418 g
2	Test 1 Run 2 Log Number -09 Comments	Filter No. 0827 Filter Type 4" Filter Tare Wt. 0.8920 g Filter+Sample Wt. 0.9307 g Sample Wt. 0.0387 g
3	Test 1 Run 3 Log Number -13 Comments	Filter No. 0830 Filter Type 4" Filter Tare Wt. 0.8800 g Filter+Sample Wt. 0.9185 g Sample Wt. 0.0385 g
4	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0418	0.0387	0.0385		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0667	0.0623	0.0813		

LSC-02PR

INTERPOLL LABORATORIES
(612)786-6020

EPA Method 10 NDIR Analysis Data Sheet

Job Name: USS Minntac
Source: Step III No 6 Waste Gas Stack
Date of Analysis: 4-6-89 Time: 1430 HRS
Technician: Mark Kuehler
Zero gas: 99.999 % N_2 Vendor: Linde
Span gases: 299 + 597 ppm CO Vendor: 〃

NDIR Analyzer:
- ☑ Fuji ACS Model 3300
- ☐ Mon. Labs Model 8310
- ☐ Dasibi Model 3003

Range: 0 - 1000 ppm
Flow rate: 1000 cc/min

Box No. 12

Sample Description	Sample Log No.	Carbon Monoxide Concentration (ppm, dry)						
		Trial 1			Trial 2			AVG.
		DF	Reading	Actual ppm	DF	Reading	Actual ppm	
Zero Gas	Pre Zero / Span	1	0		1	0		
299 ppm CO		1	296		1	296		
597 ppm CO		1	598		1	598		
T1R1	7560-07	1	26.2	26.2	1	26.2	26.2	26.2
T1R2	-11	1	31.7	31.7	1	31.7	31.7	31.7
T1R3	-15	1	28.7	28.7	1	26.2	26.2	27.4
Zero Gas	Post Zero / Span	1	0		1	0		
299 ppm CO		1	299		1	299		
597 ppm CO		1	601		1	601		

Note 1: DF is the dilution factor if the sample was diluted with CO-free air prior to analysis.

Note 2: The Fuji ACS Model 3300 has a rejection ratio for CO to CO2 greater than 100,000:1 and the Mon. Labs Model 8310 and the Dasibi Model 3003 have rejection ratios greater than 200,000:1 and thus CO2 removal prior to analysis is not required.

Note 3: The analyzer must be zeroed and spanned immediately before and after sample analysis. Additional zero and span checks may be performed between sample analyses if required. Record the analyzer readings for all zero and span checks after the initial calibration of the analyzer has been completed.

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job USS / Minntac
Team Leader J BURESH
Date Submitted 3
Test No. 2

Source STEP III NO.6 WASTEGAS STACK
Test Site STACK
Date of Test 3-28-89
No. of Runs Completed 3

Method 25 to be sent to RTL

No. of Samples	Type of Sample	Analysis Required	Comments
	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	
	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	
	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 USS Minntac
Team Leader JBureSH
Date Submitted 3-31-89
Test No. 3

Source STEP III NO. 6 Pellet cooler
Test Site STACK
Date of Test 3-28-89
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3 + 1	Probe Wash: ☑ Acetone ☐ D.I. Water	☑ As per EPA M-5 ☐ Other ___	Same As T.
3 + 1	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 + 1	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 ___	" "
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 cooler
2) Fuel: ☐ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☑ Other NONE
3) Is sample combustible? ~~☐ No~~ ☐ Yes
4) Does sample need special handling? ~~☐ No~~ ☐ Yes If yes, explain ___

S-278RRRR

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job USS/Minntac
Team Leader JB
Date Submitted 3-31-89
Test No. 3
Date of Analysis 4-4-89

Source Pellet Cooler
Test Site Stack
Date of Test 3-28-89
No. of Runs Completed 3
Technician SD

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
3/1		1	0.00	0.60	21.00	0.60	20.40	0.83
	7560 -20	2	0.00	0.60	21.00	0.60	20.40	0.83
	☒ B ☐ F	Avg				0.60	20.40	
3/2		1	0.00	0.71	21.10	0.71	20.39	0.72
	-24	2	0.00	0.71	21.10	0.71	20.39	0.72
	☒ B ☐ F	Avg				0.71	20.39	
3/3		1	0.00	0.45	21.15	0.45	20.45	1.00
	-28	2	0.00	0.45	21.15	0.45	20.45	1.00
	☒ B ☐ F	Avg				0.45	20.45	
		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

Box 17

LSC-04-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 3
Date of Analysis 4-3-89

Source Step III No. 6 Pellet Cooler
Test Site Stack
Date of Test 3-28-89
No. of Runs Completed 3
Technician Mark Kaehler

0	Test ___ Run 0 Field Blank Log Number Comments	Dish No. Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g
1	Test 3 Run 1 Log Number 7560-17 Comments	Dish No. 4 Dish Tare Wt. 47.2148 g Dish+Sample Wt. 47.2179 g Sample Wt. 0.0031 g
2	Test 3 Run 2 Log Number -23 Comments	Dish No. 6 Dish Tare Wt. 49.1358 g Dish+Sample Wt. 49.1372 g Sample Wt. 0.0014 g
3	Test 3 Run 3 Log Number -27 Comments	Dish No. 43 Dish Tare Wt. 46.5916 g Dish+Sample Wt. 46.5959 g Sample Wt. 0.0043 g
4	Test ___ Run ___ Log Number Comments	Dish No. Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g
5	Test ___ Run ___ Log Number Comments	Dish No. Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g

Blank Solvent Wt. ___ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
0.0000	0.0031	0.0014	0.0043		

LSC-03.GF

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job USS MinnTac
Team Leader JB
Date Submitted
Test No. 3
Date of Analysis 4-3-89
Transport Leakage ☒ None ☐ ______ml

Source No. 6 PelleT Cooler
Test Site STack
Date of Test 3-28-89
No. of Runs Completed 3
Technician BSL
Solvent AceTone

0	Test ____ Run 0 Field Blank Log Number ____ Vol. of Solvent ____ ml *Solvent Residue 0.7 ug/ml	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
1	Test 3 Run 1 Vol. of Solvent 120 ml Log Number 7560-17 Comments ____	Dish No. 84 Dish Tare Wt. 79.0134 g Dish+Sample Wt. 79.2990 g Sample Wt. 0.2856 g
2	Test 3 Run 2 Vol. of Solvent 150 ml Log Number -21 Comments ____	Dish No. 79 Dish Tare Wt. 85.9340 g Dish+Sample Wt. 86.2055 g Sample Wt. 0.2715 g
3	Test 3 Run 3 Vol. of Solvent 220 ml Log Number -25 Comments ____	Dish No. 80 Dish Tare Wt. 73.6139 g Dish+Sample Wt. 73.9490 g Sample Wt. 0.3351 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

*Solvent Residue ___ug/ml=[(Sample Wt. _____g)(10^6)]/Vol. of Sol. _____ml
EPA-M5 Acetone Residue Blank Spec. ≤7.8 ug/ml

Results:

G-11

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.2855	0.2714	0.3349		

LSC-01Y

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 3
Date of Analysis 4-3-89

Source Pellet Cooler
Test Site No 6 Stack
Date of Test 3-28-89
No. of Runs Completed 3
Technician Mark Baehler

0	Test ___ Run 0 Field Blank Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
1	Test 3 Run 1 Log Number 7560-19 Comments	Filter No. 0829 Filter Type 4" Filter Tare Wt. 0.8951 g Filter+Sample Wt. 0.8971 g Sample Wt. 0.0020 g
2	Test 3 Run 2 Log Number -22 Comments	Filter No. 0831 Filter Type 4" Filter Tare Wt. 0.8827 g Filter+Sample Wt. 0.8860 g Sample Wt. 0.0033 g
3	Test 3 Run 3 Log Number -26 Comments	Filter No. 0879 Filter Type 4" Filter Tare Wt. 0.8739 g Filter+Sample Wt. 0.8770 g Sample Wt. 0.0031 g
4	Test ___ Run ___ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
5	Test ___ Run ___ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0020	0.0033	0.0031		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.2906	0.2761	0.3423		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job USS Minntac
Team Leader JBURESH
Date Submitted 3-31-87
Test No. 4

Source St PIII No # WASTE GAS LINE
Test Site STACK
Date of Test 3-29 + 30-87
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3 + 1	Probe Wash: ☑ Acetone ☐ D.I. Water	☑ As per EPA M-5 ☐ Other	Blank same as T1
3 + 1	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 + 1	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	" "
3	Integrated Gas sample	☑ As per EPA M-3 ☐ As per EPA M-10 ☐ Other	
12	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

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job USS/Minntac
Team Leader JB
Date Submitted 3-31-89
Test No. 4
Date of Analysis 4-4-89

Source Step III No. 7 Waste Gas Line
Test Site Stack
Date of Test 3-29-89
No. of Runs Completed 3
Technician JD

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
4/1	7560-32	1	0.00	2.40	20.80	2.40	18.40	1.042
		2	0.00	2.40	20.80	2.40	18.40	1.042
	☒ B ☐ F	Avg				2.40	18.40	
4/2	-36	1	0.00	2.82	20.63	2.82	17.81	1.096
		2	0.00	2.82	20.63	2.82	17.81	1.096
	☒ B ☐ F	Avg				2.82	17.81	
4/3	-40	1	0.00	3.00	20.64	3.00	17.64	1.087
		2	0.00	3.00	20.64	3.00	17.64	1.087
	☒ B ☐ F	Avg				3.00	17.64	
		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

Box 19

LSC-04-BR

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 4
Date of Analysis 4-3-89

Source Step III No. 7 Waste Gas Line
Test Site Stack
Date of Test 3-29-89
No. of Runs Completed 3
Technician Mark Kaehler

0	Test ___ Run 0 Field Blank Log Number Comments	Dish No. Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g
1	Test 4 Run 1 Log Number 7560- 29 Comments	Dish No. 58 Dish Tare Wt. 50.2255 g Dish+Sample Wt. 50.2301 g Sample Wt. 0.0046 g
2	Test 4 Run 2 Log Number -83 Comments	Dish No. 61 Dish Tare Wt. 44.5909 g Dish+Sample Wt. 44.5942 g Sample Wt. 0.0033 g
3	Test 4 Run 3 Log Number -37 Comments	Dish No. 71 Dish Tare Wt. 46.1585 g Dish+Sample Wt. 46.1657 g Sample Wt. 0.0072 g
4	Test ___ Run ___ Log Number Comments	Dish No. Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g
5	Test ___ Run ___ Log Number Comments	Dish No. Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g

Blank Solvent Wt. ___ g

Results:

Field Blk.	Run 1	Run 2	G-15 Run 3	Run 4	Run 5
0.0000	0.0046	0.0033	0.0072		

LSC-03.GR

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job USS/ Minntac
Team Leader JB
Date Submitted 3-31-89
Test No. 4
Date of Analysis 4-3-89
Transport Leakage [x] None [ ] ______ ml

Source Step III No. 7 Gas line
Test Site Stack
Date of Test 3-29/30-89
No. of Runs Completed 3
Technician [illegible]
Solvent Acetone

0	Test ____ Run 0 Field Blank Log Number ____ Vol. of Solvent ____ ml *Solvent Residue .7 ug/ml	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
1	Test 4 Run 1 Vol. of Solvent 155 ml Log Number 9560-29 Comments ____	Dish No. 2 Dish Tare Wt. 46.2265 g Dish+Sample Wt. 46.2405 g Sample Wt. 0.0140 g
2	Test 4 Run 2 Vol. of Solvent 120 ml Log Number -33 Comments ____	Dish No. 5 Dish Tare Wt. 45.2269 g Dish+Sample Wt. 45.2466 g Sample Wt. 0.0197 g
3	Test 4 Run 3 Vol. of Solvent 130 ml Log Number -37 Comments ____	Dish No. 10 Dish Tare Wt. 48.2553 g Dish+Sample Wt. 48.2910 g Sample Wt. 0.0357 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

*Solvent Residue ___ ug/ml=[(Sample Wt. _____ g)(10^6)]/Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. ≤7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0139	0.0196	0.0356		

LSC-01Y

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 4
Date of Analysis 4-4-89

Source Step III No. 7 Waste Gas Lin.
Test Site Stack
Date of Test 3-29-89
No. of Runs Completed 3
Technician Mark Kaehler

0	Test Run 0 Field Blank Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
1	Test 4 Run 1 Log Number 7560-30 Comments	Filter No. 0880 Filter Type 4" Filter Tare Wt. 0.8909 g Filter+Sample Wt. 0.9198 g Sample Wt. 0.0289 g
2	Test 4 Run 2 Log Number -37 Comments	Filter No. 0881 Filter Type 4" Filter Tare Wt. 0.8828 g Filter+Sample Wt. 0.9110 g Sample Wt. 0.0282 g
3	Test 4 Run 3 Log Number -38 Comments	Filter No. 0896 Filter Type 4" Filter Tare Wt. 0.8828 g Filter+Sample Wt. 0.9157 g Sample Wt. 0.0329 g
4	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0289	0.0282	0.0329		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0414	0.0511	0.0757		

LSC-02PR

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EPA Method 7A Recovery and Analysis Data Sheet (1)

**************SOURCE*************	**************RECOVERY****************	*************ANALYTICAL************
Job USS Minntac	Date of Recovery 4-4-89	Date of Analysis 4-7-89
Source Step III No. 7 Gas line/Stack	Recovered by B.D.	Analyst BTW
Date of Sampling 3-29,30-89	Recovery volume 500.00 ml	Eluent Sys 10 Eluent
Test No(s) 4	Barometric at time 28.96 IN.HG.	Chromatograph: Dionex System [illegible] 10

Samples collected in accordance with EPA Method 7, CFR Title 40, Part 60, Appendix A. Samples analyzed in accordance with EPA Method 7A by ion chromatography. Mercury manometers used to measure flask pressures/vacuums in sampling and in recovery. Thommen Model TX 19 jewel barometer calibrated against laboratory mercury in glass barometer used to measure field barometric pressure. Three field blanks are prepared and the average used to correct measured nitrate concentrations. All samples are analyzed as a batch using a Dionex Model 4270 Chromatograph Data Intergrator. The integrator is programmed to give the actual concentration of the 500 ml recovered sample even if a subsequent dilution was made. The dilution is indicated here as well as on the chromatogram.

$C_{RS} = DF(C_{DS})$ $\qquad M_{NO_3} = (C_{RS} - \overline{C}_B)V_R$ $\qquad \overline{C}_B = (C_{B1} + C_{B2} + C_{B3})/3$

where: C_{RS} = concentration of nitrate in 500 ml recovered sample in ug/ml

DF = dilution factor

C_{DS} = concentration of nitrate of a 500 ml recovered sample which has been diluted by a factor of DF to bring it into the proper range for the ion chromatograph. This value is an intermediate number and is not outputted by the electronic integrator which is programmed to output the concentration of the original undiluted 500 ml recovered sample.

M_{NO_3} = total mass of nitrate in micrograms in the 500 ml recovered sample and/or in the 2L flask.

C_B = average conc. of nitrate in 500 ml recovered samples from the three field blanks (ug/ml)

C_{B1}, C_{B2}, C_{B3} = conc. of nitrate in 500 ml recovered samples from the three field blanks (ug/ml)

V_R = recovery volume for samples and field blanks in ml

S-340(1)

Interpoll Laboratories
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EPA Method 7A Recovery and Analysis Data Sheet (2)

	Sample Log ID No.	Flask No.	Test/ Run	Final Flask Conditions t_f (°F)	+	-	Δ Pg (IN.HG.)	Chrom Run No.	DF	Nitrate Concentration (ug/ml) Uncorr. for blank C_{RS}	Corr. for blank (C_{RS} - C_B)	Total nitrate in Sample (ug) ($M_{NO_3^-}$)
1	9560-41	7	4-1-A	76	✓		0.90		1Y	2.93	2.93	1460
2	-42	8	-B		✓		1.10			3.02	3.02	1510
3	-43	9	-C		✓		1.10			4.86	4.86	2430
4	-44	10	-D		✓		0.60			2.44	2.44	1220
5	-45	11	4-2-A		✓		0.40			2.15	2.15	1080
6	-46	12	-B			✓	0.90			2.12	2.12	1060
7	-47	66	-C			✓	0.90			2.07	2.07	1040
8	-48	67	-D			✓	0.30			2.24	2.24	1120
9	-49	68	4-3-A			✓	0.80			1.99	1.99	1000
10	-50	69	-B			✓	0.20			2.07	2.07	1040
11	-51	71	-C			✓	0.30			2.16	2.16	1080
12	-52	72	-D			✓	0.30			2.04	2.04	1020
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
Blank 1	-53	73	Blank	76	✓		1.70		1	CB1 <0.025		
Blank 2	-54	74	/		✓		0.70		1	CB2 <0.025		
Blank 3	-55	75	/		✓		2.40		1	CB3 <0.025		

$\bar{C}_B$ = <0.025

S-340(2) R-9/85

Interpoll Laboratories
(612) 786-6020

Analytical Method QC Checklist

Project Name: USS Minntac	Date: 4-10-89

Category: Anions	Analyst: BTW

Matrix: Acidified H_2O_2	Batch Numbers:

Prep Method #: EPA-7A	7560

Analytical Method #: EPA 300.0 IC

Total Number of Samples Analyzed: 12

1. Values for all instrument blanks below detection limit: Yes ___ No ___

2. Reference standard analysis: Source EPA-987

Analyte	Theoretical Value	Observed Value	Percent Recovery
NO_3	17.7	17.6	99.4
NO_3	17.7	16.9	95.4

3. Matrix Spikes

Number of spiked samples analyzed: 1	Average % Recovery: 96%

Range of % Recovery: —

Recovery of each spike within control limits: Yes X No ___

4. Duplicates

Number of duplicate samples analyzed: 1

Average Relative Percent Difference: 0

Range of Relative Percent Difference: —

Precision for each set of duplicates within control limits: Yes X No ___

5. Method Blank

Number of method blanks analyzed: 3

All below detection limit: Yes X No ___

6. Calibration verified every 10 samples.

Comments: ___

LQA-26RRR (b)

Interpoll Laboratories

(612)786-6020

QC Data Report

Category: Anions

Matrix: Acidified H_2O_2

Prep Method #: EPA-7A

Date: 4-10-89

Analyst: BTW

Precision Report

SAMPLE #	METHOD #	INSTRUMENT	ANALYTE	UNITS	INITIAL RESULT	DUPLICATE RESULT	ABSOLUTE DIFFERENCE	RELATIVE PERCENT DIFFERENCE
7560-45	300.0	IC-1	NO_3	ug	1080	1080	0	0

Accuracy Report

SAMPLE #	METHOD #	INSTRUMENT	ANALYTE	UNITS	INITIAL RESULT	SPIKE CONC.	FINAL RESULT	PERCENT RECOVERY
7560-50	300.0	IC-1	NO_3	ug	1040	1000	2000	96.0%

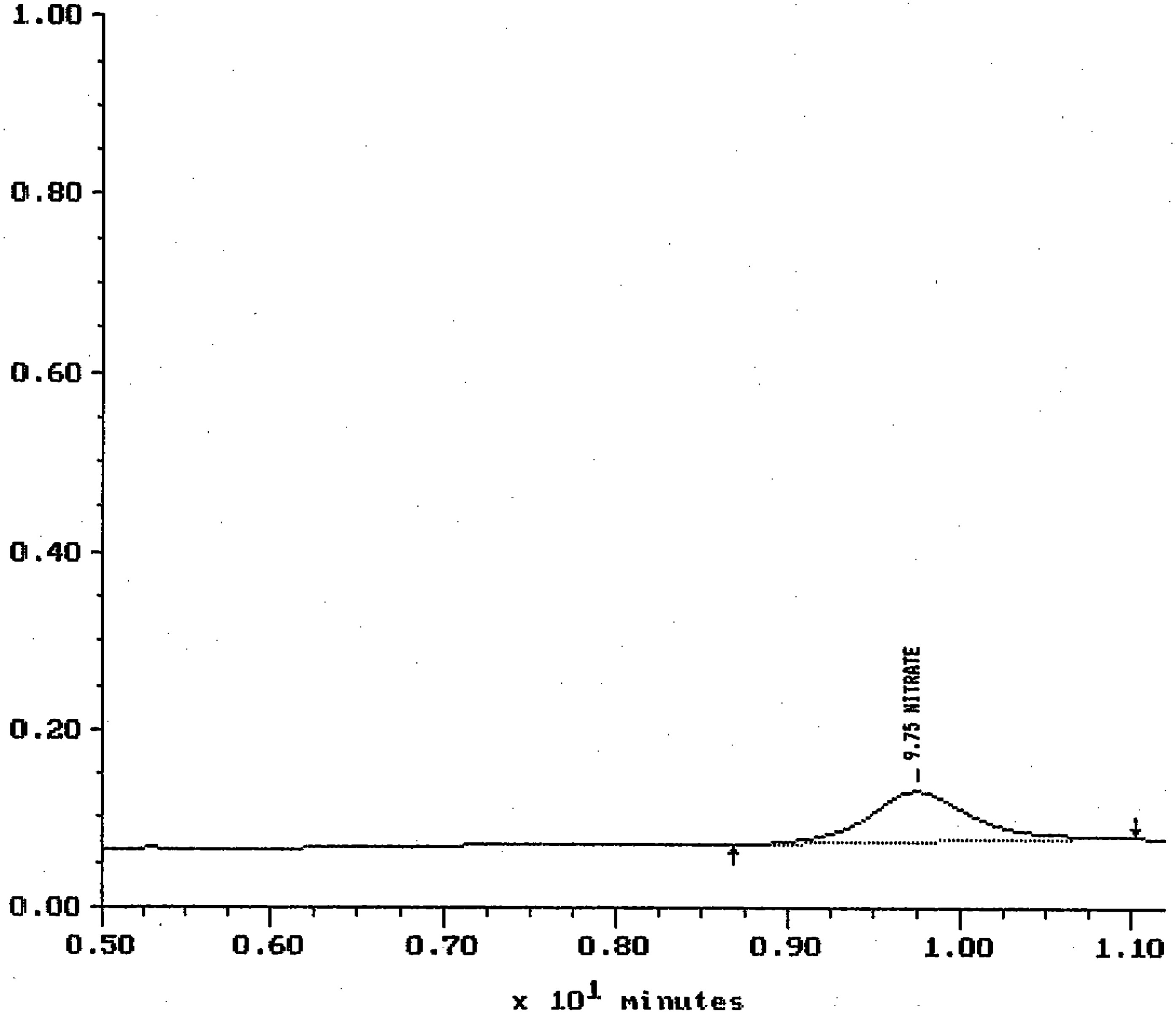
DATA PROCESSED BY: ______________________ ON: ____/____/____

LQA-26RRR (a)

Sample: SYS 10 STD #1
Acquired: 06-APR-89 8:11
Inj Vol: 50.00

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS5\ANION\7560\7560

Filename: STD1
Operator: BJN



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:47:01

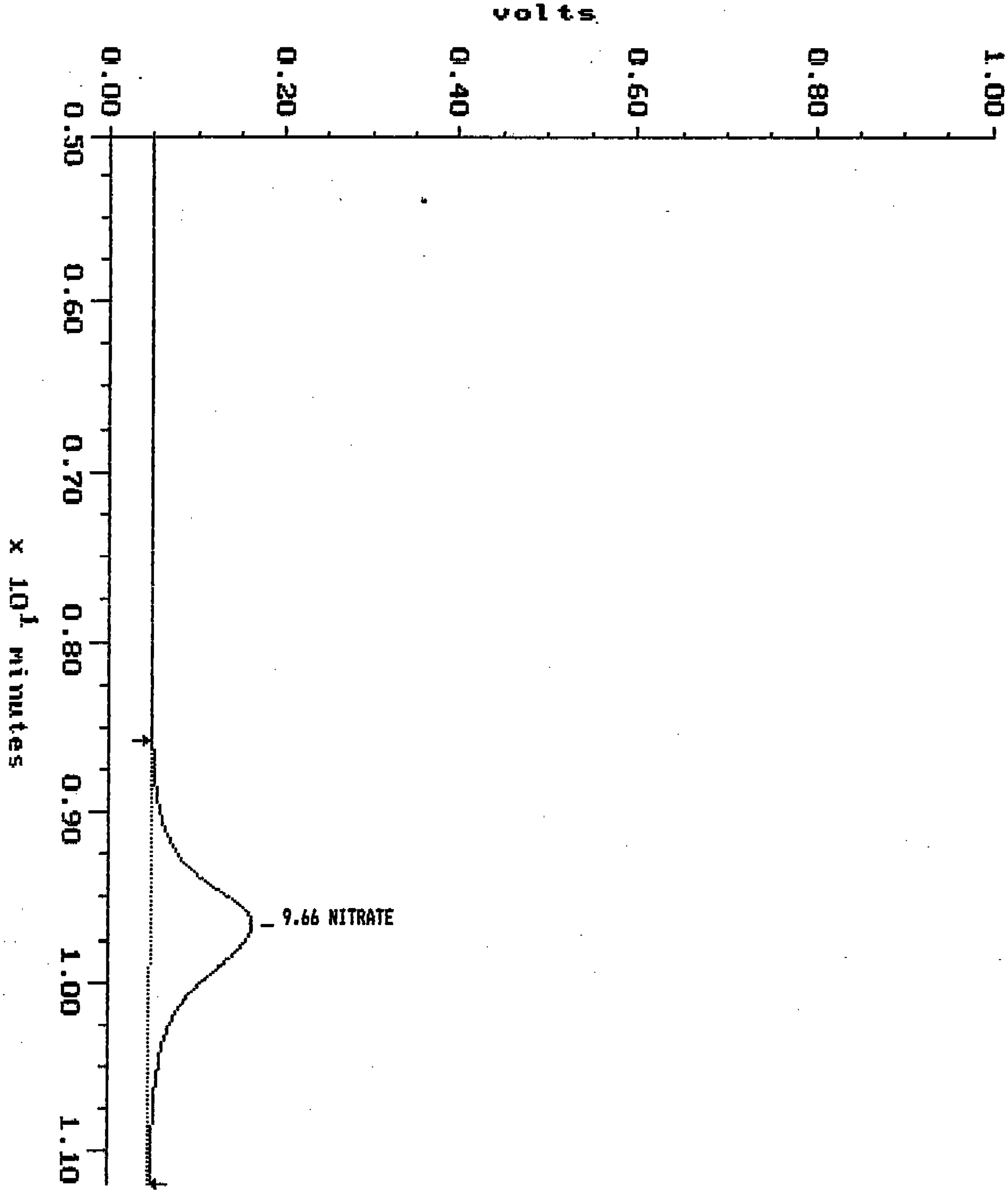
SAMPLE: SYS 10 STD #1
#1 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 8:11
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: STND
Instrument: DIONEX SYSTEM10
Filename: STD1
Index: Disk
Injection Volume: 50.0

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.750	NITRATE	0.5000	0.5000	2439736	56419	EXT	AREA	0.000010247009
TOTAL				0.5000	0.5000	2439736	56419			

Sample: SYS 10 STD #2 Channel: CONDUCTIVITY Filename: STD2
Acquired: 06-APR-89 8:33 Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560 Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:47:29

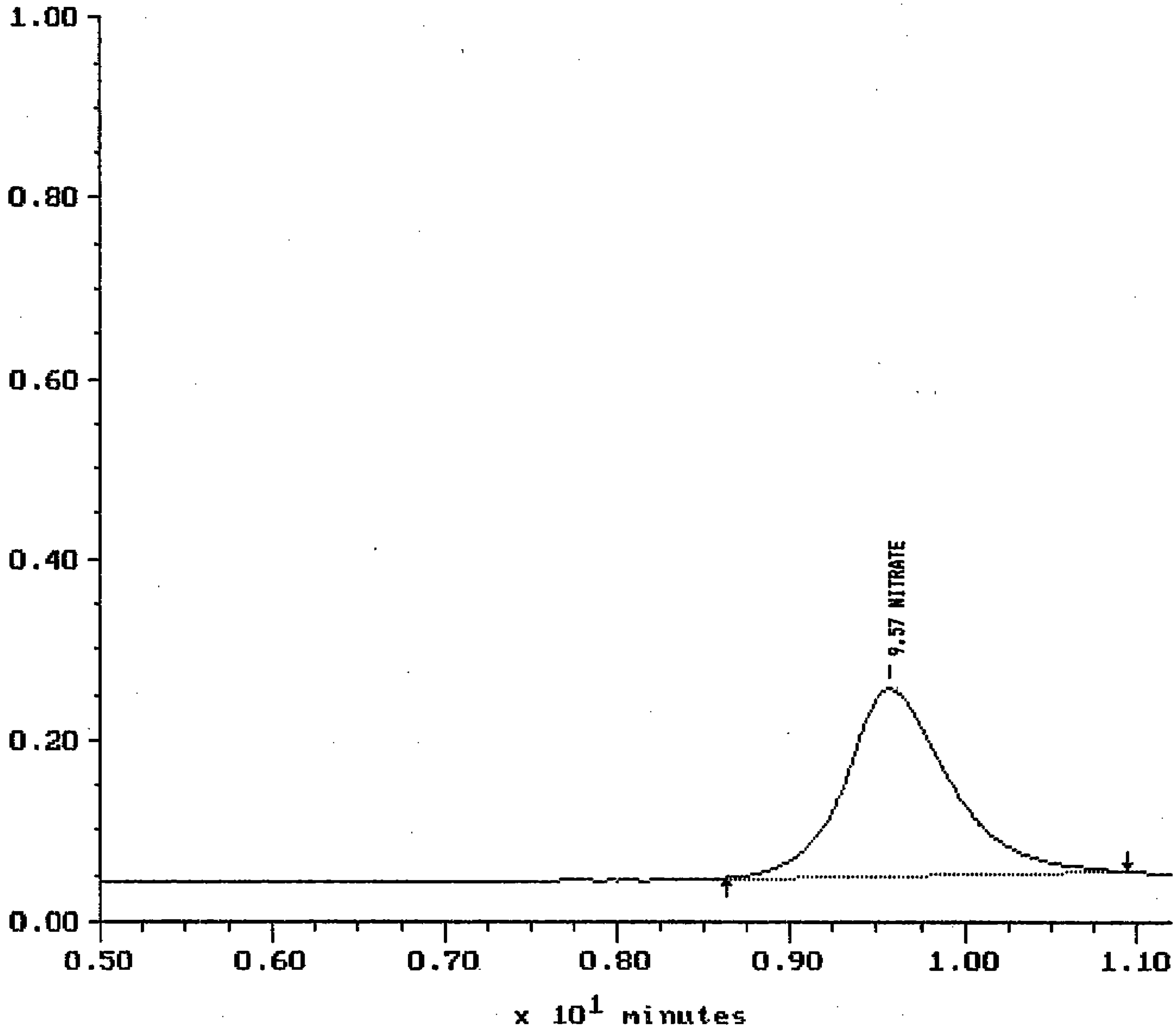
SAMPLE: SYS 10 STD #2
#2 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 8:33
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: STND
Instrument: DIONEX SYSTEM10
Filename: STD2
Index: Disk
Injection Volume: 50.0

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.658	NITRATE	1.0000	1.0000	4916992	113841	EXT	AREA	0.000010168819
TOTAL				1.0000	1.0000	4916992	113841			

Sample: SYS 10 STD #3   Channel: CONDUCTIVITY   Filename: STD3
Acquired: 06-APR-89   8:52   Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560   Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

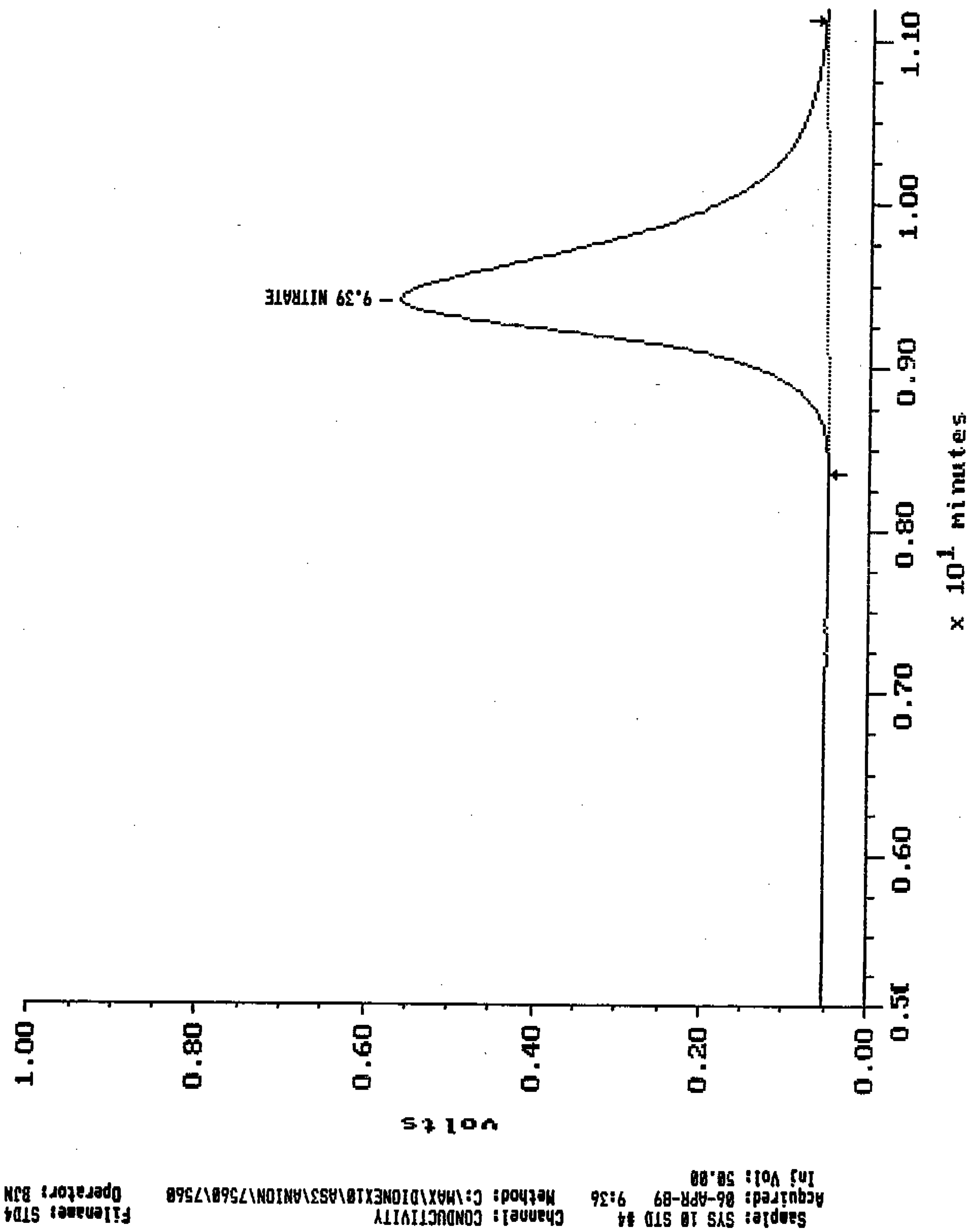
Printed: 7-APR-1989 13:47:59

SAMPLE: SYS 10 STD #3
#3 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 8:52
Rate: 2.0 points/sec
Duration: 10.000 minutes
Operator: BJN

