ENHANCING THE USE OF COALS BY GAS REBURNING-SORBENT INJECTION

Environmental Monitoring Report Illinois Power Company's Hennepin Station Unit 1 Long Term Testing Period September 1, 1991 - January 15, 1993

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1.0 INTRODUCTION

This report summarizes the results of environmental monitoring conducted in a demonstration of Gas Reburning-Sorbent Injection (GR-SI) technology, at Illinois Power Company's Hennepin Station Unit 1. Energy and Environmental Research Corporation (EER) carried out this GR-SI demonstration in a Clean Coal Technology (CCT) Round 1 Program from June, 1987 to January, 1993. The project was completed in three phases: Phase 1 - Design and Permitting, Phase 2 - Construction and Start-Up, and Phase 3 - Operation, Data Collection, Reporting and Disposition. The design of the GR-SI system was completed in March, 1989. Construction and Start-Up were completed in June, 1991 and testing (operation) of the system was initiated immediately after Start-Up. The GR and SI systems were evaluated first with parametric (optimization) tests, from June, 1991 through August, 1991. Following this, the combined GR and SI systems were operated for one year (September, 1991, to September, 1992) with the unit under normal dispatch load control. At the conclusion of the year-long GR-SI demonstration, three alternate sorbents were tested. This report presents environmental monitoring data from the long-term GR-SI testing period; earlier results were presented in quarterly reports.

The goal of the GR-SI demonstration was to reduce acid rain precursor gases, nitrogen oxides (NO_x) and sulfur dioxide (SO_2) , by 60 and 50%, respectively. The combustion of coal at utility power plants contributes significantly to the total emissions of these species. The technology used is Gas Reburning (GR) and Sorbent Injection (SI). GR involves injection of natural gas, accounting for 15 to 25% of the total heat input, in the region above the coal burners. A reburning zone is formed, which is slightly fuel rich, to reduce NO_x to N_2 . Overfire air is injected higher up in the furnace to complete the combustion process. In SI, dry hydrated lime sorbent is injected into the upper furnace for reaction with SO₂. The micron-sized sorbent is injected with carrier air at the furnace exit. Spent and unreacted sorbents are then captured by the normal particulate collection device, an ESP of baghouse fabric filter.

GR-SI demonstrations were conducted at two sites, on units typical of pre-NSPS utility boilers which contribute to emissions of acid rain precursor gases. One demonstration was at a tangentially fired unit (Illinois Power's Hennepin Station Unit 1), results of which are described in this report, while the other was at a cyclone fired unit (City Water Light & Power's Lakeside Unit 7, in Springfield, Illinois). The environmental monitoring data from the other site are presented in separate documents.

In accordance with terms of a cooperative agreement with project sponsors, EER prepared an Environmental Monitoring Plan (EMP) which specified environmental measurements to be taken during each phase of the project. The purpose of environmental monitoring was to verify that project emissions control levels were met, to ensure that there were no adverse impacts on the local environment, and to develop a data base for the GR-SI technology for future applications.

Environmental monitoring was conducted during each phase of the project to determine pre-project (baseline) environmental impacts of operating Hennepin Station Unit 1 and impacts due to GR-SI operation. The monitoring during Phases I (Design and Permitting) and II (Construction and Start-Up) was limited to compliance monitoring of coal analyses, ash sluice system water analysis, and emissions monitoring (NO_x, O₂, CO) for use in the GR-SI system design. The Hennepin Station has been operating under two permits issued by the Illinois Environmental Protection Agency (IEPA). The air emissions source permit limits emissions of SO₂ while the National Pollutant Discharge Elimination System (NPDES) Permit regulates aqueous discharges to the Illinois River. Compliance with the SO₂ limit is determined by analysis of coal samples for theoretical SO₂ level below of 6.0 lb/MBtu. The only aqueous discharge pertinent to this project is Outfall 005, which is the discharge from the ash pond. This was of interest since spent sorbent changes the chemical makeup of the material sluiced to the pond. The compliance monitoring was continued in Phase III (Operation, Data Collection, Reporting and Disposition) and was supplemented with other measurements. These included monitoring of gaseous emissions NO_x , SO_2 , CO, CO₂, and hydrocarbons, N₂O, particulate loading and size distribution, fly ash resistivity, and opacity.

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

1.1 Gas Reburning-Sorbent Injection

Gas Reburning is a combustion modification in which primary (coal) firing to the burners is limited to 75 to 85% of the fuel (corresponding to the total heat release). Nitrogen oxides (NO_x) are formed in the burner region of the furnace from the oxidation of fuel bound nitrogen and from high temperature N₂ fixation in the flame. In GR, the reduction of NO_x to molecular nitrogen (N₂) is accomplished via the downstream injection of the remaining fuel in the form of natural gas (which also reduces the total SO₂ emissions). Natural gas is injected with recirculated flue gas (FGR) through injectors in each corner of the unit. The FGR acts as a carrier to improve reburning fuel jet penetration and reduce mixing time. Sub-stoichiometric combustion of natural gas forms a variety of hydrocarbon fragments and free radicals which reduces NO_x to N₂. In a third stage, burnout air is added at a relatively low temperature in the upper furnace to complete the combustion process without generating significant additional NO_x. Three zones are created in the furnace with the following design stoichiometries: 1.10 (coal burner zone), 0.90 (reburning zone), and 1.18 (burnout zone).

