

**A Graphics Monitoring and Reporting System For
Existing C.E.M.'s**

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A Graphics Monitoring and Reporting
System for Existing CEM's

Abstract

With the new "Clean Air" act now requiring utilities to provide much greater detail in environmental reporting, many utilities with existing Continuous Emissions Monitors (CEM's) are finding their systems do not have the capabilities to generate these reports. The only way to produce these reports is by manually compiling data to meet these new requirements. This process is man hour intensive and with new regulations requiring this data in a timely manner it is easy to fall short on reports submitted.

At Texas Municipal Power Agency the problem was addressed by creating a computer program that runs on a standard PC. In order to not disturb the permitted CEM the exact print file that drives the CEM printer is paralleled off the line and feeds the PC. The PC therefore receives the exact information the CEM reports. The program in the PC does all of the data compiling, averaging, and archiving. All data is available on graphic screens either in real time mode or history trends. All reports can be compiled and printed in seconds.

With this system TMPA can now easily meet new regulations for reporting. This paper details the basic system construction. Operational experience is then addressed for the several months the system has been on line.

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"STAK"
System Introduction

The "STAK" system was designed to meet an immediate need to provide detailed CEM reporting to state and federal agencies to meet the new "Clean Air Act" regulations. STAK is intended as an add on device to existing CEM's. This met short term goals of developing a system for the least cost rather than a complete CEM replacement that is very costly (\$200,000 - \$300,000).

STAK is an interim system. In other words the system allows existing CEM's to meet new reporting standards that are now required before future CEM requirement (Year 2000) are implemented.

This is done by simply accessing the ASCII print file that feeds our permitted printer and feeding that data to a PC. The permitted CEM is not disturbed in any way. The same data file that feeds the permitted printer is sent via short haul modem to a PC in the Operations Department. The data is received, compiled, averaged and archived on a special data base that is used by the graphic display system.

The result is a system that can easily access any data in either text or graphic trend formats. Data can be displayed in either current real time or historical formats. Reports in any variety of tabulations is available on screens or printed hard copies.

Hardware Requirements

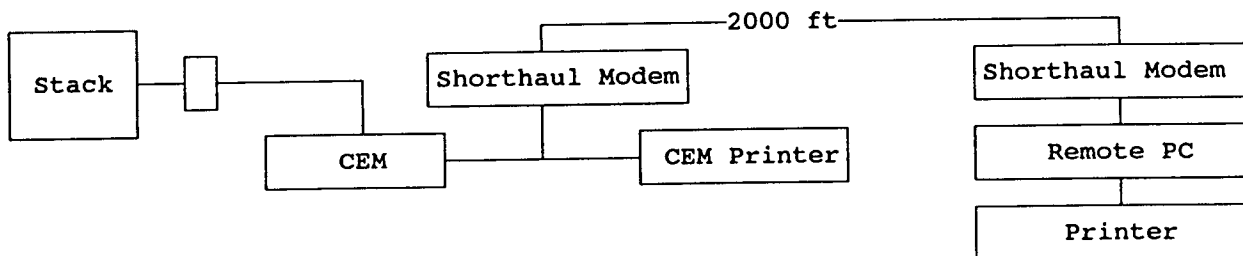
Minimum hardware requirements are listed below. Upgrades to the PC for faster processors will enhance the system speed, especially in graphic displays.

- Personal Computer
- 386 Processor
- 25 MZ
- 387 Coprocessor
- VGA Color Monitor
- 40 Mbyte Hard disc
- 3 1/2" High density floppy drive
- 4 Mbyte RAM
- Printer capable of Graphics
- 1 Comm and 1 Parallel Port

Although these would be considered minimum requirements it is recommended that upgrades in processor, memory and hard disc be considered for future growth.

System Configuration

The system configuration is very simple. The print file sent to the permitted printer is paralleled to the PC via an RS-232 serial COMM port.



The wiring from the CEM was paralleled to the short haul modem. If a parallel port printer is used then a parallel to serial converter would be required before connection to the short haul modem.

