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**ENHANCING THE USE OF COALS BY
GAS REBURNING-SORBENT INJECTION**

Environmental Monitoring Report
Quarterly Report No. 6
For the Period
October 1 - December 31, 1991

Prepared for
U.S. Department of Energy
Gas Research Institute
State of Illinois Department of
Energy and Natural Resources

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1.0 INTRODUCTION

Clean Coal Technology implies the use of coal in an environmentally acceptable manner. Coal combustion results in the emission of two types of acid rain precursors: oxides of sulfur (SO_x) and oxides of nitrogen (NO_x). This Clean Coal Technology project will demonstrate a combination of two developed technologies to reduce both NO_x and SO_x emissions: gas reburning and calcium based dry sorbent injection. The demonstrations will be conducted on two pre-NSPS utility boilers representative of the U.S. boilers which contribute significantly to the inventory of acid rain precursor emissions: tangentially and cyclone fired units. Because of cost growth and lack of available funding, no further work has been done after Phase I at site B; the wall fired unit.

Gas reburning is a combustion modification technique that consists of firing 80-85 percent of the fuel (corresponding to the total heat release) in the lower furnace. Reduction of NO_x to molecular nitrogen (N_2) is accomplished via the downstream injection of the remaining fuel requirement in the form of natural gas (which also reduces the total SO_x emissions). In a third stage, burnout air is injected at lower temperatures in the upper furnace to complete the combustion process without generating significant additional NO_x .

Dry sorbent injection consists of injecting calcium based sorbents (such as limestone dolomite, or hydrated lime) into the combustion products. For sulfation of the sorbent to CaSO_4 , an injection temperature of about 1230°C is optimum, but calcium-sulfur reactions can also take place at lower temperatures. Thus, the sorbent may be injected at different locations, such as with the burnout air, at the exit from the superheater, or into the ducting downstream of the air heater with H_2O added for humidification. The calcium sulfate or sulfite products are collected together with unreacted sorbent fly ash by the electrostatic precipitator. The specific goal of this project is to demonstrate NO_x and SO_x emission reductions of 60 percent and 50 percent, respectively, on two coal fired utility boilers having the design characteristics mentioned above.

At the inception of the project, Host Site Agreements were signed by EER and three utility companies in the State of Illinois: Site A, Illinois Power Company [Hennepin Unit 1, 71 MW (net) tangentially fired boiler in Hennepin]; Site B, Central Illinois Light Company [Edwards Unit 1, 117 MW (net) front wall fired boiler in Bartonville; and Site C, City Water Light and Power [Lakeside Unit 7, 33 MW (net) cyclone fired boiler in Springfield].

Funding for this project is provided by the U.S. Department of Energy (DOE), the Gas Research Institute (GRI), and the Illinois Department of Energy and Natural Resources (ENR)--the other funding participants. GRI and ENR are responsible for funding approximately one-third and one-sixth, respectively, of the total project costs.

To achieve its objectives, the project is conducted in the following three phases at each site:

Phase I: Design and Permitting

Phase II: Construction and Startup

Phase III: Operation, Data Collection, Reporting, and Disposition

Phase I work has been completed for all three sites. Because of cost growth and lack of available funding, no further work has been done after Phase I at Site B; the wall fired unit. At Site A, Phase II has been completed and Phase III long-term tests are currently being initiated. Site C is currently in Phase II of the program.

In accordance with the cooperative agreement, EER has prepared an Environmental Monitoring Plan to verify that no adverse environmental impacts would be associated with the project, to determine if projected emission control levels are being met, and to maintain a data base for future development of GR-SI technology. Tables 1 through 4 show the environmental monitoring to be conducted at Sites A and C, (Hennepin and Lakeside) during Phases I, II and III of the project.

The following section provides a description of the monitoring which has been conducted during the previous quarter at the host sites. A discussion of the monitoring results is presented in Section 3. Section 4 provides a status report of permits obtained for the project at each facility, and Section 5 discusses any proposed changes in the original monitoring plan based on available information.

TABLE 1. HENNEPIN PROJECT MONITORING IN PHASES I AND II

MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
COMPLIANCE			
<u>WATER</u>			
Flow Rate	single reading estimate	once/wk	existing ash pond discharge
pH	grab sample	once/wk	existing ash pond discharge
Total Suspended Solids	24 hr composite	once/wk	existing ash pond discharge
Oil and Grease	grab sample	twice/mo	existing ash pond discharge
<u>GASEOUS EMISSIONS</u>			
Coal Composition	24 hr composite	daily	coal hopper
sulfur, ash, Btu, moisture			
Coal Flow	24 hr composite	daily	coal feed belt
SUPPLEMENTAL			
<u>WATER</u>			
General Use Water	composite	once	Illinois River - 100 ft upstream and downstream of ash pond discharge
Quality Standards			
<u>GASEOUS EMISSIONS</u>			
NOx	continuous	(1)	economizer inlet
CO	continuous	(1)	economizer inlet
O2	continuous	(1)	economizer inlet
SO2	continuous	(1)	economizer inlet
<u>WORKER HEALTH</u>			
Hearing		once (2)	TBD
Pulmonary Function		once (2)	TBD
TSP		once (2)	TBD

1. Two-week period in Phase I.
2. Must occur prior to initiation of Phase III.

TABLE 2. HENNEPIN PROJECT MONITORING IN PHASE III-page 1 of 3

MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
COMPLIANCE			
<u>WATER</u> Flow Rate	24 hr total	daily	ash pond discharge
pH	grab sample	once/wk	ash pond discharge
Total Suspended Solids	24 hr composite	once/wk	ash pond discharge
Oil and Grease	grab sample	once/mo	ash pond discharge
Groundwater (pH, TDS, S, B, Mn, Ca, Chloride, Nitrate, Nitrite, Sulfite, Sulfate)	grab sample	(1)	groundwater monitoring wells
<u>GASEOUS EMISSIONS</u> Coal Composition (sulfur, ash, Btu, moisture) Coal Flow	24 hr composite	daily	coal hopper
	24 hr composite	daily	coal feed belt
SUPPLEMENTAL			
<u>WATER</u> Ill. River General Use Water Quality Standards (35 Ill. Adm. Code 302)	grab sample	once (4)	Illinois River - 100 ft upstream and downstream of ash pond discharge
Sluice water analyses(2)	grab sample	monthly (3)	ash sluice line to existing ash pond
<u>GASEOUS EMISSIONS</u> NOx SOx CO CO2 O2 HC	extractive probe/ chemiluminescent extractive probe/ NDUV extractive probe/ NDIR extractive probe/ NDIR extractive probe/ paramagnetic extractive probe/ FID	(9) continuous (9) continuous (9) continuous (9) continuous (9) continuous (9) continuous	stack breaching stack breaching stack breaching stack breaching stack breaching stack breaching

TABLE 2. HENNEPIN PROJECT MONITORING IN PHASE III

page 2 of 3

MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
<u>GASEOUS EMISSIONS</u>			
Particulate	Method 17	(4)	ESP inlet
Particle Size Distribution	Method 5	(4)	ESP outlet
Resistivity	cascade impactors	(4)	ESP inlet and outlet
Velocity	cyclonic flow probe	(4)	ESP inlet
Opacity	Method 2	(4)	ESP inlet
N2O	in-situ optical extractive	(9) continuous (5)	stack breeching stack breeching
<u>SOLID BY-PRODUCTS</u>			
Ash (6)	grab sample	(7)	Ash hoppers
<u>WORKER HEALTH</u>			
Hearing	N/A	once/yr	TBD
Pulmonary Function	N/A	once/yr	TBD
TSP	N/A	once/yr	TBD
<u>AIR</u>			
Noise	single reading	once (4)	near equipment installation
Ambient Dust	single reading-Hi-Volume Sampler	once (4)	upwind and downwind of sorbent silo

TABLE 2. FOOTNOTES- HENNEPIN PROJECT MONITORING IN PHASE III

page 3 of 3

1. Monitoring will occur once prior to GR-SI operation, quarterly until the program is completed, and quarterly through closure and post-closure periods.
2. Water will be analyzed for arsenic, barium, boron, cadmium, chromium, iron, lead, mercury, oil and grease, pH, selenium, silver, sulfates, TDS, TSS, zinc, and flow rate.
3. Sampling will be conducted once prior to Phase III, then monthly for the first six months of long-term testing.
4. Measurements will be taken once prior to Phase III, then once during long term testing.
5. Samples will be collected once prior to Phase III, and once during long-term testing. Additional testing will then be done if the N2O concentration is greater than 5 ppm.
6. Ash will be monitored for mineral analysis, free CaO, total organic carbon, sulfate, COD, phenol, cyanide, nitrate, chloride sulfide, specific gravity, fineness, pozzolanic activity, soundness, PAH and pH. Paint filter and TCLP tests will also be conducted.
7. Sampling will be conducted once prior to Phase III. During long-term testing sampling and analysis will be conducted monthly for the first 3 months.
8. Sampling will occur once prior to Phase III, and CEM data will be reported during long-term testing.