Sorbent Injection (SI) involves dry injection of calcium based sorbents (such as limestone, dolomite, or hydrated lime) into the upper furnace. The micron-sized sorbent is injected with carrier air through multiple ports on the boiler front and side walls. In the furnace, the sorbent undergoes calcination to form highly reactive calcium oxide (CaO), which then undergoes sulfation to form calcium sulfate (CaSO₄) and sulfite (CaSO₃) solids. Sulfation reactions occur at temperatures of 2200°F down to 1600°F. The sorbent is typically input at a rate corresponding to a Ca (sorbent) to sulfur (coal) ratio of 2.0. Sorbent/SO₂ reactions can also take place at lower temperatures. Thus, it is possible to inject sorbent 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 spent and unreacted sorbent are collected together with the fly ash by the electrostatic precipitator. SO_2 reduction of at least 50% was expected from both sorbent-SO₂ capture and from replacement of coal with sulfur free natural gas.

1.2 Description of Host Boiler

The host unit is a 71 MW_e (net) tangentially fired unit, supplied by Combustion Engineering. At its normal continuous rating the unit produces 525,000 lb/hr of superheated steam at a temperature of 1005°F and a pressure of 1500 psig. It has a reheat steam cycle which reheats 462,000 lb/hr of steam also to a temperature of 1005°F. It was commissioned in 1953 and fires a high sulfur (approximately 3%) Midwestern bituminous coal. Coal is pulverized to a specification of 70% passing 200 mesh U.S. Standard Sieve, then fired through three levels of tangential nozzles. Coal combustion takes place in a swirling zone in the furnace. The combustion gases then flow through the convective pass consisting of a secondary superheater, high temperature reheater, primary superheater, low temperature reheater, economizer, and regenerative air heater. The unit is equipped with an ESP, which provides 223 ft²/1000 actual cubic feet of flue gas per minute, at the units rated capacity. The ESP limits particulate emissions to well below the 0.1 lb/MBtu limit. Combustion gases then are discharged to the stack.

2.0 ENVIRONMENTAL MONITORING

Environmental monitoring was conducted in each phase of the project. The purpose of the monitoring was to ensure that GR-SI operation was conducted in an environmentally acceptable manner and to establish a data base of environmental parameters for use in future applications of technology. Monitoring in Phases I and II entailed compliance monitoring of ash sluice discharge water, coal analyses, and limited emissions characterization for the purposes of GR-SI process design. The measurements are shown in Table 2-1. The Phase III monitoring was aimed at obtaining a full range of measurements to determine process efficiency and impacts on gaseous or aqueous discharges. The supplementary measurements are listed in Table 2-2. The measurements of NO_x and SO_2 emissions were of primary importance to verify that project target emissions reductions were met. Other measurements were used to characterize combustion completion (CO), ESP performance (particulate matter), and other species which may be impacted by GR-SI at a coal fired unit. EPA reference methods were used to verify the accuracy of continuous emissions measurements.

3.0 **RESULTS DISCUSSION**

The Environmental Health, Safety and Socioeconomic (EHSS) impacts of the GR-SI demonstration on the local region are discussed in this section. Following this, the results of environmental monitoring are presented. Impacts of GR-SI on the quality of water discharged from the site and in groundwater wells are discussed. The characteristics of the major waste product of GR-SI, solid fly ash/spent sorbent, are then discussed. The air

TABLE 2-1. HENNEPIN UNIT 1 COMPLIANCE MONITORING

AIR EMISSION SOURCE OPERATING PERMIT

MEASUREMENT Coal composition sulfur, ash, Btu, moisture SAMPLE TYPE 24 hour composite

FREQUENCYmpositeDaily

LOCATION Coal hoppers

NPDES PERMIT

MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
Flow Rate	Single reading estimate	Once/wk	Existing ash pond discharge
рН	Grab sample	Once/wk	Existing ash pond discharge
Total Suspended Solids	24 hour composite	Once/wk	Existing ash pond discharge
Oil and Grease	Grab sample	Twice/mo	Existing ash pond discharge

TABLE 2-2. SUPPLEMENTAL EMISSIONS MONITORING

MEASUREMENT

<u>SAMPLE TYPE</u>

LOCATION

<u>PHASE I</u>

Preliminary	NOx
	0 ₂ "
	СŌ
PHASE 1	II

Continuous (7E) Continuous (3A) Continuous (10) Economizer Inlet Economizer Inlet Economizer Inlet