Type: STND
Instrument: DIONEX SYSTEM10
Filename: STD3
Index: Disk
Injection Volume: 50.0

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.567	NITRATE	2.0000	2.0000	8772399	206982	EXT	AREA	0.000011399391
TOTAL				2.0000	2.0000	8772399	206982			


9.39 NITRATE
volts
x 10^1 minutes
0.00
0.20
0.40
0.60
0.80
1.00
0.50
0.60
0.70
0.80
0.90
1.00
1.10
Sample: SYS 10 STD #4
Acquired: 06-APR-89 9:36
Inj Vol: 50.00
Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Filename: STD4
Operator: BJN

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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:48:29

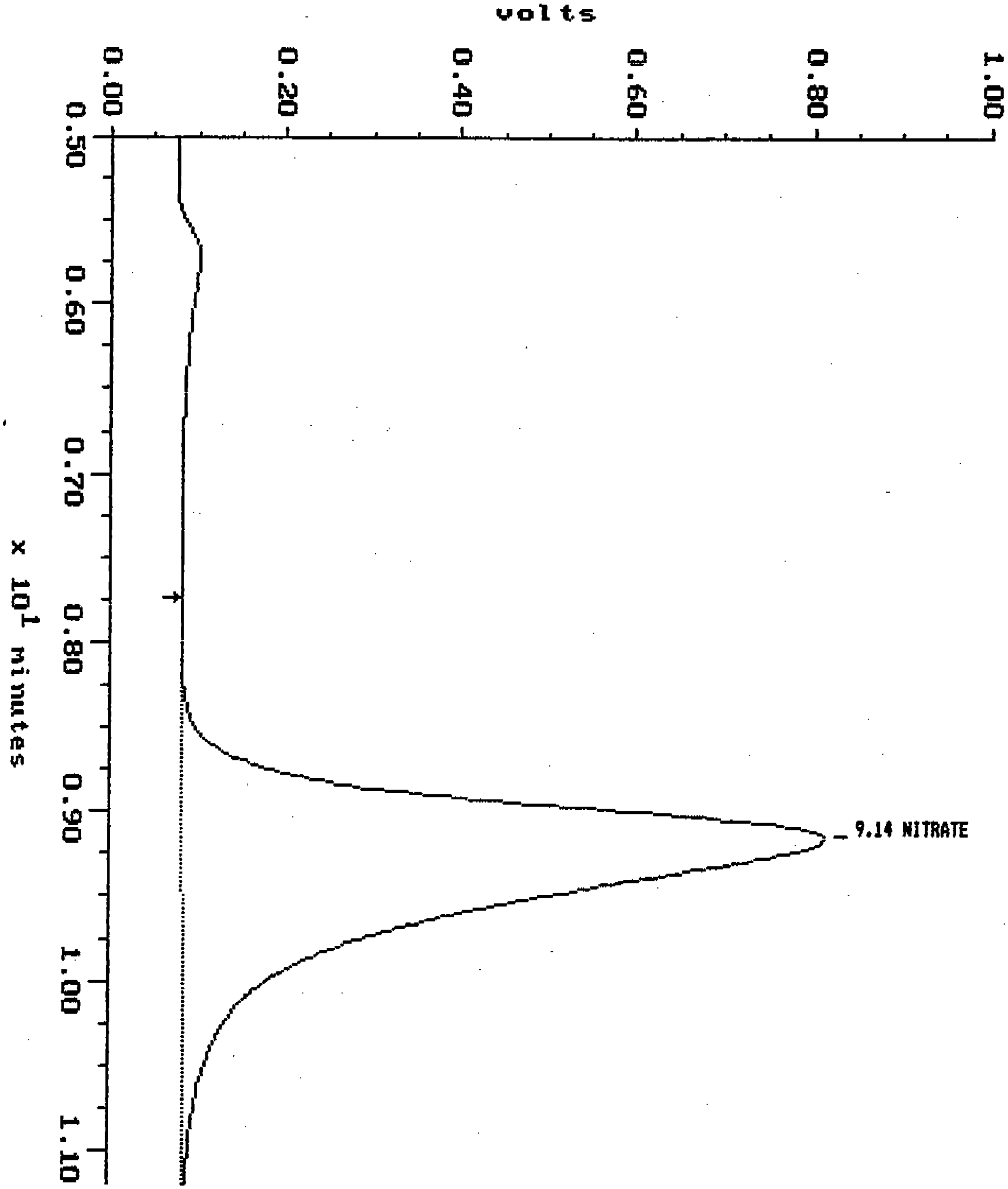
SAMPLE: SYS 10 STD #4
#4 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 9:36
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: STND
Instrument: DIONEX SYSTEM10
Filename: STD4
Index: Disk
Injection Volume: 50.0

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.392	NITRATE	5.0000	5.0000	22096743	508823	EXT	AREA	0.0000011313885
TOTAL				5.0000	5.0000	22096743	508823			

Sample: SYS 10 STD #5   Channel: CONDUCTIVITY   Filename: STD5
Acquired: 06-APR-89 14:47   Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560   Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

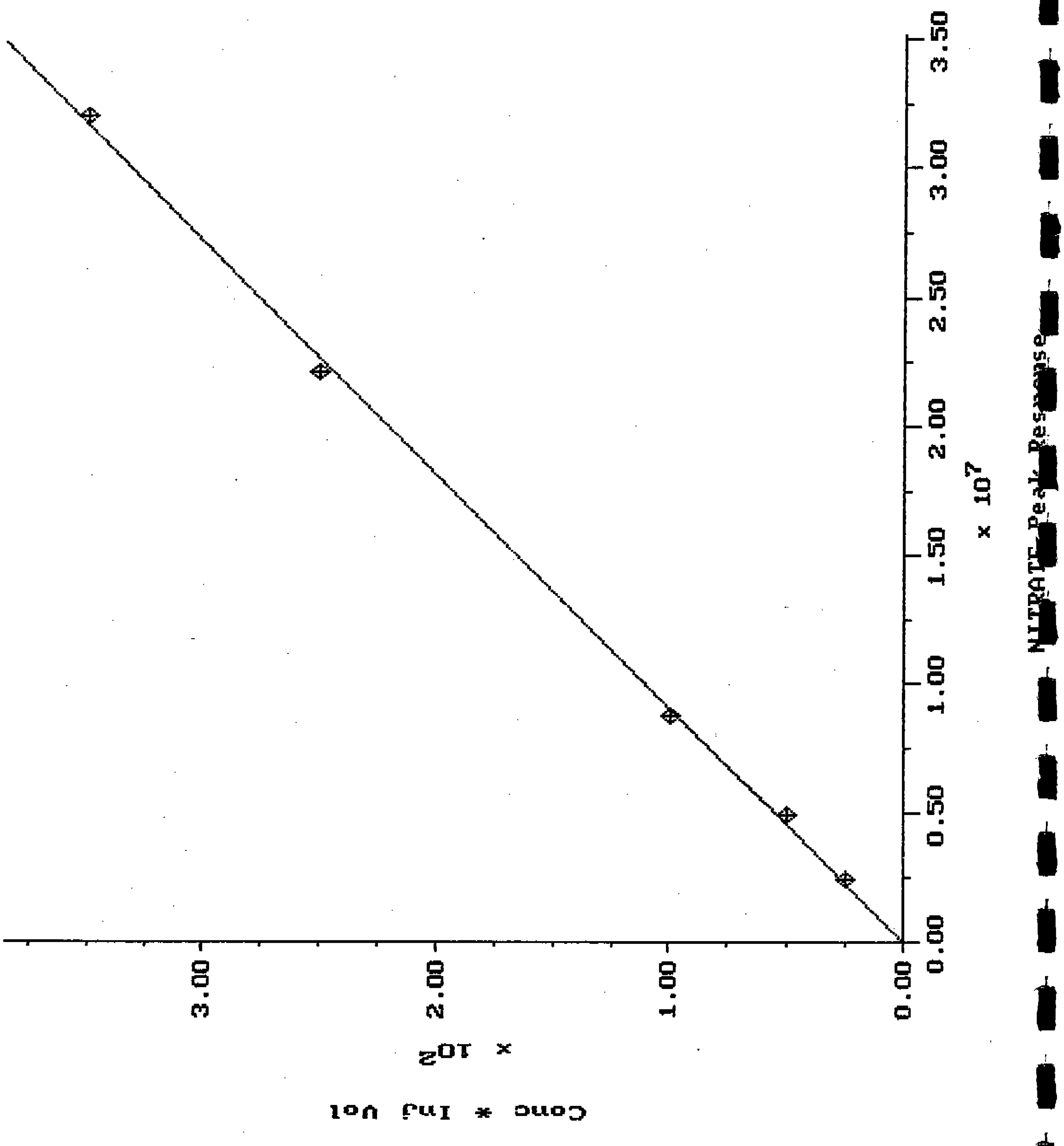
Printed: 7-APR-1989 13:48:59

SAMPLE: SYS 10 STD #5
#5 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 14:47
Rate: 2.0 points/sec
Duration: 10.000 minutes
Operator: BJN

Type: STND
Instrument: DIONEX SYSTEM10
Filename: STD5
Index: Disk
Injection Volume: 50.0

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.142	NITRATE	7.0000	7.0000	31977960	730478	EXT	AREA	0.000010945038
TOTAL				7.0000	7.0000	31977960	730478			


NITRATE Peak Response
x 10^7
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
Conc * Inj Vol
x 10^2
0.00
1.00
2.00
3.00

NITRATE Calibration Report

Printed: 7-APR-1989 13:49:15

Quant Basis: Area
Curve Type: Linear

Rejection Tolerance: None
Weighting: None

Internal Standard: None
Forced Through Origin: Yes

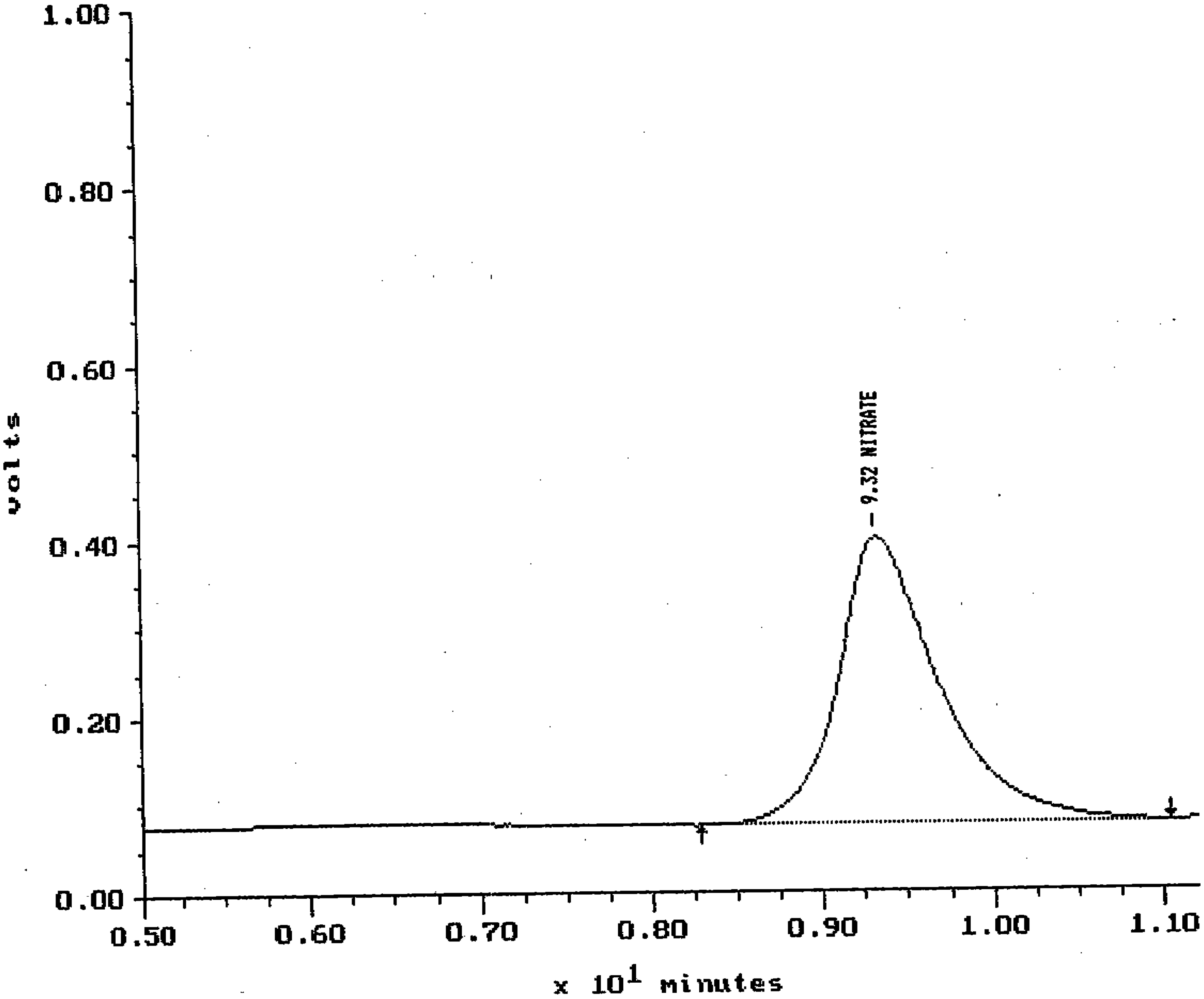
Equation: Conc = 1.106379E-05 * R

Sample	File Name	Valid	Concentration	Response	Calc'd Concentration	% Deviation	Response Factor
SYS 10 STD #1	STD1	Y	5.000000E-01	2.4397362E+06	5.398540E-01	-7.38E+00	1.024701E-05
SYS 10 STD #2	STD2	Y	1.000000E+00	4.9169915E+06	1.088012E+00	-8.09E+00	1.016882E-05
SYS 10 STD #3	STD3	Y	2.000000E+00	8.7723990E+06	1.941120E+00	3.03E+00	1.139939E-05
SYS 10 STD #4	STD4	Y	5.000000E+00	2.2096742E+07	4.889476E+00	2.26E+00	1.131389E-05
SYS 10 STD #5	STD5	Y	7.000000E+00	3.1977960E+07	7.075951E+00	-1.07E+00	1.094504E-05

Sample: 7560-41
Acquired: 06-APR-89 10:33
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756041
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:50:44

SAMPLE: 7560-41
#8 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 10:33
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756041
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

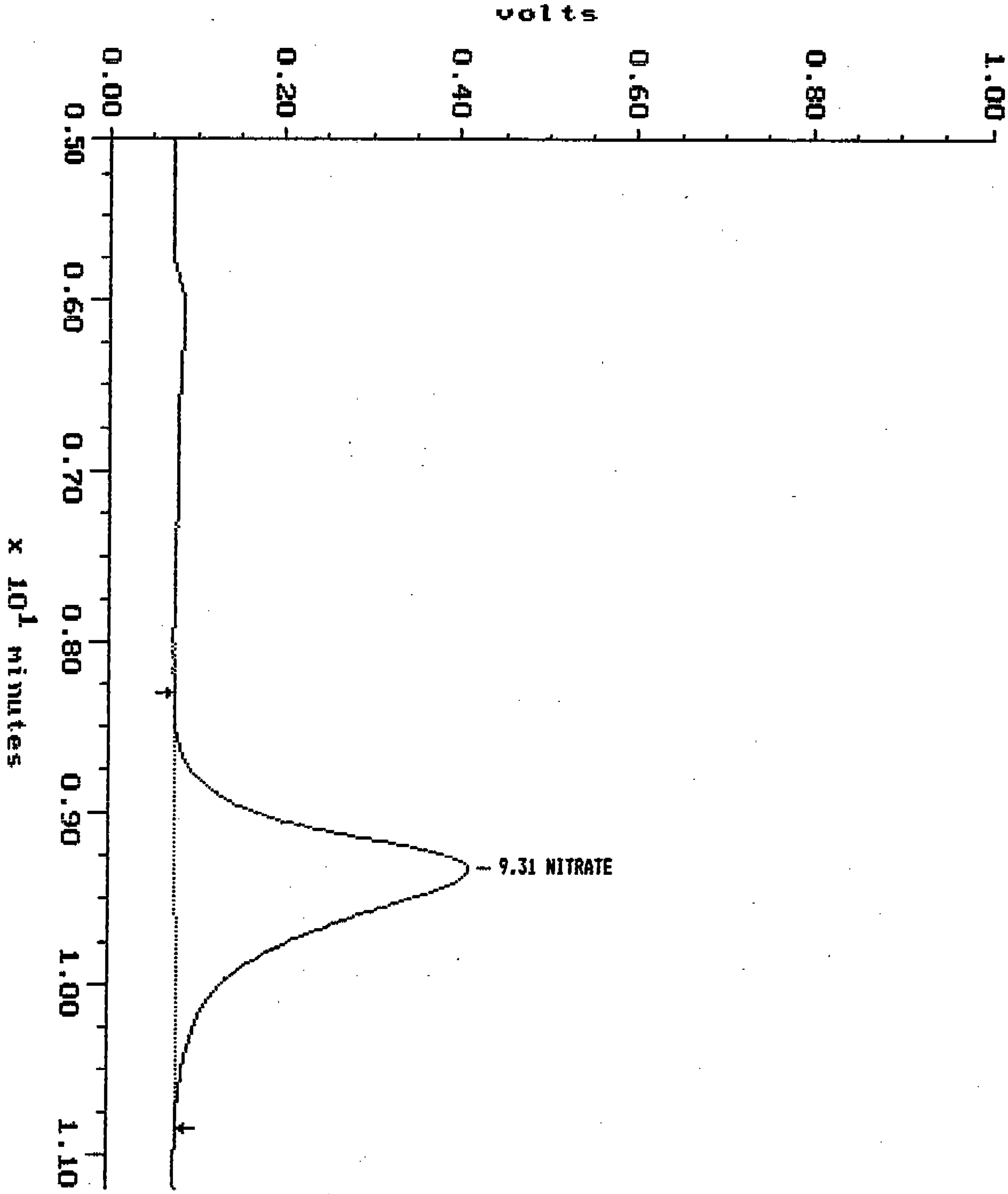
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.317	NITRATE	2.9349	1467.4386	13263430	322315	EXT	AREA	0.000011063794
TOTAL				2.9349	1467.4386	13263430	322315			

Sample: 7560-42
Acquired: 06-APR-89 10:58
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756042
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:51:14

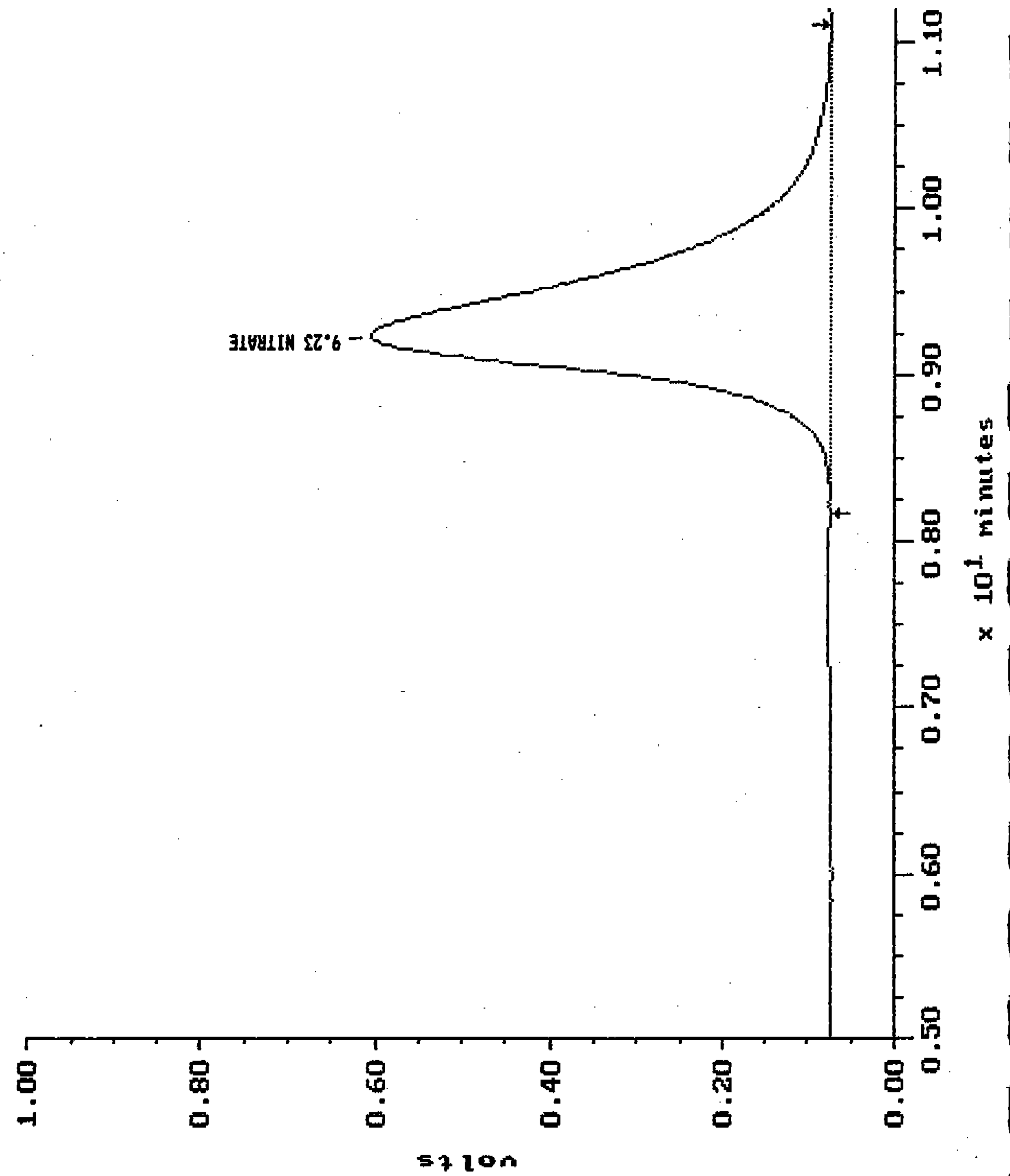
SAMPLE: 7560-42
#9 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 10:58
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756042
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.300	NITRATE	3.0240	1512.0122	13666309	334767	EXT	AREA	0.000011063794
TOTAL				3.0240	1512.0122	13666309	334767			

Sample: 7560-43   Channel: CONDUCTIVITY   Filename: 756043
Acquired: 06-APR-89 11:18   Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560   Operator: BJN
Dilution: 1 : 500.000   Amount: 1.000   Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:51:44

SAMPLE: 7560-43

#10 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 11:18
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756043
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

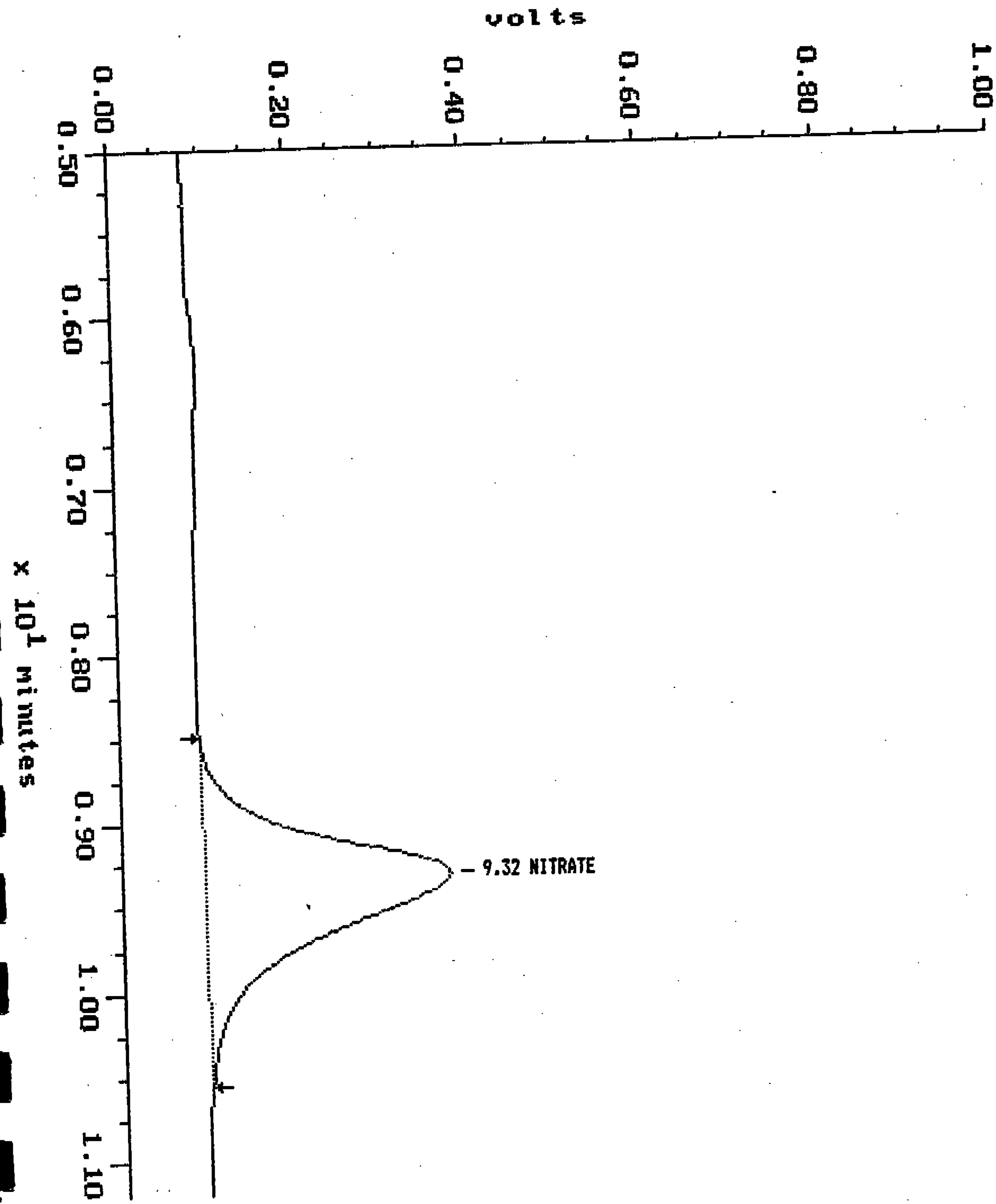
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.225	NITRATE	4.8579	2428.9534	21954073	531250	EXT	AREA	0.000011063794
TOTAL				4.8579	2428.9534	21954073	531250			

Sample: 7560-44
Acquired: 06-APR-89 11:51
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756044
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:52:15

SAMPLE: 7560-44
#11 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 11:51
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756044
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

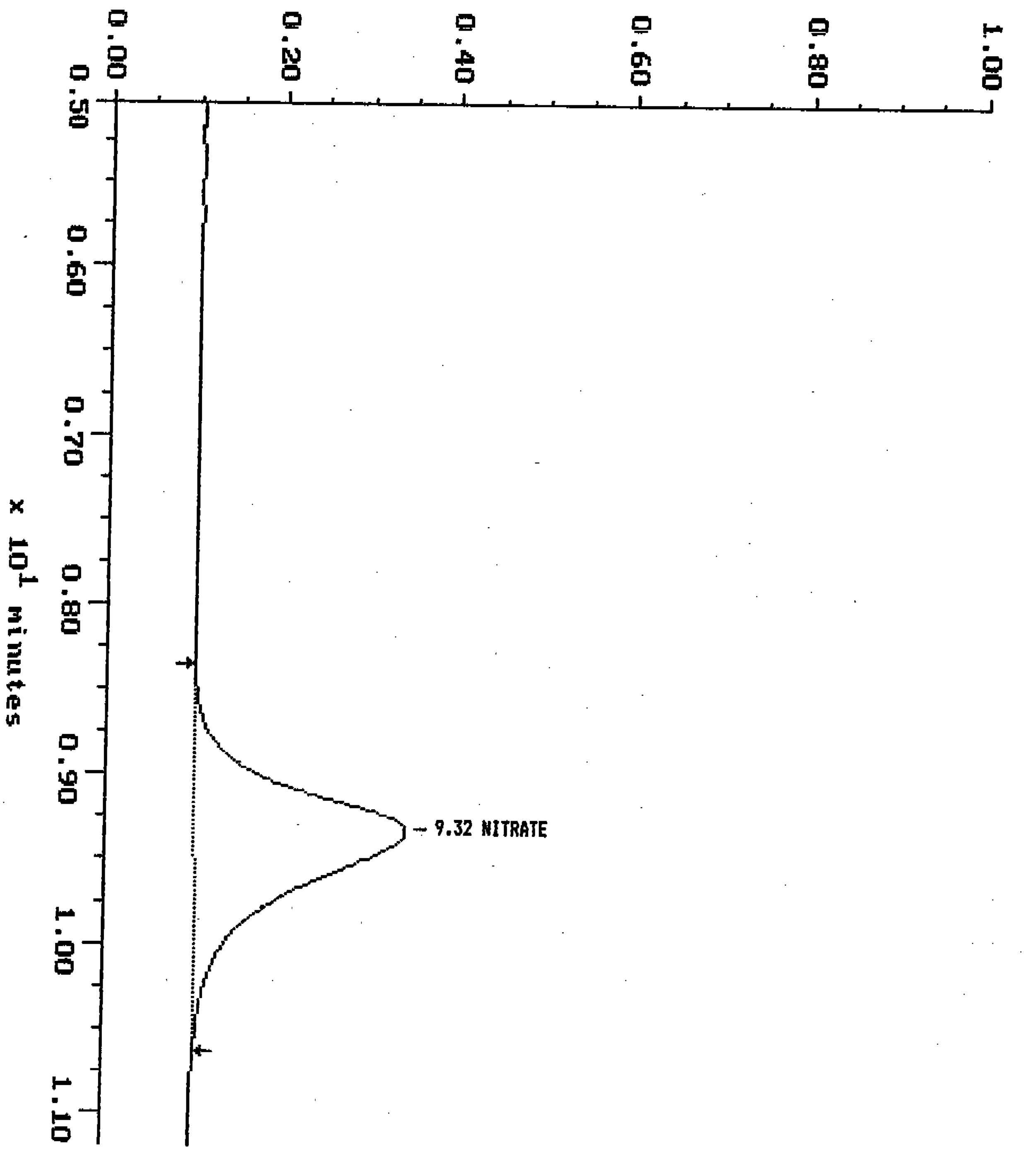
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.317	NITRATE	2.4426	1221.2887	11038607	279351	EXT	AREA	0.000011063794
TOTAL				2.4426	1221.2887	11038607	279351			

Sample: 7560-45
Acquired: 06-APR-89 12:40
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756045
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:53:15

SAMPLE: 7560-45D
#13 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 12:59
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 7560450
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

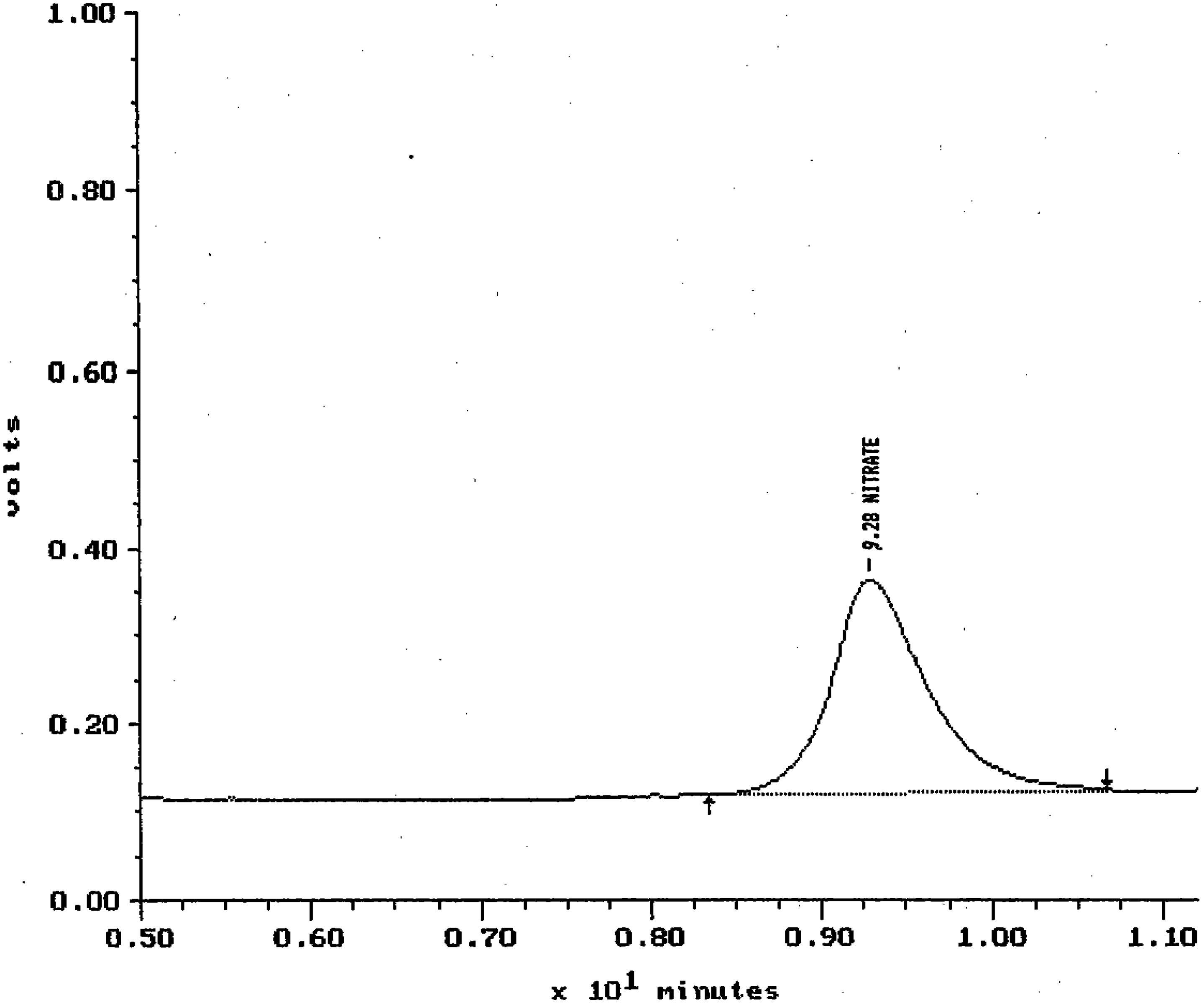
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.300	NITRATE	2.1535	1076.7370	9732078	243110	EXT	AREA	0.000011063793
TOTAL				2.1535	1076.7370	9732078	243110			