MULTI-TASKING

The data from the CEM in an ASCII print file format is sent once an hour to the CEM printer. The same data is sent across the modem line to the PC. This presents a problem at the PC. The PC must be watching the COMM port at all times and be ready to accept data. But the PC also may be displaying graphics or generating reports. Thus, there are two processes going on at the same time. This introduces the need to Multitask. There are several products available to multitask under DOS. Windows and DesqView are examples. Our application uses DesqView due to a need for a hidden process and also for good memory management (QEMM-386). With this system installed one task is running in the background communicating with the CEM. This "background" task is not visible to the user. The other task is the graphic user interface for data displays and reports. Both tasks are going on at the same time.

Communications

The background task is the communication link to the CEM. This is a program written in "C" that is constantly looking at the open COMM port. When data is received, it is cleaned of unwanted characters and sent to the data base on the hard drive. The program also monitors the daily and monthly end points to perform averaging routines at the end of each period.

Since this program runs hidden to the user, a "beep" every 60 seconds is produced to let the user know the program is running and everything is ok.

Data Manipulation

Data is manipulated in a variety of ways. First, as described before, the communication program writes raw data to the data base every hour. Data is averaged everyday, month, quarter and year at the end of each period automatically.

If there are problems with the CEM and false data is sent, the display system provides an edit feature to modify any raw data. If raw data is changed, the averaging programs can be run manually within the display system to reaverage the new changes.

Every data point includes an alarm flag attached to it and is stored with the data. Alarm points are defined in the communication program and the alarms are assigned to the data before it is sent to the data base. Alarms are either an "exceedance" alarm or an "out of service" alarm.

Every data point includes a 15 character exceedance code stored in the data base. These codes are 15 character messages that describe the reason for the exceedance. The user each day must assign these codes to the exceedances for data base storage. Our system has 14 predefined exceedance codes that are assigned by merely selecting the code number. A 15th exceedance code is for "other" and allows the user to type any message desired.

Thus the data base includes raw data, alarm flags, exceedance codes and averaged values. Our system stores 6 minute opacity and three hour SO₂ and NO_x values along with date and time stamps. The data base is split into 12 files, one for each month. Each month file is about 286 Kbytes large. The system can access any of the 12 files. This means that STAK can access an hour of data defined for any hour out of the entire year.

The Display System

The display system uses a graphical user interface program that was purchased from Expert-EASE Systems. This system is designed to access data, either real time or historical, and display it on high resolution graphic background screens. The data can be numerical or plotted in trend curves. The system is very versatile and allows almost any combination of displays. There is also a print driver for graphic hard copies of any screen.

Reports

Several standard reports are selected within the display system. When a report is selected a "C" program is shelled to the system that asks for time periods and then compiles and prints the report. The reports are first displayed on the screen. The user then has the option to direct the output to a printer for hard copy. Examples of our reports are:

- Hour
- Day
- Week
- Month
- Quarter
- Year
- Exceedance Summary - Week
- Detailed Exceedances - Week

Operational Experience

After implementing the program in October of 1991, several problems immediately occurred. We attempted to utilize a computer that was not totally dedicated to environmental reporting. One of the major problems that occurred was that when an operator "rebooted" the computer, collection of all environmental data stopped. This was corrected by hiding the multi-tasking system and running the "STAK" program in the background. We also added a 60 second audible beep which gives notification that the background is on line.

These two changes allowed the system to be more reliable and an accuracy study was performed for a period of two months. This was accomplished by manually comparing the permitted printout with the "STAK" data. Our findings were that there was no deviation between the permitted printout and the "STAK" program.

We have added additional functions to the program to streamline its reporting capabilities. The original program only gave us a summary daily report, this was changed to include an hourly detail report also which is used to review an emissions on an hour by hour basis. Added also was an auto restart for the program in the event that the computer is taken down or "rebooted" for any reason.

The "error code entry" was expanded to the "daily report" to facilitate code entry capabilities and combine three reports into one.

After the initial start-up "bugs" were worked out, the system has been a tremendous asset to the Operations Department at Texas Municipal Power Agency. This system has given us the ability to review and track real time data on the current reporting parameters thereby giving us the ability to produce any required or requested environmental reports in a timely manner.