No measurement

PHASE III

<u>FIIAS</u>			
Baseline	NO _x	Continuous (7E)	Econ Outlet or Stack Breeching
	SO ₂	Continuous (6C), Method 6	Econ Outlet or Stack Breeching
	CO	Continuous (10)	Econ Outlet or Stack Breeching
	CO ₂	Continuous (3A) Method 3	Econ Outlet or Stack Breeching
	0 ₂	Continuous (3A) Method 3	Econ Outlet or Stack Breeching
	Particulate	Method 17	ESP Inlet
	Particulate	Method 5	ESP Outlet
	Particle Size	Cascade Impactors	ESP Inlet and Outlet
	Distribution		
	_		
	Resistivity	Cyclonic flow probe	ESP Inlet
	Velocity	Method 2	ESP Inlet
	Opacity	In-situ optical	Stack Breeching
	N ₂ O	Extractive	Stack Breeching
Parametri	c NO.	Continuous (7E)	Econ Inlet or ESP Outlet
	so ₂	Continuous (6C)	Econ Inlet or ESP Outlet
	CO	Continuous (10)	Econ Inlet or ESP Outlet
	CO ₂	Continuous (3A)	Econ Inlet or ESP Outlet
	0 ₂	Continuous (3A)	Econ Inlet or ESP Outlet
	НĊ	Continuous (25A)	Econ Inlet or ESP Outlet
	Particulate	Method 17	ESP Inlet
	Particulate	Method 5	ESP Outlet
	Particle Size	Cascade Impactors	ESP Inlet and Outlet
	Distribution		

Resistivity	Cyclonic flow probe	ESP Inlet
Velocity	Method 2	ESP Inlet
Opacity	In-situ optical	Stack Breeching
N ₂ O	Extractive	Stack Breeching

TABLE 2-2. SUPPLEMENTAL EMISSIONS MONITORING (CONTINUED)

Long Term Operation	NO _x SO ₂ CO CO ₂ O ₂ HC Particulate Particulate Particulate Particle Size Distribution	Continuous (7E) Continuous (6C), Method 6 Continuous (10) Continuous (3A), Method 3 Continuous (3A), Method 3 Continuous (25A) Method 17 Method 5 Cascade Impactors	Stack Breeching Stack Breeching Stack Breeching Stack Breeching Stack Breeching Stack Breeching ESP Inlet ESP Outlet ESP Inlet and Outlet
	Resistivity	Cyclonic flow probe	ESP Inlet
	Velocity	Method 2	ESP Inlet
	Opacity	In-situ optical	Stack Breeching
	N ₂ O	Extractive	Stack Breeching

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emissions measured during the GR-SI demonstration are then presented. Finally, the impacts of GR-SI on worker health is addressed.

3.1 EHSS Impacts

The EHSS impacts of the GR-SI demonstration were addressed prior to initiation of the project and evaluated during the testing phase. Health concerns for Hennepin Station personnel due to the GR-SI demonstration were limited to two areas: noise from GR-SI equipment and potential hazards in handling sorbent. The GR-SI system includes four fans. Data on the noise levels of three of the four were available and indicated that they produce noise levels below that considered an audiometric hazard (85 decibels - averaged over 8 hours) at the fan casing. Data on noise from operation of the other fan were not available, but this was expected to be minor in relation to background station noise. The other health concern was from handling of sorbent. The sorbent is an alkaline material and is a known irritant. The transport system used to carry the sorbent to the silo incorporated features to limit fugitive dust emissions. The silo vent is equipped with a fabric filter to prevent fugitive dust emissions. In addition, specific handling techniques were developed in case project or IP personnel were required to directly handle the sorbent. This included use of tight goggles and dust masks, which have been required for employees handling sorbent at EER's Santa Ana Test Facility.

The socioeconomic impacts were also predicted prior to initiation of the project. The impacts of the GR-SI demonstration on the area surrounding the Hennepin Station were determined to be minor. The project required delivery of two truckloads of sorbent per week, but the transportation route was planned along a major highway and not along small residential streets. The added traffic was very minor in comparison to the 1800 vehicles which daily traversed nearby Interstate Highway 180. Economic impacts to the area were expected to be minor. A majority of the testing personnel involved in the GR-SI demonstration at Hennepin were from outside of the local area; they were EER personnel based in the Orrville, OH office. These included the Phase II construction manager and the Phase III GR-SI testing personnel. Some support, particularly in Phase II, was provided by local personnel. The use of local personnel and purchased materials had small positive impacts on the local economy.

The energy and material requirements are part of the socioeconomic impacts. Full load GR-SI operation resulted in an increase in auxiliary power of approximately 300 kW. This is 0.4 percent of the generating capacity of Unit 1 and 0.26 percent of the station capacity. Therefore, GR-SI had a negligible impact on the electric energy availability in the area. The project resulted in a reduction in coal usage due to firing 18 percent gas and due to the demand-related reduction in capacity factor from approximately 62 to 34 percent. These resulted in a reduction in coal usage by Unit 1 from approximately 184,000 to 98,000 tons/year. The full load GR-SI design natural gas input was 2240 scfm and the average natural gas consumption over the long-term testing period was 1930 scfm. GR with 2240 scfm of natural gas at a capacity factor of 34 percent, results in a total annual consumption of 400 MSCF. Capacity exists to deliver 3,400 billion SCF of natural gas annually to the U. S. market over current consumption;

therefore the natural gas used is a very small percentage of available natural gas. Full load GR-SI at a Ca/S molar ratio of 2.0 required sorbent input at a rate of 7,200 lb/hr. At a capacity factor of 34 percent, the annual sorbent usage is 10,720 tons.