TABLE 3. LAKESIDE PROJECT MONITORING IN PHASES I AND II
page 1 of 2

MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
WATER			
Flow Rate	single reading estimate	once/wk	ash pond discharge
pH	grab sample	twice/wk	ash pond discharge
Total Suspended Solids	24 hr composite	twice/wk	ash pond discharge
Oil and Grease	grab sample	twice/mo	ash pond discharge
Flow Rate	single reading estimate	once/wk	outfall 008
pH	grab sample	once/wk	outfall 008
Total Suspended Solids	8 hr composite	once/wk	outfall 008
Oil and Grease	grab sample	once/wk	outfall 008
Iron	8 hr composite	once/wk	outfall 008
<u>GASEOUS EMISSIONS</u>			
Opacity	in-situ optical	continuous	stack
<u>GASEOUS EMISSIONS</u>			
SUPPLEMENTAL			
NOx	extractive probe/ chemiluminescent	continuous (2)	economizer inlet
CO	extractive probe/ NDIR	continuous (2)	economizer inlet
O2	extractive probe/ paramagnetic	continuous (2)	economizer inlet
SO2	extractive probe/ NDUV	continuous (2)	economizer inlet
CO2	extractive probe/ NDIR	continuous (2)	stack breeching
HC	extractive probe/ FID	continuous (2)	stack breeching
Particulate Loading	Method 17	see note 2	ESP inlet
	Method 5	see note 2	ESP outlet
	cascade impactors	see note 2	ESP inlet and outlet
Particle Size			
Distribution	cyclonic flow probe	see note 2	ESP inlet
Resistivity	extractive	see note 2	stack breeching
N2O			

TABLE 3. LAKESIDE PROJECT MONITORING IN PHASES I AND II
page 2 of 2

MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
SUPPLEMENTAL			
<u>WATER</u> pH, sulfates pH, sulfates	grab sample grab sample	once once	sluice line discharge sluice water intake (Lake Springfield)
<u>SOLID BY-PRODUCTS</u> Ash (1)	grab sample	(2)	Ash Hoppers
<u>WORKER HEALTH</u> Hearing Pulmonary Function TSP	NA N/A N/A	once (3) once (3) once (3)	TBD TBD TBD
<u>AIR</u> Noise	single reading	once (3)	near equipment installation
Ambient Dust	single reading	once (3)	near coal pile

1. Ash will be monitored for the following parameters: mineral analysis, TCLP, total organic carbon, cyanide chloride, sulfide, specific gravity, fineness, PAH, and pH.
2. Measurements will be taken once during Phase I.
3. Must occur prior to initiation of Phase III.

TABLE 4. LAKESIDE PROJECT MONITORING IN PHASE III
page 1 of 2

MEASUREMENT	SAMPLE TYPE	COMPLIANCE	FREQUENCY	LOCATION
<u>WATER</u>				
Flow Rate	single reading estimate		once/wk	ash pond discharge
pH	grab sample		twice/wk	ash pond discharge
Total Suspended Solids	24 hr composite		twice/wk	ash pond discharge
Oil and Grease	grab sample		twice/mo	ash pond discharge
Flow Rate	single reading estimate		once/wk	outfall 008
pH	grab sample		once/wk	outfall 008
Total Suspended Solids	8 hr composite		once/wk	outfall 008
Oil and Grease	grab sample		once/wk	outfall 008
Iron	8 hr composite		once/wk	outfall 008
<u>GASEOUS EMISSIONS</u>				
Opacity	in-situ optical		continuous	stack
<u>WATER</u>				
pH, sulfate	grab sample		see note 1	sluice line discharge
pH, sulfate	grab sample		see note 1	sluice water intake (Lake Springfield)
<u>GASEOUS EMISSIONS</u>				
NO _x	extractive probe/ chemiluminescent		continuous	stack breaching
SO _x	extractive probe/ NDUV		continuous	stack breaching
CO	extractive probe/ NDIR		continuous	stack breaching
CO ₂	extractive probe/ NDIR		continuous	stack breaching
O ₂	extractive probe/ paramagnetic		continuous	stack breaching
HC	extractive probe/ FID		continuous	stack breaching
Particulate Loading	Method 17		see note 1	ESP inlet
	Method 5		see note 1	ESP outlet
		SUPPLEMENTAL		

TABLE 4. LAKESIDE PROJECT MONITORING IN PHASE III, continued

MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
<u>GASEOUS EMISSIONS</u>			
Particle Size	cascade impactors	see note 1	ESP inlet and outlet
Distribution			
Resistivity	cyclonic flow probe	see note 1	ESF inlet
N ₂ O	extractive	see note 2	stack breeching
<u>SOLID BY-PRODUCTS</u>			
Ash	grab sample	see note 3	ESP hopper
<u>WORKER HEALTH</u>			
Hearing	N/A	once/yr	TBD
Pulmonary Function	N/A	once/yr	TBD
<u>AIR</u>			
Noise	single reading	once (1)	near equipment installation
Ambient Dust	single reading	once (1)	near coal pile

1. Measurements taken once during Phase III long-term testing.
2. N₂O measurements taken once during long-term testing. Additional testing will then be done if the N₂O concentration is greater than 5 ppm.
3. Ash sampling will be conducted monthly for the first three months of the long-term testing period.

2.0 ENVIRONMENTAL MONITORING

Both compliance and supplemental monitoring was conducted at the Hennepin and Lakeside sites during the previous quarter. The monitoring results from Hennepin and Lakeside are presented in the following sections.

2.1 Compliance Monitoring

Compliance monitoring is that monitoring required by Federal, State or local authorities.

2.1.1 Hennepin

The compliance monitoring conducted at Hennepin during the quarter which directly influences this project includes NPDES permit monitoring and coal quality reports. Illinois Power submits NPDES Discharge Monitoring Reports to the Illinois EPA, on a monthly basis. Coal quality reports are submitted to Illinois EPA on a quarterly basis. Copies of the discharge monitoring, and coal quality reports for October, November, and December are included in Appendix A of this report.

All personnel engaged in manual sampling or subject to frequent exposure to the process areas have had physical examinations which included pulmonary function testing.

2.1.2 Lakeside

The compliance monitoring conducted at Lakeside during the quarter which directly influences this project includes NPDES permit monitoring and gaseous emissions opacity reports. Copies of the reports for October, November, and December are included in Appendix B of this report.

2.2 Supplemental Monitoring

2.2.1 Hennepin

The supplemental monitoring reported during this quarter included baseline resistivity measurements and a baseline opacity reading. Illinois Power submitted baseline opacity readings for

the month of May that ranged from 5 to 21.1% opacity. The average baseline opacity reading was 2.65 percent.

Gaseous Emissions

Hydrocarbon emissions were monitored under baseline condition at low, mid and high loads. Results corrected to 3% O₂ are shown below:

Hydrocarbon Concentration ppmv (@3% O₂)

<u>Load</u>	<u>Range</u>	<u>Average</u>
Low (~45 MW)	1 - 61	24
Mid (50 - 65 MW)	0 - 4	2.6
High (65 - 75 MW)	3 - 31	10

Resistivity

The baseline resistivity measurements are listed below by both spark method and voltage current method reported in ohm-cm.

<u>Temperature (F)</u>		<u>Resistivity (ohm-cm)</u>	
		<u>Spark Method</u>	<u>V-I Method</u>
1-	316	-----	7.6 x 10 ¹⁰
2-	331	6.9 x 10 ⁹	2.5 x 10 ¹⁰
3-	331	2.7 x 10 ⁹	3.6 x 10 ¹⁰
4-	331	1.2 x 10 ¹⁰	5.0 x 10 ¹⁰
5-	331	1.1 x 10 ¹⁰	3.8 x 10 ¹⁰
6-	333	2.6 x 10 ¹⁰	3.7 x 10 ¹⁰

2.2.2 Lakeside

The supplemental monitoring reported during this quarter included baseline emissions data for NO_x, SO₂, CO, CO₂, HC. Baseline opacity data is also reported.

Gaseous Emissions

The baseline opacity readings for Lakeside are <30% as reported by City Water Light and Power. The average baseline gaseous emissions data is reported below in corrected form by load and level of excess oxygen. The various loads consisted of 33 MW, 25 MW, and 19.5 MW. All loads were run at normal and low excess oxygen levels. The emissions data is included in Appendix C of this report.