EXAMPLE REPORTS

3 CHANNEL SYSTEM

TMPA
 EMISSION MEASUREMENT SUMMARY
 GIBBONS CREEK STATION UNIT #1

Monthly Report
 Reporting Period
 Month 4
 Year 1992

Day	Opacity		SO2		-NOX	
	Value	No.Exclds	Value	No.Exclds	Value	No.Exclds
1	0.0	0	0.000	0	0.000	0
2	1.7	0	1.135	0	0.523	0
3	3.4	0	1.128	0	0.496	0
4	3.4	0	1.143	0	0.482	0
5	1.8	0	1.130	0	0.517	0
6	1.4	0	1.126	0	0.477	0
7	0.9	0	1.142	0	0.464	0
8	0.9	0	0.855	0	0.445	0
9	0.7	0	0.843	0	0.482	0
10	1.9	3	0.808	0	0.475	0
11	1.3	0	0.941	0	0.450	0
12	0.9	0	0.979	0	0.432	0
13	1.8	0	1.125	0	0.450	0
14	0.0	0	0.000	0	0.000	0
15	1.1	0	1.151	0	0.369	0
16	2.0	1	1.153	0	0.358	0
17	1.7	0	1.173	5	0.353	0
18	1.2	0	1.147	0	0.401	0
19	1.5	0	1.124	1	0.358	0
20	2.2	0	1.110	0	0.354	0
21	2.7	0	1.126	0	0.342	0
22	1.7	0	1.135	0	0.399	0
23	2.3	0	1.138	0	0.391	0
24	8.3	30	0.932	2	0.432	2
25	10.4	14	0.000	0	0.000	0
26	3.1	8	1.106	0	0.533	6
27	1.5	0	0.667	0	0.423	0
28	0.7	0	0.433	0	0.453	0
29	1.5	0	1.139	0	0.302	0
30	1.1	0	1.013	2	0.364	0
Month	2.1	56	0.930	10	0.384	8

TMPA
 EMISSION MEASUREMENT SUMMARY
 GIBBONS CREEK STATION UNIT #1

Monthly Report
 Reporting Period
 Month 5
 Year 1992

Day	Opacity		SO2		NOX	
	Value	No.Exclds	Value	No.Exclds	Value	No.Exclds
1	1.6	0	1.061	3	0.489	0
2	0.6	0	0.855	0	0.463	0
3	0.5	0	0.773	0	0.358	0
4	0.2	0	1.072	0	0.352	0
5	0.9	0	1.117	0	0.344	0
6	6.2	0	1.150	0	0.388	0
7	9.5	0	1.157	0	0.432	0
8	10.2	3	1.168	0	0.453	0
9	7.8	1	0.968	0	0.470	0
10	8.2	0	1.098	0	0.447	0
11	8.6	0	1.116	0	0.425	0
12	7.7	0	1.113	4	0.424	0
13	10.4	0	1.148	0	0.438	1
14	7.7	0	1.160	0	0.421	0
15	5.7	0	1.157	0	0.393	0
16	6.3	1	1.133	0	0.427	0
17	5.5	0	1.157	0	0.417	0
18	4.6	0	1.151	0	0.462	0
19	5.6	0	1.146	0	0.379	0
20	5.2	0	1.112	1	0.376	0
21	3.4	0	1.137	0	0.363	0
22	2.3	0	1.029	0	0.417	0
23	3.0	1	1.133	3	0.390	0
24	4.2	0	0.709	0	0.414	0
25	2.7	0	0.591	0	0.405	0
26	6.5	1	0.839	0	0.441	0
27	7.6	0	1.155	0	0.494	0
28	6.9	0	1.165	0	0.427	0
29	3.1	0	1.130	0	0.421	0
30	0.0	0	0.000	0	0.000	0
31	0.0	0	0.000	0	0.000	0
Month	4.9	7	0.990	11	0.391	1