Sample: 7560-46
Acquired: 06-APR-89 13:17
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756046
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:53:44

SAMPLE: 7560-46

#14 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 13:17
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756046
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

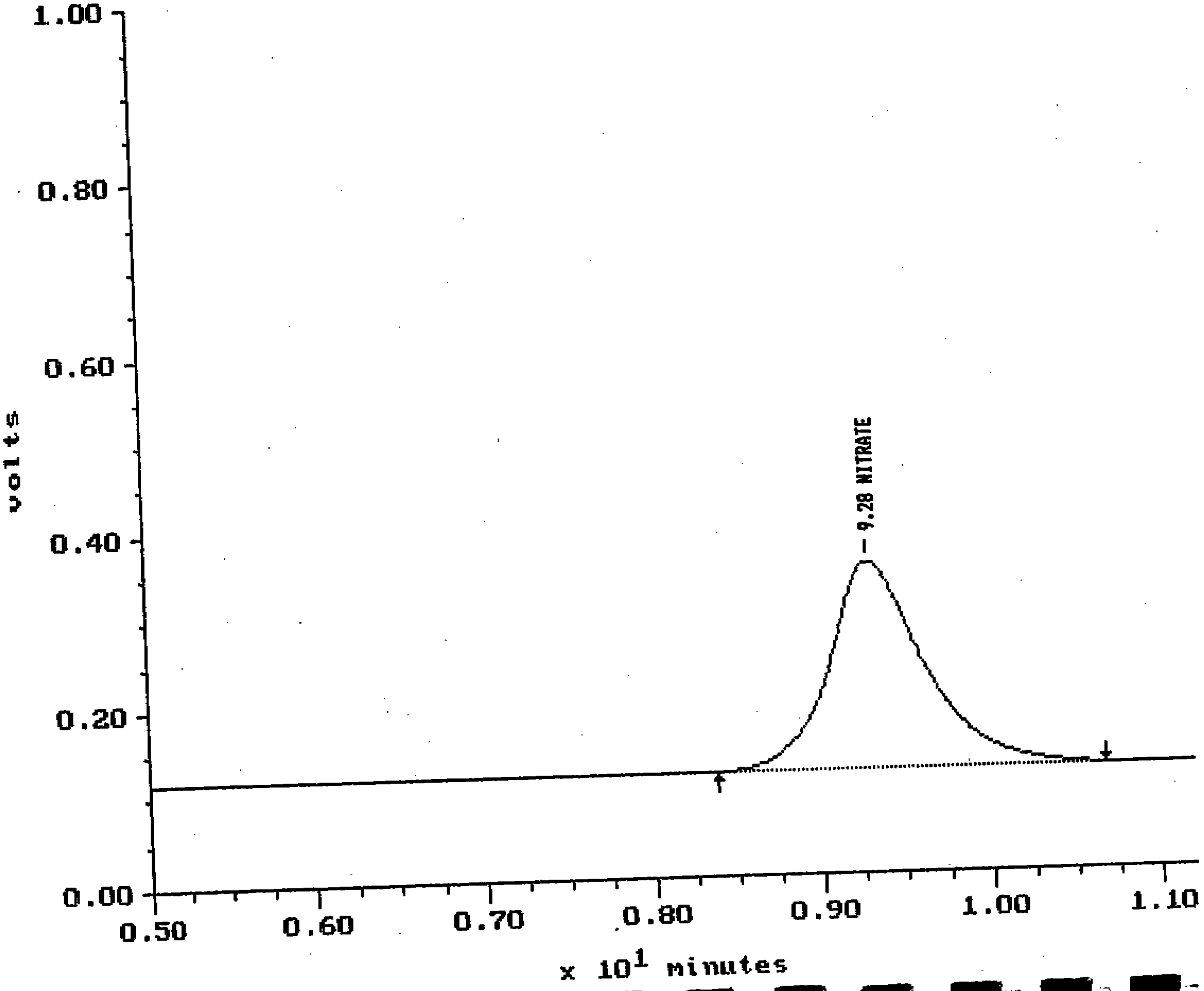
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.283	NITRATE	2.1246	1062.2958	9601551	241322	EXT	AREA	0.000011063794
TOTAL				2.1246	1062.2958	9601551	241322			

Sample: 7560-47
Acquired: 06-APR-89 13:38
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756047
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:54:14

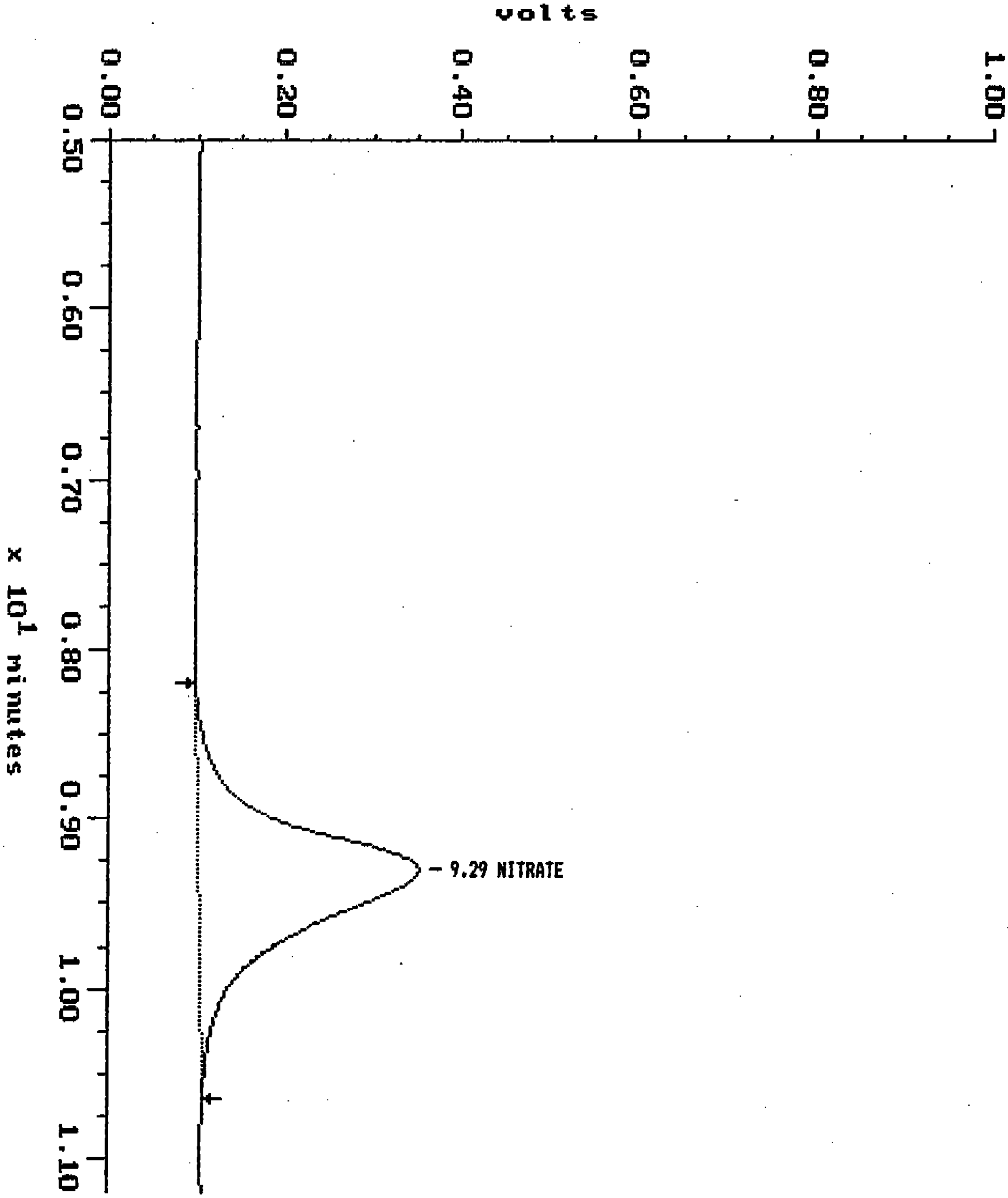
SAMPLE: 7560-47
#15 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 13:38
Rate: 2.0 points/sec
Duration: 10.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756047
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.283	NITRATE	2.0657	1032.8315	9335238	234981	EXT	AREA	0.000011063794
TOTAL				2.0657	1032.8315	9335238	234981			

Sample: 7560-48	Channel: CONDUCTIVITY	Filename: 756048
Acquired: 06-APR-89 13:58	Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560	Operator: BJN
Dilution: 1 : 500.000	Amount: 1.000	Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:54:44

SAMPLE: 7560-48
#16 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 13:58
Rate: 2.0 points/sec
Duration: 10.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756048
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

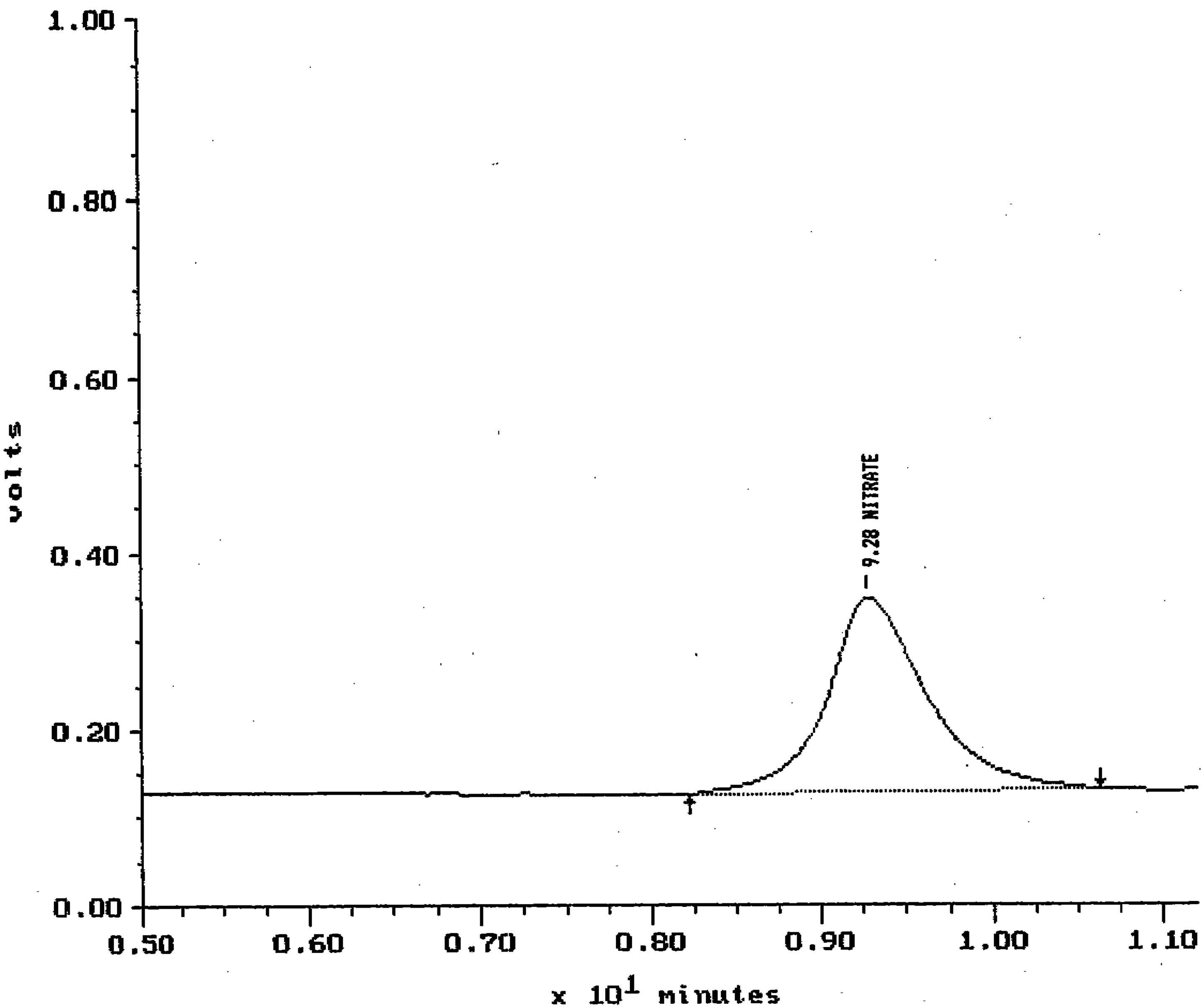
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.292	NITRATE	2.2447	1122.3421	10144279	249629	EXT	AREA	0.000011063793
TOTAL				2.2447	1122.3421	10144279	249629			

Sample: 7560-49
Acquired: 06-APR-89 14:17
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756049
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:55:15

SAMPLE: 7560-49

#17 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 6-APR-1989 14:17
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756049
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

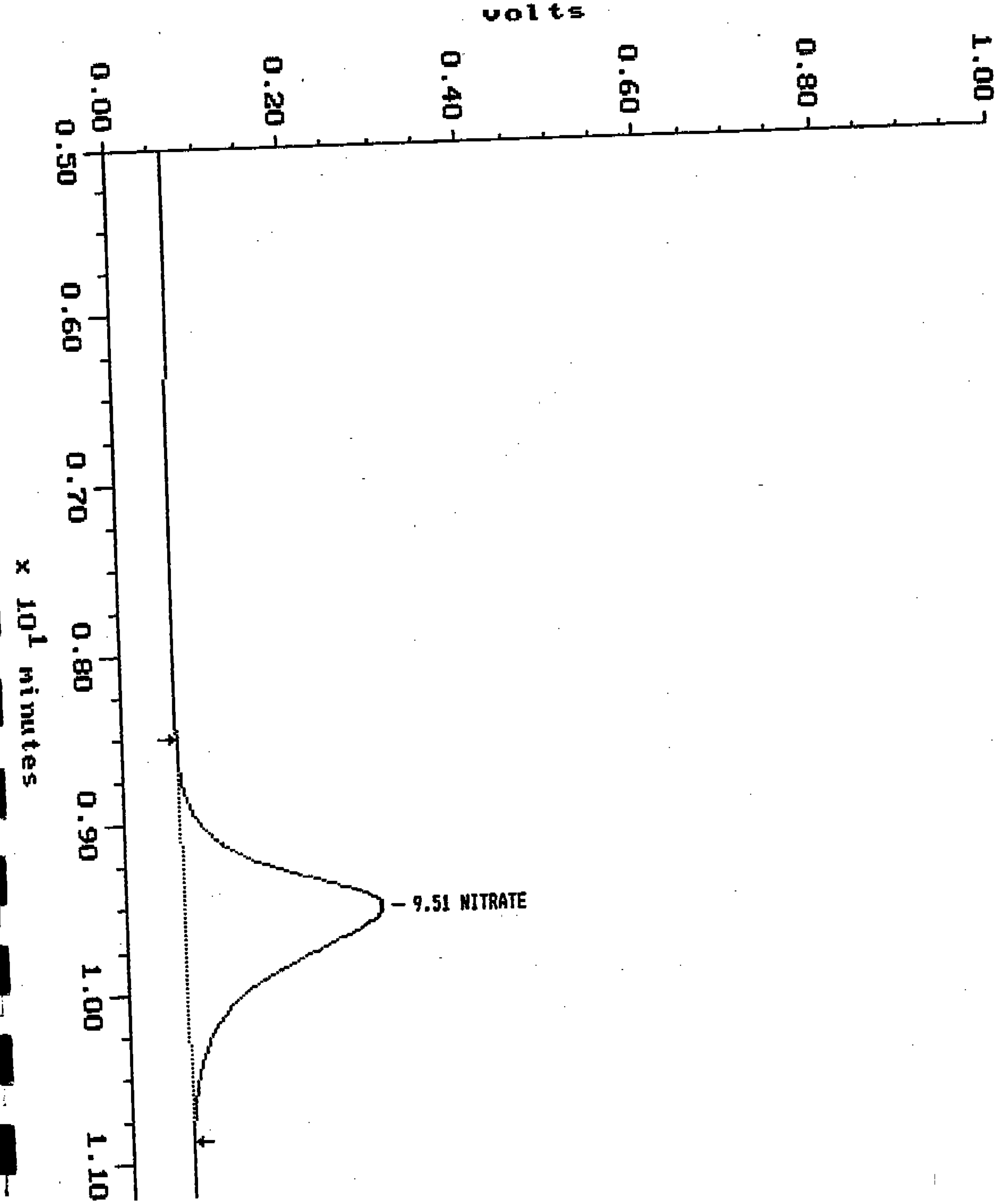
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.275	NITRATE	1.9925	996.2516	9004611	218267	EXT	AREA	0.000011063794
TOTAL				1.9925	996.2516	9004611	218267			

Sample: 7560-50
Acquired: 07-APR-89 7:00
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756050
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:55:45

SAMPLE: 7560-50
#18 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 7-APR-1989 7:00
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756050
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

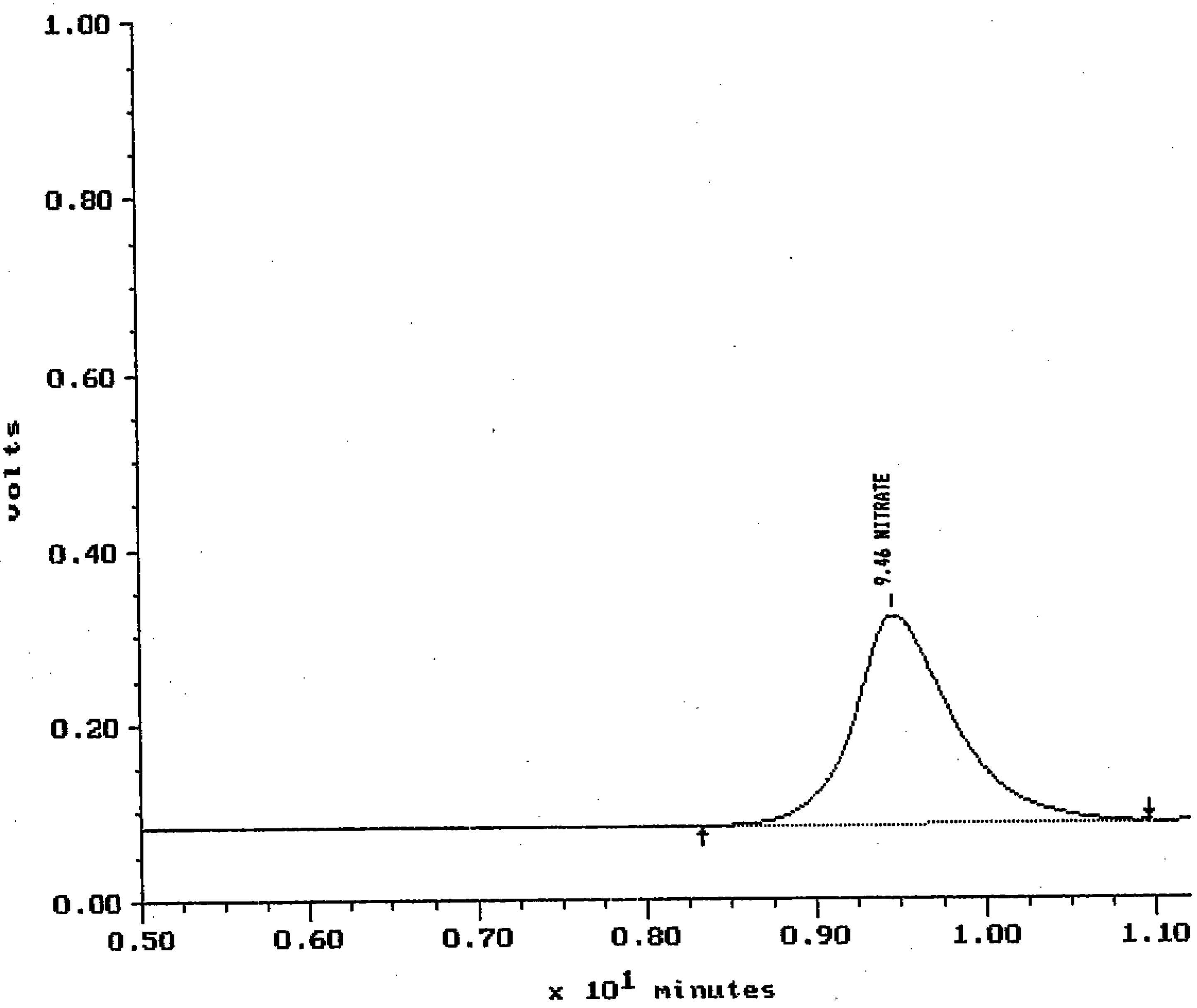
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.500	NITRATE	2.0675	1033.7322	9343379	226719	EXT	AREA	0.000011063794
TOTAL				2.0675	1033.7322	9343379	226719			

Sample: 7560-51
Acquired: 07-APR-89 9:19
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: 756051
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:56:44

SAMPLE: 7560-51

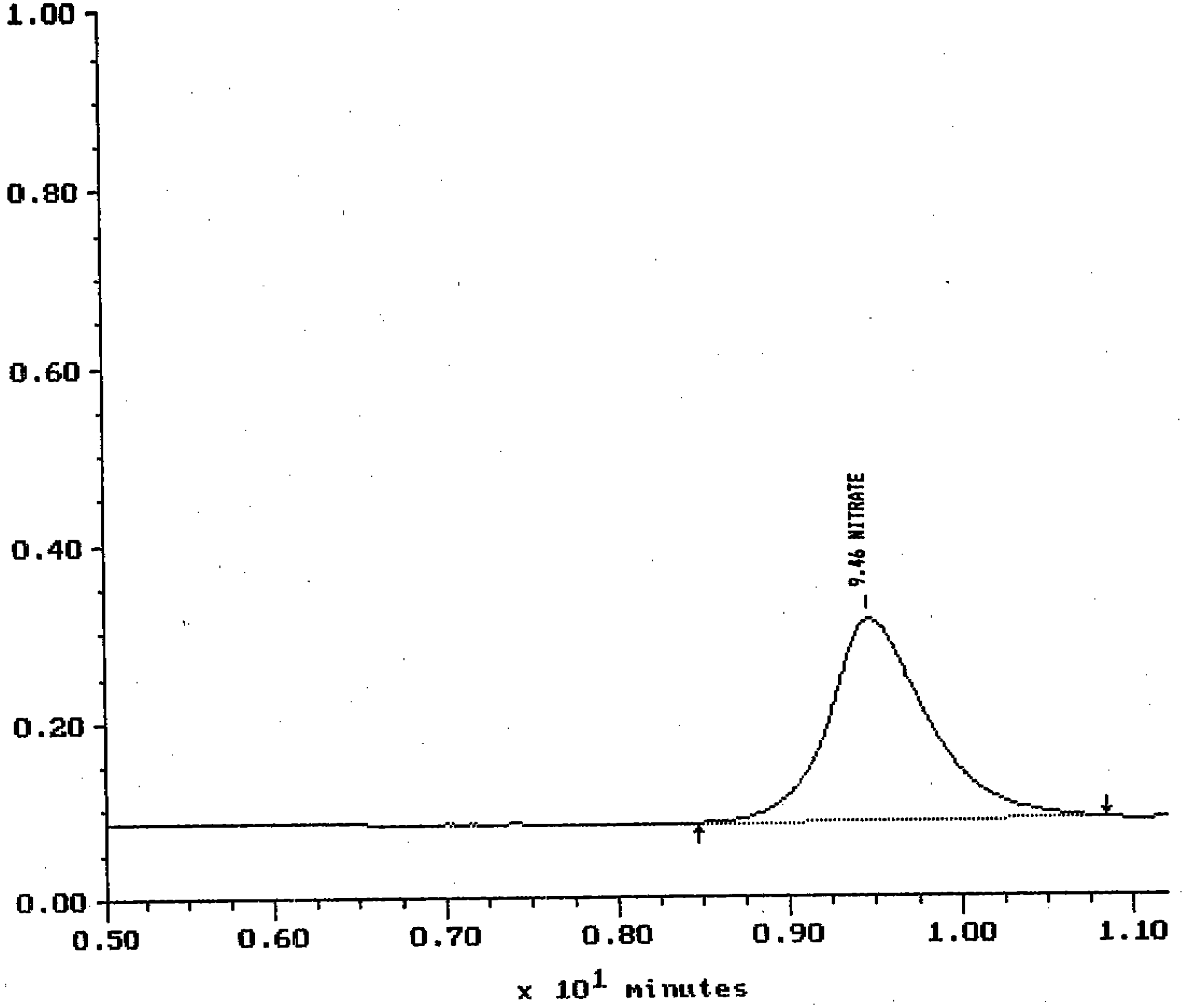
#20 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 7-APR-1989 9:19
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756051
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.458	NITRATE	2.1555	1077.7293	9741047	236069	EXT	AREA	0.000011063794
TOTAL				2.1555	1077.7293	9741047	236069			

Sample: 7560-52
Acquired: 07-APR-89 9:42
Dilution: 1 : 500.000
Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000
Filename: 756052
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:57:14

SAMPLE: 7560-52

#21 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 7-APR-1989 9:42
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: 756052
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

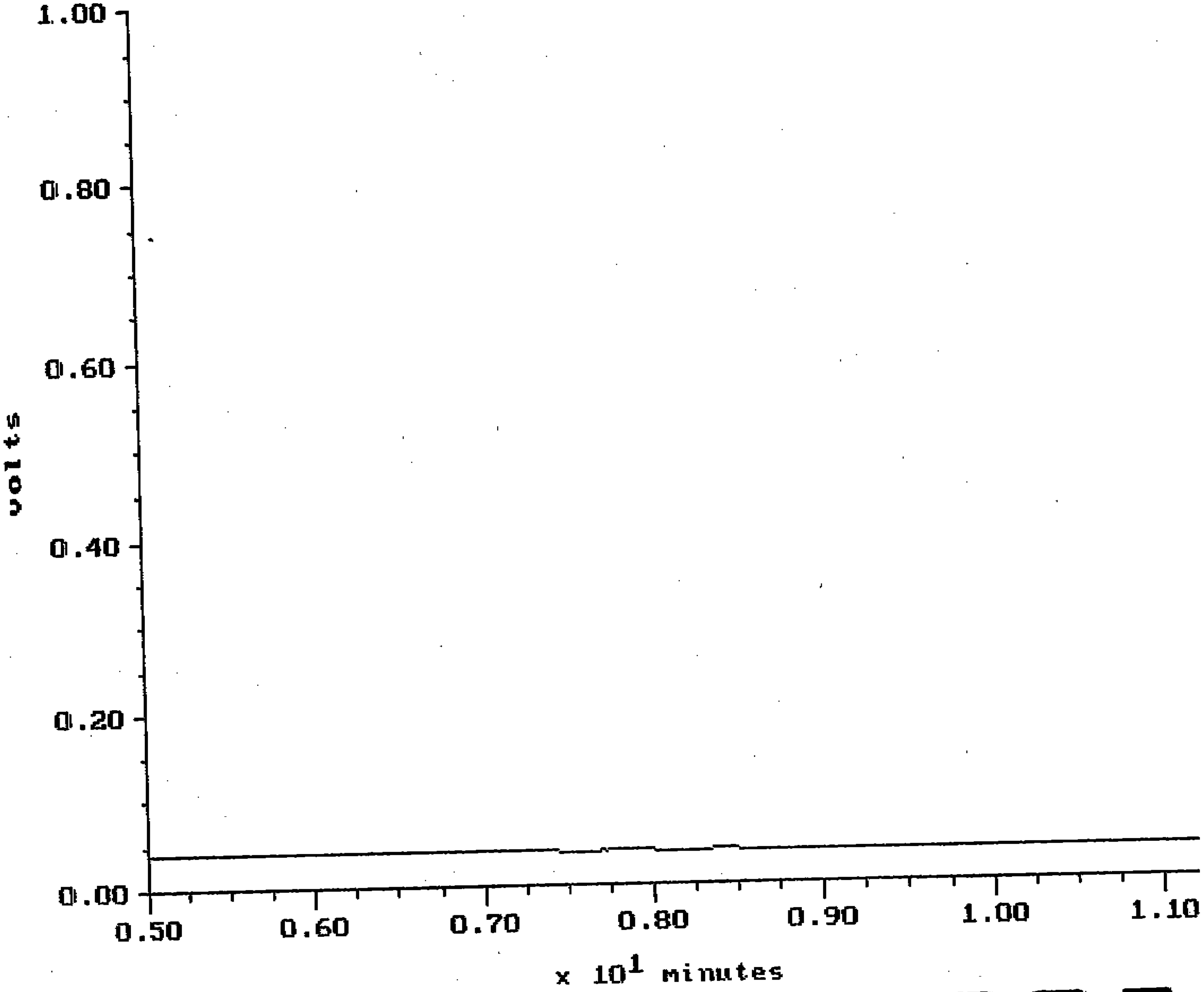
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1	1	9.458	NITRATE	2.0395	1019.7498	9216999	226657	EXT	AREA	0.000011063794
TOTAL				2.0395	1019.7498	9216999	226657			

Sample: 7560-BLK
Acquired: 07-APR-89 18:01
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: BLK
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:57:46

SAMPLE: 7560-BLK
#22 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 7-APR-1989 10:01
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: BLK
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

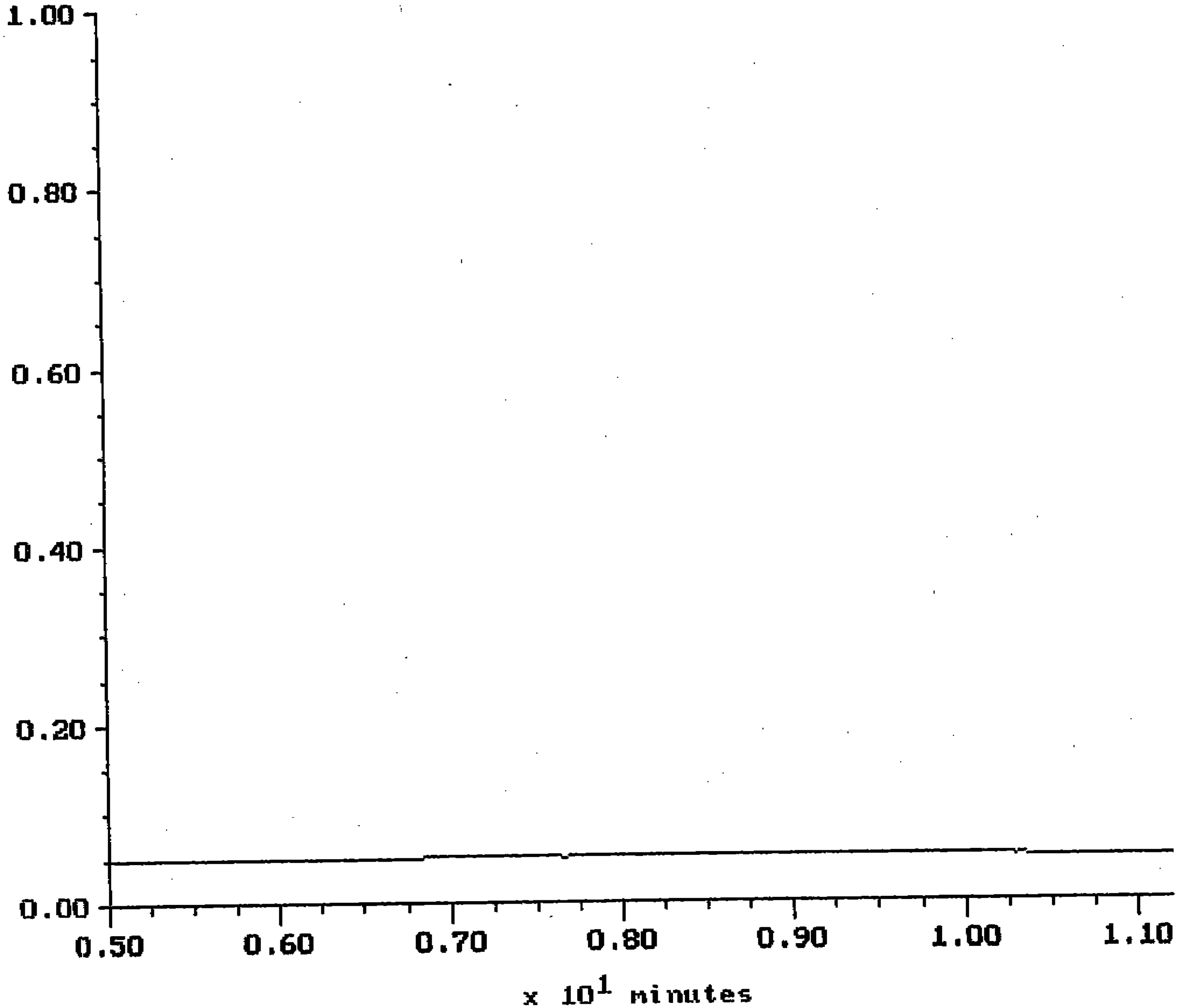
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1		0.433				58	72			
TOTAL				0.0000	0.0000	58	72			

Sample: 7560-BLK
Acquired: 07-APR-89 10:22
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: BL
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:58:16

SAMPLE: 7560-BLK
#23 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 7-APR-1989 10:22
Rate: 2.0 points/sec
Duration: 10.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: BL
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