At 33 MW-Normal O₂ levels

CO ₂ c	COc	NO _x c	SO ₂ c	HCc
<u>Percent</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>
15.55	7.53	699.71	2794.23	17.57

At 33 MW-Low O₂ levels

CO ₂ c	COc	NO _x c	SO ₂ c	HCc
<u>Percent</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>
15.58	79.31	652.42	2855.65	9.98

At 25 MW- Normal O₂ levels

CO ₂ c	COc	NO _x c	SO ₂ c	HCc
<u>Percent</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>
15.57	6.33	646.27	2820.04	8.58

At 25 MW-Low O₂ levels

CO ₂ c	COc	NO _x c	SO ₂ c	HCc
<u>Percent</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>
15.36	39.89	673.22	2933.28	15.12

At 19.5 MW-Normal O₂ levels

CO ₂ c	COc	NO _x c	SO ₂ c	HCc
<u>Percent</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>
15.54	4.69	647.48	2831.32	14.33

At 19.5 MW-Low O₂ levels

CO ₂ c	COc	NO _x c	SO ₂ c	HCc
<u>Percent</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>	<u>ppmv</u>
15.44	29.8	618.11	2844.80	9.75

3.0 DATA DISCUSSION

3.1 Hennepin

The discharge monitoring reports for October through December indicated that no effluents were discharged from the ash pond to the Illinois River. The gaseous emissions for the coal composition did not exceed the regulatory emission rate 17,050 lbs. of SO₂ per hour. The average lbs. of SO₂ per MBTU for this quarter was 5.24.

The baseline resistivity measurements were taken by APCO Services in July 1991. The resistivity data indicates that there was good agreement between all runs for the V-I measurements and fair agreement between the spark and V-I measurements. It is not uncommon to see differences in the spark and V-I data when testing higher resistivity ashes. APCO Services indicated that the V-I data is more representative of the true resistivity.

The baseline opacity measurements for Hennepin indicate that the opacity levels are well below the Illinois State opacity limit of 30%. This opacity reading is a combined reading for the Hennepin station, and does not accurately represent the opacity levels from only Unit #1. As a result, EER will report particulate measurements for Hennepin Unit #1 in place of opacity readings in the future.

3.2 Lakeside

The discharge monitoring reports for the ash pond outfall structure and the coal pile runoff during the months of October through December indicate that the ash pond outfall had Ph exceedances for the months October through December and one Boron exceedance for the month of December. The coal pile runoff did not produce a discharge stream during this quarter.

The gaseous emissions opacity reports indicate the opacity limit of 30% was exceeded during the month of October due to an unknown cause, during the month of November due to the startup and shutdown of the boilers, and during the month of December due to start up of the boilers and malfunctioning board which was replaced.

The baseline gaseous emissions data indicate that the readings are typical of a coal-fired utility boiler operating under varying loads. The variation in CO is representative of the change in excess air levels.

The baseline opacity reading taken in July 1991 indicated that the opacity limit of 30% was exceeded only during startup and shutdown of the boilers and when maintenance to the power supply was necessary.

4.0 PERMIT STATUS

Permits have been obtained for construction and operation of the GR-SI system at Hennepin. At Lakeside, construction is in progress, and operating permits have not been obtained yet. The following sections describe the permits obtained at each host site.

4.1 Hennepin

IP applied for a construction permit for the GR-SI project at Hennepin on July 7, 1989, and Illinois Environmental Protection Agency granted that permit on October 18, 1989. A modification to the construction permit for operation of the GR-SI demonstration for a period of 270 days was requested. This permit was granted June 21, 1990. A permit also was required to install the Ph adjustment system for the GR-SI ash transport water to the existing ash pond. This permit was granted on July 25, 1990. Negotiations are currently underway between Illinois Power, the Illinois EPA, and the U.S. EPA regarding the reissuing of the Hennepin NPDES permit. This permit should be reissued during the next quarter.

4.2 Lakeside

On January 8, 1990, CWLP submitted a PSD permit application for the GR-SI demonstration at Lakeside Unit 7. On July 5, 1990, CWLP granted the Illinois Environmental Protection Agency a waiver from its statutory deadline to review the permit application (180 days) for a period of 120 days. Permit approval was received November 16, 1990. EER is in the process of applying for a Special Waste Permit through the Christian County Landfill for the future disposal of the Lakeside fly ash waste stream.

5.0 MODIFICATIONS TO MONITORING PLAN

5.1 Hennepin

The recommended modifications to the proposed monitoring plan as listed in Tables 2 are as follows: Under the supplemental water measurement category, the frequency of monitoring the Illinois River has been changed to reflect monitoring once prior to Phase III testing, and once during long-term testing; Under the gaseous emissions category the opacity parameter has been deleted and replaced with particulate data because the combined stack opacity readings at Hennepin do not accurately represent only Unit #1 opacity readings; Also under the gaseous emissions category the velocity parameter has been deleted due to the combined stack velocity readings. The combined stack velocity readings do not provide accurate data for conducting ambient air models for Unit #1.

The recommended modifications to the footnotes in Table 2 are listed below.

- Footnote #1- Monitoring will occur once prior to GR-SI operation, quarterly until the program is completed, and quarterly through closure and post-closure periods.
- Footnote #3 - Sampling will be conducted once prior to Phase III, then monthly for the first six months of long-term testing.
- Footnote #5 - Samples will be collected once prior to Phase III, and once during long-term testing. Additional testing will be conducted if the N₂O concentration exceeds 5 ppm.
- Footnote #7 - Sampling will be conducted once prior to Phase III. During long-term testing, sampling will be conducted monthly for the first three months.
- Footnote #8 - Sampling will occur once prior to Phase III, and CEM data will be reported during long-term testing.
- Footnote #9 - Deleted.

5.2 Lakeside

The recommended modifications to the proposed monitoring plan as listed in Table 3 are as follows. These modifications reflect baseline monitoring conducted for the Lakeside station. The following parameters have been added under the gaseous emissions category: CO₂, HC, Particulate

Loading, Particle Size Distribution, Resistivity, and N_2O . A Solid By-Product category has been added for the monitoring of ash. A Worker Health Category has been added for the monitoring of the following parameters: employee pulmonary function, hearing, and total suspended particulate. An Air category has been added for the monitoring of noise and ambient dust on-site. The sample type, frequency, and location for all additional parameters listed above are noted in Table 3.

The recommended modifications for the footnotes in Table 3 are as follows:

Footnote #1- Ash will be monitored for the following parameters: mineral analysis, TCLP, total organic carbon, cyanide, chloride, sulfide, specific gravity, fineness, PAH, and Ph.

Footnote #2 - Measurements will be taken once during Phase I.

Footnote #3 - Must occur prior to initiation of Phase III.

The recommended modifications to the proposed monitoring plan as listed in Table 4 are as follows. The frequency of monitoring the sluice water intake and discharge as listed under supplemental water monitoring has been changed to more accurately reflect monitoring to be conducted during Phase III. The velocity measurement listed under the Gaseous Emissions monitoring for Phase III has been deleted due to the combined stack readings at Lakeside. The combined readings would not provide accurate data for conducting ambient air modeling for Unit #7. The frequency of noise and ambient dust listed under Air monitoring in Phase III has been changed to more accurately reflect the testing schedule at Lakeside.

The recommended modifications for the footnotes in Table 4 are as follows:

Footnote #1 - Measurements taken once during Phase III long-term testing.

Footnote #2 - N_2O measurements taken once during long-term testing. Additional testing will then be done if the N_2O concentration is greater than 5 ppm.

Footnote #3 - Ash sampling will be conducted monthly for the first three months of the long-term testing period.

Footnote #4 - Deleted.

APPENDIX A

ILLINOIS POWER COMPANY
HENNEPIN POWER STATION
COAL ANALYSIS REPORT FOR THE PERIOD 100191 TO 103191
FOR THE VENDOR -- COAL TO BUNKERS