TMPA
 EMISSION MEASUREMENT SUMMARY
 GIBBONS CREEK STATION UNIT #1

Quarter Report
 Reporting Period

Quarter 2
 Year 1992

Month	4			5			6		
Day	Opac	Nox	So2	Opac	Nox	So2	Opac	Nox	So2
1	0.0	0.00	0.00	1.6	0.49	1.06	18.3	0.55	1.18
2	1.7	0.52	1.14	0.6	0.46	0.86	18.3	0.55	1.18
3	3.4	0.50	1.13	0.5	0.36	0.77	18.3	0.55	1.18
4	3.4	0.48	1.14	0.2	0.35	1.07	18.3	0.55	1.18
5	1.8	0.52	1.13	0.9	0.34	1.12	18.3	0.55	1.18
6	1.4	0.48	1.13	6.2	0.39	1.15	18.3	0.54	1.11
7	0.9	0.46	1.14	9.5	0.43	1.16	18.3	0.55	1.18
8	0.9	0.44	0.85	10.2	0.45	1.17	18.3	0.55	1.18
9	0.7	0.48	0.84	7.8	0.47	0.97	18.3	0.55	1.18
10	1.9	0.47	0.81	8.2	0.45	1.10	18.3	0.55	1.18
11	1.3	0.45	0.94	8.6	0.42	1.12	18.3	0.55	1.18
12	0.9	0.43	0.98	7.7	0.42	1.11	18.3	0.55	1.18
13	1.8	0.45	1.12	10.4	0.44	1.15	18.3	0.55	1.18
14	0.0	0.00	0.00	7.7	0.42	1.16	18.3	0.55	1.18
15	1.1	0.37	1.15	5.7	0.39	1.16	18.3	0.55	1.18
16	2.0	0.36	1.15	6.3	0.43	1.13	18.3	0.55	1.18
17	1.7	0.35	1.17	5.5	0.42	1.16	18.3	0.55	1.18
18	1.2	0.40	1.15	4.6	0.46	1.15	18.3	0.55	1.18
19	1.5	0.36	1.12	5.6	0.38	1.15	18.3	0.55	1.18
20	2.2	0.35	1.11	5.2	0.38	1.11	18.3	0.55	1.18
21	2.7	0.34	1.13	3.4	0.36	1.14	18.3	0.55	1.18
22	1.7	0.40	1.13	2.3	0.42	1.03	18.3	0.55	1.18
23	2.3	0.39	1.14	3.0	0.39	1.13	18.3	0.55	1.18
24	8.3	0.43	0.93	4.2	0.41	0.71	18.3	0.55	1.18
25	10.4	0.00	0.00	2.7	0.40	0.59	18.3	0.55	1.18
26	3.1	0.53	1.11	6.5	0.44	0.84	18.3	0.55	1.18
27	1.5	0.42	0.67	7.6	0.49	1.15	18.3	0.55	1.18
28	0.7	0.45	0.43	6.9	0.43	1.16	18.3	0.55	1.18
29	1.5	0.30	1.14	3.1	0.42	1.13	18.3	0.55	1.18
30	1.1	0.36	1.01	0.0	0.00	0.00	18.3	0.55	1.18
31	0.0	0.00	0.00	0.0	0.00	0.00	18.3	0.55	1.18
Mth	2.1	0.38	0.93	4.9	0.39	0.99	18.3	0.55	1.18

Qtr Opac 8.4 Percent
 Nox 0.44 lb/mmBtu
 So2 1.03 lb/mmBtu

TMPA
EMMISSION MEASUREMENT SUMMARY
GIBBONS CREEK STATION UNIT #1

Hourly Report
Reporting Period
Year 1992
Month 5
Day 8

Hour 6

Opacity 6 Minute avgs for hour (Percent):
12.70 11.80 13.70 13.30 15.20 15.50 14.40 15.60 17.30 15.10
Opacity Hourly Avg (Percent) 14.46
NOx 3-Hour avg (Lb/MMBtu) 0.410
SO2 3-Hour avg (Lb/MMBtu) 1.170

Hour 7

Opacity 6 Minute avgs for hour (Percent):
12.90 12.30 12.40 12.60 11.50 11.10 9.00 10.40 9.20 9.00
Opacity Hourly Avg (Percent) 11.04
NOx 3-Hour avg (Lb/MMBtu) 0.410
SO2 3-Hour avg (Lb/MMBtu) 1.160

Hour 8

Opacity 6 Minute avgs for hour (Percent):
8.80 5.30 5.30 6.50 6.10 6.20 6.50 5.80 7.10 7.70
Opacity Hourly Avg (Percent) 6.53
NOx 3-Hour avg (Lb/MMBtu) 0.450
SO2 3-Hour avg (Lb/MMBtu) 1.160