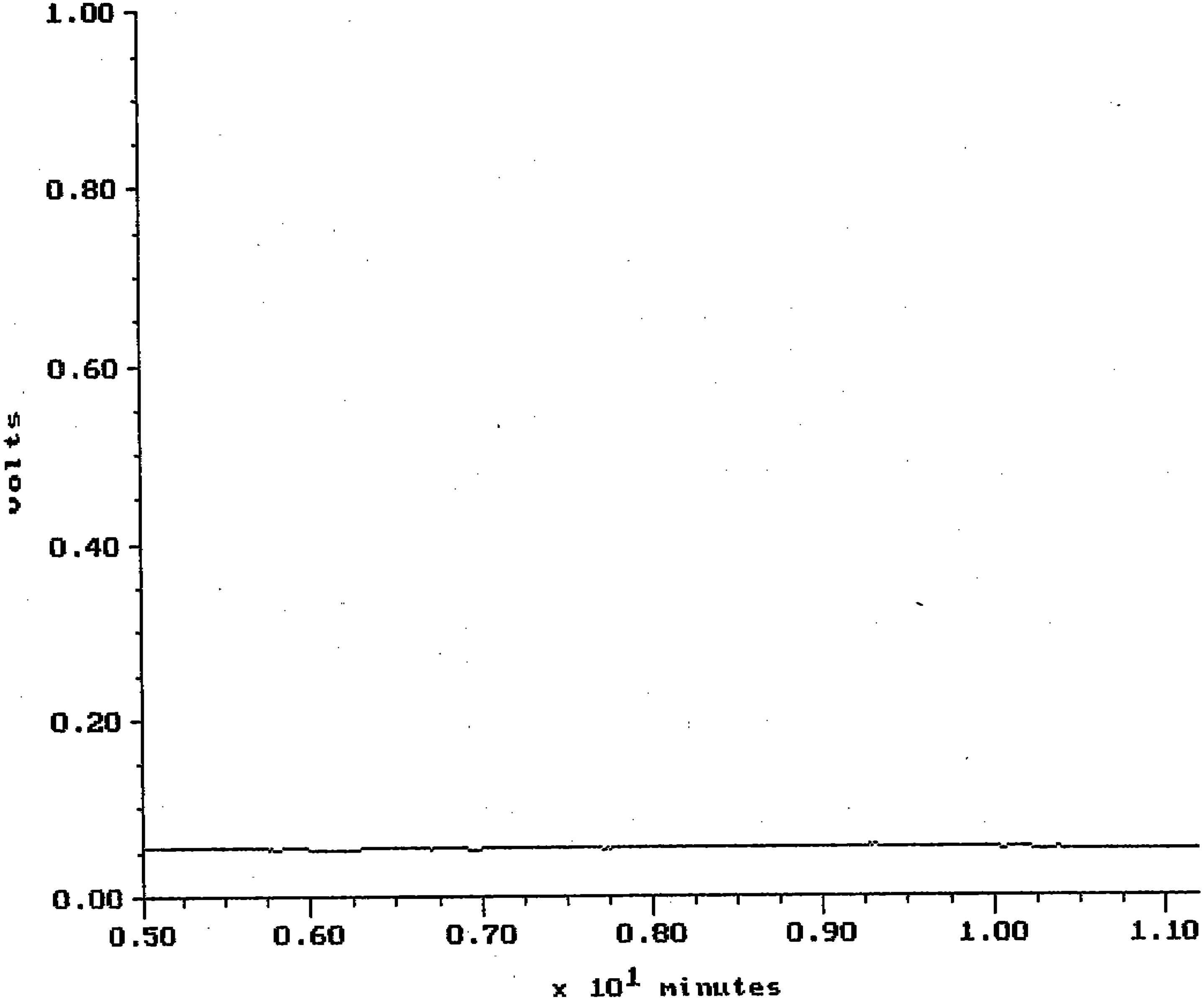
DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1		2.167				137243	9901			
TOTAL				0.0000	0.0000	137243	9901			

Sample: 7560-BLK
Acquired: 07-APR-89 10:40
Dilution: 1 : 500.000

Channel: CONDUCTIVITY
Method: C:\MAX\DIONEX10\AS3\ANION\7560\7560
Amount: 1.000

Filename: B
Operator: BJN
Inj Vol: 50.00



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MAXIMA 820 CUSTOM REPORT

Printed: 7-APR-1989 13:58:47

SAMPLE: 7560-BLK
#24 in Method: SYS10 ANIONS FOR NOX 7560
Acquired: 7-APR-1989 10:40
Rate: 2.0 points/sec
Duration: 18.000 minutes
Operator: BJN

Type: UNKN
Instrument: DIONEX SYSTEM10
Filename: B
Index: Disk
Injection Volume: 50.0
Dilution: 500.000
Amount: 1.000

DETECTOR: CONDUCTIVITY

PK#	ID#	Retention Time (minutes)	Component Name	Solution Conc (UG\ML)	TOTAL MASS (UG)	Peak Area	Peak Height	Code	Base	Response Factor
1		2.175				15678	911			
TOTAL				0.0000	0.0000	15678	911			

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job USS Minntac
Team Leader JBURESH
Date Submitted 3-31-89
Test No. 5

Source Primary CRUSHER Baghouse
Test Site STACK
Date of Test 3-31-89
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3 + 1	Probe Wash: ☒Acetone ☐D.I. Water	☒As per EPA M-5 ☐Other	Blank shared
3 + 1	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	" "
—	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	" "
—	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 CRUSHER
2) Fuel: ☐ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other NONE
3) Is sample combustible? ☒ No ☐ Yes
4) Does sample need special handling? ☒ No ☐ Yes If yes, explain

S-278RRRR

Interpoll Laboratories
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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job USS/Minntac
Team Leader JB
Date Submitted 3-31-89
Test No. 5
Date of Analysis 4-5-89
Transport Leakage [ ] None [ ] ______ ml

Source Primary Crusher Baghouse
Test Site Stack
Date of Test 3-31-89
No. of Runs Completed 3
Technician [illegible]
Solvent Acetone

0	Test ____ Run 0 Field Blank Log Number ______ Vol. of Solvent ____ ml *Solvent Residue .7 ug/ml	Dish No. ______ Dish Tare Wt. ______ g Dish+Sample Wt. ______ g Sample Wt. ______ g
1	Test 5 Run 1 Vol. of Solvent 150 ml Log Number -56 Comments ______	Dish No. 19 Dish Tare Wt. 48.2711 g Dish+Sample Wt. 48.3034 g Sample Wt. 0.0323 g
2	Test 5 Run 2 Vol. of Solvent 105 ml Log Number -58 Comments ______	Dish No. 20 Dish Tare Wt. 48.4168 g Dish+Sample Wt. 48.4362 g Sample Wt. 0.0194 g
3	Test 5 Run 3 Vol. of Solvent 90 ml Log Number -60 Comments ______	Dish No. 33 Dish Tare Wt. 49.5448 g Dish+Sample Wt. 49.5603 g Sample Wt. 0.0155 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ______ Comments ______	Dish No. ______ Dish Tare Wt. ______ g Dish+Sample Wt. ______ g Sample Wt. ______ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ______ Comments ______	Dish No. ______ Dish Tare Wt. ______ g Dish+Sample Wt. ______ g Sample Wt. ______ g

*Solvent Residue ___ ug/ml=[(Sample Wt. _____ g)(10^6)]/Vol. of Sol. ____ ml
EPA-M5 Acetone Residue Blank Spec. ≤7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0322	0.0193	0.0154		

G-65

LSC-01Y

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 5
Date of Analysis 4-4-89

Source Primary Crusher
Test Site Stack
Date of Test 3-30-89
No. of Runs Completed 3
Technician Mark Kaehler

0	Test ___ Run 0 Field Blank Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
1	Test 5 Run 1 Log Number 7560-57 Comments	Filter No. 0897 Filter Type 4" Filter Tare Wt. 0.8902 g Filter+Sample Wt. 0.8994 g Sample Wt. 0.0092 g
2	Test 5 Run 2 Log Number -59 Comments	Filter No. 0898 Filter Type 4" Filter Tare Wt. 0.8910 g Filter+Sample Wt. 0.8989 g Sample Wt. 0.0079 g
3	Test 5 Run 3 Log Number -61 Comments	Filter No. 0899 Filter Type 4" Filter Tare Wt. 0.8919 g Filter+Sample Wt. 0.8971 g Sample Wt. 0.0052 g
4	Test ___ Run ___ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
5	Test ___ Run ___ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0092	0.0079	0.0052		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0414	0.0272	0.0206		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job USS/Mintac	Source STEP II [illegible] Blk
Team Leader J Buresh	Test Site STACK
Date Submitted 8-31-89	Date of Test 8-31-89
Test No. 6	No. of Runs Completed

No. of Samples	Type of Sample	Analysis Required	Comments
3 + 1	Probe Wash: ☒Acetone ☐D.I. Water	☒As per EPA M-5 ☐Other	Blank same As T1
3 + 1	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	" "
	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	
	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

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job USS / Minntac
Team Leader JB
Date Submitted 3-31-89
Test No. 6
Date of Analysis 4-3-89
Transport Leakage [x] None [ ] ____ ml

Source Step III Turn Bin
Test Site Stack
Date of Test 3-31-89
No. of Runs Completed 3
Technician DD
Solvent Acetone

0	Test ____ Run 0 Field Blank Log Number ____ Vol. of Solvent ____ ml *Solvent Residue .7 ug/ml	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
1	Test 6 Run 1 Vol. of Solvent 100 ml Log Number 7560-62 Comments ____	Dish No. 34 Dish Tare Wt. 51.7554 g Dish+Sample Wt. 51.7669 g Sample Wt. 0.0115 g
2	Test 6 Run 2 Vol. of Solvent 95 ml Log Number -64 Comments ____	Dish No. 35 Dish Tare Wt. 51.0915 g Dish+Sample Wt. 51.0992 g Sample Wt. 0.0077 g
3	Test 6 Run 3 Vol. of Solvent 100 ml Log Number -66 Comments ____	Dish No. 36 Dish Tare Wt. 43.5639 g Dish+Sample Wt. 43.5701 g Sample Wt. 0.0062 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

*Solvent Residue ___ ug/ml=[(Sample Wt. ____ g)(10^6)]/Vol. of Sol. ____ ml
EPA-M5 Acetone Residue Blank Spec. $\leq$7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	G-68 Run 3	Run 4	Run 5
	0.0114	0.0076	0.0061		

LSC-01YP

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job USS Minntac
Team Leader JB
Date Submitted
Test No. 6
Date of Analysis 4-4-89

Source Step III Crusher
Test Site Stack
Date of Test 3-31-89
No. of Runs Completed 3
Technician Mark Kuehler

0	Test ___ Run 0 Field Blank Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
1	Test 6 Run 1 Log Number 7560 - 63 Comments	Filter No. 0900 Filter Type 4" Filter Tare Wt. 0.8704 g Filter+Sample Wt. 0.8721 g Sample Wt. 0.0017 g
2	Test 6 Run 2 Log Number -65 Comments	Filter No. 0884 Filter Type 4" Filter Tare Wt. 0.9202 g Filter+Sample Wt. 0.9233 g Sample Wt. 0.0031 g
3	Test 6 Run 3 Log Number -67 Comments	Filter No. 0885 Filter Type 4" Filter Tare Wt. 0.9147 g Filter+Sample Wt. 0.9173 g Sample Wt. 0.0026 g
4	Test ___ Run ___ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
5	Test ___ Run ___ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0017	0.0031	0.0026		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0131	0.0107	0.0087		

LSC-02PR

APPENDIX H

MPCA EXHIBITS C

Interpoll Laboratories
(612)786-6020

MPCA Exhibit C for Process Emissions

JOB USS, A Division of USX Corp.

SOURCE Ident. No. 5.4

DATE March 31, 1989

C. Equipment & Operating Data

1. Process Equip. No./Ident. Eqpt. No. 068-03-1G1.

2. Process Equip. Description Turn Bin Conveyor Transfer

3. Process equipment operating under normal operating conditions:
No ____. Yes X.

D. Instrument Data on Process Equipment

1. Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, lbs. per hour, pressure, air flow, etc.

E. Air Pollution Control Equipment

1. Type/model control equipment Wet Scrubber Environeering, Size A11085 Hydro-filter.

2. Air pressure drop across the control equipment ____.

3. Air flow through the control equipment 42,000 ACFM.

4. Was the control equipment operating normally? Yes.

5. Data of last major maintenance/cleaning of control equipment
3/23/89

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from MPCA, Division of Air Quality.

By JKrak, Position Area Mgr. Maint.

S-349R

Interpoll Laboratories
(612)786-6020

MPCA Exhibit C for Process Emissions

JOB USS, A Division of USX Corp.

SOURCE Ident. No. 4.6

DATE March 30, 1989

C. Equipment & Operating Data

1. Process Equip. No./Ident. Eqpt. No. 058-03-1G1
2. Process Equip. Description Minntac Step III Coarse Crusher Dump Pocket
3. Process equipment operating under normal operating conditions: No____. Yes X .

D. Instrument Data on Process Equipment

1. Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, lbs. per hour, pressure, air flow, etc.

E. Air Pollution Control Equipment

1. Type/model control equipment Baghouse Collector Envirotech Norblo Model 6-294-14-10
2. Air pressure drop across the control equipment 4-6" Water .
3. Air flow through the control equipment 60,000 ACFM
4. Was the control equipment operating normally? Yes
5. Data of last major maintenance/cleaning of control equipment Routine inspection and bag changes as needed

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from MPCA, Division of Air Quality.

By JKrak , Position Area Mgr Maint

S-3498

Interpoll Laboratories
(612)786-6020

MPCA Exhibit C for Process Emissions

JOB USS, A Division of USX Corp.

SOURCE Ident. No. 8.55

DATE March 28, 1989

C. Equipment & Operating Data

1. Process Equip. No./Ident. Line 6 Cooler

2. Process Equip. Description Agglomerator Line 6 Cooler Vent Stack

3. Process equipment operating under normal operating conditions:
   No____. Yes X.

D. Instrument Data on Process Equipment

1. Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, lbs. per hour, pressure, air flow, etc.

E. Air Pollution Control Equipment

1. Type/model control equipment None
2. Air pressure drop across the control equipment N/A
3. Air flow through the control equipment N/A
4. Was the control equipment operating normally? N/A
5. Data of last major maintenance/cleaning of control equipment
   N/A

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from MPCA, Division of Air Quality.

By Tom R. Hakala, Position AREA MANAGER OPERATIONS
AGGLM 3

S-349R

Interpoll Laboratories
(612)786-6020

MPCA Exhibit C for Process Emissions

JOB USS, A Division of USC Corp.

SOURCE Ident. No. 8.41

DATE March 28, 1989

C. Equipment & Operating Data

1. Process Equip. No./Ident. ES 247-06-2
2. Process Equip. Description Agglomerator Line 6 Waste Gas Stack
3. Process equipment operating under normal operating conditions: No ___. Yes x.

D. Instrument Data on Process Equipment

1. Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, lbs. per hour, pressure, air flow, etc.

E. Air Pollution Control Equipment

1. Type/model control equipment Wet Scrubber Environeering Model A33600L Ventri-Rod
2. Air pressure drop across the control equipment 7" Water
3. Air flow through the control equipment 350,000 SCFM
4. Was the control equipment operating normally? Yes
5. Data of last major maintenance/cleaning of control equipment February, 1988

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from MPCA, Division of Air Quality.

By Tom R. Uskala. Position AREA MANAGER OPERATIONS AGGLOM 3

S-349B

Interpoll Laboratories
(612)786-6020

MPCA Exhibit C for Process Emissions

JOB USS, A Division of USX Corp.

SOURCE Ident. No. 9.42

DATE March 29, 1989

C. Equipment & Operating Data

1. Process Equip. No./Ident. ES 247-07-2
2. Process Equip. Description Agglomerator Line 7 Waste Gas Stack
3. Process equipment operating under normal operating conditions:
   No ____. Yes X .

D. Instrument Data on Process Equipment

1. Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, lbs. per hour, pressure, air flow, etc.

E. Air Pollution Control Equipment

1. Type/model control equipment Wet Scrubber Environeering Model A33600L Ventri-Rod
2. Air pressure drop across the control equipment 7" Water
3. Air flow through the control equipment 350,000 SCFM
4. Was the control equipment operating normally? Yes
5. Data of last major maintenance/cleaning of control equipment January, 1988

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from MPCA, Division of Air Quality.

By Tom R. Hakala, Position AREA MANAGER OPERATIONS AGGLOM 5

S-349R

APPENDIX I

PROCESS RATE DATA

Minntac Agglomerator Operating Data Summary
Interpoll Testing - March 1989

Test	Date	Run	Time	Fuel Rates * Gas Flow Standard MCF/hr	Fuel Rates * Coal feed lbs./hr	Solid rates Feed rate Green Ball Long Tons/hr.	Solid rates Bentonite Pounds/hr	Solid rates Moisture %	Wet Scrubber Data GPM	Wet Scrubber Data Pressure Drop In. w.c.	Wet Scrubber Data Recycle Rate
1	3-28-89	1	0955-1100	80**	9750**	468** 524	7220**	9.2	3050	NA***	0
1	3-28-89	2	1132-1238	82.8	9572	468 524	7168	9.2	3050	6.89	0
1	3-28-89	3	1253-1359	68.4	10296	469 525	7164	9.4	3050	7.22	0
2	3-28-89	1	1029-1129	80**	9325**	470**	7174**	9.2	3050	6.87	0
2	3-28-89	2	1213-1313	81.0	9734	483	7168	9.4	3050	6.98	0
2	3-28-89	3	1542-1642	47.5	11434	472	7142	9.5	3050	7.14	0
3	3-28-89	1	1542-1650	47.5	11434	472 529	7142	9.5	3050	7.14	0
3	3-28-89	2	1706-1810	49.5	11345	482 540	7279	9.5	3050	7.51	0
3	3-28-89	3	1824-1931	58.3	11763	483 541	7283	9.8	3050	7.70	0
4	3-29-89	1A	0857-0915	205.2	0	500 560	7571	9.4	2800	9.55	0
4	3-29-89	1A	1215-1303	184.3	0	379 424	5747	9.4	2800	9.73	0
4	3-29-89	2	1326-1431	188.6	0	406 455	6116	9.4	2800	9.73	0
4	3-30-89	3	0737-0842	180.0	0	409 458	6576	9.6	2800	6.05	0

* The gas flows for 3-28-89 represent the gas burned in the preheat burners. The gas flows for 3-29 and 3-30 represent the total gas flow on the line including the kiln and the preheat burners.

** Rates are based on hourly log readings. All other rates are based on averages of 15 minute readings.

*** Pressure sensing instrument was not working. It was repaired at approximately 11:00 a.m.

Computer Collected Process ...

The Minntac Agglomerator process computer collected data for the Interpoll stack tests in the following manner. Readings of all process analog values are normally read by the computer every 10 seconds. Process values pertinent to the tests were selected, stored, averaged over 15 minute intervals and printed out. The code number of the process value is given at the top of the columns. The number of the 15 minute interval is given in the far left column. For example readings in row 8 were taken 8 - 15 minute intervals (2 hours) after collection started.

Following is a list of the code numbers for the process values and an explanation of their meaning:

3368	Is the number of long tons of fluxed concentrate feeding all five balling circuits on line 6 in a 10 second interval. To convert this to an hourly rate multiply by 360.
3376	Is the number of long tons of green pellets feeding line 6 grate in a 10 second interval. Each long ton of green balls (2240 lbs) contains approximately 15 pounds of bentonite, 211 pounds of water, 161 pounds of flux (50% limestone, 50% dolomite) and 1853 pounds of concentrated iron ore. The green ball feed rate per hour is used as a measure of the operating levels of the indurating lines.
3372	Is the number of pounds of bentonite feeding all five balling circuits on line 6 in a 10 second interval.
2034	Is the number of pounds of coal being fed to the burner on Line 6 during a 10 second interval.
2041	Is the standard MCF of natural gas being consumed by the preheat burners on line 6 during a 10 second interval.
2703	Is the pressure change across the line 6 wet scrubber. This is an analog value representing the pressure change at the instant the value was recorded. The values listed on the data print out represent the average of the 90 readings in the 15 minute interval.
3369	Is the number of long tons of fluxed concentrate feeding all five balling circuits on line 7 in a 10 second interval.
3377	Is the number of long tons of green pellets feeding line 7 grate in a 10 second interval.
3373	Is the number of pounds of bentonite feeding all five balling circuits on line 7 in a 10 second interval.
3479	Is the total standard MCF of gas being consumed by Line 7 during a 10 second interval. It includes both the kiln and the preheat burners.
2042	Is the standard MCF of natural gas being consumed by the preheat burners on line 7 during a 10 second interval.
2863	Is the pressure change across line 7 wet scrubber.

03-29-89

Time		3368	Grem Ball 3376	Bentonite 3372	Coal 2034	Gas 3-28-89 2041	Wet scrubber ΔP 1.128 2703	3-29-89 0723
1143	1	1.35	1.30	19.90	26.10	0.23	6.87	Test 1
1158	2	1.34	1.30	19.90	26.52	0.23	6.91	Run 2
1216	3	1.34	1.30	19.92	27.35	0.23	6.93	Test 2
1229	4	1.34	1.30	19.93	26.38	0.23	6.85	Run 2
1245	5	1.35	1.31	19.89	27.77	0.22	6.96	
1258	6	1.34	1.30	19.90	26.66	0.22	7.17	Test 1
1313	7	1.35	1.32	19.90	26.38	0.23	7.22	
1331	8	1.34	1.30	19.91	26.10	0.19	7.35	Run 3
	9	1.34	1.30	19.88	31.93	0.17	7.23	
	10	1.35	1.30	19.91	31.93	0.14	7.14	
	11	1.36	1.30	19.92	33.03	0.13	7.02	
1429	12	1.34	1.30	19.89	31.93	0.13	7.02	
	13	1.35	1.30	19.89	32.62	0.13	6.83	
	14	1.35	1.31	19.86	31.10	0.13	6.90	
	15	1.34	1.30	19.71	32.06	0.13	7.01	
1535	16	1.35	1.30	19.61	30.82	0.13	6.75	
1543	17	1.34	1.30	19.65	30.54	0.12	6.87	Test 2 and Test 3
	18	1.34	1.31	19.62	30.82	0.12	6.90	Run 3 Run 1
	19	1.35	1.30	19.63	33.87	0.13	7.20	
1609	20	1.37	1.31	20.07	31.93	0.15	7.16	
	21	1.39	1.33	20.23	31.65	0.14	7.56	
1635	22	1.39	1.33	20.23	31.10	0.13	7.64	
1715	23	1.38	1.33	20.20	32.48	0.14	7.45	Test 3
	24	1.39	1.33	20.24	31.79	0.15	7.34	
	25	1.38	1.35	20.21	31.24	0.13	7.48	Run 2
	26	1.39	1.35	20.23	30.55	0.13	7.77	
	27	1.38	1.34	20.24	32.07	0.14	7.69	
1906	28	1.39	1.34	20.21	33.73	0.14	7.66	Test 3
	29	1.38	1.34	20.25	33.31	0.15	7.68	
	30	1.39	1.35	20.23	30.82	0.16	7.76	Run 3
	31	1.38	1.34	20.22	31.93	0.18	7.72	
	32	1.39	1.34	20.25	33.59	0.18	7.70	
	33	1.39	1.34	20.25	32.48	0.18	7.85	
	34	1.39	1.35	20.25	32.20	0.18	8.00	
	35	1.39	1.34	20.22	31.66	0.18	7.79	
	36	1.39	1.30	20.24	32.34	0.17	7.54	
	37	1.39	1.07	20.23	31.92	0.14	5.94	
	38	1.30	1.08	18.90	29.57	0.11	5.15	
	39	1.11	0.74	16.21	17.35	0.07	4.85	
	40	0.64	0.00	9.17	0.00	0.00	1.51	
	41	0.04	0.00	0.61	0.00	0.00	1.29	
	42	0.01	0.00	0.31	0.00	0.00	0.66	
	43	0.54	0.25	8.35	0.00	0.03	3.22	
	44	1.13	1.05	16.47	0.00	0.26	6.17	
	45	1.16	1.13	17.01	0.00	0.31	8.67	
	46	1.16	1.13	17.01	0.00	0.17	7.78	
	47	1.17	1.12	17.01	0.00	0.22	8.46	
	48	1.16	1.13	16.99	0.00	0.29	7.52	
	49	1.19	1.16	17.43	0.00	0.26	7.53	
	50	1.22	1.17	17.93	0.00	0.27	7.63	
	51	1.25	1.19	18.16	0.00	0.26	7.56	
	52	1.27	1.23	18.59	0.00	0.19	7.67	
	53	1.29	1.25	18.77	0.00	0.26	8.04	
	54	1.30	1.26	18.96	0.00	0.27	7.83	
	55	1.30	1.26	18.96	0.00	0.24	7.69	
	56	1.32	1.27	19.19	0.00	0.23	7.95	
	57	1.33	1.29	19.39	0.00	0.23	7.93	
	58	1.34	1.30	19.46	0.00	0.24	8.08	

03-30-89

Time	3369	Green Ball 3377	Bentonite 3373	Total Gas 3479	P.H. Gas 3-29-89 2042	Scrubber ΔP 0748 2863	3-30-89 0951
1	1.40	1.38	21.04	0.53	0.20	9.55	
2	1.40	1.39	21.08	0.54	0.20	9.55	
3	1.39	1.39	21.05	0.54	0.19	9.55	
0848-4	1.39	1.39	21.06	0.55	0.19	9.55	
0913 5	1.40	1.39	21.03	0.57	0.19	9.55	Test 4 Run 1A
0918 6	1.26	1.08	19.29	0.48	0.14	7.99	
7	0.36	0.37	5.19	0.37	0.11	7.42	
0948-8	0.00	0.00	0.00	0.40	0.00	6.94	
9	0.00	0.00	0.00	0.52	0.00	7.69	
10	0.00	0.00	0.00	0.61	0.00	8.78	
11	0.00	0.00	0.00	0.56	0.00	9.29	
1048-12	0.00	0.00	0.00	0.56	0.00	9.43	
13	0.10	0.00	1.78	0.62	0.00	9.76	
14	0.96	0.89	14.57	1.07	0.17	9.79	
15	1.06	1.05	15.90	0.99	0.25	9.73	
1148-16	1.04	1.05	15.68	0.69	0.20	9.73	
1205-17	1.07	1.06	15.92	0.58	0.21	9.73	
1211 18	1.07	1.05	15.97	0.52	0.21	9.73	Test 4
19	1.07	1.05	15.97	0.49	0.21	9.73	
1249-20	1.06	1.06	15.99	0.50	0.21	9.73	Run 1B
1303 21	1.06	1.04	15.97	0.47	0.19	9.73	
22	1.08	1.07	16.32	0.46	0.18	9.73	
1338 23	1.11	1.09	16.63	0.48	0.18	9.73	
1348 24	1.12	1.12	16.89	0.48	0.19	9.73	Test 4
1405 25	1.13	1.14	16.96	0.59	0.20	9.73	
1419 26	1.14	1.14	17.12	0.54	0.20	9.73	Run 2
1433 27	1.16	1.15	17.34	0.53	0.20	9.73	
1448 28	0.88	0.80	13.13	0.48	0.19	7.81	
29	0.47	0.30	6.42	0.27	0.05	4.56	
30	0.00	0.00	0.00	0.32	0.00	3.45	
31	0.00	0.00	0.00	0.38	0.00	3.67	
1548 32	0.00	0.00	0.00	0.41	0.00	4.01	
33	0.00	0.00	0.00	0.43	0.00	4.67	
34	0.00	0.00	0.00	0.46	0.00	4.89	
35	0.00	0.00	0.00	0.49	0.00	5.09	
1648 36	0.00	0.00	0.00	0.46	0.00	5.22	
37	0.00	0.00	0.00	0.43	0.00	5.44	
38	0.00	0.00	0.00	0.43	0.00	6.14	
39	0.00	0.00	0.00	0.50	0.00	7.25	
1745 40	0.00	0.00	0.00	0.42	0.00	7.55	
41	0.00	0.00	0.00	0.47	0.00	7.63	
42	0.00	0.00	0.00	0.83	0.00	7.71	
43	0.39	0.19	6.15	1.11	0.00	9.14	
1848-44	0.81	0.81	12.30	0.66	0.00	9.80	
45	0.84	0.74	12.65	1.00	0.00	10.10	
46	0.73	0.34	11.12	0.79	0.06	8.34	
47	0.26	0.00	4.06	0.61	0.00	6.47	
1948 48	0.26	0.00	3.85	0.46	0.00	7.41	
49	0.01	0.00	0.01	0.34	0.00	8.09	
50	0.14	0.00	2.15	0.37	0.00	8.01	
51	0.71	0.54	11.12	0.62	0.00	9.65	
2048 52	0.89	0.90	13.95	1.02	0.22	9.85	
53	0.96	0.97	14.76	0.95	0.30	10.05	
54	1.04	1.03	16.01	0.71	0.30	10.05	
55	1.14	1.13	17.65	0.63	0.30	10.05	
2148 56	1.23	1.21	19.02	0.61	0.28	10.10	
57	1.29	1.29	20.06	0.64	0.30	10.29	
58	1.34	1.32	20.95	0.65	0.30	10.29	

03-30-89

59	1.37	1.37	21.22	0.61	0.27	10.29
60	1.37	1.37	21.14	0.57	0.24	10.29
61	1.36	1.38	21.21	0.57	0.24	10.29
62	1.38	1.35	21.11	0.56	0.24	10.26
63	1.12	1.02	17.06	0.48	0.18	7.68
64	0.94	0.84	14.67	0.29	0.01	6.18
65	1.09	1.11	16.55	0.58	0.23	8.03
66	1.16	1.10	17.58	0.58	0.19	9.15
67	1.26	1.25	19.40	0.55	0.23	9.11
68	1.27	1.27	19.45	0.63	0.30	9.41
69	1.26	1.27	19.59	0.60	0.28	9.29
70	1.28	1.28	19.89	0.56	0.24	9.23
71	1.29	1.30	19.99	0.53	0.23	9.33
72	1.30	1.30	20.34	0.53	0.22	9.27
73	1.31	1.32	20.70	0.55	0.22	9.16
74	1.31	1.32	20.73	0.55	0.22	9.05
75	1.33	1.32	20.90	0.55	0.22	8.72
76	1.32	1.33	20.91	0.55	0.22	8.93
77	1.33	1.33	21.07	0.56	0.22	8.97
78	1.35	1.34	21.24	0.56	0.22	9.65
79	1.34	1.33	21.32	0.57	0.22	9.95
80	1.35	1.35	21.69	0.56	0.22	10.23
81	1.35	1.35	21.71	0.57	0.21	10.25
82	1.36	1.36	21.82	0.55	0.22	9.92
83	1.37	1.36	21.83	0.57	0.22	9.49
84	1.36	1.36	21.88	0.57	0.22	9.21
85	1.38	1.37	21.99	0.57	0.22	9.11
86	1.37	1.37	22.11	0.58	0.22	8.96
87	1.38	1.38	22.07	0.57	0.22	7.84
88	1.38	1.37	22.03	0.60	0.22	7.50
89	1.39	1.38	22.23	0.59	0.22	7.87
90	1.26	1.08	20.11	0.48	0.15	5.43
91	1.21	1.22	19.51	0.52	0.21	5.98
92	1.25	1.26	20.06	0.68	0.21	6.38
93	1.25	1.25	20.08	0.53	0.20	6.86
94	1.25	1.25	20.02	0.51	0.20	6.98
95	1.25	1.25	20.03	0.53	0.20	6.93
96	1.25	1.25	20.09	0.54	0.20	7.16
97	1.16	1.15	18.50	0.51	0.20	6.80
98	1.08	1.05	17.36	0.49	0.20	5.25
99	0.96	0.98	15.36	0.43	0.15	4.09
100	0.78	0.80	12.65	0.42	0.13	4.69
101	0.78	0.70	12.64	0.40	0.15	4.26
102	0.84	0.71	13.56	0.48	0.18	6.38
103	0.94	0.94	15.34	0.63	0.24	7.45
104	1.03	1.03	16.99	0.57	0.24	8.30

Test 1-4
Run 3

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	97.93	97.94	97.97	96.42	96.28	93.03	94.55	99.37	93.30	95.90	
UNIT 7	85.58	85.41	85.58	84.27	85.48	83.43	89.64	77.30	85.07	98.62	369.30
TOT/AVG											869.30

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	O.S.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1506.56	1457.86	1429.36	1457.47	1465.88	478.77	448.91	377.48		6.00	254.30
UNIT 7	1302.61	1351.69	1371.59	1292.41	1351.70	426.25	434.02	353.78	695.73	-0.94	400.70
TOT/AVG						453.88	441.59	365.82	695.73		

	GATE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	214.91	5.30			42.66	0.02	0.08	-0.33	13.20	9.43	
UNIT 7	104.19	5.75	48.01	47.78		0.01	0.08	-0.31	14.32	7.00	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	3RD ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-3.23	-5.35	-0.41	-6.95	2416.84	2243.91	1999.44	523.18	593.33	733.52	704.94
UNIT 7	-3.20	-5.21	-0.45	-6.71	2425.84	2203.97	1865.45	383.36	519.04	524.35	586.03
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	356.56	927.77	715.25	665.64	759.11	489.12	514.12	-1.01	1351.77	1431.02	1313.36
UNIT 7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	DRYER PRES PSI	COAL FD TOT LBS
UNIT 6	593.19	1007.43	953.22	635.13	759.02	543.39*	497.46	115.49	111.11	-0.03	2500.00
UNIT 7	321.81	1043.73	[illegible]	322.63	318.41	261.03	464.66	[illegible]	133.57	7.39	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	95.91	97.72	95.53	90.52	94.22	1477.00	1471.00	1404.00	1373.00	1394.00
UNIT 7	34.51	[illegible]	[illegible]	[illegible]	[illegible]	1275.00	1297.00	1375.00	1265.00	1334.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	90.42	93.22	89.81	81.52	84.43	73.45	75.95	72.52	58.54	53.79
UNIT 7	81.41	83.21	77.31	83.71	76.32	45.33	71.87	41.75	54.20	70.71
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC CRT G3 LTPH
UNIT 6	20.24	19.46	19.53	20.41	19.66	474.52	7124.13	441.59	359.99	19.82	452.73
UNIT 7	19.50	13.50	22.47	19.50	17.51	427.49	6569.36	426.93	348.08	18.97	417.25
TOT/AVG						902.01	13693.13	868.52	708.07	19.40	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS/HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	50.47	-0.53	9533.75	123.70	125.44	93.31
UNIT 7	50.57	-0.65		124.06	132.63	93.00
TOT/AVG	51.04	-0.59	9533.75			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	97.97	97.82	98.12	97.91	97.88	92.89	94.52	99.40	92.37	95.45	
UNIT 7	~~91.59~~	~~91.54~~	~~91.47~~	~~92.27~~	~~91.51~~	~~88.04~~	~~95.30~~	~~82.29~~	~~92.16~~	~~104.58~~	~~920.35~~
TOT/AVG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.3.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1507.75	1458.97	1428.56	1459.06	1490.11	489.71	474.52	386.81		4.00	401.57
UNIT 7	~~1401.56~~	~~1445.47~~	~~1466.39~~	~~1382.95~~	~~1445.97~~	~~453.68~~	~~462.29~~	~~376.84~~	~~807.06~~	~~-3.94~~	~~401.28~~
TOT/AVG						474.59	468.47	381.87	807.06		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	216.84	5.36			42.66	0.01	0.09	-0.36	12.95	9.23	
UNIT 7	~~195.33~~	~~5.74~~	~~89.23~~	~~48.31~~		~~0.02~~	~~0.12~~	~~-0.45~~	~~16.04~~	~~7.19~~	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT H.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.31	-5.84	-0.42	-7.84	2404.57	2237.53	1949.53	447.64	698.27	729.61	711.25
UNIT 7	~~-0.27~~	~~-7.51~~	~~-0.46~~	~~-7.59~~	~~2421.72~~	~~2138.28~~	~~1964.14~~	~~539.34~~	~~637.33~~	~~646.63~~	~~598.13~~
TOT/AVG											