SAMPLE DATE	TONS TO BUNKERS	MOISTURE (AR)	ASH (AR)	SULFUR (AR)	BTU/LB (AR)	BTU/LB (DRY)	BTU/LB (H.A.F.)	UNIT COAL BTU/LB	POUNDS SO2 PER HBTU	SO2 LIMIT EXCEEDED
10/01/91	1,628.00	12.78	10.73	2.83	10,774	12,352	14,684	14,353	5.12	
10/02/91	1,804.00	14.67	10.78	2.83	10,545	12,359	14,145	14,424	5.23	
10/03/91	1,268.00	14.51	10.77	2.93	10,551	12,343	14,123	14,401	5.42	
10/05/91	.00	.00	.00	.00	.00	.00	.00	.00	.00	
10/06/91	266.00	11.43	11.79	2.92	10,938	12,349	14,246	14,538	5.41	
10/07/91	1,197.00	13.73	11.17	2.97	10,719	12,425	14,272	14,525	5.40	
10/08/91	516.00	14.41	9.84	2.69	10,800	12,619	14,256	14,514	4.86	
10/09/91	128.00	13.51	10.49	2.83	10,818	12,508	14,235	14,506	5.10	
10/10/91	.00	.00	.00	.00	.00	.00	.00	.00	.00	
10/11/91	.00	.00	.00	.00	.00	.00	.00	.00	.00	
10/12/91	1,392.00	13.30	10.88	2.87	10,845	12,599	14,266	14,542	5.16	
10/13/91	1,739.00	14.46	10.57	2.96	10,637	12,435	14,189	14,469	5.43	
10/14/91	1,451.00	11.69	10.55	2.93	11,034	12,496	14,210	14,479	5.18	
10/15/91	1,889.00	12.03	10.57	2.99	11,009	12,514	14,223	14,493	5.12	
10/16/91	.00	.00	.00	.00	.00	.00	.00	.00	.00	
10/18/91	713.00	14.54	10.21	2.81	10,672	12,488	14,182	14,450	5.13	
10/19/91	1,628.00	13.79	10.24	2.86	10,763	12,484	14,167	14,434	5.18	
10/20/91	2,342.00	13.42	10.34	2.77	10,828	12,566	14,202	14,467	4.99	
10/21/91	1,501.00	13.23	10.47	2.91	10,905	12,452	14,189	14,431	5.25	
10/22/91	1,517.00	13.14	10.37	2.85	10,867	12,511	14,206	14,473	5.12	
10/23/91	1,439.00	12.69	10.91	2.86	10,850	12,426	14,201	14,473	5.14	
10/24/91	2,100.00	14.38	10.09	2.77	10,723	12,574	14,197	14,430	5.06	
10/25/91	799.00	15.01	10.49	2.79	10,596	12,467	14,221	14,497	5.13	
10/26/91	664.00	15.61	10.79	2.91	10,527	12,386	14,187	14,462	5.21	
10/27/91	609.00	15.93	10.22	2.71	10,495	12,484	14,210	14,480	5.04	
10/28/91	1,567.00	15.68	10.67	2.76	10,542	12,414	14,198	14,475	5.11	
10/29/91	1,321.00	12.44	10.45	2.83	10,957	12,513	14,209	14,475	5.04	
10/30/91	1,620.00	13.76	10.16	2.89	10,753	12,469	14,155	14,528	5.24	
10/31/91	1,541.00	14.19	10.42	2.89	10,712	12,470	14,172	14,464	5.26	

WEIGHTED AVERAGES FOR THE PERIOD 100191 TO 103191

TOTAL TONS	MOISTURE (AR)	ASH (AR)	SULFUR (AR)	BTU/LB (AR)	BTU/LB (DRY)	BTU/LB (H.A.F.)	UNIT COAL BTU/LB	POUNDS SO2 PER HBTU
32,651.00	13.66	10.52	2.85	10,750	12,460	14,190	14,461	5.17

... END OF REPORT RUN ON 12/05/91 AT 09:59:31

ILLINOIS POWER COMPANY
HENNEPIN POWER STATION
COAL ANALYSIS REPORT FOR THE PERIOD 110191 TO 113091
FOR THE VENDOR : COAL TO BUNKERS

SAMPLE DATE	TONS TO BUNKERS	Z MOISTURE (AR)	Z ASH (AR)	Z SULFUR (AR)	BTU/LB (AR)	BTU/LB (DRY)	BTU/LB (H.A.F.)	UNIT COAL BTU/LB	POUNDS 502 PER MBTU	502 LIMIT EXCEEDED
11/01/91	3,159.00	14.97	10.59	2.83	10,558	12,417	14,185	14,462	5.22	
11/02/91	1,622.00	11.90	10.26	2.89	11,079	12,575	14,235	14,496	5.09	
11/03/91	3,334.00	15.46	10.41	2.86	10,508	12,428	14,174	14,450	5.31	
11/04/91	2,540.00	12.49	10.91	2.93	10,855	12,414	14,184	14,462	5.26	
11/05/91	1,415.00	12.43	10.54	2.84	10,727	12,477	14,219	14,495	5.16	
11/06/91	2,547.00	14.31	10.56	2.93	10,644	12,422	14,169	14,446	5.37	
11/07/91	2,392.00	13.96	10.65	2.89	10,727	12,459	14,217	14,495	5.25	
11/08/91	2,216.00	14.97	10.23	2.79	10,638	12,510	14,221	14,491	5.12	
11/09/91	1,927.00	14.48	10.37	2.85	10,699	12,500	14,223	14,496	5.19	
11/10/91	2,928.00	13.82	10.63	2.89	10,735	12,457	14,209	14,488	5.25	
11/12/91	3,214.00	15.22	10.74	2.83	10,464	12,342	14,132	14,410	5.27	
11/13/91	2,666.00	13.91	10.35	2.92	10,738	12,520	14,231	14,508	5.39	
11/14/91	1,457.00	13.49	9.93	3.00	10,909	12,610	14,245	14,513	5.36	
11/15/91	2,660.00	13.42	10.51	3.11	10,869	12,554	14,289	14,574	5.52	
11/16/91	1,338.00	12.49	11.08	3.12	10,887	12,440	14,243	14,535	5.59	
11/17/91	1,983.00	16.06	9.81	2.88	10,524	12,536	14,195	14,464	5.34	
11/18/91	1,217.00	15.15	10.76	2.87	10,580	12,471	14,253	14,568	5.29	
11/19/91	2,080.00	15.01	10.89	2.90	10,505	12,479	14,313	14,604	5.33	
11/20/91	1,436.00	13.93	10.91	2.94	10,729	12,466	14,278	14,562	5.34	
11/21/91	2,849.00	14.49	10.55	2.94	10,696	12,511	14,292	14,575	5.35	
11/22/91	412.00	14.49	10.73	2.98	10,692	12,503	14,309	14,596	5.44	
11/23/91	390.00	14.65	11.07	2.96	10,644	12,470	14,328	14,625	5.42	
11/24/91	1,443.00	14.79	10.55	2.86	10,722	12,582	14,324	14,602	5.20	
11/25/91	3,280.00	13.45	11.13	3.10	10,765	12,438	14,233	14,569	5.62	
11/26/91	1,649.00	12.42	10.08	3.09	11,040	12,666	14,243	14,516	5.43	
11/27/91	1,615.00	12.13	10.36	2.96	11,054	12,580	14,261	14,531	5.22	
11/28/91	1,516.00	13.20	10.88	2.91	10,822	12,467	14,254	14,535	5.24	
11/29/91	1,645.00	11.69	11.02	3.29	10,982	12,436	14,298	14,501	5.84	
11/30/91	1,637.00	11.63	10.92	3.12	11,010	12,459	14,216	14,499	5.53	

WEIGHTED AVERAGES FOR THE PERIOD 110191 TO 113091

TOTAL TONS	MOISTURE (AR)	ASH (AR)	SULFUR (AR)	BTU/LB (AR)	BTU/LB (DRY)	BTU/LB (H.A.F.)	UNIT COAL BTU/LB	LBS. 502 PER MBTU
58,331.00	13.98	10.60	2.94	10,733	12,476	14,230	14,509	5.34

... END OF REPORT RUN ON 12/05/91 AT 09.11.23

ILLINOIS POWER COMPANY
HENNEPIN POWER STATION
COAL ANALYSIS REPORT FOR THE PERIOD 120191 TO 123191
FOR THE VENDOR : COAL TO BUNKERS