Hour 9

Opacity 6 Minute avgs for hour (Percent):
8.10 8.40 9.00 8.50 7.80 8.00 8.00 8.30 8.30 8.20
Opacity Hourly Avg (Percent) 8.26
NOx 3-Hour avg (Lb/MMBtu) 0.450
SO2 3-Hour avg (Lb/MMBtu) 1.160

WEEKLY ENVIRONMENTAL EMISSIONS EXCEEDANCE SUMMARY
 TEXAS MUNICIPAL POWER AGENCY
 GIBBONS CREEK STATION UNIT #1

Week of 1
 Month 5
 Year 1992

	No. of Exceedances		Hours of Exceedances	
	Week	Year	Week	Year
Opacity	0	524	0:00	52:24
SO2	3	104	3:00	104:00
NOX	0	125	0:00	125:00

Hours out of Service

	Week	Year
Opacity	0:00	0:00
SO2	0:00	77:00
NOX	0:00	77:00

EXAMPLE REPORTS

16 CHANNEL SYSTEM

EMISSION MEASUREMENT SUMMARY
Single Hour Report

Reporting Period
Date 01/01/92
Hour 1

CHAN #	Station Name		SAMPLE			Station ID 1		
	01	02	03	04	05	06	07	08
CHAN	OPAC	SO2PPM	SO2#MM	FLOW	MOIST	SO2#	NOXPPM	02
UNITS	%	PPM	#/MMBT	KSCFH	%	#/HR	PPM	%
FSC1	100.00	1000.00	4.00	5000.00	100.00	10000.00	1000.00	100.00
ZERO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hour	01	6-Minute Avg		Data	Type			
00:06	-20.22	436.95	1.18	4721.72	16.48	-4203.24	-153.11	3.87
00:12	15.92	365.34	0.83	4292.04	13.61	3809.37	118.02	3.15
00:18	16.00	366.63	0.83	4299.76	13.67	3816.45	118.65	3.17
00:24	19.90	431.65	1.16	4689.92	16.27	4174.09	-150.51	3.82
00:30	16.63	377.14	0.89	4362.84	14.09	3874.27	123.80	3.27
00:36	13.99	333.13	0.67	4098.80	12.33	3632.23	102.24	2.83
00:42	15.89	364.83	0.82	4288.96	13.59	3806.55	117.77	3.15
00:48	13.97	332.87	0.66	4097.20	12.31	3630.77	102.10	2.83
00:54	-21.90	-465.00	-1.33	4890.00	17.60	-4357.50	-166.85	-4.15
00:60	18.18	402.96	1.01	4517.76	15.12	4016.28	136.45	3.53
HrAvg	17.13	385.45	0.93	4412.68	14.42	3919.96	127.87	3.35

CHAN #	09	10	11	12	13	14	15	16
CHAN	NOX#MM	CO2	TEMP	LOAD	SO2IN	A-SO2	B-SO2	C-SO2
UNITS	#/MMBT	#/HR	DEG F	MWG	PPM	PPM	PPM	PPM
FSC1	1.00	5000.00	500.00	500.00	5000.00	1000.00	1000.00	1000.00
ZERO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hour	01	6-Minute Avg		Data	Type			
00:06	-0.70	2092.38	191.09	425.87	-2629.34	336.95	-360.11	313.80
00:12	0.41	1913.35	169.60	375.74	2378.69	265.34	292.07	238.61
00:18	0.42	1916.57	169.99	376.64	2383.19	266.63	293.30	239.96
00:24	-0.68	2079.13	189.50	422.16	-2610.79	331.65	-355.07	308.24
00:30	0.46	1942.85	173.14	384.00	2419.99	277.14	303.28	251.00
00:36	0.28	1832.83	159.94	353.19	2265.97	233.13	261.48	204.79
00:42	0.41	1912.07	169.45	375.38	2376.89	264.83	291.59	238.07
00:48	0.28	1832.17	159.86	353.01	2265.03	232.87	261.22	204.51
00:54	-0.81	2162.50	199.50	445.50	-2727.50	-365.00	-386.75	343.25
00:60	0.56	2007.40	180.89	402.07	-2510.36	302.96	327.81	278.11
HrAvg	0.49	1963.62	175.63	389.81	2449.06	285.45	311.17	259.72