3.2 <u>Water Quality</u>

Aqueous discharges from the Hennepin Station are regulated by the National Pollutant Discharge Elimination System (NPDES) permit. A modified permit was issued by the Illinois Environmental Protection Agency (IEPA) on June 2, 1989. It specified discharge limits and monitoring requirements for the following sources of discharge water:

Stream Number	Discharge Stream
001	Condenser Cooling Water
001 (a)	Boiler Blowdown
001 (b)	Intake Screen Backwash
001 (c)	Roof Drain Discharge
003	Ash Lagoon #2 and #4 Discharge
005	Ash Lagoon #3 Discharge
005(a)	Chemical Metal Cleaning Waste
	Treatment System Effluent

The GR-SI demonstration potentially impacted only Stream No. 005, which contains the bottom and fly ash transport water from Unit 1. Unit 1 sluice water was estimated to be 0.35 Million Gallons per Day (MGD), but was expected to increase to 0.69 MGD during full load GR-SI operation. The permit specified the frequency and type of sampling required to verify that the following maximum discharge limits were not exceeded:

pH	Minimum: 6	Maximum: 9
Total Suspended Solids (TSS)	Average: 15.0 mg/l	Maximum: 30.0 mg/l
Oil and Grease:	Average: 15.0 mg/l	Maximum: 20.0 mg/l

The permit also specified limits of thermal impacts on the main river water. A maximum temperature rise of $5^{\circ}F$ above the natural temperature and maximum temperatures of 60 to 90°F, depending on the month, are also specified.

Application of GR-SI to Hennepin Unit 1 was expected to change the nature and quantity of ash produced, but expected impacts on the ash pond discharge water makeup were expected to be minor. The GR-SI ash is fully characterized in the following section. Only a minor impact on Total Suspended Solids (TSS) was expected, since the sorbent size is smaller than normal fly ash, with a mean particle diameter of 5 microns, and has a lower settling rate. But with proper retention time in the pond, any increase in total suspended solids was expected to be minor. Injection of CO_2 was used to bring the pH to the acceptable range, and no impact on the oil or grease was expected. Some increase in sulfates was expected since a fraction of the spent sorbent sluiced with fly ash is $CaSO_4$.

The compliance monitoring conducted by IP during long-term GR-SI testing indicated no discharge from the ash pond. The existing pond is unlined, resulting in flow into the ground instead of discharge to the Illinois River. The monitoring sheets, submitted to IEPA, are attached in Appendix A. During the first quarter of 1992, eight sluice water samples were taken during baseline operation and five during GR-SI operation. The pH of all samples was in the 6 to 9 range.

Supplemental analyses of ash sluice water were conducted. Samples taken during baseline operation as well as the long-term testing period were analyzed and the results are shown in Table 3-3. The results indicate low metals content, with most metals not detected. Moderate levels of sulfates, Fe, and CaO were detected. The sluice water concentrations are not required to conform to the limits stated above since those apply to water discharged to the Illinois River and no discharge took place during the long-term testing period.

Supplemental monitoring of groundwater was also conducted. The groundwater sampling data for sulfite, sulfate, nitrate as nitrogen, nitrite as nitrogen, total dissolved solids, boron, chloride, etc., are presented in Table 3-4. The groundwater concentration standards depend on the classification. Class I and Class II groundwater have standards for total dissolved solids (TDS) of 1200 mg/l and sulfate of 400 mg/l. Application of GR-SI to the unit had the potential to increase sulfate concentration in the discharge water, from sluicing of solid CaSO₄. Elevated groundwater concentrations of sulfates, relative to the standards, were measured in some of the wells.

3.3 <u>GR-SI Ash Characteristics</u>

GR-SI operation resulted in an increase in the quantity and a change in the makeup of the ash produced. Under GR-SI operation at a Ca/S of 2.0, approximately 7,200 lb/hr of sorbent was injected. The sorbent reacted with flue gas SO_2 and oxygen to produce calcium sulfate and calcium sulfite. Over the long-term GR-SI demonstration period the average calcium utilization was 24%, with the remainder of the sorbent passing through as unreacted lime (CaO).

Changes in ash characteristics were evaluated by firing coal representative of the normal supply at the Hennepin Station in a pilot scale test furnace, under conditions designed to simulate baseline and GR-SI conditions. The ash produced was then evaluated for characteristics shown in Table 3-5. The ash analyses were compiled in a document entitled "Pilot Scale Ash Characterization Test Report for IP Hennepin Station, Unit 1", which was issued in December 1988. The results of ash characterization with respect to composition, pozzolanic activity (compressive strength in a cement mix), temperature rise upon addition of water, and leaching properties are summarized below.