SAMPLE DATE	TONS TO BUNKERS	Z			BTU/LB (AR)	BTU/LB (DRY)	BTU/LB (H.A.F.)	UNIT COAL BTU/LB	POUNDS SO2 PER MBTU	SO2 LIMIT EXCEEDED
		MOISTURE (AR)	ASH (AR)	SULFUR (AR)						
12/01/91	1,359.00	15.74	16.55	2.85	10,433	12,382	14,176	14,458	5.35	
12/02/91	1,645.00	11.43	16.59	2.93	11,105	12,537	14,239	14,512	5.23	
12/03/91	2,077.00	10.89	16.35	3.19	11,187	12,554	14,259	14,539	5.57	
12/04/91	1,510.00	10.99	11.12	3.11	11,117	12,498	14,273	14,559	5.46	
12/05/91	3,281.00	14.04	10.21	2.92	10,787	12,549	14,240	14,511	5.28	
12/06/91	1,597.00	13.55	10.12	2.88	10,848	12,591	14,257	14,536	5.18	
12/07/91	1,506.00	12.81	10.49	2.98	10,936	12,542	14,240	14,514	5.31	
12/08/91	1,635.00	14.15	10.74	2.84	10,504	12,351	14,117	14,383	5.22	
12/09/91	1,699.00	13.35	11.64	2.86	10,582	12,211	14,107	14,397	5.27	
12/10/91	1,627.00	15.32	11.19	2.89	10,479	12,375	14,259	14,551	5.21	
12/11/91	3,036.00	12.29	11.32	2.90	10,893	12,418	14,259	14,545	5.19	
12/12/91	1,624.00	14.45	11.93	2.94	10,620	12,414	14,253	14,543	5.44	
12/13/91	2,343.00	15.59	11.29	2.84	10,406	12,341	14,250	14,546	5.32	
12/14/91	1,472.00	14.89	10.56	2.87	10,512	12,468	14,234	14,514	5.28	
12/15/91	1,514.00	14.16	10.62	2.93	11,205	12,612	14,217	14,474	5.16	
12/16/91	1,391.00	14.16	9.78	2.77	10,799	12,579	14,198	14,454	5.60	
12/17/91	1,379.00	12.35	9.59	2.80	11,166	12,749	14,290	14,538	4.89	
12/18/91	2,735.00	12.52	10.50	2.94	11,906	12,579	14,295	14,579	5.21	
12/19/91	1,629.00	15.14	11.09	2.79	10,514	12,391	14,235	14,542	5.18	
12/20/91	1,511.00	15.11	11.88	2.85	10,372	12,218	14,206	14,511	5.35	
12/21/91	1,502.00	14.99	11.05	2.81	10,521	12,349	14,189	14,475	5.25	
12/22/91	1,541.00	14.11	11.16	2.81	10,635	12,381	14,239	14,516	5.16	
12/23/91	1,599.00	10.90	12.01	2.80	10,808	12,229	14,124	14,405	4.89	
12/24/91	1,487.00	10.59	11.52	2.69	11,129	12,437	14,277	14,564	5.24	
12/25/91	1,628.00	15.81	10.13	2.64	10,512	12,495	14,203	14,468	4.90	
12/26/91	2,653.00	15.53	10.75	2.85	10,523	12,463	14,202	14,567	5.27	
12/27/91	1,299.00	10.91	9.56	2.92	11,372	12,764	14,398	14,559	5.02	
12/28/91	2,384.00	11.33	9.72	2.92	11,258	12,696	14,258	14,512	5.06	
12/29/91	1,255.00	14.55	10.53	2.77	10,683	12,502	14,358	14,533	5.06	
12/30/91	1,213.00	15.01	11.53	2.79	10,456	12,392	14,254	14,539	5.29	
12/31/91	1,184.00	14.61	10.84	2.93	10,609	12,423	14,229	14,511	5.20	

WEIGHTED AVERAGES FOR THE PERIOD 120191 TO 123191						
TOTAL TONS	MOISTURE (AR)	ASH (AR)	SULFUR (AR)	BTU/LB (AR)	BTU/LB (DRY)	BTU/LB (H.A.F.)
53,748.60	13.48	10.74	2.88	10,799	12,469	14,236
						14,514
						5.21

... END OF REPORT RUN ON 01/02/92 AT 12.48.54

DISCHARGE MONITORING REPORT

(217) 424-6833

Ash Lagoon 1 & 3 Discharge

CONFIDENTIAL

* No discharge in October, 1991.

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

PARAMETER	QUANTITY			SPECIES	CONCENTRATION			FREQUENCY OF ANALYSIS	ANALYST
	10000		100000		10000		100000		
	AVERAGE	MAXIMUM	AVERAGE		MAXIMUM	AVERAGE	MAXIMUM		
50050	REPORTED			MGD				1/week	est.
Flow *	PIVOTAL CONCENTRATION								
00400	REPORTED							1/week	Grab
pH	PIVOTAL CONCENTRATION								
00530	REPORTED							1/week	24 hour composite
TSS	PIVOTAL CONCENTRATION								
00556	REPORTED							2/month	Grab
Oil & Grease	PIVOTAL CONCENTRATION								
	REPORTED								
	PIVOTAL CONCENTRATION								
	REPORTED								
	PIVOTAL CONCENTRATION								
	REPORTED								
	PIVOTAL CONCENTRATION								
	REPORTED								
	PIVOTAL CONCENTRATION								

NAME OF PERSONAL INCLUDING DEPT

Connec 11 W.

SIGNATURE OF PERSONAL INCLUDING DEPT

W. K. K. K.

DATE

11 11 11

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.

This Agency is authorized to require this information under Illinois Revised Statute 1910, Chapter 111 1/2, Section 10-2. Disclosure of this information is required. Failure to do so may result in a civil penalty up to \$10,000.00 per day of violation or a fine up to \$25,000.00 per day of violation and imprisonment.

11-16-1974

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Hennepin Power Plant
Ash Lagoon 1 & 3 Discharge

* No discharge November, 1991.

11.	51								
PERIOD NUMBER									
110001554									
10 001									
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LATITUDE		LONGITUDE							
100 200 100 200 100 311									

30-Day Daily

[illegible]

Field

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.

Vice-President

DATE	TIME	YEAR	MO	DAY	REMARKS
					While Agency is authorized to require this information under Illinois Revised Statutes, Chapter 111 1/2, Section 104-1, it is not authorized to require this information from any person who is not a resident of Illinois. Chapter 111 1/2, Section 104-1, states: "Any person who is not a resident of Illinois shall not be required to furnish information to the State of Illinois under this Act." The State of Illinois is not a resident of Illinois.

F

PERMITTEE NAME

ADDRESS

PHONE

ILLINOIS POWER COMPANY
500 South 27th Street
Decatur, IL 62525
(217) 424-6833

Hennepin Power Plant

Ash Lagoon 1 & 3 Discharge

11. 51

IL0001554
PERMIT NUMBER

005
DSS

LATITUDE LONGITUDE

91 112 10 1
YEAR MONTH DAY

91 112 10 1
YEAR MONTH DAY

REPORTING PERIOD FROM

TO

30-Day Daily

PARAMETER	30-day only		QUANTITY		CONCENTRATION		30-day only		FREQUENCY OF ANALYSIS	SAMPLE TYPE
	MAXIMUM	AVERAGE	MAXIMUM	MINIMUM	AVERAGE	MINIMUM	MAXIMUM	MINIMUM		
50050 Flow	REPORTED									
00400 pH	PERMIT COMPLIANCE								1/week	est.
00530 TSS	REPORTED								1/week	Grab
00556 Oil & Grease	PERMIT COMPLIANCE								1/week	24 hour composite
	REPORTED								2/month	Grab
	PERMIT COMPLIANCE									
	REPORTED									
	PERMIT COMPLIANCE									
	REPORTED									
	PERMIT COMPLIANCE									

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.

E. F. Allen
SIGNATURE OF PERMITTEE OFFICIAL
OFFICIAL (OR AUTHORIZED AGENT)

This Agency is authorized to require this information under Illinois Revised Statutes, Chapter 115 1/2, Section 1042. Disclosure of this information is required. Failure to do so may result in a civil penalty up to \$10,000 per day of violation or a fine up to \$25,000 per day of violation.

TITLE OF THE USER

DATE

Vice-President

YEAR MONTH DAY

Council W.

DATE

15023909

APPENDIX B

1

ADVANTAGES

PTREE NAME:

REFS.

115

No discharge during this period.

II, 0024767
PERMIT NUMBER

008	SIC
D15	

LATITUDE		LONGITUDE	

REPORTING PERIOD		FROM	
YEAR	MO	YEAR	DAY
2	1	1	1

YEAR	MO	DAY
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REPORTING PERIOD FROM		TO		YEAR		MO		DAY		YEAR		MO		DAY		YEAR		MO		DAY	
03-31		91		11		10		01		91		11		10		91		11		10	
PARAMETER	REPORTED	QUANTITY (LBS)			UNITS	RD EX	CONCENTRATION (GAL)		UNITS	RD EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE									
		MINIMUM	AVERAGE	MAXIMUM			AVERAGE	MAXIMUM													
Flow	PERMIT CONDITION										1/7	EST									
pH	REPORTED						6.0				1/7	GRAB									
	PERMIT CONDITION										1/7	COMP									
Total Suspended Solids	REPORTED						15				1/7	COMP									
	PERMIT CONDITION										1/7	GRAB									
Oil and Grease	REPORTED						15				1/7	COMP									
	PERMIT CONDITION										1/7	GRAB									
Total Iron	REPORTED						2.0				1/7	COMP									
	PERMIT CONDITION										1/7	GRAB									
Flow	REPORTED										1/7	EST									
	PERMIT CONDITION										1/7	GRAB									
pH	REPORTED										1/7	COMP									
	PERMIT CONDITION										1/7	GRAB									
Total Suspended Solids	REPORTED										1/7	COMP									
	PERMIT CONDITION										1/7	GRAB									
Oil and Grease	REPORTED										1/7	COMP									
	PERMIT CONDITION										1/7	GRAB									
Total Iron	REPORTED										1/7	COMP									
	PERMIT CONDITION										1/7	GRAB									

NAME OF PRINCIPAL EXECUTIVE OFFICER

Francisco, Lynn A.