	PRE H.B. TEMP 1E	PRE H.B. TEMP 2E	PRE H.B. TEMP 3E	PRE H.B. TEMP 4E	PRE H.B. TEMP 5E	PRE H.B. TEMP 6E	PRE H.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	887.37	952.50	975.30	924.12	703.40	490.24	529.51	-1.03	922.59	1320.73	1222.92
UNIT 7	~~921.04~~	~~977.27~~	~~984.69~~	~~101.93~~	~~598.17~~	~~500.53~~	~~427.08~~	~~-1.02~~	~~959.33~~	~~1344.19~~	~~1339.54~~
TOT/AVG											

	PRE H.B. TEMP 1W	PRE H.B. TEMP 2W	PRE H.B. TEMP 3W	PRE H.B. TEMP 4W	PRE H.B. TEMP 5W	PRE H.B. TEMP 6W	PRE H.B. TEMP 7W	WSTE GAS TEMP N01	WSTE GAS TEMP N02	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	717.98	1040.22	985.45	862.57	703.83	567.85	514.15	111.55	138.41	-0.02	10175.07
UNIT 7	~~833.37~~	~~1082.19~~	~~95[illegible]~~	~~841.16~~	~~739.35~~	~~269.63~~	~~177.94~~	~~107.26~~	~~198.57~~	~~-7.24~~	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	95.71	97.02	96.41	95.31	98.62	1480.00	1472.00	1403.00	1439.00	1472.00
UNIT 7	~~90.51~~	~~96.03~~	~~89.01~~	~~93.11~~	~~90.71~~	~~1363.00~~	~~1388.00~~	~~1470.00~~	~~1376.00~~	~~1431.00~~
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	92.80	96.12	91.61	89.41	94.71	75.51	73.30	74.63	72.84	77.16
UNIT 7	~~89.71~~	~~94.21~~	~~82.21~~	~~90.41~~	~~102.13~~	~~69.99~~	~~76.75~~	~~65.93~~	~~73.66~~	~~83.20~~
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC SRT GB LTPH
UNIT 6	20.35	19.47	19.51	20.52	19.77	483.39	7266.13	464.67	373.84	19.29	457.73
UNIT 7	~~20.15~~	~~18.79~~	~~22.61~~	~~19.41~~	~~17.53~~	~~460.16~~	~~7028.00~~	~~454.87~~	~~378.34~~	~~19.04~~	~~441.57~~
TOT/AVG						944.05	14294.13	919.54	749.67	19.16	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	10144.37	125.60	127.18	93.37
UNIT 7	~~50.85~~	~~-0.06~~		~~125.31~~	~~139.58~~	~~97.26~~
TOT/AVG	51.32	-0.59	10144.37			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL-CAKE LTPH
UNIT 6	98.03	97.81	97.59	97.89	97.99	95.37	96.36	99.36	92.89	95.92	
UNIT 7	92.10	91.91	91.85	79.77	91.25	89.89	96.89	82.90	85.36	105.09	867.67
TOT/AVG											867.67

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN-BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1460.91	1411.30	1429.05	1457.92	1488.39	489.32	479.75	391.03		4.00	389.26
UNIT 7	1391.53	1405.42	1472.48	1269.05	1448.11	417.44	400.95	335.19	839.38	-0.94	400.20
TOT/AVG						455.95	443.63	365.43	839.38		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	218.40	5.37			42.66	0.04	0.11	-0.36	14.15	9.74	
UNIT 7	173.88	5.67	84.92	50.01		0.03	0.07	-0.45	11.87	6.69	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.28	-6.01	-0.43	-8.00	2416.00	2318.59	1994.59	479.31	701.69	739.63	715.38
UNIT 7	-0.15	-5.90	-0.46	-6.17	2422.75	2187.41	1923.30	635.43	638.18	653.01	607.80
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1-BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	864.62	949.50	975.30	917.41	776.98	497.45	527.27	-1.06	1031.64	1379.64	1204.55
UNIT 7	927.53	979.53	951.75	786.80	566.46	504.88	431.23	-0.87	1002.70	1397.58	1049.38
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	911.48	1028.08	975.78	845.19	773.71	560.57	509.16	113.77	110.67	-0.02	9325.00
UNIT 7	925.55	1040.48	951.73	837.56	703.45	286.38	481.90	107.91	108.57	7.48	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	95.62	98.12	96.40	95.41	98.72	1434.00	1425.00	1406.00	1439.00	1470.00
UNIT 7	90.81	96.00	90.91	54.87	86.91	1369.00	1349.00	1477.00	831.00	1377.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	95.21	97.41	91.51	90.20	95.21	77.57	79.36	74.55	73.49	77.57
UNIT 7	88.01	93.52	80.71	41.68	95.43	70.08	76.19	65.77	33.97	77.75
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.17	18.52	19.61	20.35	19.64	484.29	7174.12	469.60	382.84	18.85	461.28
UNIT 7	19.84	17.91	22.61	19.91	17.50	419.52	6403.00	397.37	323.91	19.72	390.91
TOT/AVG						903.80	13577.13	866.96	706.75	19.25	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	9205.88	125.03	126.95	96.93
UNIT 7	50.82	-0.06		117.33	133.60	90.77
TOT/AVG	51.29	-0.59	9205.88			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	97.83	97.93	98.57	97.82	97.92	93.77	94.45	99.43	94.61	95.56	
UNIT 7	92.03	92.04	91.97	91.97	91.91	89.07	97.05	83.31	92.77	104.40	891.57
TOT/AVG											891.57

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1459.70	1410.44	1431.02	1460.27	1487.39	490.05	477.78	389.44		4.00	233.63
UNIT 7	1396.27	1406.86	1470.64	1387.64	1451.06	459.47	420.30	349.11	759.06	-0.94	392.75
TOT/AVG						475.11	454.27	370.27	759.06		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	220.36	5.36			42.66	0.04	0.11	-0.37	14.31	9.26	
UNIT 7	183.01	5.59	90.69	50.05		0.02	0.05	-0.42	14.14	6.43	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.29	-6.25	-0.43	-8.26	2415.69	2338.19	1974.13	494.01	702.55	739.65	715.63
UNIT 7	-0.19	-7.50	-0.47	-7.63	2331.63	2137.56	1846.66	528.52	643.58	654.45	610.03
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	890.15	952.94	976.11	917.67	777.33	498.50	529.64	-1.10	1013.91	1332.69	1180.73
UNIT 7	872.37	915.00	903.62	757.70	561.91	518.64	451.74	-0.92	934.96	1262.92	1035.09
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	913.91	1032.23	975.77	846.51	775.38	562.66	510.43	114.21	111.07	-0.02	9550.00
UNIT 7	790.93	997.41	916.88	813.17	700.66	293.81	487.29	107.50	109.27	11.46	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	95.21	98.02	96.81	95.21	98.52	1431.00	1424.00	1409.00	1438.00	1470.00
UNIT 7	91.21	96.21	90.41	92.91	91.11	1368.00	1350.00	1476.00	1379.00	1435.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 5	94.01	95.92	91.41	91.51	94.71	76.59	78.14	74.47	74.55	77.16
UNIT 7	86.60	95.41	83.50	84.32	73.35	70.56	77.73	68.04	68.70	59.77
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.45	18.86	19.70	20.04	19.72	483.79	7172.13	467.56	381.21	18.90	465.32
UNIT 7	20.14	18.02	22.42	19.34	17.30	461.88	7008.06	423.23	345.04	20.99	493.96
TOT/AVG						945.67	14180.12	890.79	726.25	19.90	

	GAS FLO AC MCF		FUEL OIL FLOW GPM		COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47		-0.53		9513.88	125.09	127.28	99.23
UNIT 7	63.51		-0.06			121.60	132.62	93.94
TOT/AVG	63.98		-0.59		9513.88			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	98.00	97.96	97.78	97.98	97.91	94.03	95.39	99.98	95.30	95.51	
UNIT 7	91.86	88.03	91.98	92.10	92.07	88.01	95.82	83.28	92.37	104.12	854.48
TOT/AVG											854.48

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1459.28	1408.33	1429.23	1458.27	1489.19	487.59	480.19	391.38		1.00	
UNIT 7	1397.59	1333.00	1470.45	1388.50	1453.61	424.12	384.93	323.62	412.00	-0.94	
TOT/AVG						459.20	437.35	360.92	412.00		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	221.76	5.37			42.66	0.04	0.11	-0.35	14.58	8.99	
UNIT 7	174.10	5.43	81.95	50.01		0.02	0.08	-0.44	15.51	8.14	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.31	-6.50	-0.43	-6.72	2415.13	2319.59	1971.91	461.93	704.04	737.43	717.21
UNIT 7	-0.20	-6.29	-0.46	-6.66	2402.75	2132.69	1846.23	607.10	639.05	647.43	607.48
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	893.35	959.00	977.52	916.90	776.01	498.65	528.67	-1.13	984.70	1293.83	1170.45
UNIT 7	890.33	932.71	920.56	770.46	568.30	505.73	439.07	-0.90	862.80	1198.34	965.40
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	916.69	1033.03	976.42	851.19	778.59	562.84	512.80	114.21	111.07	-0.02	9650.00
UNIT 7	818.66	1026.03	942.92	831.01	707.67	288.66	486.91	107.91	109.55	9.31	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	95.61	97.82	96.31	95.31	98.42	1432.00	1422.00	1404.00	1438.00	1471.00
UNIT 7	74.74	76.84	90.41	92.81	91.11	1121.00	1057.00	1476.00	1380.00	1436.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	93.91	96.81	92.01	92.41	94.71	76.51	78.87	74.96	75.29	77.16
UNIT 7	69.64	65.46	81.11	89.02	78.65	56.74	53.34	66.09	72.52	64.08
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.41	18.63	19.45	19.84	19.60	483.47	7167.13	469.87	383.10	18.82	468.58
UNIT 7	20.16	16.12	22.54	19.27	17.55	425.96	6470.08	383.86	312.83	21.39	377.73
TOT/AVG						909.44	13637.13	853.73	695.93	19.97	

	GAS FLO AC MCF		FUEL OIL FLOW GPM		COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47		-0.53		9602.00	125.76	127.09	101.85
UNIT 7	57.34		-0.06			122.29	130.64	96.12
TOT/AVG	57.81		-0.59		9602.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	97.89	98.04	97.92	97.56	97.92	94.92	94.70	99.88	94.82	95.65	
UNIT 7	90.35	91.96	91.83	91.84	92.20	88.31	97.13	83.25	92.01	104.57	903.65
TOT/AVG											903.65

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1458.02	1410.72	1430.48	1459.50	1486.88	487.29	479.94	391.18		2.00	
UNIT 7	1379.25	1405.88	1471.44	1387.75	1453.09	449.93	438.15	362.18	394.67	-0.94	
TOT/AVG						470.30	459.80	377.21	394.67		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	222.13	5.36			42.66	0.03	0.11	-0.20	13.33	9.41	
UNIT 7	189.67	5.65	84.93	50.01		0.02	0.12	-0.24	14.14	8.27	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.28	-6.12	-0.43	-8.03	2413.00	2243.44	2018.92	525.72	707.01	742.25	720.01
UNIT 7	-0.30	-7.80	-0.44	-8.56	2378.34	2003.42	1650.39	369.57	647.80	657.54	614.98
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	897.73	963.03	980.35	913.69	781.30	504.46	534.20	-1.05	1007.88	1360.17	1180.00
UNIT 7	941.24	972.84	966.84	812.46	584.09	541.59	452.72	-0.98	785.69	1003.20	944.22
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	924.54	1042.52	981.90	856.77	781.77	567.91	518.34	114.21	111.07	-0.02	11650.00
UNIT 7	871.74	1089.75	997.04	874.16	754.01	290.76	509.32	108.86	109.05	15.95	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	95.11	98.22	96.31	95.51	99.12	1431.00	1424.00	1405.00	1439.00	1470.00
UNIT 7	80.73	96.60	90.01	93.11	90.51	1218.00	1351.00	1477.00	1382.00	1436.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	94.81	95.92	92.01	90.80	94.41	77.25	78.14	74.96	73.98	76.92
UNIT 7	72.34	89.32	81.61	89.71	101.93	58.94	72.77	66.50	73.09	83.84
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.22	18.85	19.48	20.22	19.79	484.26	7169.12	467.96	381.54	18.89	468.90
UNIT 7	20.17	17.78	22.73	19.40	17.41	451.00	6864.06	434.87	354.57	19.60	425.15
TOT/AVG						935.26	14033.12	902.83	736.11	19.23	

	GAS FLO AC MCF	FUEL OIL FLOW GPH	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	11331.00	125.78	128.03	94.75
UNIT 7	76.64	-0.06		131.24	134.38	97.31
TOT/AVG	77.11	-0.59	11331.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	97.94	97.91	97.91	98.32	97.88	93.51	94.94	100.13	94.03	95.43	
UNIT 7	91.96	91.86	92.04	92.01	92.00	88.56	96.80	83.28	92.47	105.65	928.27
TOT/AVG											928.27

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1458.95	1385.98	1428.50	1435.59	1487.56	489.97	478.02	389.65			
UNIT 7	1398.09	1386.03	1469.00	1358.67	1452.62	459.86	466.74	380.46	360.02	1.93	
TOT/AVG						475.26	472.43	385.10	360.02		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	221.18	5.36			42.66	0.03	0.10	-0.21	13.24	9.78	
UNIT 7	197.20	5.75	86.01	50.01		0.02	0.09	-0.38	15.22	9.92	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEG AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.26	-5.88	-0.43	-7.81	2417.44	2229.44	2034.27	552.39	709.65	747.73	723.36
UNIT 7	-0.26	-7.29	-0.45	-1.61	2422.63	2209.97	1904.88	588.50	654.98	663.17	619.70
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	FA1 BYPS TEMP	FA2 BYPS TEMP	FB1 BYPS TEMP	FB2 BYPS TEMP
UNIT 6	895.36	962.07	979.32	913.06	782.65	510.61	536.75	-1.02	1045.58	1427.88	1215.61
UNIT 7	946.69	994.56	976.19	806.80	574.08	519.73	440.30	-1.05	928.30	1316.26	991.98
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	918.17	1035.42	978.46	854.70	780.62	569.95	518.90	114.21	111.07	-0.02	11375.00
UNIT 7	855.71	1079.84	988.11	869.27	726.47	270.05	495.50	109.38	111.07	6.86	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	95.71	98.32	96.21	95.32	98.62	1432.00	1399.00	1402.00	1416.00	1470.00
UNIT 7	91.21	96.00	91.11	92.51	91.31	1371.00	1329.00	1474.00	1348.00	1436.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	93.51	96.51	92.01	91.31	94.91	76.18	78.63	74.96	74.39	77.32
UNIT 7	86.11	95.91	83.11	90.71	103.33	70.16	78.14	67.71	73.90	84.17
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.50	18.38	19.42	19.80	19.70	484.19	7119.13	468.27	381.79	18.75	467.05
UNIT 7	20.25	17.62	22.51	19.07	17.38	462.17	6958.06	459.15	374.35	18.66	446.07
TOT/AVG						946.36	14077.12	927.41	756.13	18.70	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	11237.00	125.57	127.94	92.35
UNIT 7	49.22	-0.06		125.64	139.02	93.26
TOT/AVG	49.70	-0.59	11237.00			

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	CONC-1 FD LTPH	CONC-2 FD LTPH	CONC-3 FD LTPH	CONC-4 FD LTPH	CONC-5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	98.53	98.51	98.63	98.51	98.58	94.11	95.62	100.53	93.95	96.17	
UNIT 7	94.83	93.96	94.67	94.62	93.48	90.79	98.76	85.74	94.78	107.56	920.70
TOT/AVG											920.70

	BENT-1 LBS/HR	BENT-2 LBS/HR	BENT-3 LBS/HR	BENT-4 LBS/HR	BENT-5 LBS/HR	CONC FD LTPH	ORN BALL TOT TPH	PELLETS LTPH	O.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1469.14	1379.06	1439.75	1419.30	1499.42	492.77	480.40	391.57		1.00	
UNIT 7	1440.44	1402.38	1518.59	1336.84	1494.36	468.15	453.34	376.86	390.38	-3.29	
TOT/AVG						480.67	467.15	384.36	390.38		

	GRTE-SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	222.09	5.37			42.66	0.06	0.10	-0.22	13.58	9.35	
UNIT 7	198.37	5.74	66.59	50.01		0.06	0.12	-0.38	14.67	9.38	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT TA FAN TEMP	PREHT TB FAN TEMP
UNIT 6	-0.25	-5.99	-0.43	-8.18	2414.00	2227.41	1992.22	568.91	713.93	742.77	731.48
UNIT 7	-0.22	-6.99	-0.48	-7.62	2409.00	2161.38	1938.37	566.00	644.73	651.59	604.18
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	888.86	951.67	969.77	913.14	776.48	507.89	534.70	-1.07	1020.78	1367.60	1246.03
UNIT 7	909.88	961.42	940.65	783.11	557.56	506.09	430.83	-1.01	972.83	1340.72	1021.54
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	913.19	1030.42	975.44	852.94	781.42	572.02	510.86	114.21	111.07	-0.02	11475.00
UNIT 7	814.88	1034.55	951.48	839.73	698.55	273.34	475.99	108.72	110.47	8.01	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	96.21	98.52	96.82	95.92	99.22	1441.00	1384.00	1413.00	1399.00	1480.00
UNIT 7	93.71	98.21	93.11	95.51	89.32	1412.00	1330.00	1523.00	1330.00	1427.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	93.81	97.02	92.61	90.91	95.12	76.43	79.04	75.45	74.06	77.49
UNIT 7	87.61	95.72	84.11	91.82	91.14	71.38	77.98	68.53	74.80	74.25
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	ORN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.57	18.08	19.46	19.65	19.77	486.70	7117.13	469.48	382.77	18.70	469.15
UNIT 7	20.17	17.54	22.63	18.05	17.42	469.87	7022.06	450.39	367.21	19.19	448.29
TOT/AVG						956.57	14139.13	919.88	749.98	18.94	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	11449.62	125.72	127.20	95.15
UNIT 7	53.07	-0.06		123.72	136.34	93.89
TOT/AVG	53.54	-0.59	11449.62			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	100.96	100.95	100.98	101.00	100.87	96.07	97.59	102.73	95.45	98.16	
UNIT 7	94.88	94.77	94.94	94.89	94.94	91.56	100.08	86.43	94.64	108.22	953.78
TOT/AVG											953.78

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1503.72	1401.48	1472.70	1453.67	1533.39	504.77	490.07	399.45		2.00	
UNIT 7	1444.22	1404.88	1519.56	1338.75	1499.91	474.62	480.77	391.86	360.02	-3.69	
TOT/AVG						490.05	485.45	395.68	360.02		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A-SIDE PRESSURE	3B SIDE PRESSURE	WDBOX-3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	227.40	5.36			42.66	0.07	0.11	-0.20	14.96	9.32	
UNIT 7	202.19	5.76	63.75	50.01		0.06	0.16	-0.40	17.11	8.88	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.26	-6.45	-0.43	-8.64	2417.28	2235.13	1995.14	545.48	724.48	739.09	746.98
UNIT 7	-0.27	-7.71	-0.46	-8.54	2419.59	2101.91	1911.48	530.67	652.66	657.11	615.62
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	893.98	974.62	971.21	924.24	780.65	512.55	540.73	-1.12	983.96	1301.50	1256.42
UNIT 7	916.41	970.30	955.06	786.95	560.26	512.26	438.97	-1.22	939.63	1241.81	1064.66
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	920.71	1040.25	982.20	863.93	791.32	575.53	525.25	114.21	111.07	-0.02	11425.00
UNIT 7	814.55	1047.67	964.69	842.12	707.38	267.76	487.50	109.26	111.07	7.96	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	98.52	101.02	99.42	98.32	101.52	1475.00	1414.00	1445.00	1433.00	1516.00
UNIT 7	93.81	99.10	93.51	95.61	93.81	1416.00	1348.00	1525.00	1333.00	1483.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	96.11	98.72	94.71	92.21	97.32	78.30	80.42	77.16	75.13	79.28
UNIT 7	89.51	99.02	86.70	92.71	105.93	72.92	80.67	70.64	75.53	86.30
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.49	18.09	19.40	19.81	19.74	498.85	7283.13	479.06	390.63	18.74	480.25
UNIT 7	20.17	17.23	22.44	18.33	17.35	475.88	7105.00	473.86	386.36	18.46	458.19
TOT/AVG						974.72	14388.13	952.91	776.98	18.60	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	11378.63	126.23	126.81	103.37
UNIT 7	53.42	-0.06		129.92	137.80	99.92
TOT/AVG	53.89	-0.59	11378.63			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	100.96	100.82	100.90	100.91	100.97	97.05	98.07	103.07	98.15	98.44	
UNIT 7	87.70	88.06	87.74	87.27	95.17	92.26	99.89	86.39	92.42	108.40	855.07
TOT/AVG											855.07

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1503.59	1402.42	1474.08	1452.61	1534.48	504.63	494.77	403.28		7.00	
UNIT 7	1395.00	1363.41	1453.44	1292.78	1500.20	373.15	374.31	390.83	385.25	-1.16	
TOT/AVG						448.27	442.45	397.87	385.25		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	228.25	5.36			42.66	0.07	0.12	-0.16	14.62	9.60	
UNIT 7	201.56	5.70	74.23	62.63		0.08	0.13	-0.38	14.74	9.02	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.27	-6.82	-0.43	-9.42	2415.19	2234.16	1990.61	501.91	726.34	735.86	749.15
UNIT 7	-0.21	-5.77	-0.46	-7.54	2408.22	2095.66	1945.34	509.02	692.98	674.67	646.13
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	680.09	970.72	974.75	922.78	778.90	508.96	538.50	-1.13	960.80	1274.06	1246.64
UNIT 7	698.69	951.35	927.75	764.30	572.58	527.51	443.29	-1.25	979.45	1257.42	1156.63
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	919.77	1038.75	978.77	862.56	791.42	576.98	526.45	114.21	111.07	-0.02	11475.00
UNIT 7	803.51	1018.16	936.88	818.67	686.55	283.77	483.11	107.87	109.92	-6.52	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	98.62	100.72	99.22	98.52	101.52	1476.00	1414.00	1447.00	1432.00	1516.00
UNIT 7	73.74	77.84	73.84	75.15	73.54	1109.00	1054.00	1195.00	1039.00	1158.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	96.71	99.12	95.11	94.91	97.52	78.79	80.75	77.49	77.32	79.44
UNIT 7	70.75	77.75	68.05	71.34	83.15	57.64	63.35	55.44	58.13	67.75
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.39	18.04	19.35	19.18	19.67	498.63	7285.13	483.38	394.13	18.57	481.97
UNIT 7	20.03	17.20	22.44	18.58	17.40	374.13	5555.06	371.02	302.48	18.50	458.20
TOT/AVG						872.75	12840.13	854.41	696.61	18.54	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	11403.00	126.66	127.63	102.68
UNIT 7	47.69	-0.04		124.07	130.35	95.61
TOT/AVG	48.16	-0.59	11403.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	100.63	100.84	100.91	100.97	100.91	95.91	98.29	102.33	98.12	98.65	
UNIT 7											
TOT/AVG											~~483.66~~ 483.66

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC-STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1503.28	1402.30	1474.03	1451.86	1533.69	504.29	493.38	402.14		97.00	
UNIT 7									~~360.13~~	~~88.88~~	
TOT/AVG						504.28	493.38	402.14	360.13		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	220.58	5.37			42.66	0.07	0.11	-0.18	14.43	9.91	
UNIT 7		~~5.21~~	~~84.59~~	~~67.23~~		~~0.05~~	~~0.00~~	~~0.09~~	~~-1.35~~	~~5.46~~	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEG AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.28	-1.09	-0.43	-10.02	2414.72	2272.22	1997.86	515.23	726.63	736.22	750.80
UNIT 7	~~-0.00~~	~~0.02~~	~~-0.11~~	~~-1.32~~	~~2349.09~~	~~1911.02~~	~~1348.77~~	120.30	513.44	~~484.78~~	~~498.01~~
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	882.46	961.88	977.08	928.74	780.46	507.52	540.08	-1.17	966.48	1292.45	1249.95
UNIT 7	~~604.23~~	~~619.84~~	~~540.06~~	~~437.85~~	~~346.51~~	~~256.37~~	~~198.77~~	-0.08	700.02	409.63	~~853.56~~
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	916.40	1036.92	977.66	862.00	793.23	577.84	526.77	114.21	111.07	-0.02	11700.00
UNIT 7	~~567.36~~	~~623.86~~	~~588.18~~	~~483.19~~	~~329.22~~	~~228.28~~	~~223.03~~	~~85.93~~	88.39	~~14.90~~	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	98.22	100.82	99.62	98.12	101.42	1477.00	1415.00	1448.00	1433.00	1516.00
UNIT 7										
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	96.01	99.32	94.41	95.11	98.42	78.22	80.91	76.92	77.49	80.18
UNIT 7										
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.50	18.01	19.50	19.17	19.48	498.23	7289.13	483.27	394.05	18.57	482.85
UNIT 7											
TOT/AVG						498.23	7289.13	483.27	394.05	18.57	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	0.47	-0.53	11579.12	126.62	128.63	100.69
UNIT 7	~~73.92~~	~~-0.06~~		~~110.11~~	~~119.12~~	~~74.89~~
TOT/AVG	74.39	-0.59	11579.12			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6											
UNIT 7	100.09	99.97	99.64	99.91	99.81	96.01	104.81	90.92	99.13	113.03	498.74
TOT/AVG											498.74

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6										-7.00	368.19
UNIT 7	1560.08	1480.64	1638.30	1399.73	1618.48	499.39	503.95	410.75	746.32	-2.92	406.41
TOT/AVG						499.39	503.95	410.75	746.32		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6		5.89			42.66	-0.02	-0.08	-0.11	4.29	6.76	
UNIT 7	218.16	5.54	63.64			0.14	0.24	-0.50	17.50	6.58	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.04	-0.05	-0.27	-0.99	2043.19	1652.22	1620.08	310.78	816.53	605.34	621.94
UNIT 7	-0.23	-6.91	-0.45	-8.35	2422.16	2104.28	1916.13	535.13	718.63	715.75	691.66
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	594.40	607.02	605.38	561.86	442.66	327.63	257.37	-0.12	671.32	1071.98	817.53
UNIT 7	962.20	990.60	983.64	827.61	618.57	591.30	498.56	-1.56	957.06	1211.14	1183.88
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	583.78	622.41	635.20	548.27	458.98	353.53	282.79	79.54	75.37	2.89	
UNIT 7	857.59	1083.04	983.09	866.66	762.41	345.52	538.59	110.52	113.02	7.35	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6										
UNIT 7	99.52	104.61	98.62	100.32	99.22	1534.00	1420.00	1644.00	1389.00	1600.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6										
UNIT 7	94.11	104.32	91.11	97.72	111.13	76.67	84.99	74.23	79.61	90.53
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6											
UNIT 7	20.72	17.08	23.03	17.98	17.83	502.32	7587.06	498.41	406.39	18.75	475.74
TOT/AVG						502.32	7587.06	498.41	406.39	18.75	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS	
UNIT 6	62.37	-0.53				85.52	
UNIT 7	52.53	-0.06		132.51	133.50	106.76	
TOT/AVG	114.90	-0.59	0.00				
TOT/AVG				7.51	6.61	121.25	480.16

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6			87.06	89.52	87.18						
UNIT 7	99.84	99.55	98.61	97.72	92.90	95.56	104.70	93.95	97.26	109.19	481.76
TOT/AVG											481.76

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6			1398.30	1411.64	1477.00	34.83				2.00	268.98
UNIT 7	1558.45	1477.02	1632.20	1398.22	1509.31	423.02	411.70	397.39	758.22	-4.68	399.96
TOT/AVG						390.53	411.69	397.39	758.22		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6		5.85			42.66	0.00	0.14	0.08	0.48	0.54	
UNIT 7	212.63	5.33	57.51			0.15	0.23	-0.52	16.81	6.88	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	0.03	0.08	0.21	0.12	1820.00	1175.63	967.21	119.68	595.66	521.39	540.27
UNIT 7	-0.17	-5.74	-0.46	-7.54	2417.38	2107.91	1903.69	542.65	706.78	695.84	677.48
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	561.07	581.88	538.45	499.65	391.34	323.35	264.69	0.22	616.47	486.91	754.73
UNIT 7	919.43	948.90	942.09	797.51	609.64	567.40	479.87	-1.37	929.59	1193.34	1147.06
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	543.57	604.65	561.30	492.27	421.66	355.96	241.88	67.58	63.89	3.12	
UNIT 7	827.73	1038.77	947.16	837.05	735.06	317.41	520.14	109.34	111.63	7.70	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6			12.90	13.00	13.50			196.00	199.00	208.00
UNIT 7	87.03	91.63	85.63	85.43	76.82	1344.00	1244.00	1427.00	1196.00	1235.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6										
UNIT 7	77.44	87.74	80.23	81.53	83.64	63.10	71.48	65.37	66.43	68.14
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6						39.40	603.15				
UNIT 7	20.99	17.33	22.62	18.53	17.49	426.58	6446.06	410.57	334.71	19.23	459.52
TOT/AVG						465.97	7049.19	410.57	334.71	19.23	

	GAS FLO AC MCF		FUEL OIL FLOW GPM		COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	31.30		-0.53					87.06
UNIT 7	52.34		-0.06			125.95	129.06	105.45
TOT/AVG	83.34		-0.59		0.00			

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	CONC 1 FD-LTPH	CONC 2 FD-LTPH	CONC 3 FD-LTPH	CONC 4 FD-LTPH	CONC 5 FD-LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6			57.00	61.58	48.5J			62.26	69.86	46.27	
UNIT 7											201.18
TOT/AVG											201.18

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6			1433.22	1414.69	1475.06	7.51	6.61	121.25		1.00	
UNIT 7									480.16	-4.68	
TOT/AVG						7.51	6.61	121.25	480.16		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	75.20	6.14			42.66	-0.09	0.06	0.00	0.33	0.21	
UNIT 7		3.89	57.23			0.07	0.07	-0.11	3.00	3.16	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	0.01	0.05	0.16	0.07	1818.88	1181.39	1021.57	77.00	528.61	463.57	484.38
UNIT 7	-0.01	-0.16	-0.49	-2.41	2393.75	1867.70	1407.84	204.05	592.91	530.09	529.73
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	522.29	520.28	468.03	442.76	332.87	296.64	240.52	0.17	578.21	408.82	695.84
UNIT 7	496.52	628.59	560.80	506.30	411.48	331.18	248.97	-0.38	668.00	603.66	608.96
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES-PSI	COAL FD TOT-LBS
UNIT 6	484.89	538.19	498.31	440.00	368.69	323.19	213.77	81.72	75.63	5.20	
UNIT 7	619.52	706.30	674.98	579.12	484.21	313.17	223.70	91.21	93.90	10.22	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6			3.10	3.00	2.70			58.00	52.00	49.00
UNIT 7										
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6			3.30	3.30	2.90			2.69	2.69	2.36
UNIT 7										
TOT/AVG										

	BNT1 LBS /PRD-TON	BNT2 LBS /PRD-TON	BNT3 LBS /PRD-TON	BNT4 LBS /PRD-TON	BNT5 LBS /PRD-TON	CONC FD TOT-TONS	BENT FD TOT-LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB-LTPH
UNIT 6			27.76	27.38	24.26	8.80	159.05	9.50	7.74	25.48	201.39
UNIT 7											
TOT/AVG						8.80	159.05	9.50	7.74	25.48	

	GAS FLO AC-MCF		FUEL OIL FLOW-GPM		COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	34.54		-0.53					80.93
UNIT 7	74.22		-0.06			108.06	117.25	84.08
TOT/AVG	108.76		-0.59		0.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6			82.56	85.96	84.73			85.79	91.32	90.17	
UNIT 7	74.34	74.33	73.91	74.42	61.27	71.82	81.07	73.65	77.44	76.54	389.55
TOT/AVG											389.55

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6			1449.41	1430.06	1512.77	65.12	34.14	204.45			
UNIT 7	1194.80	1142.92	1246.86	1089.64	958.23	167.23	153.78	289.24	514.86	-4.68	
TOT/AVG						138.35	130.27	272.58	514.86		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	122.85	5.66			42.66	-0.10	0.06	0.00	0.32	0.17	
UNIT 7	158.23	4.54	54.23			0.05	0.10	0.00	4.54	3.20	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	0.02	0.05	0.15	0.07	1819.64	1150.95	1023.67	80.64	476.29	421.55	446.65
UNIT 7	-0.10	-3.64	-0.49	-5.34	2434.41	1836.17	1011.41	85.59	450.48	488.30	493.27
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	466.10	457.72	401.16	376.82	275.12	253.67	200.12	0.16	554.88	378.10	647.13
UNIT 7	594.00	686.21	692.46	620.10	465.03	406.56	343.58	-0.43	523.73	230.22	625.44
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	427.14	466.10	432.74	381.27	310.26	276.26	177.35	80.66	71.61	5.21	
UNIT 7	640.78	815.80	806.41	730.09	608.01	292.88	301.11	96.19	96.01	4.38	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6			22.49	21.89	21.69			359.00	339.00	341.00
UNIT 7	36.39	36.06	35.49	32.69	24.99	573.00	531.00	601.00	463.00	393.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6			11.50	12.90	12.60			9.37	10.51	10.27
UNIT 7	30.29	34.59	31.79	27.89	26.79	24.68	28.19	25.91	22.73	21.83
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6			23.58	19.76	20.80	66.09	1039.14	37.00	30.16	20.32	254.12
UNIT 7	21.24	17.55	22.01	18.12	16.78	167.62	2561.03	151.33	123.37	20.43	342.10
TOT/AVG						233.71	3600.16	188.33	153.53	20.41	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	34.72	-0.53				80.08
UNIT 7	90.57	-0.06		123.75	130.91	86.33
TOT/AVG	125.40	-0.59	0.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	68.48	51.95	61.47	63.54		78.29	7.68	81.65	80.70		
UNIT 7	79.53	79.38	79.42	79.56	62.68	76.54	82.64	74.60	75.84	76.00	386.98
TOT/AVG											386.98