TABLE 3-3. SLUICE WATER ANALYSES

(BASELINE OPERATION)

24 hour Composite Samples Sampling Period		From: 8:30 7/20/92 To: 8:30 7/21/92				8:30 7/22/92 :30 7/23/92		
Parameter	<u>Units</u>	Method	<u>MDL</u>	<u>Result</u>	Method	MDL	<u>Result</u>	
Arsenic [As] (total)	mg/1	SW6010	0.1	ND	SW6010	0.2	ND	
Barium [Ba] (total)	mg/1	SW6010	0.003	0.022	SW6010	0.1	4.2	
Cadmium [Cd] (total)	mg/1	SW6010	0.007	ND	SW6010	0.1	ND	
Chromium [Cr] (total)	mg/1	SW6010	0.025	ND	SW6010	0.2	1.6	
Lead [Pb] (total)	mg/1	SW6010	0.085	ND	SW6010	0.2	ND	
Selenium [Se] (total)	mg/1	SW6010	0.2	ND	SW6010	0.5	ND	
Silver [Ag] (total)	mg/1	SW6010	0.01	ND	SW6010	0.2	ND	
Iron [Fe] (total)	mg/1	SW6010	0.017	0.18	SW6010	0.34	1100	
Manganese [Mn] (total)	mg/1	SW6010	0.003	ND	SW6010	0.1	3.2	
Mercury [Hg] (total)	mg/1	SW7470	0.005	ND	SW7470	0.001	ND	
Boron [B] (total)	mg/1	SW6010	0.25	8.56	SW6010	0.5	ND	
Calcium Oxide	mg/1	SW6010	0.3	110	SW6010	0.5	1800	
Copper [Cu] (total)	mg/1	SW6010	0.012	ND	EPA200.7	0.2	0.8	
Nickel [Ni] (total)	mg/1	SW6010	0.034	ND	EPA100.7	0.2	1.25	
Zinc [Zn] (total)	mg/1	SW6010	0.004	ND	EPA200.7	0.2	6.46	
Total Dissolved Solids								
(Filt. Residue)	mg/l	EPA160.1	5	620	EPA160.1	5	1100	
Total Suspended Solids	-							
(Non-Filt Residue)	mg/l	EPA160.2	5	5600	EPA160.2	5	20000	
Sulfate	mg/1	EPA375.4	5	230	EPA375.4	5	390	
Oil and Grease (grav)	mg/1	EPA413.1	2	ND	EPAA413.1	2	ND	
pH (lab)	Š	SW9040		9.21				

MDL: Method Detection Limit

ND: Not detected at a concentration greater than or equal to the MDL

TABLE 3-3. ASH SLUICE WATER ANALYSES (CONTINUED)(LONG TERM DEMONSTRATION PERIOD)

Date	1/6/92	1/6/92	1/7/92	1/8/92	1/9/9 2	1/9/92
Test	-		BL	BL	GR	GR
рН	11.08	11.61	11.28	11.15	11.11	11.30
Dissolved Solids(mg/l) 1500	1200	2100	1400	2800	3800
Suspended Solids	(mg/l)5500	10000	5000	4500	2000	1400
Sulfates (mg/l)	480	390	780	500	670	530
Oil, Grease (mg/	l) ND	ND	ND	ND	ND	ND
<u>Metal (mg/kg)</u>						
As Ba Cd Cr Pb Se	ND 5.9 ND ND ND ND	ND 3.8 ND ND ND ND	ND 9 ND ND ND ND	ND 5.6 ND ND ND ND	ND 5.4 ND ND ND ND	ND 4.4 ND ND ND ND
Ag Fe Mn	ND 450 5.4	ND 320 3.6	ND 780 8.0	ND 530 4.5	ND 360 5.0	ND 330 3.9
Hg B CaO	ND 50 74	ND 30 53	ND 74 110	ND 50 66	ND 54 1600	ND 40 1200

ANALYSES	
GROUNDWATER	
TABLE 3-4.	