TITLE OF THE OFFICER

General Manager, Public Utilities

DATE

91 11 15

YEAR MO DAY

91 11 15

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.

William A. Francisco

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

PAGE 9 OF 12

1851
1852-1853

7

NAME: _____

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[4-108]		W7-192		126-213		126-213		126-213		126-213	
PERMIT NUMBER		DIS		SIC		LATITUDE		LONGITUDE		YEAR	
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[illegible]

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter 111 1/2, Section 1042. Disclosure of this information in a civil penalty up to \$10,000.00 per day of violation and imprisonment is required. Failure to do so may result in a civil penalty up to \$10,000.00 per day of violation and imprisonment.

COMMENTS

No discharge during this period.

PERMITTEE NAME:

ADDRESS:

PHONE:

IL 0024767
PERMIT NUMBER

008
DIS

LAITUDE LONGITUDE

REPORTING PERIOD FROM TO
9/11/11 9/11/11
YEAR MO DAY YEAR MO DAY

9/11/11 9/11/11
YEAR MO DAY YEAR MO DAY

9/11/11 9/11/11
YEAR MO DAY YEAR MO DAY

9/11/11 9/11/11
YEAR MO DAY YEAR MO DAY

REPORTING PERIOD FROM				YEAR				MO				DAY				10-4-86				165-203			
PARAMETER	REPORTED	PERMIT CONDITION	REPORTED	QUANTITY (132-137)			CONCENTRATION (134-139)			FREQUENCY OF ANALYSIS			SAMPLE TYPE										
				MINIMUM (132-133)	AVERAGE (134-135)	MAXIMUM (136-137)	MINIMUM (138-139)	AVERAGE (140-141)	MAXIMUM (142-143)	NO. EX.													
Flow	REPORTED												EST										
	PERMIT CONDITION												EST										
pH	REPORTED												GRAB										
	PERMIT CONDITION												GRAB										
Total Suspended Solids	REPORTED												COMP										
	PERMIT CONDITION												COMP										
Oil and Grease	REPORTED												GRAB										
	PERMIT CONDITION												GRAB										
Total Iron	REPORTED												COMP										
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DISCHARGE MONITORING REPORT

PERMITTEE NAME
 City Water, Light & Power
 Seventh & Monroe
 Springfield, IL 62757
 (217) 786-4052

(4-16) IL 0024767 PERMIT NUMBER		(4-19) 004 DIS		(4-20) SIC		(4-21) LATITUDE		(4-22) LONGITUDE	
(4-23) 01 12 01 1 YEAR MO DAY		(4-24) 01 12 01 1 YEAR MO DAY		(4-25) 01 12 01 1 YEAR MO DAY		(4-26) 01 12 01 1 YEAR MO DAY		(4-27) 01 12 01 1 YEAR MO DAY	

REPORTING PERIOD FROM

PARAMETER	REPORTED PERMIT CONDITION	3 and only (4-28)			QUANTITY (4-29)			CONCENTRATION (4-30)			FREQUENCY OF ANALYSIS (4-31)			SAMPLE TYPE
		AVERAGE	MAXIMUM	NO. TX	AVERAGE	MAXIMUM	NO. TX	AVERAGE	MAXIMUM	NO. TX	UNITS	NO. TX	UNITS	
Flow	REPORTED	6.629	6.629		6.629	6.629								EST
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	PERMIT CONDITION													COMP
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Total Suspended Solids	REPORTED													GRAB
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Oil and Grease	REPORTED													GRAB
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Silver	REPORTED													COMP
	PERMIT CONDITION													COMP
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I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT
 William G. Haring

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter 111 1/2, Section 1942. Disclosure of this information is required. Failure to do so may result in a civil penalty up to \$10,000.00 per violation or a fine up to \$25,000.00 per day of violation and imprisonment.

DISCHARGE MONITORING REPORT

PERMITTEE NAME

City Water, Light & Power
Seventh & Monroe
Springfield, IL 62757
(217) 786-4052

ADDRESS

PHONE

COMMENTS

No discharge during this period.

(10-91)	
008	
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32011011	
YEAR	MO DAY

(10-91)	
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YEAR	MO DAY

REPORTING PERIOD FROM

(12-21)

PARAMETER	QUANTITY			UNITS	CONCENTRATION			UNITS	FREQUENCY OF ANALYSIS	SAMPLE TYPE
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pH	PERMIT CONDITION								1/7	EST
Total Suspended Solids	REPORTED								1/7	GRAB
Oil and Grease	PERMIT CONDITION								1/7	GRAB
Total Iron	REPORTED								1/7	COMP
Dissolved Iron	PERMIT CONDITION								1/7	COMP
	REPORTED								1/7	COMP
	PERMIT CONDITION								1/7	COMP
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111, BREEP-INC

1-27-91 10147401

117 786 3967-

91249356701# 3

JAN-22-1992 09:47 FROM

CMLP MAINTENANCE BLDG

TO

912134935670

P.03

CITY WATER, LIGHT & POWER
3100 Stevenson Drive

EXCESS OPACITY REPORT

Unit(s) Lakeside

Opacity Limit: 30%

#7 Boiler Hours: 212

#8 Boiler Hours: 92

Month/Year: October 1991

Day	Start	Opacity (%)	Cause	Corrective Action Taken
10-2	12:54	35.0	Unknown	

PCU BY/TEEP-110

1 1-27-92 10:45AM

217 788 3967-

9194935870/H10

JAN-22-1992 08:42 FROM

CITY MAINTENANCE BLDG

TO

919194935870

P.10

CITY WATER, LIGHT & POWER
3100 Stevenson Drive

UNIT OPACITY CEM
DOWNTIME REPORT

Unit(s) Lakeside

Month/Year October 1991

Date	Start-End	Component	Cause	Corrective Action Taken
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N O N E

FROM BY:EEF-HMC

1-23-91 1100AM

217 736 39674

91949356701# 3

1991-22-1992 10:01 FROM CULP MAINTENANCE BLDG

TO

919134935670

P.03

CITY WATER, LIGHT & POWER
3100 Stevenson Drive

EXCESS OPACITY REPORT

Unit(s) Lakeside

Opacity Limit: 30%

#7 Boiler Hours: 26

#8 Boiler Hours: 0

Month/Year: November 1991

Day	Start	Opacity (%)	Cause	Corrective Action Taken
11-24	11:12	68.0	Startup #7	
	:18	65.0	"	
	:30	31.0	"	
	:36	58.0	"	
	:42	66.0	"	
	:48	89.0	"	
	13:18	37.0	Shutdown #7	
	:24	34.0	"	
11-25	02:54	34.0	Startup #7	
	03:00	43.0	"	
	:06	43.0	"	
	:12	49.0	"	
	:18	33.0	"	
	:30	42.0	"	
	:36	47.0	"	
	:42	84.0	"	
	:48	55.0	"	
	:54	72.0	"	
	04:00	68.0	"	
	:06	68.0	"	
	:12	56.0	"	
	:18	46.0	"	
	:24	73.0	"	
	:30	89.0	"	
	:36	57.0	"	
	:42	40.0	"	
	:48	36.0	"	
	:54	67.0	"	
	05:00	34.0	"	
	:06	51.0	"	
	:12	59.0	"	
	:18	34.0	"	
	08:06	74.0	"	
	:12	74.0	"	
	:18	62.0	"	
	09:18	64.0	"	
	:24	57.0	"	
	:36	33.0	"	

ENGINEER-111 1-23-92 11:01AM 215
JAN-23-1992 10:01 FROM CMLP MAINTENANCE BLDG TO

Excess Opacity Report
Lakeside - November 1991
Page -2-

Day	Start	Opacity (%)	Cause	Corrective Action Taken
	10:00	58.0	"	
	:12	68.0	"	
	:18	67.0	"	
	11:00	50.0	"	
	:06	60.0	"	

PCV BY:EEB-HC

: 1-22-92 11:00AM :

217 788 3987-

2194935670/H 2

JAN-22-1992 10:01 FROM CMLP MAINTENANCE BLDG

TO

918194935670

P.02

CITY WATER, LIGHT & POWER
3100 Stevenson Drive

UNIT OPACITY CEM
DOWNTIME REPORT

Unit(s) Lakeside

Month/Year November 1991

Date	Start-End	Component	Cause	Corrective Action Taken
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N O N E