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1203.69	1090.64	1235.22	1191.06		20.39	7.57	158.57			
UNIT 7	1230.30	1173.98	1302.89	1112.53	987.28	380.61	385.50	314.22	452.45	-4.68	
TOT/AVG						362.73	377.88	311.08	452.45		

	GRTE SPD IN-P-MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	78.19	5.17			42.66	-0.10	0.04	-0.01	0.34	0.14	
UNIT 7	170.28	5.54	51.29			0.12	0.22	-3.31	15.49	7.74	
TOT/AVG											

	PREHEAT FUR-PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP-DEG	EXIT GAS TEMP-DEG	SEC AIR TEMP-DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN-TEMP	PREHT 1B FAN-TEMP
UNIT 5	-3.00	0.05	0.13	0.06	1822.59	1190.70	984.70	74.49	395.02	385.00	413.38
UNIT 7	-0.13	-7.23	-0.44	-7.51	2400.19	2091.84	1521.02	288.25	601.41	600.87	604.77
TOT/AVG											

	PRE W.B. TEMP-1E	PRE W.B. TEMP-2E	PRE W.B. TEMP-3E	PRE W.B. TEMP-4E	PRE W.B. TEMP-5E	PRE W.B. TEMP-6E	PRE W.B. TEMP-7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	415.63	401.69	351.00	334.21	240.69	222.48	179.02	0.14	527.30	337.30	605.41
UNIT 7	942.12	995.05	979.67	818.16	578.77	525.59	442.82	-0.92	567.27	772.71	795.25
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT-LBS
UNIT 6	376.64	401.68	381.65	337.32	269.00	243.76	157.35	81.59	70.63	8.01	
UNIT 7	830.80	1078.70	993.57	863.42	738.23	268.50	486.53	111.12	111.31	1.95	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	6.20	1.70	5.90	6.10		101.00	30.00	106.00	102.00	
UNIT 7	78.11	82.81	78.11	81.01	61.13	1209.00	1125.00	1309.00	1102.00	975.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	1.60	0.20	2.80	3.20		1.30	0.16	2.28	2.61	
UNIT 7	74.81	81.60	74.61	74.01	74.21	60.96	66.49	60.80	60.31	60.47
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT-TONS	BENT FD TOT-LBS	GRN BALL TOT-TONS	PELLETS TOT-TONS	BENT LBS /PRD-TON	CALC ORT GD-LTPH
UNIT 6	16.98	36.81	19.00	16.04		19.90	339.06	7.80	6.36	24.50	196.19
UNIT 7	20.62	17.66	22.01	19.21	16.42	381.27	5720.00	379.20	309.22	18.59	371.61
TOT/AVG						401.17	6059.00	387.00	315.58	18.71	

	GAS FLO AC-MCF		FUEL OIL FLOW-GPM		COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	40.56		-0.53					79.82
UNIT 7	52.98		-0.06			131.56	141.69	101.65
TOT/AVG	93.55		-0.59		0.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	80.01	66.66	80.12	80.25		80.54	61.39	85.27	35.79		
UNIT 7	81.17	81.07	81.10	80.57	62.60	77.22	84.55	75.88	75.34	75.54	432.09
TOT/AVG											432.09

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	3.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1194.31	1096.00	1171.31	1156.92		50.13	50.01	240.53			
UNIT 7	1265.14	1198.89	1331.55	1135.58	988.04	386.62	388.54	316.68	366.30	-4.68	
TOT/AVG						347.82	349.15	307.82	366.30		

	GATE SPD IN P MIN	SED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	130.22	6.80			42.66	-0.11	0.05	-0.00	0.35	0.12	
UNIT 7	172.24	5.54	53.77			0.12	0.20	-0.32	13.24	6.45	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.06	0.03	0.09	-0.01	2052.53	1393.20	928.77	96.03	348.61	349.72	381.15
UNIT 7	-0.07	-5.51	-0.46	-6.51	2419.56	2133.28	1717.80	273.89	635.34	627.35	636.89
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	346.20	341.46	316.07	288.29	231.40	197.33	140.67	0.11	492.90	299.27	563.32
UNIT 7	954.42	1000.00	977.07	814.63	597.09	547.18	456.05	-0.90	709.23	1004.67	985.27
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	325.27	333.56	340.91	294.20	241.56	208.29	131.38	80.65	66.82	8.26	
UNIT 7	826.90	1061.00	975.51	850.53	724.19	269.95	505.15	110.52	110.52	0.78	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	13.50	10.10	13.50	13.40		198.00	146.00	190.00	190.00	
UNIT 7	80.21	64.71	79.71	81.71	61.13	1235.00	1150.00	1337.00	1127.00	980.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	13.90	8.60	13.60	14.20		11.33	7.01	11.08	11.57	
UNIT 7	75.21	83.61	75.81	73.72	73.71	61.28	68.12	61.77	60.06	60.06
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	18.37	22.78	18.24	17.45		50.49	724.05	50.29	40.99	18.21	278.96
UNIT 7	20.67	17.49	21.93	19.42	16.81	387.54	5829.06	381.99	311.50	18.80	375.77
TOT/AVG						436.03	6553.06	432.29	352.49	18.73	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	69.81	-0.53				
UNIT 7	43.74	-0.06				79.66
TOT/AVG	113.56	-0.59	0.00	125.27	139.04	94.48

HOURLY LOG

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	64.94	60.73	19.98	59.74	56.34	77.30	69.94		70.88	48.68	
UNIT 7	86.14	86.09	86.16	85.73	62.88	82.22	91.05	79.84	86.86	75.44	450.94
TOT/AVG											450.94

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1054.31	1017.73	1013.98	1152.81	1394.66	111.61	43.36	192.78		1.00	
UNIT 7	1346.03	1274.50	1413.50	1206.39	983.42	407.03	415.41	338.63	533.63	-4.68	
TOT/AVG						344.33	380.18	324.82	533.63		

	GRTE SPD IN P MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	107.29	7.37			42.66	-0.08	0.08	0.03	0.58	0.14	
UNIT 7	180.80	5.53	55.23			0.13	0.22	-0.38	15.98	7.77	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.06	-1.53	-0.05	-1.85	2206.47	1862.02	919.02	93.52	315.10	341.47	370.29
UNIT 7	-0.09	-6.09	-0.45	-7.25	2418.53	2126.69	1725.11	371.20	649.91	642.95	646.52
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	346.63	343.86	366.77	377.95	322.23	217.82	188.20	-0.00	412.09	198.25	472.80
UNIT 7	952.32	1006.77	979.38	812.45	600.27	556.24	463.68	-1.01	739.56	1017.65	992.88
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	333.96	346.14	395.41	362.27	322.25	239.60	174.87	76.93	66.47	5.17	
UNIT 7	833.80	1066.53	982.82	860.13	732.34	257.86	515.92	110.52	110.52	1.09	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	34.39	29.49	0.70	24.89	20.49	553.00	502.00	18.00	476.00	470.00
UNIT 7	85.11	90.00	84.51	86.91	61.43	1310.00	1225.00	1420.00	1199.00	977.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	8.90	12.90		12.20	8.70	7.25	10.51		9.94	7.09
UNIT 7	77.91	89.81	79.61	85.21	73.61	65.11	73.17	64.87	69.42	59.98
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT G3 LTPH
UNIT 6	18.23	20.22		22.31	35.00	109.95	2019.02	42.69	34.80	26.13	216.82
UNIT 7	20.70	17.35	22.46	17.88	16.44	408.12	6131.06	408.17	332.76	18.52	393.58
TOT/AVG						518.07	8150.06	450.86	367.55	19.24	

	GAS FLO AC MCF		FUEL OIL FLOW GPM		COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	87.78		-0.53			143.79	139.07	81.77
UNIT 7	51.02		-0.06			125.77	138.85	100.75
TOT/AVG	138.80		-0.59		0.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	87.95	89.94	89.59	89.63	90.04	89.44	90.82	92.56	91.01	88.96	
UNIT 7	89.82	87.90	90.04	89.85	89.92	86.50	95.01	82.32	90.94	103.96	894.36
TOT/AVG											894.36

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1384.39	1384.86	1402.88	1385.02	1413.20	449.38	452.80	369.09		1.00	
UNIT 7	1455.58	1428.22	1526.59	1402.08	1510.92	449.52	458.66	373.83	360.04	-4.68	
TOT/AVG						449.45	455.76	371.48	360.04		

	GATE SPD IN-P-MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	212.50	5.35			42.66	-0.07	0.15	0.08	15.00	10.71	
UNIT 7	201.69	5.59	54.49	59.10		0.02	0.14	-0.41	16.13	9.02	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.26	-7.81	-0.40	-9.94	2415.34	2270.28	1911.64	435.21	536.88	678.33	704.50
UNIT 7	-0.26	-7.25	-0.42	-9.09	2424.69	2150.22	1908.66	484.73	679.15	681.24	651.27
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	902.30	964.59	976.13	909.69	777.09	440.96	522.92	-0.75	756.85	1131.66	1042.69
UNIT 7	915.61	961.56	957.00	797.67	563.88	559.27	470.39	-1.36	920.07	1198.02	1133.64
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP NO1	WSTE GAS TEMP NO2	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	907.16	1023.19	977.73	868.21	764.63	534.48	515.25	119.21	118.56	8.41	
UNIT 7	800.62	1047.38	959.95	856.27	729.48	257.67	513.78	112.87	113.02	1.24	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS	
UNIT 6	87.31	89.71	88.01	87.51	90.41	1358.00	1399.00	1375.00	1346.00	1397.00	
UNIT 7	86.71	93.91	86.61	90.51	88.41	1429.00	1372.00	1535.00	1393.00	1492.00	
TOT/AVG											

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS	
UNIT 6	89.01	92.01	85.51	88.11	87.71	72.52	74.96	69.50	71.79	71.46	
UNIT 7	84.21	94.01	82.40	89.21	101.52	68.51	76.59	67.14	72.63	82.71	
TOT/AVG											

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.41	19.41	20.53	19.77	20.29	442.95	6895.13	442.16	360.47	19.23	447.82
UNIT 7	21.56	15.56	23.52	19.91	18.49	450.16	7221.06	451.39	367.98	19.72	444.35
TOT/AVG						893.13	14116.13	893.55	728.45	19.48	

	GAS FLO AC-MCF		FUEL OIL FLOW GPM		COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS			
UNIT 6	53.59		-0.53			124.35	128.33	99.73			
UNIT 7	54.96		-0.06			129.36	135.48	97.90			
TOT/AVG	108.55		-0.59		0.00						

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	CONC 1 FD-LTPH	CONC 2 FD-LTPH	CONC 3 FD-LTPH	CONC 4 FD-LTPH	CONC 5 FD-LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	88.57	89.19	88.74	89.31	87.75	88.38	90.03	92.68	92.21	87.08	
UNIT 7	92.25	97.10	97.47	90.18	97.89	81.73	102.15	88.56	88.80	110.45	320.01
TOT/AVG											320.01

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT-TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1388.17	1391.08	1410.30	1389.56	1414.98	423.53	421.95	363.11		1.00	
UNIT 7	1498.38	1553.86	1663.23	1402.53	1639.92	404.80	410.50	334.50	379.60	-4.68	
TOT/AVG						414.28	416.29	349.02	379.60		

	GRTE SPD IN P-MIN	BED DPTH INCHES	CONC THK UFLO-A-1	CONC THK UFLO-A-2	SLURRY LEVL FT.	HOOD PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	209.04	5.18			42.66	-0.03	0.16	0.10	14.48	9.75	
UNIT 7	175.62	5.59	60.34	60.10		0.02	0.07	-0.44	12.15	8.40	
TOT/AVG											

	PREHEAT FUR-PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP-DEG	EXIT GAS TEMP-DEG	SEC AIR TEMP-DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.20	-7.33	-0.40	-9.77	2491.25	2191.41	1904.14	374.34	675.91	665.23	692.21
UNIT 7	-0.14	-5.89	-0.41	-7.48	2420.66	2192.06	1931.19	494.27	695.23	703.08	677.11
TOT/AVG											

	PRE W.B. TEMP-1E	PRE W.B. TEMP-2E	PRE W.B. TEMP-3E	PRE W.B. TEMP-4E	PRE W.B. TEMP-5E	PRE W.B. TEMP-6E	PRE W.B. TEMP-7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	877.56	943.30	952.39	886.59	754.64	439.43	511.75	-0.68	751.84	1093.31	1034.50
UNIT 7	935.50	985.50	982.77	825.92	612.88	588.05	501.57	-1.10	990.69	1298.16	1173.20
TOT/AVG											

	PRE W.B. TEMP-1W	PRE W.B. TEMP-2W	PRE W.B. TEMP-3W	PRE W.B. TEMP-4W	PRE W.B. TEMP-5W	PRE W.B. TEMP-6W	PRE W.B. TEMP 7W	WSTE GAS TEMP W01	WSTE GAS TEMP W02	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	883.09	995.03	951.28	846.16	761.22	528.90	499.81	118.14	116.36	10.80	
UNIT 7	811.65	1060.77	975.05	875.88	747.67	265.67	538.45	112.10	112.80	0.87	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	81.52	83.22	84.32	84.52	85.72	1274.00	1302.00	1332.00	1318.00	1340.00
UNIT 7	69.95	102.52	96.62	42.28	97.13	1123.00	1489.00	1665.00	639.00	1620.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	82.82	84.03	80.02	84.72	81.92	67.48	68.46	65.85	69.03	66.75
UNIT 7	67.05	100.52	88.63	40.58	108.32	54.63	81.89	72.20	33.07	88.24
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.65	19.60	20.75	19.63	20.86	419.29	6566.06	414.31	337.78	19.67	439.11
UNIT 7	21.63	16.87	23.82	20.36	18.71	408.48	6537.06	405.08	330.07	19.91	386.93
TOT/AVG						827.77	13103.13	819.39	667.84	19.79	

	GAS FLO AC-MCF	FUEL OIL FLOW GPM	COAL LBS./HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	59.01	-0.53		124.09	125.87	102.42
UNIT 7	46.45	-0.06		121.31	131.87	90.69
TOT/AVG	105.46	-0.59	0.00			

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	CONC 1 FD LTPH	CONC 2 FD LTPH	CONC 3 FD LTPH	CONC 4 FD LTPH	CONC 5 FD LTPH	G. BALL1 LTPH	G. BALL2 LTPH	G. BALL3 LTPH	G. BALL4 LTPH	G. BALL5 LTPH	FIL CAKE LTPH
UNIT 6	92.85	92.91	92.73	92.45	92.73	93.48	93.65	96.27	96.57	91.98	
UNIT 7	51.02	92.77	94.01		93.50	51.86	97.35	85.46		107.30	709.25
TOT/AVG											709.25

	BENT 1 LBS/HR	BENT 2 LBS/HR	BENT 3 LBS/HR	BENT 4 LBS/HR	BENT 5 LBS/HR	CONC FD LTPH	GRN BALL TOT TPH	PELLETS LTPH	G.B.CONC REJ LTPH	CONC STK TONS/TPH	RECLAIM TONS/TPH
UNIT 6	1450.70	1450.23	1469.08	1450.28	1479.14	424.05	431.32	334.70		1.00	
UNIT 7	810.88	1496.34	1590.86		1585.80	297.76	282.45	243.75	423.20	-4.68	
TOT/AVG						371.37	371.59	328.15	423.20		

	GRTE SPD IN-P-MIN	BED DPTH INCHES	CONC THK UFLO A-1	CONC THK UFLO A-2	SLURRY LEVL FT.	WIND PRESSURE	3A SIDE PRESSURE	3B SIDE PRESSURE	WDBOX 3A PRESSURE	WDBOX 3B PRESSURE	OUTSIDE TEMP
UNIT 6	220.27	5.27			42.66	-0.21	0.03	-0.03	11.64	13.78	
UNIT 7	134.91	5.27	56.34	60.25		0.02	0.02	-0.42	8.17	4.48	
TOT/AVG											

	PREHEAT FUR PRES	PREHEAT W.B.PRES	DRY FURN PRESSURE	DRY WIND PRESSURE	BRN ZONE TEMP DEG	EXIT GAS TEMP DEG	SEC AIR TEMP DEG	COOL STK TEMP DEG	DRY FURN TEMP DEG	PREHT 1A FAN TEMP	PREHT 1B FAN TEMP
UNIT 6	-0.41	-9.22	-0.27	-11.99	2297.16	2175.06	1792.06	477.48	651.94	663.77	673.63
UNIT 7	-0.01	-3.23	-0.43	-4.69	2409.13	2200.75	1772.03	473.21	637.39	705.54	589.95
TOT/AVG											

	PRE W.B. TEMP 1E	PRE W.B. TEMP 2E	PRE W.B. TEMP 3E	PRE W.B. TEMP 4E	PRE W.B. TEMP 5E	PRE W.B. TEMP 6E	PRE W.B. TEMP 7E	1A1 BYPS TEMP	1A2 BYPS TEMP	1B1 BYPS TEMP	1B2 BYPS TEMP
UNIT 6	828.30	893.48	921.74	889.56	738.48	404.98	500.07	-0.83	757.50	1078.06	1018.30
UNIT 7	944.17	973.67	976.33	842.67	648.84	614.90	524.40	-0.68	942.96	1236.11	1178.19
TOT/AVG											

	PRE W.B. TEMP 1W	PRE W.B. TEMP 2W	PRE W.B. TEMP 3W	PRE W.B. TEMP 4W	PRE W.B. TEMP 5W	PRE W.B. TEMP 6W	PRE W.B. TEMP 7W	WSTE GAS TEMP W01	WSTE GAS TEMP W02	BURNER PRES PSI	COAL FD TOT LBS
UNIT 6	863.45	991.64	952.14	856.36	776.48	518.95	498.31	121.35	119.94	4.21	
UNIT 7	853.13	1062.64	991.30	899.16	776.84	327.37	556.27	107.38	108.45	0.68	
TOT/AVG											

	CONC FD1 TONS	CONC FD2 TONS	CONC FD3 TONS	CONC FD4 TONS	CONC FD5 TONS	BENT FD1 LBS	BENT FD2 LBS	BENT FD3 LBS	BENT FD4 LBS	BENT FD5 LBS
UNIT 6	82.82	84.92	83.62	82.42	85.32	1303.00	1340.00	1316.00	1305.00	1335.00
UNIT 7	17.20	97.11	92.81		92.81	262.00	1431.00	1605.00		1565.00
TOT/AVG										

	G. BALL1 TONS	G. BALL2 TONS	G. BALL3 TONS	G. BALL4 TONS	G. BALL5 TONS	PELLET 1 TONS	PELLET 2 TONS	PELLET 3 TONS	PELLET 4 TONS	PELLET 5 TONS
UNIT 6	85.83	87.52	81.72	85.92	83.32	69.93	71.31	66.59	70.01	67.89
UNIT 7	12.00	90.22	81.61		100.53	9.78	73.51	66.50		81.90
TOT/AVG										

	BNT1 LBS /PRD TON	BNT2 LBS /PRD TON	BNT3 LBS /PRD TON	BNT4 LBS /PRD TON	BNT5 LBS /PRD TON	CONC FD TOT TONS	BENT FD TOT LBS	GRN BALL TOT TONS	PELLETS TOT TONS	BENT LBS /PRD TON	CALC GRT GB LTPH
UNIT 6	19.48	19.58	20.68	19.49	20.52	419.13	6599.06	424.32	345.94	19.28	463.45
UNIT 7	23.26	19.21	23.69		18.35	299.95	4863.00	284.37	231.78	20.68	282.37
TOT/AVG						719.08	11462.00	708.69	577.72	19.84	

	GAS FLO AC MCF	FUEL OIL FLOW GPM	COAL LBS/HR	1A FAN AMPS	1B FAN AMPS	3A FAN AMPS
UNIT 6	81.46	-0.53		127.32	126.62	39.14
UNIT 7	46.02	-0.06		112.01	121.33	37.40
TOT/AVG	127.48	-0.59	0.00			

03-30-89

RAIL CAR SCANNER/TRACK SCALE REPORT

03-30-89 1430 ALL STEPS SHIFT 2 SUMMARY OF TRAINS DUMPED

CRUSHER/ TRAIN	ENGINE	SHOVEL	LEASE	OUT TIME	CARS DUMPED	ADJUST- MENT	TONS/ CAR	TOTAL TONS	001 MAG FE
1 1	1211	65	1	0632	11	2	79.08	869.83	9.84
1 1A	1211	18	1	0632			79.08	869.83	9.84
1 2	965	64	41	0707	10		70.03	700.30	14.49
1 2A	965	15	41	0707			70.03	700.30	14.49
1 3	952	14	1	0730	10		74.52	745.16	10.38
1 4	964	25	1	0758	10		80.46	804.57	9.60
1 5	957	13	12	0828	10		78.47	784.70	11.35
1 6	1216	65	1	0854	12		79.34	952.09	9.46
1 6A	1216	18	1	0854			79.34	952.09	9.46
1 7	1211	14	1	0913	11		81.27	893.98	10.85
1 8	967	13	12	0924	10		61.60	615.99	11.47
1 9	959	19	21	0936	8		66.37	530.93	10.20
1 10	964	65	1	1005	10		84.46	844.64	7.17
1 10A	964	18	1	1005			84.46	844.64	7.17
1 11	957	64	41	1028	10		68.23	682.26	11.66
1 11A	957	15	41	1028			68.23	682.26	11.66
1 12	968	65	1	1049	10		84.55	845.51	10.55
1 12A	968	18	1	1049			84.55	845.51	10.55
1 13	966	13	12	1151	8		61.08	488.64	9.34
1 14	964	14	1	1236	10		77.30	773.04	8.15
1 15	956	26	1	1330	10		79.02	790.24	9.99
1 16	955	24	1	1346	10		85.52	855.19	8.87
CRUSHER 1 TOTALS					160	2	76.11	12177.08	
2 1	956	25	1	0635	10		73.11	731.12	21.53
2 2	967	26	1	0723	10		70.50	704.96	25.63
2 3	966	11	5	0733	6	1	71.79	430.77	24.18
2 4	955	64	41	0938	10		69.63	696.34	27.01
2 4A	955	15	41	0938			69.63	696.34	27.01
2 5	962	14	1	0853	1		85.00	85.00	23.53
2 5A	962	18	1	0853			85.00	85.00	23.53
2 6	952	64	41	1012	10	1	71.33	713.34	26.76
2 7	949	13	12	1039	10	1	63.84	638.44	23.05
2 8	957	65	1	1251	10		80.95	809.51	25.36
CRUSHER 2 TOTALS					67	3	71.78	4809.47	
3 1	950	65	1	0725	10		92.47	924.67	11.53
3 1A	950	18	1	0725			92.47	924.67	11.53
3 2	962	14	1	0739	0		85.00	0.00	
3 3	1207	26	1	0855	12		77.39	928.73	15.49
3 4	968	11	5	0906	5		76.80	383.98	14.72
3 5	956	26	1	0934	10	1	73.25	732.49	15.71
3 6	966	11	5	0949	5		84.22	421.08	12.82
3 7	963	14	1	1006	10		82.75	827.54	12.54
3 8	950	11	5	1017	5		71.44	357.20	13.76
3 9	955	65	1	1039	10		80.21	802.11	10.24
3 9A	955	18	1	1039			80.21	802.11	10.24
3 10	965	14	1	1058	10	1	79.89	798.88	12.66
3 11	962	14	1	1200	9		74.99	674.88	11.29
3 12	1216	65	1	1216	12	1	82.03	984.39	14.80
3 12A	1216	18	1	1216			82.03	984.39	14.80
3 13	950	13	12	1234	8	1	65.38	523.03	12.17

3	14	967	64	41	1249	7	1	83.53	584.70	15.22
3	14A	967	15	41	1249			83.53	584.70	15.22
3	15	952	14	1	1322	10		77.27	772.74	12.39
3	16	965	13	24	1335	10	1	62.22	622.24	13.37
3	17	1207	65	1	1406	12	1	90.32	1083.85	15.09
3	17A	1207	18	1	1406			90.32	1083.85	15.09
3	18	968	26	1	1418	10	1	67.39	673.87	16.95

CRUSHER 3 TOTALS	155	8	78.04	12093.38
CRUSHER 4 TOTALS	0	0	0.00	0.00
GRAND TOTALS	382	13	76.13	29082.94

1431 GP-PROG OUT-#31 DATA ERROR

A	Q	P	X3	X4	X5	X6
6270	6271	6272	6273	6274	6275	6276
07200000	00000000	10000207	00000003	06440215	06540215	00000025-000

RAIL CAR SCANNER/TRACK SCALE REPORT

03-30-89 2230 ALL STEPS SHIFT 3 SUMMARY OF TRAINS DUMPED

CRUSHER/ TRAIN		ENGINE	SHOVEL	LEASE	OUT TIME	CARS DUMPED	ADJUST- MENT	TONS/ CAR	TOTAL TONS	001 MAG FE
1	1	959	14	1	1518	10		76.13	761.35	7.57
1	2	949	80	22	1534	10		82.21	822.07	6.90
1	2A	949	12	22	1534			82.21	822.07	6.90
1	3	962	13	24	1648	10		82.51	825.09	9.09
1	4	955	65	1	1721	10		86.81	868.06	10.16
1	4A	955	18	1	1721			86.81	868.06	10.16
1	5	1216	14	1	1737	12		76.65	919.85	19.42
1	6	964	9	12	1749	10		82.50	825.04	18.22
1	7	959	24	1	1801	10		85.45	854.46	21.43
1	8	966	13	24	1836	10		75.01	750.09	15.34
1	9	962	64	41	1846	10		77.23	772.29	25.35
1	9A	962	5	41	1846			77.23	772.29	25.35
1	10	957	65	1	1858	10		89.89	898.94	23.93
1	10A	957	18	1	1858			89.89	898.94	23.93
1	11	955	24	1	1908	10		83.27	832.68	24.23
1	12	967	26	1	1922	10		79.09	790.95	26.76
1	13	963	13	24	1931	9		79.15	712.32	22.38
1	14	1216	65	1	1944	12		69.99	839.87	22.13
1	14A	1216	18	1	1944			69.99	839.87	22.13
1	15	964	14	1	1958	10		78.53	785.27	20.22
1	16	952	25	1	2009	10		75.34	753.37	19.22
1	17	959	64	41	2020	10		81.30	813.01	24.23
1	17A	959	5	41	2020			81.30	813.01	24.23
1	18	956	26	1	2041	9		84.44	759.94	25.56
1	19	957	65	1	2057	10		97.36	973.57	10.87
1	19A	957	18	1	2057			97.36	973.57	10.87
1	20	963	9	12	2134	10	1	92.09	920.91	10.09
1	21	964	65	1	2150	10		82.48	824.84	11.26
1	21A	964	18	1	2150			82.48	824.84	11.26
1	22	952	14	1	2214	10		61.29	612.87	10.20
1	23	959	30	1	2227	10		83.68	836.79	13.84
CRUSHER 1 TOTALS						232	1	80.83	18753.64	
2	1	962	65	1	1508	10		88.02	880.22	25.27
2	1A	962	18	1	1508			88.02	880.22	25.27
2	2	966	24	1	1531	10		87.52	875.22	24.68
2	3	952	14	1	1603	10		77.07	770.67	23.03
2	4	957	24	1	1651	10	1	82.06	820.63	24.56
2	5	967	65	1	1712	10		78.95	789.51	24.66
2	5A	967	18	1	1712			78.95	789.51	24.66
2	6	965	80	22	1824	8		81.94	655.49	18.01
2	6A	965	12	22	1824			81.94	655.49	18.01
2	7	965	80	22	1901	1		85.00	85.00	
2	8	965	80	22	2025	0	-1	85.00	0.00	
2	9	962	25	1	2112	9		79.42	714.78	19.14
2	10	967	24	1	2136	10		77.77	777.68	21.90
2	11	1216	64	41	2204	12	1	73.13	877.55	25.09
2	11A	1216	5	41	2204			73.13	877.55	25.09
2	12	949	9	12	2216	8		81.14	649.15	21.38
2	13	966	24	1	2229	9		81.74	735.67	23.06
CRUSHER 2 TOTALS						107	1	80.67	8631.58	

3	1	1216	13	24	1442	12		71.43	857.20	13.69
3	2	950	26	1	1509	10		75.75	757.46	17.26
3	3	964	65	1	1533	10		81.73	817.28	15.07
3	3A	964	18	1	1533			81.73	817.28	15.07
3	4	968	9	12	1641	10		78.19	781.89	12.72
3	5	1207	26	1	1707	12		86.30	1035.55	16.78
3	6	950	25	1	1731	10		82.19	821.92	11.09
3	7	956	26	1	1757	10		82.20	822.02	16.96
3	8	949	65	1	1818	10		82.09	820.86	14.11
3	8A	949	18	1	1818			82.09	820.86	14.11
3	9	968	80	22	1835	6		74.15	444.87	9.34
3	10	950	64	41	1945	10		81.36	813.56	13.95
3	10A	950	5	41	1945			81.36	813.56	13.95
3	11	1207	9	12	2015	11	-1	82.38	908.84	10.56
3	12	949	65	1	2027	10		82.16	821.57	14.05
3	12A	949	18	1	2027			82.16	821.57	14.05
3	13	955	64	41	2047	10		79.06	790.64	15.53
3	13A	955	5	41	2047			79.06	790.64	15.53
3	14	968	14	1	2127	10		73.10	731.04	10.71
3	15	1207	13	24	2218	11		76.44	840.87	12.63

CRUSHER 3 TOTALS 152 -1 79.38 12065.57

CRUSHER 4 TOTALS 0 0 0.00 0.00

GRAND TOTALS 491 1 80.35 39450.79

03-31-89

DAILY LOG 03-31-89 2230

	3RD CRSH OPR TIME	3RD CRSH TOT TONS	3RD CRSH AVG LTPH	3RD CRSH POWER KW	3RD CRSH TRMP MET	3RD CRSH TONS/KWH	2ND CRSH TONS/KWH	HANG UP TIME	NO ORE TIME	080 AVG
UNIT 18							3.26	0.24	8.42	
UNIT 19	1.98	606.05	304.95	192.83	0.23	1.62	5.99			
UNIT 20	4.68	1632.94	348.32	211.03	0.21	1.67	3.55			
UNIT 21	2.12	687.51	324.33	196.12		1.69	4.06			
UNIT 22	4.29	1663.47	388.99	214.64	0.44	1.84	2.93			
UNIT 23			-0.97	15.00		-0.06				
UNIT 24	11.69	4004.66	343.07	206.76	0.76	1.71				
UNIT 25	11.14	3787.25	340.66	187.85	1.45	1.88				
UNIT 26	14.76	5048.38	341.41	165.02	0.66	2.11				
UNIT 27	10.46	3688.22	359.41	193.73	1.91	1.88				
UNIT 28	14.63	6197.19	415.97	222.94	0.73	1.90				
UNIT 29										
AVG/TOT	75.75	27315.00	360.12	197.49	6.38					

	2ND CRSH OPR TIME	2ND CRSH TOT TONS	2ND CRSH AVG LTPH	2ND CRSH POWER KW	2ND CRSH TRMP MET	1+2 TO 3 TIME	1+2 TO 1+2+3 TME	3 TO 1+2 TIME	3 TO 1+2+3 TIME	SUR TON
UNIT 11	2.56	1600.45	583.02	196.82		14.98	5.59	2.75	0.20	6
UNIT 12	16.64	10334.00	613.09	108.97	0.12					
UNIT 13	14.15	10164.12	703.60	199.84	0.07					
UNIT 14	13.82	10494.63	727.06	185.76	0.06					
UNIT 15	2.16	1190.03	528.46	195.46	0.31					
AVG/TOT	49.34	33783.00	665.71	164.89	0.56					

	PRI CRSH DOWN TME	RED LITE IDLE TME	GRN LITE IDLE TME	CRUSHING TIME	PRI CONV TOT TONS	PRI CONV MAG TONS	PRI CONV MAG FE	PRI PAN OPR HRS	PRI CRSH OPR TIME	CON TOT
UNIT 3	3.57	4.10	10.19	6.13	30586.00	4780.00	0.13	9.52	9.52	202
UNIT 4	21.16	0.69	1.52	0.61	2753.00			1.84	1.84	[illegible]
AVG/TOT	24.73	4.80	11.71	6.75		4780.00	0.13	11.36	11.36	314

PM

	PLANT DELAYS	NO TRAIN TIME	PRI CRSH AVAIL TM	GREEN LITE TIM	600T BIN DELAY	070 BIN DELAY	F CNTRL DELAY	ATTNDNT DELAY	PRI TOT IMPOSED	PRI BRO
UNIT 3	4.25	13.66	17.90		0.86	0.80	0.64	3.00	9.16	
UNIT 4		23.98	1.84				21.25		22.16	
AVG/TOT	4.25	37.65	19.74	0.00	0.86	0.80	21.89	3.00	31.33	

APPENDIX J

RESEARCH TRIANGLE LABORATORIES REPORT

prepared for

INTERPPOLL LABORATORIES

prepared by

RESEARCH TRIANGLE LABORATORIES, INC.

Gene Mull
Gene Mull
Chemist

John Y. Morimoto, Ph.D.
Chemist

RTL ID #89-185
April 12, 1989

RESEARCH TRIANGLE LABORATORIES

METHOD 25 TABLE OF RESULTS

Name: Interpoll Laboratories ID #89-100-185 Date: 4/10-11/89

Sample Number	Sample Description	Concentrations (ppmC) CO+CH4	CO2	Noncondensibles	Condensibles	TGNMO	Mass Conc. (mgC/cu.m)
0	T2 R0 USS Minntac	6	3090	9	43	52	26
1	T2 R1 USS Minntac	27	34534	6	33	38	19
2	T2 R2 USS Minntac	15	26310	5	29	34	17
3	T2 R3 USS Minntac	17	36472	6	130	137	68

METHOD 25 EXPERIMENTAL PROCEDURE

Calibration

A propane calibration gas mixture of 74.7 ppm CO, 70.5 ppm CH_4, 2.10% CO_2 and 67.2 ppm propane is injected via a 1 mL sampling loop into the analyzer. The injections are repeated until three integrated areas indicate reasonable (<5%) agreement. A 1.00% CO_2 standard is run daily with the same requirement. The average daily response factors must agree within 5% of the RF(CO_2) and the RF(NMO) from the initial performance check.

Daily Performance Checks are performed at the beginning of each work day. Calibrations are performed daily or between customer sets of samples, whichever comes first. Additionally, a System Background Check is performed between each set of samples. Duplicate injections of 1.0% CO_2 are made after the final sample each day.