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		_	_	_	_	_		-	-			÷	_		_	_			_			_		_	
Mn mg/1	130	23	230	98	<5	<5	120	1400	120	120	<2	110	001	17	460	63	<5	540	140	26	230	92	<5	130	
Ca mg/1	110	160	001	140	89	87	001	130	130	130	74	100	98	108	87	110	77	87	87	88	170	96	78	89	
NO ₃ - mg/1	< 0.05	0.1	0.1	< 0.05	8.2	0.6	< 0.05	< 0.05	0.1	< 0.05	8.3	0.1	< 0.05	0.1	< 0.05	< 0.05	8.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	8.0	< 0.05	
Cl mg/1	52.0	69.2	36.2	66.6	27.8	27.6	51.7	87.7	50.6	61.3	23.6	52.2	53.8	81.3	39.8	60.09	26.1	43.1	43.2	87.4	39.5	60.2	24.8	45.3	
NO ₂ mg/1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
SO4 mg/1	95	450	480	190	120	90	260	320	250	350	77	240	280	402	241	395	73	239	230	560	250	400	76	230	
B mg/1	5.1	14.0	3.4	5.0	1.7	2.0	5.9	13.0	5.0	6.7	1.5	5.6	6.4	12.5	4.4	7.5	1.8	4.7	4.6	12.2	4.8	7.4	1.6	5.1	
TDS mg/1	700	966	600	820	410	410	730	800	750	870	410	720	738	824	663	867	418	969	609	1048	639	868	395	610	
SO ₃ mg/1	< 0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	< 0.5	<0.5	< 0.5	< 0.5	0.6	<0.5	< 0.5	<0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5	
Temp °C	12.5	13.5	13.2	12.9	12.1		14.4	14.1	14.9	14.4	12.9		12.9	12.6	12.5	12.5	11.1	*	12.9	12.1	12.1	12.9	11.5		
Hq	7.3	8.6	7.2	7.8	7.3	1	7.4	8.8	7.4	7.3	7.4		7.4	8.9	7.4	7.3	7.9		7.1	7.1	7.1	7.1	7.0	4	
Water Level	446.21	446.52	447.98	446.72	446.52	1	444.73	445.28	445.44	445.35	444.99		447.97	448.23	448.40	448.36	444.99	1	449.51	449.61	450.23	449.99	449.71	1	
Well #	W1	W2	W3	W4	W5	W5rep	N N	W2	W3	W4	W5	Wirep	۲N	W2	W3	W4	W5	W3rep	۲I ۱۸	¥2	W3	W4	W5	W3rep	
Sample Date	2/5/92	2/5/92	2/5/92	2/5/92	2/5/92	2/5/92	8/25/92	8/25/92	8/25/92	8/25/92	8/25/92	8/25/92	11/17/92	11/17/92	11/17/92	11/17/92	11/17/92	11/17/92	2/2/93	2/2/93	2/2/93	2/2/93	2/2/93	2/2/93	

TABLE 3-4. GROUNDWATER ANALYSES (continued)

Sample Date	Well #	Water Level	Hd	Temp °C	SO ₃ mg/1	TDS mg/1	B mg/1	SO4 mg/1	NO ₂ mg/1	Cl mg/1	NO ₃ - mg/1	Ca mg/1	Mn mg/1
5/18/93	W1	448.23	7.0	14.0	<0.5	720	5.6	270	0.02	52.4	< 0.05	94	140
5/18/93	W2	448.18	8.6	15.1	< 0.5	920	11.4	420	0.02	77.2	1.0	130	25
5/18/93	W3	449.00	7.2	14.2	< 0.5	069	4.6	260	0.02	42.0	< 0.05	16	270
5/18/93	W4	448.84	7.2	14.4	<0.5	850	7.7	430	0.02	69.69	< 0.05	110	120
5/18/93	W5	448.53	7.3	11.6	< 0.5	450	1.8	130	0.02	38.0	6.1	81	< 5.0
5/18/93	W2rep	1	ł		<0.5	910	11.6	470	0.02	76.6	1.2	120	27
8/17/93	۸I ۷	448.22	7.4	14.2	< 0.5	790	5.8	300	0.02	56.6	< 0.05	92	130
8/17/93	W2	448.27	8.9	13.3	< 0.5	920	9.7	490	0.02	70.2	0.95	92	16
8/17/93	W3	448.78	7.3	13.5	< 0.5	850	4.9	320	0.02	52.8	< 0.05	78	870
8/17/93	W4	448.77	7.4	14.2	< 0.5	906	7.6	430	0.02	73.0	< 0.05	94	130
8/17/93	W5	448.47	7.3	11.8	<0.5	610	2.5	240	0.02	56.2	3.8	83	< 5.0
8/17/93	W5rep	-	1	1	< 0.5	611	2.3	230	0.02	56.4	4.1	94	<5.0
													-
Average		447.73	7.55	13.1	<0.5	717	6.0	286	0.02	53.7	1.7	102	210

TABLE 3-5. ASH ANALYSIS PARAMETERS.

PARAMETER	METHOD	AN	MPLES ALYZED
Temperature Rise on Addition of Water	ASTM D4326	<u>BL</u> X	<u>GR-SI</u> X
Sulfate	ASTM D1757		Х
Phenols	Std Methods for Water and		Х
	Wastewater (SMWW) Method 510		
Sulfide	SMWW 427		Х
Chloride	SMWW 407C		Х
Cyanide	SMWW 412		x
Total Organic Carbon	ASTM D429		Х
Chemical Oxygen Demand	ASTM D1252		х
EP Tox - Metals, Ph	Ref: EPA SW-846	Х	х
Paint Filter Test	Ref: EPA SW-846		х
Specific Gravity	ASTM C188, C618		х
Apparent Loose Density	ASTM C110-85, Section 15	х	x
Apparent Packed Density	ASTM C110-85, Section 16	Х	x
Fineness	ASTM 430, C618		x
Temperature Rise on Addition of Water	ASTM C110-85, Section 10	х	x
Pozzolanic Activity	ASTM C311, C618		Х
Increase of Drying Shrinkage	ASTM C311, C618		х
Autoclave Expansion	ASTM C151, C618		х
Water Requirement	ASTM C311, C618		Х
Settling Rate of Water	ASTM C110-85, Section 9	Х	Х

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The baseline ash (without GR-SI) contained approximately 55 percent silica, 21 percent alumina, 12 percent ferric oxide, and various other materials and trace minerals. The GR-SI ash was approximately 50 percent spent sorbent, with 42 percent calcium oxide and 6 percent sulfur trioxide (calcium sulfate), 28 percent silica, 11 percent alumina, and 6 percent ferric oxide. The high CaO content influenced several characteristics including pozzolanic activity and temperature rise upon addition of water.