CITY WATER, LIGHT & POWER
 3100 Stevenson Drive

EXCESS OPACITY REPORT

Unit(s) Lakeside

Capacity Limit: 30%

#7 Boiler Hours: 168

#8 Boiler Hours: 125

Month/Year: December 1991

Day	Start	Opacity (%)	Cause	Corrective Action Taken
12-2	02:18	39.0	Startup #8	
	:24	35.0	"	
	03:06	33.0	"	
	04:06	35.0	"	
	:30	34.0	"	
	:36	48.0	"	
	09:00	52.0	"	
	:06	67.0	"	
	:12	60.0	"	
	10:00	34.0	"	
	:18	40.0	"	
	:24	51.0	"	
	:30	36.0	"	
	11:00	63.0	"	
	:06	62.0	"	
	:12	40.0	"	
	:18	65.0	"	
	:24	64.0	"	
	:30	59.0	"	
	:36	52.0	"	
	12:30	63.0	"	
	:54	56.0	"	
	13:00	50.0	"	
	:36	48.0	"	
	14:00	37.0	"	
	:06	61.0	"	
	22:24	37.0	Startup #7&8	
	:30	75.0	"	
	:36	84.0	"	
	:42	39.0	"	
	23:00	34.0	"	
	:06	52.0	"	
	:12	62.0	"	
	:18	68.0	"	
	:24	67.0	"	
	:30	62.0	"	
	:36	67.0	"	
	:42	56.0	"	
	:48	69.0	"	
	:54	67.0	"	

Excess Opacity Report
 Lakeside - December 1991
 Page -2-

Day	Start	Opacity (%)	Cause	Corrective Action Taken
12-3	00:00	58.0	Startup #7&8	
	:06	70.0	"	
	:12	65.0	"	
	:18	68.0	"	
	:24	45.0	"	
	:30	62.0	"	
	:36	66.0	"	
	:42	56.0	"	
	05:24	51.0	"	
	:30	52.0	"	
	:36	63.0	"	
	:42	46.0	"	
	:48	54.0	"	
	:54	57.0	"	
	06:00	36.0	"	
	:06	45.0	"	
	:12	71.0	"	
	:18	54.0	"	
	07:30	75.0	"	
	:36	71.0	"	
	:42	49.0	"	
	08:30	33.0	"	
	:36	63.0	"	
	:42	64.0	"	
	:48	41.0	"	
	09:00	58.0	"	
	:06	68.0	"	
	:12	63.0	"	
	:54	50.0	Startup #8	
	10:00	61.0	"	
	:06	63.0	"	
	:12	41.0	"	
12-4	01:42	64.0	Startup #8	
	:48	40.0	"	
	:54	54.0	"	
	02:00	35.0	"	
	:18	32.0	"	
	:24	59.0	"	
	:30	67.0	"	
	:42	32.0	"	
	03:06	34.0	"	
	05:54	36.0	Startup #7	
	06:00	60.0	"	
	:06	38.0	"	
	:18	36.0	"	

JAN-22-1992 11:35 FROM OMLP MAINTENANCE BLDG

TO

919194935670

P.05

Excess Opacity Report
Lakeside - December 1991
Page -3-

Day	Start	Opacity (%)	Cause	Corrective Action Taken
12-4	06:24	60.0	Startup #7	
	:36	31.0	"	
	:42	65.0	"	
	:48	33.0	"	
	:54	36.0	"	
	07:00	66.0	"	
	:06	81.0	"	
12-5	05:36	37.0	Startup #7	
	:42	55.0	"	
	:54	49.0	"	
	06:00	62.0	"	
	:06	74.0	"	
	:12	39.0	"	
	:18	82.0	"	
	:24	86.0	"	
	:30	77.0	"	
	:36	55.0	"	
	:42	55.0	"	
	:48	66.0	"	
	:54	37.0	"	
	07:00	68.0	"	
	:06	40.0	"	
	:12	35.0	"	
	:18	82.0	"	
	:24	35.0	"	
	21:54	34.0	"	
	22:00	75.0	"	
	:06	52.0	"	
	:18	43.0	"	
	:24	47.0	"	
	:54	59.0	"	
	23:12	45.0	"	
	:30	40.0	"	
	:42	39.0	"	
12-6	05:18	65.0	Startup #7	
	:24	50.0	"	
	:30	33.0	"	
	:36	63.0	"	
	:42	33.0	"	
	:54	46.0	"	
	06:00	35.0	"	
	:12	31.0	"	
	:18	50.0	"	
	:24	33.0	"	

CITY WATER, LIGHT & POWER
3100 Stevenson DriveUNIT OPACITY CEM
DOWNTIME REPORT

Unit(s) Lakeside

Month/Year December 1991

Date	Start-End	Component	Cause	Corrective Action Taker
12/17	03:48	Transmissometer	Malfunctioning Board	Replaced ma: board
12/18	05:48			
12/18	09:54	Transmissometer	Malfunctioning Board	Replaced ma: board
12/20	16:00			

APPENDIX C

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 1
Plant: Lakeside Unit No.7
Load: 33 MW
Plant O2 Level: Normal

Date: 30 September 1991

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	HCc PPMV
Avg.	3.43	15.25	7.47	666.96	2,722.42	19.07	15.63	7.65	706.07	2,790.07	19.55
Maximum	3.77	15.57	9.91	816.16	2,925.93	23.26	15.97	10.25	833.64	2,889.46	24.04
Minimum	3.06	14.99	4.93	558.59	2,619.63	15.94	15.42	5.03	570.55	2,673.57	16.28
Std. Dev.	.10	.08	1.22	14.92	28.75	1.68	.04	1.24	14.92	30.07	1.76

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 2
Plant: Lakeside Unit No.7
Load: 33 MW
Plant O2 Level: Normal

Date: 01 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	HCc PPMV
Avg.	3.32	15.27	6.59	697.41	2,741.58	16.83	15.54	6.71	699.86	2,791.28	17.14
Maximum	3.64	15.46	12.50	789.72	2,825.93	18.09	15.69	12.75	715.20	2,867.48	18.44
Minimum	2.93	15.05	5.76	668.70	2,530.52	15.91	15.22	5.80	680.19	2,582.00	15.95
Std. Dev.	.09	.06	.69	7.93	39.67	.43	.05	.71	7.36	42.31	.46

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 3
Plant: Lakeside Unit No.7
Load: 33 MW
Plant O2 Level: Normal

Date: 01 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	HCc PPMV
Avg.	3.53	15.02	7.99	672.67	2,718.22	15.57	15.47	8.24	693.22	2,801.32	16.03
Maximum	5.03	15.44	22.17	700.44	2,883.38	22.69	15.87	22.32	722.59	2,936.98	25.59
Minimum	3.24	13.65	4.74	603.76	2,451.17	10.43	15.29	4.83	663.18	2,764.15	11.44
Std. Dev.	.21	.26	1.89	16.98	55.36	1.39	.35	1.97	12.00	19.46	1.37

Continuous Emissions Monitoring
Thirty Second Average Data

Load: 33 MW
Plant O2 Level: Low

Date: 02 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	1.52	16.88	166.75	663.69	3,010.82	16.62	15.60	153.99	613.17	2,789.10	15.35
Maximum	1.93	17.03	492.92	681.15	3,103.59	21.37	15.86	455.99	630.32	2,950.66	19.74
Minimum	1.32	16.62	44.19	650.88	2,731.93	13.54	15.45	40.65	559.53	2,511.41	12.54
Std. Dev.	.11	.07	91.69	7.68	114.94	2.13	.06	84.63	7.81	108.03	1.95

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 5
Plant: Lakeside Unit No.7
Load: 33 MW
Plant O2 Level: Low

Date: 02 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	2.00	16.48	162.42	691.39	3,060.85	12.31	15.61	150.03	655.84	2,907.09	11.67
Maximum	2.66	17.32	211.77	733.64	3,245.85	13.34	15.96	748.82	709.55	3,130.03	12.94
Minimum	1.31	16.00	2.30	654.79	2,860.65	11.46	15.41	0.04	602.1	2759.13	10.58
Std. Dev.	.45	.40	203.73	24.82	87.77	.51	.05	187.59	37.35	34.38	.57

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 6
Plant: Lakeside Unit No.7
Load: 33 MW
Plant O2 Level: Low

Date: 02 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	2.47	16.00	7.76	726.58	2,957.44	9.37	15.54	7.54	705.86	2,873.20	9.10
Maximum	2.87	16.34	20.75	753.17	3,110.35	15.44	15.62	20.16	724.45	3,022.43	14.80
Minimum	2.16	15.56	4.39	690.92	2,546.39	5.01	15.19	4.25	671.12	2,473.42	4.80
Std. Dev.	.12	.13	2.00	9.13	42.22	1.39	.05	1.91	7.02	42.66	1.32

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 7
Plant: Lakeside Unit No.7
Load: 25 MW
Plant O2 Level: Normal

Date: 03 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	HCc PPMV
Avg.	3.43	15.16	6.53	621.64	2,724.53	10.84	15.58	6.74	638.89	2,779.65	11.14
Maximum	3.71	15.31	13.18	632.09	2,796.63	22.18	15.70	13.54	648.55	2,883.61	22.68
Minimum	3.26	15.00	3.91	603.52	2,496.34	2.14	15.40	4.08	619.46	2,559.60	8.39
Std. Dev.	.09	.06	1.20	4.37	47.30	3.12	.05	1.24	5.12	55.27	3.13