<-> in front of value indicates exceedance

EMISSION MEASUREMENT SUMMARY
Daily Report
Page 1

Reporting Period
Date 01/01/92

CHAN #	Station Name	SAMPLE		Station ID 1					
CHAN	01	02	03	04	05	06	07	08	
UNITS	OPAC	SO2PPM	SO2#MM	FLOW	MOIST	SO2#	NOXPPM	02	
	%	PPM	#/MMBT	KSCFH	%	#/HR	PPM	%	
FSCL	100.00	1000.00	4.00	5000.00	100.00	10000.00	1000.00	100.00	100.00
ZERO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hour Averages

01:00	17.13	385.45	0.93	4412.68	14.42	3919.96	127.87	3.35
02:00	20.10	434.95	1.17	4709.72	16.40	4192.24	152.13	3.85
03:00	17.65	394.17	0.97	4465.00	14.77	3967.92	132.14	3.44
04:00	20.17	436.11	1.18	4716.68	16.44	4198.62	152.70	3.86
05:00	19.52	425.28	1.13	4651.68	16.01	4139.04	147.39	3.75
06:00	19.18	419.71	1.10	4618.24	15.79	4108.39	144.66	3.70
07:00	14.87	347.81	0.74	4186.88	12.91	3712.97	109.43	2.98
08:00	18.52	408.62	1.04	4551.72	15.34	4047.41	139.22	3.59
09:00	18.46	407.67	1.04	4546.00	15.31	4042.17	138.76	3.58
10:00	21.23	453.76	1.27	4822.56	17.15	4295.68	161.34	4.04
11:00	15.46	357.61	0.79	4245.64	13.30	3766.84	114.23	3.08
12:00	21.83	463.89	1.32	4883.32	17.56	4351.38	166.30	4.14
13:00	21.29	454.84	1.27	4829.04	17.19	4301.62	161.87	4.05
14:00	13.87	331.17	0.66	4087.04	12.25	3621.45	101.27	2.81
15:00	18.89	414.89	1.07	4589.32	15.60	4081.88	142.29	3.65
16:00	20.58	442.97	1.21	4757.84	16.72	4236.35	156.06	3.93
17:00	18.49	408.24	1.04	4549.44	15.33	4045.32	139.04	3.58
18:00	16.88	381.27	0.91	4387.60	14.25	3896.97	125.82	3.31
19:00	20.68	444.65	1.22	4767.92	16.79	4245.59	156.88	3.95
20:00	18.63	410.52	1.05	4563.12	15.42	4057.86	140.15	3.61
21:00	19.84	430.63	1.15	4683.76	16.23	4168.45	150.01	3.81
22:00	17.14	385.61	0.93	4413.64	14.42	3920.84	127.95	3.36
23:00	21.12	452.03	1.26	4812.16	17.08	4286.15	160.49	4.02
24:00	14.34	339.07	0.70	4134.40	12.56	3664.87	105.14	2.89
DyAvg	14.34	339.07	0.70	4134.40	12.56	3664.87	105.14	2.89

EMISSION MEASUREMENT SUMMARY
Daily Report
Page 2

Reporting Period
Date 01/01/92

CHAN #	09	10	11	12	13	14	15	16
CHAN	NOX#MM	CO2	TEMP	LOAD	SO2IN	A-SO2	B-SO2	C-SO2
UNITS	#/MMBT	#/HR	DEG F	MWG	PPM	PPM	PPM	PPM
FSC1	1.00	5000.00	500.00	500.00	5000.00	1000.00	1000.00	1000.00
ZERO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hour Averages