Response factors (average integrated area/concentration in ppmC) are calculated daily from the initial triplicate injections.

Analysis

Each trap is stored with dry ice until just prior to analysis and is flushed of CO_2 by passing zero air through it a -78 °C and via the CO_2 NDIR to the sample tank. Flushing is continued until no NDIR response is noted. The trap is baked at 200 °C with zero air flushing through the trap and via the oxidation catalyst and the NDIR into the collection vessel. Collection is continued until no NDIR response is noted. The trap is transferred to an oven set at 350 °C and baking is continued for 30 minutes. This ensures the cleanliness of the trap for a subsequent sampling. The trap is taken out of the oven and allowed to cool; it is then capped and stored for shipment.

The sample tank is analyzed by injecting an aliquot via a 1 mL sample loop into the GC column, which is held at 85 °C to elute the CO+CH_4 and then the CO_2 which is passed to the oxidation catalyst, reduction catalyst, and FID. The column is then backflushed at 195 °C to elute the organic fraction. The collection vessel is analyzed identically. In both cases, triplicate injections are made. The sample tank is pumped for 5 minutes (to less than 5 mmHg) and air is then allowed in via a paper fiber filter; this procedure is repeated. The tank is pumped 10 minutes and allowed to stand overnight. The tank is then connected to a pressure gauge to test for leaks (maximum permissible leak rate = 10 mmHg/day). If the tank passes the leak test, it is filled with zero air to slightly greater than atmospheric pressure and stored for shipment.

Calculations

Calculations are done in accord with EPA Method 25 procedures. A sample calculation is provided using client/RTL data.

RESEARCH TRIANGLE LABORATORIES

METHOD 25 SAMPLE CALCULATION

Note: All pressure values have been converted when necessary to mm Hg and all temperature values to Kelvin.

Name: Interpoll Laboratories ID #89-100-185 Date: 4/10-11/89

Sample # 0 T2 RO USS Minntac

DATA

Tank 6169:			Trap PQ	Collection Vessel:		
Volume (cu.m) = 0.005786				Volume (cu.m) = 0.004551		
	Pressure (mm Hg)	Temp.(K)			Pressure (mm Hg)	Temp.(K)
Presampling	2.0	278.2				
Postsampling	699.3	278.2				
Final	1015.0	291.2		Final	1000.0	297.2

Calibration Data:

	CO2	Backflush
Response Factor (area units/ppmC)	193.4	207.8
Blank (ppmC)	2.0	
Blank Area (area units)		2385

Areas:

CO + CH4	1,080	899	417
CO2	424,680	431,210	433,310
Noncondensibles	4,208	3,169	3,809
Condensibles	7,730	9,064	7,840

CALCULATIONS

Measured Concentrations, corrected for blank:

Cm(CO+CH4) = Area(CO+CH4)/RF(CO2)
= 1080 /193 = 5.6
= 899 /193 = 4.6
= 417 /193 = 2.2

Cm(CO2) = Area(CO2)/RF(CO2)
= 424680 /193 = 2195.9
= 431210 /193 = 2229.6
= 433310 /193 = 2240.5

Cm(Noncondensibles) = [Area(Noncondensibles) - Blank Area(NMO)]/RF(NMO)
= (4208 - 2385)/208 = 8.8
= (3169 - 2385)/208 = 3.8
= (3809 - 2385)/208 = 6.9

Cm(Condensibles) = Area(Condensibles)/RF(CO2) - Blank(CO2)
= 7730 /193 - 2.0 = 38.0
= 9064 /193 - 2.0 = 44.9
= 7840 /193 - 2.0 = 38.5

Pressure-Temperature Ratio, Q(i) = P(i)/T(i):

postsampling tank: Q(1) = 699.262 / 278.15 = 2.513975
presampling tank: Q(2) = 2.032 / 278.15 = 7.305411E-03
final tank: Q(3) = 1015 / 291.15 = 3.486176
final CV: Q(4) = 1000 / 297.15 = 3.365304

Volume Sampled (dscm) = 0.386 x Tank Volume x [Q(1)-Q(2)]
= 0.386 x .005786 x [2.5140 - 0.0073]
= 0.005598

Averages and % Relative Standard Deviations (%RSD) of Cm's are calculated.
(%RSD of C = %RSD of Cm)

Calculated Concentrations:

C(CO+CH4) = Q(3)/[Q(1)-Q(2)] x Cm(CO+CH4)
= 3.4862/(2.5140 - 0.0073) x 4.1 = 5.7

C(CO2) = Q(3)/[Q(1)-Q(2)] x Cm(CO2)
= 3.4862/(2.5140 - 0.0073) x 2222.0 = 3090.3

C(Noncondensibles) = Q(3)/[Q(1)-Q(2)] x Cm(Noncondensibles)
= 3.4862/(2.5140 - 0.0073) x 6.5 = 9.0

C(Condensibles)
= Volume(CV)/Volume(Tank) x Q(4)/[Q(1)-Q(2)] x Cm(Condensibles)
= 0.004551/0.005786 x 3.3653/(2.5140 - 0.0073) x 40.5 = 42.7

Total Gaseous Non-Methane Organics(TGNMO)=C(Noncondensibles)+C(Condensibles)
= 9.0 + 42.7
= 51.7

Mass Concentration = 0.498 x TGNMO
= 0.498 x 51.7 = 25.8

SAMPLE QA/QC DATA

METHOD 25 CALIBRATION CHECK

5.1.1 Carrier gas and auxiliary oxygen blank (9/29/87)
$CO + CH_4 + CO_2 + NMO = 0$ ppm   Requirement: <5 ppm

5.1.2 Catalyst Efficiency Check (10/1/87)
CO_2 ppmC = 10036   Requirement: (CO_2 ppmC = 10000 ± 200)

5.1.3 System Performance Check (10/1-2/87)

	Average percent Recovery (100 ± 5%)	% RSD (<2%)
50 uL Hexane	100.6%	0.2
10 uL Hexane	100.9%	0.2

5.2.1 Oxidation Catalyst Efficiency Check (10/2/87)

FID Response with Reduction Catalyst out = 0.85%
Requirement: <1% FID Response

5.2.2 Reduction Catalyst Efficiency Check (10/2-9/87)
Response factor of CO_2 with Oxidation Catalyst and Reduction Catalyst operative was 121.2% of response with Catalysts out.
Requirement: Response Factor >95%

5.2.3 Analyzer Linearity Check and NMO Calibration (Initial, 10/4-6/87).

$\overline{RF}$ Values agree within 2%   Requirement: Agree within 2.5%
% RSD values for triplicates <2%   Requirement: % RSD values <2%

$\frac{RF(NMO)}{RF(CO_2)} = 1.018$ Requirement: $\frac{RF(NMO)}{RF(CO_2)} = 1.0 \pm 0.1$

5.2.4 System Performance check (10/4/87)

	Measured Value	Expected Value	Requirement
Propane Mix	56.6 ppm	56.7 ppm	Expected ±5%
Hexane	54.2 ppm	51.8 ppm	Expected ±5%
Toluene	60.7 ppm	60.5 ppm	Expected ±5%
Methanol	94.2 ppm	92.7 ppm	Expected ±5%

5.3 NMO Analyzer Daily Calibration
Mixed propane gas plus high level CO_2 triplicate injections are made at the beginning of the day.

Requirement:
$DRF(CO_2) = RF(CO_2) \pm 5\%$
$DRF(NMO) = RF(NMO) \pm 5\%$

RESEARCH TRIANGLE LABORATORIES
METHOD 25 DATA REPORT

Name: Interpoll Laboratories   ID #89-100-185   Date: 4/10-11/89

Sample # 0   T2 RO USS Minntac

TANK 6169:   TRAP PQ   COLLECTION VESSEL:

Volume (cu.m) = 0.005786   Volume (cu.m) = 0.004551

	Pressure (mm Hg)	Temp.(K)		Pressure (mm Hg)	Temp.(K)
Presampling	2.0	278.2			
Postsampling	699.3	278.2			
Final	1015.0	291.2	Final	1000.0	297.2

Volume Sampled (dscm) = 0.005598

Calibration Data:

	CO2	Backflush
Response Factor (area units/ppmC)	193.4	207.8
Blank (ppmC)	2.0	
Blank Area (area units)		2385

Areas:

CO + CH4	1,080	899	417
CO2	424,680	431,210	433,310
Noncondensibles	4,208	3,169	3,809
Condensibles	7,730	9,064	7,840

Concentrations (ppmC):		%RSD
CO + CH4	5.7433	42.9088
CO2	3090.2580	1.0473
Noncondensibles	8.9929	39.0080
Condensibles	42.7254	9.4635
TGNMO	51.7183	

(=   25.7557 mgC/cu.m)

RESEARCH TRIANGLE LABORATORIES

METHOD 25 DATA REPORT

Name: Interpoll Laboratories ID #89-100-185 Date: 4/10-11/89

Sample # 1 T2 R1 USS Minntac

TANK new 73: TRAP LN COLLECTION VESSEL:

Volume (cu.m) = 0.004578 Volume (cu.m) = 0.004551

	Pressure (mm Hg)	Temp.(K)		Pressure (mm Hg)	Temp.(K)
Presampling	8.4	277.0			
Postsampling	680.2	278.7			
Final	1015.0	291.2	Final	1047.0	298.2

Volume Sampled (dscm) = 0.004259

Calibration Data:

	CO2	Backflush
Response Factor (area units/ppmC)	193.4	207.8
Blank (ppmC)	2.0	
Blank Area (area units)		2385

Areas:

CO + CH4	2.146	1.912	6.830
CO2	4,581,000	4,602,200	4,670,200
Noncondensibles	3.066	3.407	3.066
Condensibles	4,660	4,920	4,607

Concentrations (ppmC):		%RSD
CO + CH4	27.1418	76.4418
CO2	34533.9900	1.0092
Noncondensibles	5.5310	24.7747
Condensibles	32.5195	3.8580
TGNMO	38.0505	

(= 18.9492 mgC/cu.m)

RESEARCH TRIANGLE LABORATORIES

METHOD 25 DATA REPORT

Name: Interpoll Laboratories ID #89-100-185 Date: 4/10-11/89

Sample # 2 T2 R2 USS Minntac

TANK new 84: Volume (cu.m) = 0.004583

TRAP MA

COLLECTION VESSEL: Volume (cu.m) = 0.004551

	Pressure (mm Hg)	Temp.(K)		Pressure (mm Hg)	Temp.(K)
Presampling	2.0	277.6			
Postsampling	689.1	277.6			
Final	1021.0	291.2	Final	1140.0	297.2

Volume Sampled (dscm) = 0.004379

Calibration Data:

	CO2	Backflush
Response Factor (area units/ppmC)	193.4	207.8
Blank (ppmC)	2.0	
Blank Area (area units)		2385

Areas:

CO + CH4	2,005	2,132	2,049
CO2	3,581,400	3,606,300	3,586,300
Noncondensibles	3,066	3,407	3,066
Condensibles	3,871	4,182	3,962

Concentrations (ppmC):		%RSD
CO + CH4	15.1061	3.1276
CO2	26309.8300	0.3673
Noncondensibles	5.4182	24.7747
Condensibles	28.7979	4.4192
TGNMO	34.2161	

(= 17.0396 mgC/cu.m)

RESEARCH TRIANGLE LABORATORIES

METHOD 25 DATA REPORT

Name: Interpoll Laboratories   ID #89-100-185 Date: 4/10-11/89

Sample # 3   T2 R3 USS Minntac

TANK new 118:
Volume (cu.m) = 0.004554

	Pressure (mm Hg)	Temp.(K)
Presampling	2.0	278.2
Postsampling	668.8	278.7
Final	1030.0	292.2

TRAP HQ   COLLECTION VESSEL:
Volume (cu.m) = 0.004551

	Pressure (mm Hg)	Temp.(K)
Final	1013.0	299.2

Volume Sampled (dscm) = 0.004205

Calibration Data:

	CO2	Backflush
Response Factor (area units/ppmC)	193.4	207.8
Blank (ppmC)	2.0	
Blank Area (area units)		2385

Areas:

CO + CH4	2,296	2,404	2,063
CO2	4,821,000	4,791,200	4,746,800
Noncondensibles	3,066	3,407	3,407
Condensibles	18,224	17,906	18,546

Concentrations (ppmC):

		%RSD
CO + CH4	17.1782	7.7307
CO2	36472.2900	0.7801
Noncondensibles	6.4419	21.6745
Condensibles	130.4820	1.7939
TGNMO	136.9240	

(= 68.1881 mgC/cu.m)

APPENDIX K

RESULTS OF FUEL ANALYSIS

Interpoll Laboratories, Inc.
Fuel Laboratory
(612) 786-6020
FAX (612) 786-7854

Date: 04-05-1989

JOB: USS/DIVISION OF USX

SAMPLE LOG NO.: 7560-68-6075

SAMPLE DESCRIPTION: COAL/COKE COMPOSITE TEST 3 3/29/89

SHORT PROXIMATE ANALYSIS WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			0.77
Ash		3.82	3.79
Sulfur	3.11	2.99	2.97
Heating Value, BTU/LB.	15145	14566	14455

APPENDIX L

PROCEDURES

Particulate Loadings and Emission Rates

The particulate emission rates were determined per EPA Methods 1-5, CFR Title 40, Part 60, Appendix A (revised July 1, 1987). In this procedure, a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

The sampling train consists of a heated glass-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in line filter holder in a temperature controlled oven. In addition, the sampling module also houses the condenser case and a Drierite drying column. The sampling module is connected by means of an umbilical cord to the control module which houses the dry test gasmeter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples were collected as follows: The sample gas was drawn in through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter. The particulates were removed at this point and collected on the filter. The gases then passed through an ice-cooled condenser and a desiccant-packed drying column which quantitatively absorb all moisture from the sample gas stream after which the sample gas passes through the pump and the dry test gasmeter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides instantaneous flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each site such that an isokinetic sampling condition prevails. Nomographs are used to aid in the rapid determination of the sampling rate.

Particulate Loadings and Emission Rates

The particulate emission rates were determined per EPA Methods 1-5, CFR title 40, Part 60, Appendix A (revised July 1, 1987). In this procedure, a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

The sampling train consists of a heated stainless steel-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in line filter holder in a temperature controlled oven. In addition, the sampling module also houses the impinger case and a Drierite drying column. The sampling module is connected by means of an umbilical cord to the control module which houses the dry test gasmeter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples were collected as follows: The sample gas was drawn in through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter. The particulates were removed at this point and collected on the filter. The gases then passed through an ice-cooled impinger train and a desiccant-packed drying column which quantitatively absorb all moisture from the sample gas stream after which the sample gas passes through the pump and the dry test gasmeter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides instantaneous flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each site such that an isokinetic sampling condition prevails. Nomographs are used to aid in the rapid determination of the sampling rate.

After sampling is complete, the filter is removed and placed in a clean container. The nozzle and inlet side of the filter holder are quantitatively washed with acetone and the washings are stored in a second container. A brush is often used in the cleaning step to help dislodge deposits. The samples are returned to the laboratory where they are logged in and analyzed. The volume of the acetone rinse ("probe wash") is noted and then the rinse is quantitatively transferred to a tared 120 cc porcelain evaporating dish and the acetone evaporated off at 97-105 °F. This temperature is used to prevent condensation of atmospheric moisture due to the cooling effect induced by the evaporation of acetone. The acetone-free sample is then transferred to an oven and dried at 105 °C for 30 minutes, cooled in a desiccator over Drierite, and then weighed to the nearest .01 mg. The filter sample is quantitatively transferred to a 6-inch watch glass and dried in an oven at 105 °C for two hours. The filter and watch glass are then cooled in a desiccator and the filter weighed to the nearest .01 mg. All weighings are performed in a balance room where the relative humidity is hydrostatted to less than 50% relative humidity. Microscopic examination of the samples is performed if any unusual characteristics are observed. The weight of the acetone rinse is corrected for the acetone blank. The Drierite column is weighed on-site and the water collected by Drierite is added to the condensate so that the total amount of absorbed water may be ascertained.

Integrated gas samples for Orsat analysis were collected at a constant flow rate throughout each particulate run. The gas samples were analyzed using an all-glass Orsat analyzer. Standard commercially prepared solutions were used in the Orsat analyzer (sat. KOH for carbon dioxide and reduced methylene blue for oxygen). In addition to the above, the oxygen content of the flue gas was measured at each traverse during the particulate determinations using a Teledyne Model 320P-4 Portable Oxygen Analyzer to sample the effluent from the Method 5 train.

3a P2(7)

Interpoll Laboratories
(612)786-6020

Condensible Organic Compounds Analysis

(State of Minnesota - MPCA Exhibit C)

Method II-8672-MN

Equipment:

Separatory funnel - 500 cc with Teflon stopcock

Powder funnel - 75 mm ID with a 17 mm stem

Evaporating dish(es) - 200 cc or 250 cc beaker

Reagents:

Diethyl ether - reagent grade

Chloroform - reagent grade

Sodium sulfate - (ACS) granular anhydrous

Toluene - (if 3% hydrogen peroxide is used to collect the samples)

Glass wool (Pyrex microfiber)

PREPARATION

1. Place 1 kg of granular anhydrous sodium sulfate in a shallow tray and heat to 200 °C for at least four hours. Store in a tightly sealed glass container.

2. Place a plug of clean glass wool in the stem of the powder funnel. The plug must be of sufficient size so that it is held snuggly in place by its own pressure. Add a one-inch layer of dry sodium sulfate.

SAMPLING

An all-glass impinger assembly is used in the back half of the EPA Method 5 sampling train when an organic wet catch is to be collected. The impinger assembly consists of a modified impinger, a Greenburg Smith impinger followed by another modified impinger. The third impinger should have a temperature measuring device at the outlet upstream of a final impinger or desiccant column to monitor the temperature of the outlet gas stream. Prior to the start of the test, each of the first two impingers should be charged with 100 g of Class I water. The Method 5 train should be operated as provided for in EPA Method 5. Ice should be added to the impinger bath to keep the temperature of the gas at the outlet at or less than 68 ^{o}F. After the post test leak check, the impinger train is removed and impinger contents poured into a tared all-glass sample bottle and closed with a Teflon-lined cap. The sample bottle is then weighed and the total condensate calculated by subtraction of the bottle tare weight and the weight of initial water added to the impingers (200 g). A label is affixed and the sample is returned to the laboratory for analysis. The sample should be stored at 4 ^{o}C if the analysis is not conducted within 48 hours.

ANALYSIS

I. Organics

Caution! Work in vented hood!!!

A. Organic Blank Determination

1. Pour 125 mL of ethyl ether and 125 mL of chloroform into a tared beaker.
2. Evaporate solvent in hood at 70 ^{o}F or less until no solvent remains.
3. Desiccate the sample in dish for two hours.
4. Weigh the sample to nearest 0.1 mg, record and report on Form LSC-036.

B. Organic Sample Determination

1. Test for peroxide in sample ether using KI strips. (If KI strip shows positive, contact your supervisor before proceeding.)
2. Transfer the sample solution quantitatively to a 500 mL separatory funnel. Use the first of three 25 mL chloroform aliquots to rinse the sample container.
3. Extract with three 25 mL portions of chloroform. (Shake and vent to release pressure about 4 to 5 times each.) Allow the phases to separate. (Bottom layer is chloroform.) Draw off the bottom layer, transferring the solvent with a funnel containing a plug of sodium sulfate into a tared beaker. (Do not draw off any of the aqueous layer.)

4. After the three chloroform extractions, use two 25 mL portions of chloroform to rinse the sodium sulfate, collecting the rinses in the same tared beaker as the extracts.

5. Next extract the sample three times with 25 mL aliquots of ethyl ether. (Shake and vent to release pressure about 4 to 5 times each.) Allow the phases to separate. (Top layer is ethyl ether.) Draw off the bottom layer (aqueous) into another separatory funnel taking less than 1 mL of the ethyl ether layer with. Decant the ethyl ether, passing it through sodium sulfate and collecting the ethyl ether in the same tared dish as the chloroform.

6. After the three ethyl ether extractions, take two 25 mL portions of ethyl ether and rinse the sodium sulfate collecting the rinses in the same tared beaker as the extracts.

7. Evaporate the solvents (chloroform and ethyl ether) in the tared beaker in the hood at 70 ^{o}F or less until no solvent remains. (Use no heat and have no sources of ignition in the hood when doing this procedure.) Do not evaporate so quickly as to allow evaporative cooling to lower the temperature of the container below the dew point of water, otherwise, water will be condensed out in the container.

8. Desiccate to constant weight (two hours). Record and report the final weight to the nearest 0.1 mg on Form LSC-036.

II. Inorganics

If inorganic residue information is required, the following procedure should be conducted:

A. Inorganic Blank Determination

1. Vent the remaining aqueous phase from the organic extraction in the hood to remove residual organic solvents (usually overnight).
2. Decant the impinger catch into a tared evaporating dish.
3. Evaporate all of the water in the sample in an oven at 100 $^{\circ}C$. Take care not to boil to prevent bumping and loss of sample.
4. Cool the dried sample in the desiccator and desiccate until a constant weight is obtained.
5. Report the results to the nearest 0.1 mg on Form LSC-036.

B. Inorganic Sample Determination

Follow steps 1-5 in Section A above.

NOTES

1. For the organics determination, in the rare event that the impinger catch resulted from a Modified Method 6 determination (SO_2), whereby the solution contains dilute hydrogen peroxide ($\geq$ 3%), do <u>not</u> use ether as an extraction solvent. <u>Substitute toluene</u> for ethyl ether in Section I. (Ether in the presence of peroxide forms explosive hydroperoxide.)

2. In the organics determination, more than three extractions may be required to extract all of the organics. Additional extractions should be performed if the aqueous phase is still cloudy.

3. Special state requirements:

   <u>Michigan</u> - Total sample evaporated in tared evaporating dish on steam bath.

   <u>Iowa</u> - Organics and inorganics separately, as required.

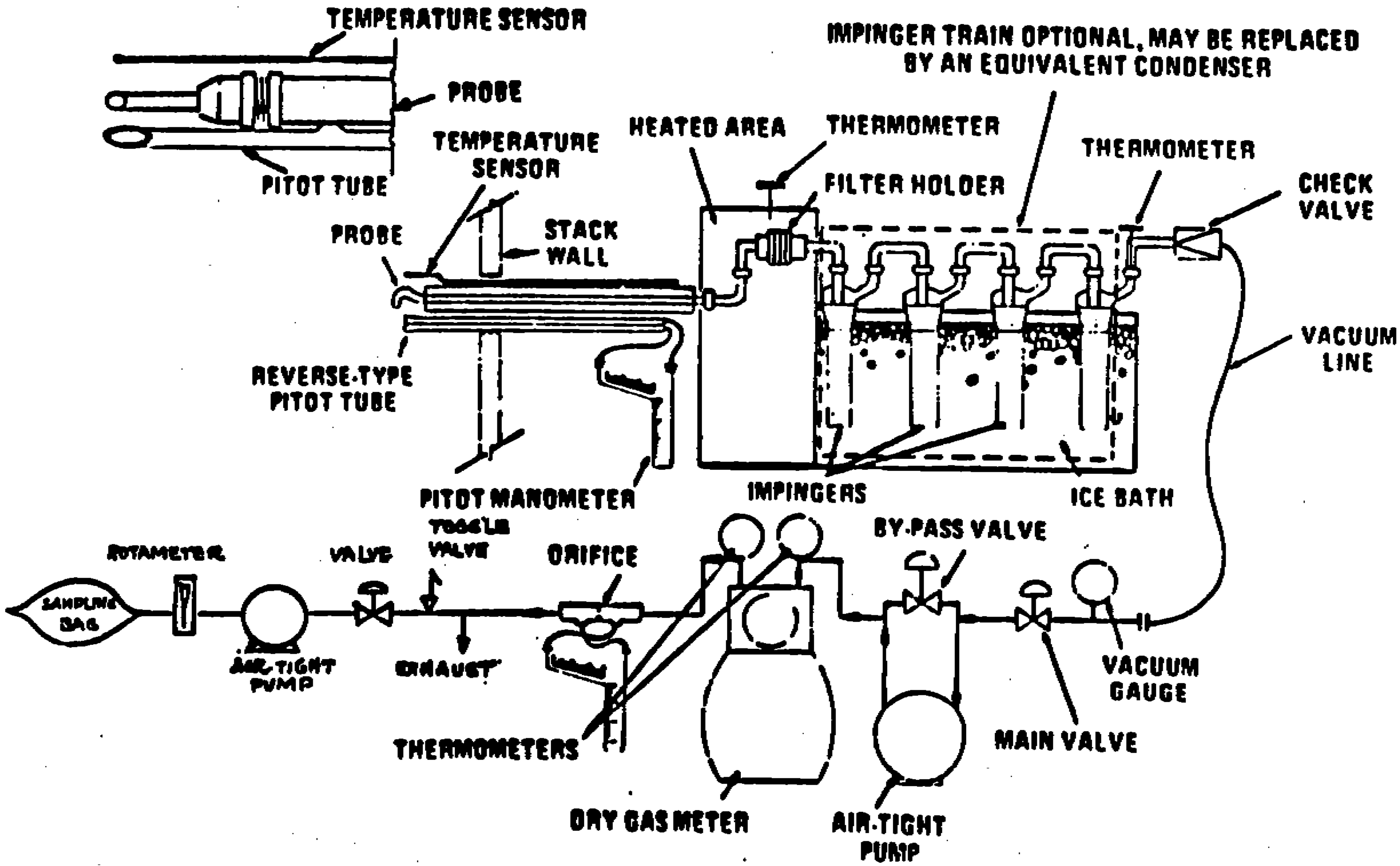
   <u>Wisconsin</u> - Use Method II-8672-WI.

   <u>Rest of states</u> - Organics only.

REFERENCES

Proposed Standards of Performance for New Stationary Sources, Federal Register <u>36</u>(159) Part II, August 1, 1979.

Minnesota Pollution Control Agency, Exhibit C.



Particulate-sampling train.

Oxides of Nitrogen

Oxides of nitrogen concentrations were collected in accordance with EPA Method 7 (see above-cited reference) with a specially designed all glass manifold and valving assembly and a heated stainless steel-lined probe. Samples were collected in two-liter evacuated insulated flasks which contained 25 cc of acidified peroxide solution (Method 7 reagent). Nine sets or more of three samples each were collected over a period of 4.5 to 5 hours.

The sampling train was leak checked through the probe at the beginning and end of the test and, in addition, the system leak checked at the time of evacuation of each flask. Before the samples were collected, the probe was purged to eliminate dead volume effects and to raise the temperature of the probe outlet and manifold assembly to minimize condensation of moisture. A plug of microfiber glass wool inserted in the probe inlet was used to prevent particulate material from entering into the flask. The temperature of the flask, vacuum in the flask and barometric pressure at the time of sampling was recorded for each flask. After sampling was complete, as evidenced by the in-line vacuum gauge, the flask valve was closed, the flask assembly disconnected from the manifold/valve assembly and the flask shook for several minutes to promote oxidation and absorption. The recovered oxides of nitrogen samples were returned to the laboratory and analyzed immediately by ion chromatography as per EPA 7A.

The internal volume of each numbered flask assembly has been measured prior to initial use by filling with water, weighing before and after and then converting the weight of water to volume by means of the density of water at room temperature. Flask volumes are stored in the computer and recalled automatically in the computer calculation.

5.2.6 Flexible bag. Tedlar, or equivalent, with a capacity of 60 to 90 liters (2 to 3 ft³). Leak-test the bag in the laboratory before using by evacuating bag with a pump followed by a dry gas meter. When evacuation is complete, there should be no flow through the meter.

5.2.7 Pitot tube. Type S, or equivalent, attached to the probe so that the sampling rate can be regulated proportional to the stack gas velocity when velocity is varying with the time or a sample traverse is conducted.

5.3 Analysis (Figure 10-3).

5.3.1 Carbon monoxide analyzer. Nondispersive infrared spectrometer, or equivalent. This instrument should be demonstrated, preferably by the manufacturer, to meet or exceed manufacturer's specifications and those described in this method.

5.3.2 Drying tube. To contain approximately 200 g of silica gel.

5.3.3 Calibration gas. Refer to paragraph 6.1.

5.3.4 Filter. As recommended by NDIR manufacturer.

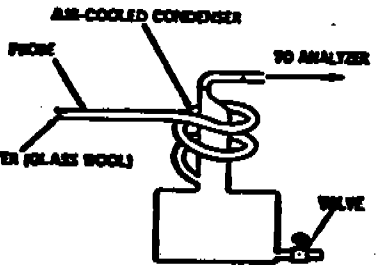


Figure 10-1. Continuous sampling train.

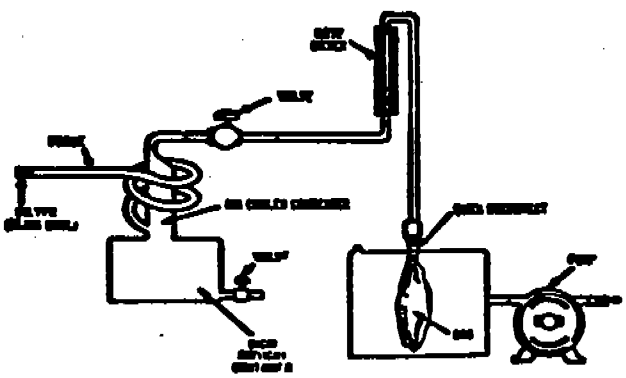


Figure 10-2. Integrated gas-sampling train.

5.3.5 CO_2 removal tube. To contain approximately 500 g of ascarite.

5.3.6 Ice water bath. For ascarite and si gel tubes.

5.3.7 Valve. Needle valve, or equivale adjust flow rate

5.3.8 Rate meter. Rotameter or equiv to measure gas flow rate of 0 to 1.0 lite min. (0.035 cfm) through NDIR.

5.3.9 Recorder (*optional*). *To provide manent record of NDIR readings.*

6. *Reagents.*

6.1 Calibration gases. Known concen tion of CO in nitrogen (N_2) for instru span, prepurified grade of N_2 for zero two additional concentrations correspo approximately to 60 percent and 30 perc span. The span concentration shall exceed 1.5 times the applicable source formance standard. The calibration shall be certified by the manufacturer to within ±2 percent of the specified co tration.

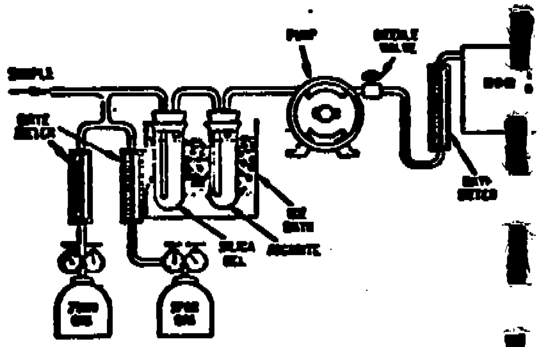


Figure 10-3. Analytical equipment.

6.2 Silica gel. Indicating type, 6 mesh, dried at 175° C (347° F) for 2 hours

6.3 Ascarite. Commercially available.

7. *Procedure.*

7.1 Sampling.

7.1.1 Continuous sampling. Set up equipment as shown in Figure 10-1 m sure all connections are leak free. Place probe in the stack at a sampling point purge the sampling line. Connect the lyzer and begin drawing sample into th alyzer. Allow 5 minutes for the system stabilize, then record the analyzer read as required by the test procedure. (See and 8). CO_2 content of the gas may be mined by using the Method 3 integr sample procedure (36 FR 24886), or weighing the ascarite CO_2 removal tub computing CO_2 concentration from th volume sampled and the weight gain of tube.

7.1.2 Integrated sampling. Evacuat flexible bag. Set up the equipment as s in Figure 10-2 with the bag disconnec Place the probe in the stack and purge sampling line. Connect the bag, making sure that all connections are leak free. Sample at a rate proportional to the stack velocity. CO_2 content of the gas may be determined by using the Method 3 integrated sample procedures (36 FR 24886), or by weighing the ascarite CO_2 removal tube and computing CO_2 concentration from the gas volume sampled and the weight gain of the tube.

7.2 CO Analysis. Assemble the apparatus as shown in Figure 10-3, calibrate the instrument, and perform other required operations as described in paragraph 8. Purge analyzer with N_2 prior to introduction of each sample. Direct the sample stream through the instrument for the test period, recording the readings. Check the zero and span again after the test to assure that any drift or malfunction is detected. Record the sample data on Table 10-1.

8. *Calibration.*

Assemble the apparatus according to Figure 10-3. Generally an instrument requires a warm-up period before stability is obtained. Follow the manufacturer's instructions for specific procedure. Allow a minimum time of 1 hour for warm-up. During this time check the sample conditioning apparatus, i.e., filter, condenser, drying tube, and CO_2 removal tube, to ensure that each component is in good operating condition. Zero and calibrate the instrument according to the manufacturer's procedures using, respectively, nitrogen and the calibration gases.

TABLE 10-1—FIELD DATA

	Comments
Location	
Test	
Date	
Operator	

Clock time	Rotameter setting, liters per minute (cubic feet per minute)

9. *Calculation.*

Concentration of carbon monoxide. Calculate the concentration of carbon monoxide in the stack using equation 10-1.

$$C_{CO\ stack} = C_{CO\ NDIR}(1 - F_{CO_2})$$

where:

$C_{CO\ stack}$=concentration of CO in stack, ppm by volume (dry basis).

$C_{CO\ NDIR}$=concentration of CO measured by NDIR analyzer, ppm by volume (dry basis).

F_{CO_2}=volume fraction of CO_2 in sample, i.e., percent CO_2 from Orsat analysis divided by 100.

10. *Bibliography.*

10.1 McElroy, Frank, The Intertech NDIR-CO Analyzer, Presented at 11th Methods Conference on Air Pollution, University of California, Berkeley, Calif., April 1, 1970.

10.2 Jacobs, M. B., et al., Continuous Determination of Carbon Monoxide and Hydrocarbons in Air by a Modified Infrared Analyzer, J. Air Pollution Control Association, *9*(2): 110-114, August 1959.

10.3 MSA LIRA Infrared Gas and Liquid Analyzer Instruction Book, Mine Safety Appliances Co., Technical Products Division, Pittsburgh, Pa.

10.4 Models 215A, 315A, and 415A Infrared Analyzers, Beckman Instruments, Inc., Beckman Instructions 1635-B, Fullerton, Calif., October 1967.

10.5 Continuous CO Monitoring System, Model A5611, Intertech Corp., Princeton, N.J.

10.6 UNOR Infrared Gas Analyzers, Bendix Corp., Ronceverte, West Virginia.

ADDENDA—A. PERFORMANCE SPECIFICATIONS FOR NDIR CARBON MONOXIDE ANALYZERS.