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 8
Plant: Lakeside Unit No.7
Load: 25 MW
Plant O2 Level: Normal

Date: 03 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	HCc PPMV
Avg.	3.50	15.14	5.99	624.38	2,768.66	7.40	15.58	6.16	642.47	2,849.01	7.62
Maximum	3.84	15.44	22.22	650.63	2,879.64	12.00	15.73	22.51	675.15	2,984.97	12.37
Minimum	3.06	14.28	.24	25.63	2,674.56	6.04	14.98	.26	26.59	2,744.30	6.25
Std. Dev.	.14	.14	2.27	47.41	23.36	.84	.05	2.02	48.62	24.89	.85

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 9
Plant: Lakeside Unit No.7
Load: 25 MW
Plant O2 Level: Normal

Date: 03 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	HCc PPMV
Avg.	3.31	15.29	5.99	645.89	2,751.59	6.26	15.56	6.10	657.46	2,831.46	6.99
Maximum	3.59	15.51	9.52	669.92	2,879.64	5.17	15.76	9.65	679.53	2,942.32	8.37
Minimum	3.02	15.05	2.69	615.48	2,677.00	5.39	15.39	2.72	631.40	2,744.30	6.05

Date: 04 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	2.77	15.73	9.48	639.88	3,016.12	8.30	15.56	9.37	632.64	2,982.24	8.20
Maximum	7.21	15.92	44.43	661.87	3,239.75	11.10	20.60	43.40	835.98	3,988.32	10.96
Minimum	2.34	15.53	6.10	607.91	2,684.52	6.68	15.26	5.98	599.42	2,817.73	6.75
Std. Dev.	.63	.08	3.62	9.77	42.36	.59	.65	3.55	27.53	135.49	.61

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average DataTest No. 12
Plant: Lakeside Unit No.7
Load: 25 MW
Plant 02 Level: Low

Date: 04 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	2.66	15.48	19.45	633.91	3,010.81	31.98	15.18	19.72	621.41	2,955.64	31.39
Maximum	6.75	15.84	684.00	666.75	3,200.68	37.00	15.28	646.70	644.37	3,344.59	35.92
Minimum	1.97	11.62	3.17	420.17	2,480.47	27.10	14.70	3.15	494.41	2,653.27	25.99
Std. Dev.	.70	.66	76.78	42.63	112.09	3.23	.09	77.00	24.67	74.23	3.83

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average DataTest No. 13
Plant: Lakeside Unit No.7
Load: 19.5 MW
Plant 02 Level: Normal

Date: 07 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	3.57	15.09	3.12	613.78	2,786.92	16.50	15.59	3.22	634.10	2,796.62	17.05
Maximum	3.99	15.28	8.54	641.11	2,795.41	19.55	15.82	8.79	654.61	2,927.93	20.21
Minimum	3.33	14.72	1.46	591.80	2,597.66	13.95	15.50	1.52	615.02	2,675.97	14.41
Std. Dev.	.11	.09	.79	9.90	45.82	1.28	.04	.02	8.52	44.51	1.34

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 14
Plant: Lakeside Unit No.7
Load: 19.5 MW
Plant O2 Level: Normal

Date: 07 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	3.60	15.06	3.32	635.89	2,754.22	14.56	15.59	3.44	658.00	2,849.90	15.07
Maximum	4.03	15.41	15.63	652.83	2,880.18	25.08	15.75	16.33	674.75	2,981.17	26.05
Minimum	3.20	14.73	1.22	618.65	2,648.93	11.44	15.38	1.24	642.23	2,729.41	11.83
Std. Dev.	.11	.10	1.34	6.70	31.67	1.50	.04	1.40	6.66	29.09	1.55

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 15
Plant: Lakeside Unit No.7
Load: 19.5 MW
Plant O2 Level: Normal

Date: 07 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	3.72	14.83	7.12	624.31	2,732.53	10.46	15.45	7.42	650.34	2,846.77	10.89
Maximum	6.70	15.85	14.16	650.63	2,893.87	52.46	15.97	14.79	685.15	3,139.65	54.37
Minimum	3.20	12.26	2.44	499.02	2,491.46	5.07	15.15	2.56	619.04	2,616.89	5.26
Std. Dev.	.20	.17	2.07	15.16	45.60	6.48	.06	2.18	13.41	49.66	6.74

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 16
Plant: Lakeside Unit No.7
Load: 19.5 MW
Plant O2 Level: Low

Date: 08 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	HCc PPMv
Avg.	2.39	15.99	16.44	624.65	2,922.07	13.09	15.47	15.88	604.21	2,826.29	12.67
Maximum	2.72	16.32	129.15	639.89	3,100.59	14.24	15.65	124.20	617.44	2,962.67	13.77
Minimum	2.04	15.62	6.24	611.33	2,751.46	10.03	15.20	6.60	584.01	2,687.15	9.79
Std. Dev.	.14	.13	3.13	3.13	45.72	.73	.05	19.81	5.43	43.02	.73

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 17
Plant: Lakeside Unit No.7
Load: 19.5 MW
Plant O2 Level: Low

Date: 08 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	H2c PPMv
Avg.	2.23	16.11	11.84	635.16	2,965.64	9.55	15.44	11.39	600.74	2,842.70	9.16
Maximum	2.64	16.59	77.15	673.63	3,063.96	10.65	15.70	73.76	637.62	2,952.10	10.20
Minimum	1.72	15.67	2.20	627.42	2,816.16	8.20	15.11	2.06	585.45	2,707.66	7.80
Std. Dev.	.24	.20	14.63	18.72	45.24	.57	.06	14.81	12.93	29.36	.58

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 18
Plant: Lakeside Unit No.7
Load: 19.5 MW
Plant O2 Level: Low

Date: 08 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	H2c PPMv
Avg.	1.89	16.37	66.31	681.13	3,043.03	7.90	15.42	62.14	641.38	2,865.41	7.44
Maximum	3.41	16.81	636.47	724.85	3,132.32	10.72	16.80	591.21	698.76	3,127.38	10.10
Minimum	1.48	15.94	.73	647.22	2,977.29	6.28	15.02	.70	600.43	2,817.08	5.87
Std. Dev.	.19	.14	119.68	24.23	28.45	.97	.11	111.92	23.27	31.81	.92

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 19
Plant: Lakeside Unit No.7
Load: 25 MW
Plant O2 Level: Low

Date: 08 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMv	NOX PPMv	SO2 PPMv	HC PPMv	CO2c Percent	COc PPMv	NOXc PPMv	SO2c PPMv	H2c PPMv
Avg.	1.90	16.29	96.33	812.76	3,038.24	6.15	15.34	90.59	765.62	2,861.97	5.79
Maximum	2.21	16.53	1,002.20	832.28	3,162.64	7.21	15.59	944.89	780.96	2,990.01	6.75
Minimum	1.35	15.69	2.20	768.55	2,924.60	5.29	14.93	2.27	720.52	2,770.64	4.96

Std. Dev. .17 .12 119.68 24.23 28.45 .97 .11 111.92 23.27 31.81 .92

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 20
Plant: Lakeside Unit No.7
Load: 26.5 MW
Plant O2 Level: Normal

Date: 09 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	H2c PPMV
Avg.	3.36	15.03	6.44	646.19	2,686.24	4.98	15.34	6.57	659.49	2,741.69	5.89
Maximum	3.97	15.39	65.92	678.98	2,883.96	6.24	15.69	66.98	682.12	2,863.48	6.33
Minimum	2.97	14.69	2.44	623.29	2,510.99	3.78	14.94	2.47	642.00	2,558.68	3.91
Std. Dev.	.15	.13	8.87	7.33	61.00	.68	.06	9.02	6.24	66.56	.69

Energy & Environmental Research
Continuous Emissions Monitoring
Thirty Second Average Data

Test No. 21
Plant: Lakeside Unit No.7
Load: 33 MW
Plant O2 Level: Low

Date: 09 October 91

Time 24 hr	CEMS O2 Percent	CO2 Percent	CO PPMV	NOX PPMV	SO2 PPMV	HC PPMV	CO2c Percent	COc PPMV	NOXc PPMV	SO2c PPMV	H2c PPMV
Avg.	2.60	15.59	5.02	771.61	2,917.32	3.88	15.25	5.69	754.81	2,853.14	3.88
Maximum	3.34	15.85	73.97	805.18	2,978.52	5.16	15.72	72.21	785.61	2,938.90	5.03
Minimum	2.27	15.27	.24	728.95	2,799.07	2.98	14.91	.24	715.94	2,731.53	2.82
Std. Dev.	.12	.09	11.79	13.41	28.85	.53	.06	11.51	11.31	26.97	.52

END

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