01:00	0.49	1963.62	175.63	389.81	2449.06	285.45	311.17	259.72
02:00	0.69	2087.38	190.49	424.47	2622.34	334.95	358.21	311.70
03:00	0.53	1985.42	178.25	395.92	2479.58	294.17	319.46	268.88
04:00	0.69	2090.28	190.83	425.28	2626.40	336.11	359.31	312.92
05:00	0.65	2063.20	187.58	417.70	2588.48	325.28	349.02	301.54
06:00	0.63	2049.27	185.91	413.79	2568.97	319.71	343.72	295.69
07:00	0.34	1869.53	164.34	363.47	2317.35	247.81	275.42	220.20
08:00	0.58	2021.55	182.59	406.03	2530.17	308.62	333.19	284.05
09:00	0.58	2019.17	182.30	405.37	2526.83	307.67	332.28	283.05
10:00	0.77	2134.40	196.13	437.63	2688.16	353.76	376.07	331.45
11:00	0.38	1894.02	167.28	370.32	2351.62	257.61	284.73	230.49
12:00	0.81	2159.72	199.17	444.72	2723.60	363.89	385.69	342.08
13:00	0.77	2137.10	196.45	438.39	2691.94	354.84	377.10	332.58
14:00	0.27	1827.93	159.35	351.82	2259.11	231.17	259.61	202.73
15:00	0.61	2037.22	184.47	410.42	2552.10	314.89	339.14	290.63
16:00	0.72	2107.43	192.89	430.08	2650.41	342.97	365.82	320.12
17:00	0.58	2020.60	182.47	405.77	2528.84	308.24	332.83	283.65
18:00	0.48	1953.17	174.38	386.89	2434.43	281.27	307.20	255.33
19:00	0.73	2111.63	193.40	431.26	2656.29	344.65	367.42	321.89
20:00	0.59	2026.30	183.16	407.36	2536.82	310.52	334.99	286.05
21:00	0.67	2076.57	189.19	421.44	2607.19	330.63	354.10	307.16
22:00	0.49	1964.02	175.68	389.92	2449.62	285.61	311.33	259.89
23:00	0.76	2130.07	195.61	436.42	2682.09	352.03	374.43	329.63
24:00	0.31	1847.67	161.72	357.35	2286.73	239.07	267.11	211.02
DyAvg	0.38	1894.92	167.39	370.58	2352.88	257.97	285.07	230.87

EMISSION EXCEEDANCE SUMMARY
Daily Report

Reporting Period
Date 01/01/92

Station Name	SAMPLE			Station ID 1				
CHAN #	01	02	03	04	05	06	07	08
CHAN	OPAC	SO2PPM	SO2#MM	FLOW	MOIST	SO2#	NOXPPM	O2
UNITS	%	PPM	#/MMBT	KSCFH	%	#/HR	PPM	%
FSCL	100.00	1000.00	4.00	5000.00	100.00	10000.00	1000.00	100.00
ZERO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Number of Exceedances

Data Type	01	02	03	04	05	06	07	08
Min	480	480	480	0	0	480	540	420
6Min	80	80	80	0	0	80	90	70
15Min	0	0	0	0	0	0	0	0
1Hr	8	6	6	0	0	6	9	4
3Hr	8	6	6	0	0	7	8	3

Minutes in Calibrate

Mins	0	0	0	0	0	0	0	0
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Minutes Out of Service

Mins	0	0	0	0	0	0	0	0
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Station Name	09	10	11	12	13	14	15	16
CHAN	NOX#MM	CO2	TEMP	LOAD	SO2IN	A-SO2	B-SO2	C-SO2
UNITS	#/MMBT	#/HR	DEG F	MWG	PPM	PPM	PPM	PPM
FSCL	1.00	5000.00	500.00	500.00	5000.00	1000.00	1000.00	1000.00
ZERO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Number of Exceedances

Data Type	09	10	11	12	13	14	15	16
Min	720	0	0	0	900	420	540	0
6Min	120	0	0	0	150	70	90	0
15Min	0	0	0	0	0	0	0	0
1Hr	12	0	0	0	16	4	9	0
3Hr	9	0	0	0	11	3	8	0

Minutes in Calibrate

Mins	0	0	0	0	0	0	0	0
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Minutes Out of Service

Mins	0	0	0	0	0	0	0	0
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DAILY SO2 EMISSIONS AND FLOW RECORD

Daily Monitor Operation Data								
Date	Prct Avail	SO2 Monitor			Prct Avail	Flow Monitor		
		Cal Error Low	Cal Error High	Tot Hrs O of C		Cal Error Low	Cal Error High	Tot Hrs O of C
01/01/92	94.50	-0.50	-0.70	-1.00	94.50	-0.50	-0.70	-1.00