Pozzolanic activity was evaluated by two tests, a 7-day and 28-day test. The evaluation involves replacement of 35 percent of a cement mixture with the material to be tested. The results of the 7-day test indicated a compressive strength of 505 psi. The 28-day test results are presented as a percentage of the control (pure cement case). The extended test hardness was 127 percent of the control, i.e. 27 percent stronger than pure cement. Therefore, the fly ash/sorbent mixture has cementitious properties, hardening to a very strong material.

Another characteristic affected by the high CaO content is the temperature rise upon addition of water. The baseline ash showed a temperature rise of only 0.5°C upon addition of water, while addition of water to GR-SI ash resulted in a temperature increase of 9°C. The weight ratio of water to ash in these evaluations was approximately 4:1, which is significantly less than the 17.6:1 used in sluicing the ash. Therefore, the actual water temperature rise was significantly less than determined by this test.

The leaching characteristics of the ash were evaluated in an EPA EP toxicity test. The metal content and the limits requiring classification as a hazardous material, are presented in Table 3-6. Both baseline and GR-SI ash have metal contents far below the EPA hazard level. Reductions in leaching of Cadmium and Chromium from GR-SI ash relative to baseline ash were measured. It would be expected that leachate from GR-SI ash would have lower metals content than baseline fly ash since the sorbent is over 90 percent calcium hydroxide. Also, for EP toxicity tests, the higher pH of this GR-SI ash binds the heavy metals, making them significantly less prone to leaching.

3.4 Gaseous Emissions

The IEPA limits gaseous emissions of SO_2 to 17,050 lb per hour, from Units 1 and 2. Compliance monitoring of coal analyses is required with a level below 6.0 lb/MBtu indicating compliance. During the first three quarters of 1992, the coal sulfur contents were: Quarter 1, 1992 -- 5.26 lb/MBtu, Quarter 2, 1992 -- 5.30 lb/MBtu, Quarter 3, 1992 -- 5.32 lb/MBtu. GR-SI operation resulted in reduction in emissions of SO_2 , NO_x , CO_2 , HCl, and HF, while CO emissions were maintained generally below 100 ppm. Over the long-term GR-SI testing period, the average emissions and reductions from Unit 1 were:

	<u>Emissio</u>	<u>ns (1b/N</u>	<u>/1Btu)</u>			Redu	ction Fro	om Baseli	ine(%)
<u>SQ</u> 2 2.510		-		<u>HF</u> 0.00010	-	~		<u>HC1</u> 73.0	

TABLE 3-6. RCRA EP CHEMICAL CHARACTERIZATION

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	<u>BASELINE_ASH</u>	<u>GR-SI ASH</u>	EPA HAZARD <u>LEVEL</u>
Arsenic (mg/l)	< 0.1	< 0.1	5.0
Barium (mg/l)	< 0.2	< 0.2	100.0
Cadmium (mg/l)	0.08	< 0.01	1.0
Chromium (mg/l)	1.26	0.14	5.0
Hexavalent Chromium, Cr ⁺⁶ (mg/l)	< 0.2	< 0.4	
Lead (mg/l)	< 0.05	< 0.05	5.0
Mercury (mg/l)	< 0.0005	< 0.0005	0.2
Selenium (mg/l)	< 0.1	< 0.1	1.0
Silver (mg/l)	0.02	0.08	5.0
Sample Weight (g)	100.02	100.04	
Volume of 0.5 N acetic acid required for pH adjustment (ml)	200	400	
Volume of deionized water added to the extract (ml)	1800	1600	
Final volume of the extract (ml)	2000	2000	
Initial pH	10.44	12.22	12.5
Final pH	4.86	12.14	

All of the above emissions were measured, with the exception of the CO_2 emissions rate which was calculated based on natural gas and coal composition. The HCl and HF emissions and reductions are the median of measured data during GR-SI operation.

 N_2O emissions were also measured during the first quarter of 1992, under baseline, SI, and GR-SI operation. The average N_2O emissions were: 0.8 ppm (baseline), 1.4 ppm (SI), and 1.6 ppm (GR-SI). These levels are very low, indicating that GR-SI operation results in insignificant emissions of N_2O .

Fly ash resistivity measurements indicated an increase from the baseline range of $3x10^{10}$ to $8x10^{10}$ ohm-cm, to the range of $6x10^{10}$ to $3x10^{11}$ ohm-cm under GR-SI. However, flue gas humidification, used when injecting sorbent, enhanced ESP performance.