Range (minimum)	0-1000 ppm.
Output (minimum)	0-10mV.
Minimum detectable sensitivity.	20 ppm.
Rise time, 90 percent (maximum).	30 seconds.
Fall time, 90 percent (maximum).	30 seconds.
Zero drift (maximum)	10% in 8 hours.
Span drift (maximum)	10% in 8 hours.
Precision (minimum)	±2% of full scale.
Noise (maximum)	±1% of full scale.
Linearity (maximum deviation)	2% of full scale.
Interference rejection ratio	CO_2—1000 to 1, H_2O—500 to 1.

B. *Definitions of Performance Specifications.*

Range—The minimum and maximum measurement limits.

Output—Electrical signal which is proportional to the measurement; intended for connection to readout or data processing devices. Usually expressed as millivolts or milliamps full scale at a given impedance.

Full scale—The maximum measuring limit for a given range.

Minimum detectable sensitivity—The smallest amount of input concentration that can be detected as the concentration approaches zero.

Accuracy—The degree of agreement between a measured value and the true value; usually expressed as ± percent of full scale.

METHOD 25 HEATED SAMPLING SYSTEM

[Adapted from Federal Register/40 CFR Part 60, February 12, 1988]

APPARATUS

The sampling system consists of a heated probe, a heated filter, a condensate trap, a flow control system, and a sample tank (Figure 1). The following are required:

1. Heated Probe. 6.4-mm (1/4 in.) OD stainless steel tubing with a heating system capable of maintaining a gas temperature at the exit end of at least 129 °C (265 °F). The probe is equipped with a thermocouple [#2] at the exit end to monitor the gas temperature.

The nozzle is an elbow fitting attached to the front end of the probe while the thermocouple is inserted in the side arm of a tee fitting attached to the rear of the probe. The probe is wrapped with a suitable length of high temperature heating tape, and then covered with two layers of glass cloth insulation and one layer of aluminum foil.

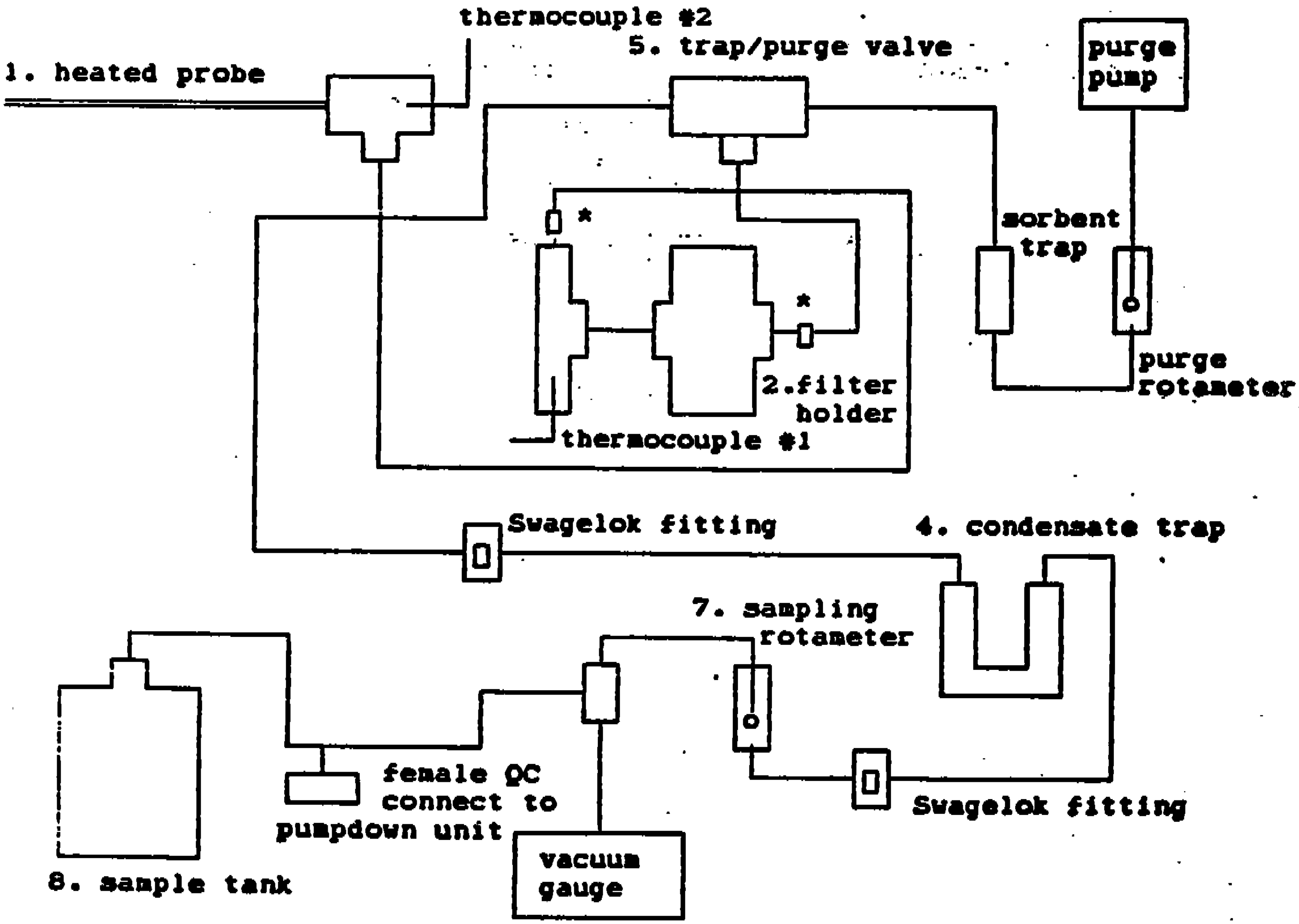
2. Filter Holder. 25-mm (15/16 in.) ID or 47-mm (1 13/16 in.) Gelman filter holder with a stainless steel body and a stainless steel support screen with the Viton O-ring replaced by a Teflon O-ring. The glass fiber filter is inserted into the holder by disconnecting the Swagelok fittings (not the pipe-thread fittings, which have Teflon tape visible). After the filter holder is removed, it may be disassembled and reassembled by rotating the large collar by hand. Carefully position the filter paper in the filter support and reassemble with the O-ring properly positioned.

3. Filter Heating System. A metal box consisting of an inner and an outer shell separated by insulating material with a heating element in the inner shell capable of maintaining a gas temperature at the filter of 121 ± 3 °C (250 ± 5 °F). The inner box is supported by 13-mm (1/2-in.) phenolic rods. The void space between the boxes is filled with fiberfrax insulation which is sealed in place by means of a silicon rubber bead around the upper sides of the box. A door made in a similar manner, with a 25-mm (1-in.) gap between the parts, is used to seal the heating chamber.

The inner box is heated with a 250-watt cartridge heater, shielded by a stainless steel shroud. The heater is regulated by a thermostatic temperature controller, which is set to maintain a temperature of 121 °C as measured by a thermocouple [#1] in the gas line just before the filter. An additional thermocouple [#3] is used to monitor the temperature of the gas behind the filter.

4. Condensate Trap. 9.5 mm (3/8 in.) OD 316 stainless steel tubing bent into a U-shape, packed with coarse quartz wool to a density of approximately 0.11 g/cc.

Schematic of Method 25 Heated Sampling System



* remove filter holder at Swagelok connection here

Figure 1.

5. Trap/Purge Valve. Stainless steel valve for directing sample from probe to either the trap or to the purge pump.

6. Metering Valve. Stainless steel control valve for regulating the sample flow rate through the sample train, located on the sampling rotameter.

7. Sampling Rotameter. Glass tube with stainless steel fittings, capable of measuring sample flow in the range of 60 to 100 cc/min.

8. Sample Tank. Stainless steel tank with a minimum volume of 4 liters.

9. Mercury Manometer or Absolute Pressure Gauge (not supplied). Capable of measuring pressure to within 1 mm Hg in the range of 0 to 900 mm.

10. Vacuum Pump (optional). Capable of evacuating to an absolute pressure of 10 mm Hg.

11. Pumpdown Unit (optional). Used to connect pump to sampling system or sample tank and via a tee-connect to a manometer/pressure gauge (contains shutoff valve).

PROCEDURE

1. Sample Tank Evacuation and Leak Check. Evacuate the sample tank to 10 mm Hg absolute pressure or less using the vacuum pump and the pumpdown unit (manometer or pressure gauge connected). Then close the pumpdown unit valve, and allow the tank to sit for 60 minutes. The tank is acceptable if no change in tank vacuum is noted. The evacuation and leak check may be conducted either in the laboratory or the field. The results of the leak check should be included in the test report.

2. Sample Train Assembly. Just before assembly, measure the tank vacuum using the pumpdown unit with a mercury U-tube manometer or absolute pressure gauge (shutoff valve closed). Record this vacuum, the ambient temperature, and the barometric pressure at this time. Carefully close the sampling rotameter metering valve and assemble the sampling system as shown in Figure 1 (without the sample tank). With the shutoff valve closed, connect the pumpdown unit with pump and manometer/pressure gauge to sampling system. Immerse the condensate trap body in a beaker full of dry ice.

3. Pretest Leak Check. A pretest leak check is required. Calculate or measure the approximate volume of the sampling train from the probe tip to the sample tank quick-connect connection (do not include the tank volume). After assembling the sampling train, plug the probe tip, and make certain that the trap/purge valve is in the trap position. Turn on the vacuum pump, open the pumpdown unit shutoff valve, and evacuate the sampling system from the probe tip to the sample tank quick-connect connection to an absolute pressure of 10 mm Hg or less. Close the pumpdown unit shutoff valve, turn off the pump, wait a minimum period of 5 minutes, and recheck the indicated vacuum. Calculate the maximum allowable pressure change based on a leak rate of 1 percent of the sampling rate using the following equation:

$$APC = 0.01\ FPt/V \quad ,$$

where APC = allowable pressure change
F = sampling flow rate, cc/min
P = barometric pressure, cm Hg
t = leak check period, min
V = sample train volume, cc .

If the measured pressure change exceeds the calculated limit, correct the problem before beginning sampling. The results of the leak check should be included in the test report.

4. Sample Train Operation. Unplug the probe tip, and place the probe into the stack such that the probe is perpendicular to the duct or stack axis: locate the probe tip at a single preselected point of average velocity facing away from the direction of gas flow. For stacks having a negative static pressure, seal the sample port sufficiently to prevent air in-leakage around the probe. Set the probe temperature controller [#2] to 129 °C (265 °F) and the filter temperature controller [#1] to 121 °C (250 °F). Allow the probe and filter to heat for about 30 minutes before purging the sample train.

Turn the trap/purge valve to the purge position and start the purge vacuum pump. Set the purge flow rate between 60 and 100 cc/min and purge the train with stack gas for at least 10 minutes. When the temperatures at the exit ends of the probe and filter are within their specified range, sampling may begin.

Check the dry ice level around the condensate trap and add dry ice, if necessary. Record the clock time. To begin sampling, connect the sample tank, turn the trap/purge valve to the trap position, and stop the purge pump. Using the flow control valve on the sampling rotameter, set the flow through the sample train to the proper rate. Adjust the flow rate as necessary to maintain a constant rate (±10 percent) throughout the duration of the sampling period. Record the sample tank vacuum and flowmeter setting at 5-minute intervals. Select a total sample time greater or equal to the minimum sampling time specified in the applicable subpart of the regulation: end the sampling when this time period is reached or when a constant flow rate can no longer be maintained because of reduced sample tank vacuum.

Note: If sampling had to be stopped before obtaining the minimum sampling time because a constant flow rate could not be maintained, proceed as follows: After closing the sample tank valve, remove the used sample tank from the sampling train (without disconnecting other portions of the sampling train). Take another evacuated and leak-checked sample tank, measure and record the tank vacuum, and attach the new tank to the sampling train. After the new tank is attached to the sample train, proceed with the sampling until the required minimum sampling time has been exceeded.

5. Sample Recovery. After sampling is completed, set the trap/purge valve to the purge position (or the intermediate off position) and record the final tank vacuum; then record the tank temperature and barometric pressure. Carefully close the flow control valve on the sampling rotameter, and disconnect the sample tank from the sampling system. Disconnect the condensate trap at its Swagelok fittings and tightly cap both ends of the condensate trap. Do not include the probe from the stack to the filter as part of the condensate sample. Keep the trap packed in dry ice until the samples are returned to the laboratory for analysis. Ensure that the test run number is properly identified on the condensate trap and sample tank(s).

APPENDIX M

CALCULATION EQUATIONS

CALCULATION EQUATIONS

METHOD 2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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, ^oF

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

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

$T_s(avg)$ = Absolute average stack temperature, ^oF

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

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.

Y = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

CALCULATION EQUATIONS

METHOD 7

$$V_{m(std)} = 17.64\ (V_f - 25) \left[\frac{P_f}{T_f} - \frac{P_i}{T_i}\right]$$

$$C_s = 6.243 \times 10^{-5} \frac{M}{V_{m(std)}}$$

$$E = \frac{2090\ C_s F}{20.9 - \bar{B}'_{O_2}}$$

$$C_s\ (GR/DSCF) = 7000\ C_s$$

$$C_s\ (MG/DSCM) = 1.60186 \times 10^{7}\ C_s$$

$$C_s\ (ppm\text{-}dry) = 8.37552 \times 10^{6}\ C_s$$

$$C_s\ (ppm\text{-}3\%\ O_2) = 8.37552 \times 10^{6}\ C_s \left\{1 + \left[\frac{\bar{B}'_{O_2} - 3}{20.9 - \bar{B}'_{O_2}}\right]\right\}$$

$$C_s\ (ppm\text{-}wet) = 8.37552 \times 10^{6}\ C_s \quad (1 - \frac{MC}{100})$$

CE6-1

SYMBOLS

$\bar{B}'_{O_2}$	=	Average oxygen content in flue gas, % v/v
C_s	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, LB/DSCF
C_s (GR/DSCF)	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, GR/DSCF
C_s (MG/DSCM)	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, MG/DSCM
E	=	Emission factor, LB/10^6BTU
F	=	F-Factor for given fuel type, DSCF/10^6BTU
M	=	Mass of nitrogen oxides as nitrogen dioxide in gas sample, µg
MC	=	Moisture content of flue gas, %
P_f	=	Final absolute pressure in flask, IN. HG
P_i	=	Initial absolute pressure in flask, IN. HG
C_s (ppm-dry)	=	Concentration of nitrogen oxides in flue gas, dry basis, (v/v), ppm
C_s (ppm-3% O_2)	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to 3% O_2 , (v/v) ppm
C_s (ppm-wet)	=	Concentration of nitrogen oxides in flue gas, wet basis, (v/v), ppm

T_f = Final absolute temperature in flask, ^oR

T_i = Initial absolute temperature in flask, ^oR

V_f = Volume of flask and valve, cc

$V_{m(std)}$ = Sample volume at standard conditions, dry basis, cc

CALCULATION EQUATIONS

METHOD 10

$$CO \cdot PPM \cdot DRY = CO_{CO_2\text{-free,dry,avg}} (1 - CO_{2,d}/100)$$

$$CO \cdot PPM \cdot WET = CO \cdot PPM \cdot DRY (1 - MC/100)$$

$$GR/DSCF = 5.0885 \times 10^{-4} (CO \cdot PPM \cdot DRY)$$

$$mg/dscm = 1.165 (CO \cdot PPM \cdot DRY)$$

$$\dot{m} = 8.5714 \times 10^{-3} (GR/DSCF)(Q_{s,d})$$

$$E = \frac{2.9857 \times 10^{-3} F_d (GR/DSCF)}{20.9 - O_{2,d}}$$

Where

$CO_{CO_2\text{-free,dry,avg}}$ = average of two determinations of carbon monoxide on a dry, CO_2-free integrated flue gas sample reported in ppm by volume

$CO_{2,d}$ = carbon dioxide concentration of flue gas on a dry percent by volume basis

$O_{2,d}$ = oxygen concentration of flue gas on a dry percent by volume basis

MC	=	moisture content of flue gas on a percent by volume basis
CO·PPM·DRY	=	carbon monoxide concentration in ppm by volume on a dry basis
CO·PPM·WET	=	carbon monoxide concentration in ppm by volume on a wet or actual basis
GR/DSCF	=	concentration of carbon monoxide in flue gas on a grains per dry standard cubic foot basis (68 ^{O}F, 29.92 IN.HG.)
mg/dscm	=	concentration of carbon monoxide in flue gas on a milligrams per dry standard cubic meter basis (60 ^{O}F, 29.92 IN.HG.)
$\dot{m}$	=	emission or mass rate of carbon monoxide on a LB/HR basis
$Q_{s,d}$	=	volumetric flow rate of flue gas in dry standard cubic feet per minute
E	=	emission factor of carbon monoxide in pounds of carbon monoxide emitted per million BTU heat input (LB/MMBTU)
F_d	=	F-Factor of respective fuel in dry standard cubic feet of exhaust gas at 0% oxygen per million BTU of heat input (DSCF/MMBTU)

CALCULATION EQUATIONS

Method 25

Concentration of total gaseous nonmethane organics (TGNMO) calculated in ppm, dry as carbon exactly in accordance with th equations presented in Section 6 of EPA Method 25 (45 FR 65[illegible] 10/03/80). See next page.

Supplemental equations used in this work follow:

1. $mg/dsm^3 = 0.498$ (PPM, DRY)

2. GR/DSCF $= 2.175 \times 10^{-4}$ (PPM, DRY)

3. LB/DSCF $= 3.107 \times 10^{-8}$ (PPM, DRY)

4. LB/24-HR = .2057 (GR/DSCF) (DSCFM)

where mg/dsm^3 = milligrams of TGNMO as carbon per dry standard cubic meter

GR/DSCF = grains of TGNMO as carbon per dry standard cubic foot

LB/DSCF = pounds of TGNMO as carbon per dry standard cubic foot

LB/24-HR = pounds of TGNMO as carbon emitted in a 24-HR period

6. Calculations

Note: All equations are written using absolute pressure; absolute pressures are determined by adding the measured barometric pressure to the measured gauge pressure.

6.1 Sample Volume. For each test run, calculate the gas volume sampled:

$$V_s = 0.386\ V \left(\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}}\right)$$

6.2 Noncondensible Organics. For each sample tank, determine the concentration of nonmethane organics (ppm C):

$$C_t = \left[\frac{\frac{P_{tf}}{T_{tf}}}{\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}}}\right] \left[\frac{1}{r} \sum_{j=1}^{r} C_{tm_j} - B_a\right]$$

6.3 Condensible Organics. For each condensate trap determine the concentration of organics (ppm C):

$$C_c = 0.386\ \frac{V_v\ P_f}{V_s\ T_f} \left[\frac{1}{q} \sum_{k=1}^{q} C_{cm_k} - B_t\right]$$

6.4 Total Gaseous Nonmethane Organics (TGNMO). To determine the TGNMO concentration for each test run, use the following equation:

$$C = C_t + C_c$$

6.5 Total Gaseous Nonmethane Organics (TGNMO) Mass Concentration. To determine the TGNMO mass concentration as carbon for each test run, use the following equation:

$$M_C = 0.498\ C$$

6.6 Percent Recovery. To calculate the percent recovery for the liquid injections to the condensate recovery and conditioning system use the following equation:

$$\text{percent recovery} = 1.6\ \frac{M}{L}\ \frac{V_v}{\rho}\ \frac{P_f}{T_f}\ \frac{C_{cm}}{N}$$

6.7 Relative Standard Deviation.

$$RSD = \frac{100}{\bar{X}} \sqrt{\frac{\Sigma\ (x_i - \bar{x})^2}{n - 1}}$$

RTL Method 25 Blanks

Date	Concentration (ppm,C) Noncondensibles	Condensible	(TGNMO)	Avg
3-1989	14	148*	162	
6-1988	8	8	15	
8-1988	19	61	79	
6-1988	- 2	35	35	
4-1988	- 9	23	23	
8-1988	5	38	43	
7-1988	- 0	23	23	
6-1988	1	28	29	
2-1988	89*	3	92	
2-1988	- 5	6	6	28.4
4-1989	9	43	52	29.4

* Outliers

Interpoll Laboratories

Rationale For EPA Method 25 Field Blank Correction

EPA Method 25 has been shown to be a very imprecise method which is also plagued with high background levels of carbon in the sample traps and cylinders. EPA reports average blank concentrations for this method of 50 ppm C. More importantly, however, is the variability of blanks which scatter widely from one set of traps and cylinders to another (job to job).

In some cases, the concentration of the blanks exceeds the concentration of the exposed field samples. However, due to the high analytical costs, the number of field blanks is usually restricted to one per job. As the data base of Method 25 blank results at Interpoll Laboratories grew, it became apparent that the field blank variability was quite unpredictable with wide variation, but amenable to statistical processing.

After a careful review of all of the Method 25 projects and the field blanks associated therewith, it was decided that the best way to blank correct Method 25 field results was to use a statistical method based on the results of the analyses of all of the blank traps and cylinders. This approach, although not rigorously correct from a theoretical standpoint, seems appropriate, since all of the traps and cylinders are from the same laboratory which also performs all of the analyses (RTL).

The approach used, is to compile all of the field blank results separately for the traps and cylinders (since the level of contamination of traps is greater than that of the cylinders). The results are updated each time a job is completed. Each data set is reviewed to identify outliers, and the remaining data points used as the best estimate of the true mean trap blank and the true mean cylinder blank. The two means are then summed to give the best estimate of the true sample blank. This statistically derived blank is then used to correct field samples. For review purposes, it should be noted that the last entries in the included list of trap and field blank results is the field blank for the project in hand.

APPENDIX N

SAMPLING TRAIN CALIBRATION DATA

Date 2-1-89

Bar. Press. 29.55 in. Hg

INTERPOLL LABORATORIES

METER CALIBRATION SHEET

EPA METHOD 5

Control Module No. 9

Serial No. DTM 949230

Wet Test Meter No. AL-20

Technician JBURESH

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	99.87	.04	653.00	654.99	74.4	80	75	5:03.21	1.0082	1.82	
1.2	1.2	3	99.88	.06	647.00	649.98	74.4	80	74	4:54.41	1.0072	1.84	
2.0	2.0	3	99.89	.07	640.00	642.96	74.7	77	74	3:48.21	1.0087	1.84	
3.3	3.3	5	99.90	.085	656.00	660.95	74.1	84	74	5:00.08	1.0098	1.88	
4.7	4.7	5	99.95	.12	661.50	666.46	74.0	87	75	4:14.00	1.0087	1.91	
	2	3	4	5	6	7	8	9	10	11/12	1.0085	1.86	

Meter was in tolerance ☐

Meter was not in tolerance ☒; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Approved by [signature] Date 3-14-89

Gas Meter Bimetallic Thermometer Calibration/Verification*

Inlet ☐ ≥ ± 5°F (Out of control) ☐ Recalibrated / /
☒ ≤ ± 5°F (in control) ☒ No action required

Outlet ☐ ≥ ± 5°F (Out of control) ☐ Recalibrated / /
☒ ≤ ± 5°F (in control) ☒ No action required

* Verified against mercury in glass thermometer or calibrated platinum resistance thermometer.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: March 14, 1989

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

Date of Last Calibration: March 1, 1989
Calibration Technician: J. Buresh
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.)
March 2-6, 1989	9-2734	666.60	1222.41	555.81	555.81
March 14, 1989	9-2739	222.60	379.47	156.87	712.68
March 28-29, 1989	9-2747	382.70	819.20	436.50	1149.18

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: March 28, 1989 — Nozzle Number 4-5
Technician: J. Buresh

Nozzle rotated by 60 degree increments and diameter measured to nearest 0.001 inch. Observed readings and average:

Position	Diameter (inches)
1	0.306
2	0.306
3	0.305
Average:	0.306

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: March 29, 1989
Technician: J. Buresh

Nozzle Number 4-5

Nozzle rotated by 60 degree increments and diameter measured to nearest 0.001 inch. Observed readings and average:

Position	Diameter (inches)
1	0.306
2	0.307
3	0.306
Average:	0.306

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: March 29, 1989 — Nozzle Number 4-6
Technician: J. Buresh

Nozzle rotated by 60 degree increments and diameter measured to nearest 0.001 inch. Observed readings and average:

Position	Diameter (inches)
1	0.375
2	0.375
3	0.376
Average:	0.375

Interpoll Laboratories
(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 8-16

Pitot tube dimensions:

1. External tubing diameter (D_t) 0.316 IN.
2. Base to Side A opening plane (P_A) 0.463 IN.
3. Base to Side B opening plane (P_B) 0.462 IN.

Alignment:

4. $\alpha_1 < 10^o$ 0 Degrees
5. $\alpha_2 < 10^o$ 0 Degrees
6. $B_1 < 5^o$ 1 Degrees
7. $B_2 < 5^o$ 1 Degrees
8. Z <.125" 0.02 IN.
9. W <.0625" 0.02 IN.

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle 0.760 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) 0.762 IN.

Date of Inspection: May 26, 1988

Inspected by: E. Trowbridge

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Interpoll Laboratories
(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 5-16

Pitot tube dimensions:

1. External tubing diameter (D_t) 0.316 IN.
2. Base to Side A opening plane (P_A) 0.458 IN.
3. Base to Side B opening plane (P_B) 0.458 IN.

Alignment:

4. $\alpha_1 < 10^o$ 0 Degrees
5. $\alpha_2 < 10^o$ 0 Degrees

6. $B_1 < 5^o$ 0 Degrees
7. $B_2 < 5^o$ 1 Degree

8. Z <.125" 0.01 IN.
9. W <.0625" 0.01 IN.

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle 0.760 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) 0.762 IN.

Date of Inspection: May 26, 1988

Inspected by: E. Trowbridge

S-348(1)

Date 2-13-89

Bar. Press. 28.60 in. Hg

INTERPOLL LABORATORIES
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 2

Serial No. DTM 949231

Wet Test Meter No. AL-20

Technician JB

ΔH (in. WC)		Gas Volume Wet Test Meter (ft³)	Cal. Index Φ (%)	Diff. Wet Test Meter ΔP_w (in.WC)	Gas Volume Dry test meter (ft³)		Gas temperatures			Time Θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
nominal	actual				V_{di}	V_{df}	Wet Test t_w (°F)	Dry Test t_{di} (°F)	Dry Test t_{do} (°F)				
0.5		2	99.87	.04	916.00	917.975	82	83	79	4:54.49	1.0081	1.82	
1.2		3	99.88	.06	912.50	915.47	81.7	83	79	4:48.71	1.0043	1.86	
2.0		3	99.89	.07	909.00	911.97	82	83	79	3:44.98	1.0018	1.88	
3.3		5	99.90	.085	920.00	924.93	81.5	88	80	4:53.63	1.0091	1.89	
4.7		5	99.95	.12	926.50	931.42	81.3	90	80	405.21	1.0097	1.87	
	2	3	4	5	6	7	8	9	10	11/12			
											1.0066	1.86	

Meter was in tolerance ☑

Meter was not in tolerance ☐; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Approved by [signature] Date 2-14-89

Gas Meter Bimetallic Thermometer Calibration/Verification*

Inlet ☐ ≥ ± 5°F (Out of control) ☐ Recalibrated / /
☑ ≤ ± 5°F (in control) ☑ No action required

Outlet ☐ ≥ ± 5°F (Out of control) ☐ Recalibrated / /
☑ ≤ ± 5°F (in control) ☑ No action required

*Verif[redacted]

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: March 31, 1989

Meter Box No. : 2 (Rockwell Dry Test Meter Serial No. 949231)

Date of Last Calibration: February 13, 1989
Calibration Technician: J. Buresh
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.)
March 30-31, 1989	9-2747	931.60	1106.25	174.65	174.65

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: March 30, 1989
Technician: J. Buresh

Nozzle Number 4-5

Nozzle rotated by 60 degree increments and diameter measured to nearest 0.001 inch. Observed readings and average:

Position	Diameter (inches)
1	0.306
2	0.306
3	0.305
Average:	0.306

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: March 31, 1989 Nozzle Number 4-3
Technician: J. Buresh

Nozzle rotated by 60 degree increments and diameter measured to nearest 0.001 inch. Observed readings and average:

Position	Diameter (inches)
1	0.190
2	0.190
3	0.187
Average:	0.189

Interpoll Laboratories
(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 6-16

Pitot tube dimensions:

1. External tubing diameter (D_t) 0.316 IN.
2. Base to Side A opening plane (P_A) 0.464 IN.
3. Base to Side B opening plane (P_B) 0.462 IN.

Alignment:

4. $\alpha_1 < 10^o$ 0 Degrees
5. $\alpha_2 < 10^o$ 0 Degrees
6. $B_1 < 5^o$ 1 Degrees
7. $B_2 < 5^o$ 1 Degrees
8. Z <.125" 0.02 IN.
9. W <.0625" 0.01 IN.

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle 0.762 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) 0.762 IN.

Date of Inspection: May 26, 1988

Inspected by: E. Trowbridge

S-348(1)

INTERPOLL LABORATORIES

TEMPERATURE MEASUREMENT DEVICE CALIBRATION SHEET

Date 12-5-88

Technician JBURGIN

Unit under test (type and number): RDT-3

Unit Under Test Calibrated Against:

- ☑ ASTM mercury in glass thermometer
- ☑ Type K thermocouple/L + N potentiometer
- ☐ Stirred ice bath
- ☐ Other

Desired Temperature (°F)	Standard Device Actual Reading (°F)	Unit Under Test Reading (°F)	Deviation* (%)
32 (ice bath)	32	32.1	.3%
70	70.0	70.2	.29%
120	120	120.1	.08 %
200	200	202	1%
300	300	301	.33%
400	400	399	.25%
500	500	498	.40%
800	800	801	.125%

Temperature correlation between standard device and unit under test was obtained by using a thermostalled and insulated aluminum block designed to provide uniform temperature. The temperature measurement devices were then inserted into two adjacent wells in the block. The temperature was programmed upward by a variable voltage control unit.

*Note - unit under test must agree within 1.5% of the standard device.

- ☑ Unit in tolerance
- ☐ Unit was not in tolerance; recalibrated

Source category:	Taconite ore processing	Date:	10/24/96
Plant name :	USS Minnesota	Location:	Mountain Iron, MN
Test date :	March 28-31, 1989	Ref. No.:	27
Process :		Basis for process rate :	production

Source	Type of control	Pollutant	Run No.	Emission rate, lb/hr	Process rate, ton/hr	Emission factor kg/Mg	Emission factor lb/ton	Volumetric flow rate, DSCFM	Concen %
No. 6 Induration furnace (coal and petroleum coke fired) grate/kiln	Wet scrubber	filt. PM	1	59.12	393.00	0.075	0.15		
		filt. PM	2	52.93	393.00	0.067	0.13		
		filt. PM	3	69.71	393.75	0.089	0.18		
		AVERAGE				0.077	0.15	RATING:	
		VOC	1	7.30	393.00	0.0093	0.019		
		VOC	2	4.00	393.00	0.0051	0.010		
		VOC	3	85.00	393.75	0.11	0.22		
		AVERAGE				0.041	0.082	RATING:	
		CO	1	37.00	393.00	0.047	0.094		
		CO	2	45.00	393.00	0.057	0.11		
		CO	3	38.00	393.75	0.048	0.097		
		AVERAGE				0.051	0.10	RATING:	
		CO2	1	74106	393.00	94	189	315,683	3.42
		CO2	2	80742	393.00	103	205	322,276	3.65
		CO2	3	73741	393.75	94	187	326,539	3.29
		AVERAGE				97	194	RATING:	
No. 6 Pellet cooler		filt. PM	1	83.38	396.75	0.11	0.21		
		filt. PM	2	77.31	405.00	0.095	0.19		
		filt. PM	3	95.91	405.75	0.12	0.24		
		AVERAGE				0.11	0.21	RATING:	
		CO2	1	3439	396.75	4.3	8.7	83,513	0.60
		CO2	2	4202	405.00	5.2	10.4	86,217	0.71
		CO2	3	2716	405.75	3.3	6.7	87,924	0.45
		AVERAGE				4.3	8.6	RATING:	

Source category:	Taconite ore processing	Date:	10/24/96
Plant name :	USS Minnesota	Location:	Mountain Iron, MN
Test date :	March 28-31, 1989	Ref. No.:	27
Process :		Basis for process rate :	production

Source	Type of control	Pollutant	Run No.	Emission rate, lb/hr	Process rate, ton/hr	Emission factor kg/Mg	Emission factor lb/ton	Volumetric flow rate, DSCFM	Concen %
No. 7 Induration furnace (natural gas fired) grate/kiln	Wet scrubber	filt. PM	1	40.94	420.00	0.049	0.097		
		filt. PM	2	43.42	341.25	0.064	0.13		
		filt. PM	3	64.05	343.50	0.093	0.19		
		AVERAGE				0.069	0.14	RATING:	
		NOx	1	635.39	420.00	0.76	1.5		2.40
		NOx	2	650.34	318.00	1.0	2.0		2.40
		NOx	3	527.49	341.25	0.77	1.5		2.40
		NOx	4	470.14	343.50	0.68	1.4		2.40
		Average for Run No. 1				0.81	1.6		
		NOx	5	453.66	420.00	0.54	1.1		2.40
		NOx	6	455.66	318.00	0.72	1.4		2.40
		NOx	7	494.27	341.25	0.72	1.4		2.40
		NOx	8	443.48	343.50	0.65	1.3		2.40
		Average for Run No. 2				0.66	1.3		
		NOx	9	426.10	420.00	0.51	1.0		2.40
		NOx	10	423.59	318.00	0.67	1.3		2.40
		NOx	11	448.24	341.25	0.66	1.3		2.40
		NOx	12	413.06	343.50	0.60	1.2		2.40
		Average for Run No. 3				0.61	1.2		
		OVERALL AVERAGE				0.69	1.4	RATING:	
		CO2	1	51213	420.00	61	122	310,879	2.40
		CO2	2	58625	341.25	86	172	302,871	2.82
		CO2	3	57367	343.50	84	167	278,589	3.00
		AVERAGE				77	154	RATING:	
Primary crusher	Fabric filter	filt. PM	1	4.85	1659	0.0015	0.0029		
		filt. PM	2	3.20	2251	0.00071	0.0014		
		filt. PM	3	2.42	1700	0.00071	0.0014		
		AVERAGE				0.0010	0.0019	RATING:	
Turn bin conveyor	Wet scrubber	filt. PM	1	1.60	4305	0.00019	0.00037		
		filt. PM	2	1.30	4305	0.00015	0.00030		
		filt. PM	3	1.06	4305	0.00012	0.00025		
		AVERAGE				0.00015	0.00031	RATING:	

Notes: Furnace production rates estimated as 75% of feed rates, based on information provided by MPCA (Reference 53)