Hourly Unit Operation and Emission Data

Hour	Unit Oper Hours	Total Heat In mmbtu	Average So2 ppm	Average lb/mmbtu	Method	Average Flow scfh	Average Moist Percent	Method	Calc'd SO2 lbs
01	1.00	4370	385	0.93	1	4392	14.4	1	3920
02	1.00	4391	435	1.17	1	4710	16.4	1	4192
03	1.00	4383	394	0.97	1	4465	14.8	1	3968
04	1.00	4379	436	1.18	1	4717	16.4	1	4199
05	1.00	4374	425	1.13	1	4652	16.0	1	4139
06	1.00	4382	420	1.10	2	4618	15.8	1	4108
07	1.00	4375	348	0.74	1	4187	12.9	1	3713
08	1.00	4379	409	1.04	1	4552	15.3	1	4047
09	1.00	4392	408	1.04	1	4546	15.3	1	4042
10	1.00	4382	454	1.27	2	4823	17.2	1	4296
11	1.00	4387	358	0.79	2	4246	13.3	1	3767
12	1.00	4366	464	1.32	1	4883	17.6	1	4351
13	1.00	4387	455	1.27	1	4829	17.2	1	4302
14	1.00	4375	331	0.66	1	4087	12.2	1	3621
15	1.00	4377	415	1.07	1	4589	15.6	1	4082
16	1.00	4388	443	1.21	1	4758	16.7	1	4236
17	1.00	4388	408	1.04	1	4549	15.3	1	4045
18	1.00	4390	381	0.91	1	4388	14.3	1	3897
19	1.00	4366	445	1.22	2	4768	16.8	1	4246
20	1.00	4368	411	1.05	1	4563	15.4	1	4058
21	1.00	4377	431	1.15	1	4684	16.2	1	4168
22	1.00	4372	386	0.93	1	4414	14.4	1	3921
23	1.00	4389	452	1.26	1	4812	17.1	1	4286
24	1.00	4381	339	0.70	1	4134	12.6	1	3665
DyAvg		4380	358	0.79		4248	13.3		3769
Total	24.00	105118							97270

DAILY NOX AND CO2 EMISSIONS RECORD

Daily Monitor Operation Data

Date	Prcnt Avail	NOX Monitor				Tot Hrs OofC	CO2 Monitor			
		Cal Error		Diluent			Cal Error		Tot Hrs	
		Low	High	Low	High		Low	High	OofC	
01/01/92	94.50	0.1	-0.1	-0.1	-0.1	0.10	94.50	0.1	-0.1	0.10

Hourly Unit Operation and Emission Data

Hour	Unit Oper Hours	Total Heat In mmbtu	Average NOX		Method	Total CO2 lbs
			ppm	lb/mmbtu		
01	1.00	4370	128	0.49	1	1964
02	1.00	4391	152	0.69	1	2087
03	1.00	4383	132	0.53	1	1985
04	1.00	4379	153	0.69	1	2090
05	1.00	4374	147	0.65	1	2063
06	1.00	4382	145	0.63	2	2049
07	1.00	4375	109	0.34	1	1870
08	1.00	4379	139	0.58	1	2022
09	1.00	4392	139	0.58	1	2019
10	1.00	4382	161	0.77	2	2134
11	1.00	4387	114	0.38	2	1894
12	1.00	4366	166	0.81	1	2160
13	1.00	4387	162	0.77	1	2137
14	1.00	4375	101	0.27	1	1828
15	1.00	4377	142	0.61	1	2037
16	1.00	4388	156	0.72	1	2107
17	1.00	4388	139	0.58	1	2021
18	1.00	4390	126	0.48	1	1953
19	1.00	4366	157	0.73	2	2112
20	1.00	4368	140	0.59	1	2026
21	1.00	4377	150	0.67	2	2077
22	1.00	4372	128	0.49	1	1964
23	1.00	4389	160	0.76	2	2130
24	1.00	4381	105	0.31	1	1848
DyAvg		4380	114	0.38		1895
Total	24.00	105118				48577