Particulate matter sampling was conducted during baseline, GR, and GR-SI operation. The maximum emissions rate was 0.035 lb/MBtu, measured during baseline operation. Flue gas humidification was successfully applied, resulting in particulate emissions in the 0.015 to 0.025 lb/MBtu under full-load GR-SI operation. A small increase in the fraction of the PM_{10} was observed for GR-SI emissions. During full-load GR-SI operation the fraction of particulate matter under 10 microns was approximately 75 to 90 percent of the outlet loading. This may be compared to a baseline PM_{10} fraction of approximately 60 to 75 percent. But since the total mass of particulate emissions are reduced by a small amount [GR-SI Full Load Average: 0.021 lb/MBtu, Baseline Full Load Average: 0.026 lb/MBtu] this change in the fraction of PM_{10} did not increase the total mass of PM_{10} emitted.

3.5 Worker Health

Monitoring of noise levels near the unit was conducted during GR operation in January, 1992. The noise levels were measured at several locations including, near the sootblower air compressor, west of the overfire air duct on the 5th floor, and in the sorbent fan area on the 4th floor. The audiometric device used was a Bruel & Kjaer Model Number 2205. The results indicate that noise exceeded the Department of Labor's Occupational Safety and Health Administration (OSHA) noise 'action limit' of 85 decibels (applied over an 8-hour period) only near the sootblower air compressor. While the noise level exceeded 85 decibels at this location, employees are only briefly at this location during eight hour period. Audiometric hazard warning signs have been posted on the sootblowing air compressor and on the entry doors to the sorbent silo.

TABLE 3-7. NOISE LEVELS NEAR HENNEPIN UNIT 1

<u>Date</u>	Test Location	Test Condition	Noise (db)
1/14/92	Sootblower Air Compressor (In-Service) GR	99
1/14/92	Fourth Floor, west side of boiler	GR	79
1/14/92	Fifth Floor, west of OFA duct	GR	79

OSHA has also established a standard for total dust exposure of 15 mg/m³ and standard for coal dust of 2.4 mg/m³, above which employees should not be exposed for more than 8 hours. Ambient air sampling was conducted in January, 1992. The results indicate very low dust levels as shown in the following table:

TABLE 3-8. AMBIENT DUST LEVELS OUTSIDE OF PLANT

<u>Date</u>	Filter Number	Location	<u>TSP (μg/m³)</u>	Plant Contribution $(\mu g/m^3)$
1/14/92	1453	upwind	16.7	5.2
1/14/92	1452	downwind	21.9	
1/18/92	1455	upwind	21.4	1.1
1/18/92	1454	downwind	22.5	
1/21/92	1456	upwind	63.2	Negligible*
1/21/92	1457	downwind	36.2	
1/22/92	1459	upwind	39.5	Negligible*
1/22/92	1558	downwind	20.5	-

TSP: Total Suspended Particles

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*: High background contribution from neighboring plant facility

Air sampling in several work areas was also conducted. The results indicate that dust levels are below 15 mg/m³ in all areas with the exception of inside the lime silo. High dust levels would be expected in this location, requiring use of protective dust masks.

TABLE 3-9. AMBIENT DUST LEVELS INSIDE OF PLANT

Date	Location	Operating Condition	Dust Concentration (mg/m ³)
1/14/92	Inside lime silo	GR	33.8
	Fifth Floor	GR	7.43
1/17/92	Inside lime silo	Baseline	8.14
	Fifth Floor	Baseline	3.22
<u>Date</u>	Location	Operating Condition	Dust Concentration (mg/m ³)
1/21/92	Inside lime silo	GR-SI	12.6
	Fifth Floor	GR-SI	1.37

While the high dust level inside the lime silo was measured during GR operation, the high dust level may be attributed to GR-SI operation during the previous day.

4.0 PERMIT CONSIDERATIONS

Permitting considerations for the Hennepin Unit 1 GR-SI demonstration project were considered at the beginning of the project. The analysis focused on determining the necessary permitting changes for installation and operation of the GR-SI system. Several permanent and temporary modifications required consideration, including:

- temporary reductions in NO_x and SO₂
- possible temporary increase in PM₁₀
- possible increase in stack gas temperature
- discharge of ash/sorbent sluice water
- permanent humidification capability
- permanent sorbent injection capability

The temporary reductions in NO_x and SO_2 emissions due to GR-SI operation had the potential for application of NSPS or PSD provisions of the CAA upon completion of the program, when the emissions would rise to original levels. Section 60.14 of Title 40 of the Code of Federal Regulations (40 CFR 60.14) states that "any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification" necessitating permitting of the facility as a new source. In addition, 40 CFR 52.21 indicates that an increase in NO_x or SO_2 emissions of 40 tpy (36 ton/a) makes a source subject to PSD provisions of the CAA. But, since the primary purpose of the retrofit was to control gaseous emissions, it was expected that EPA would rule that the retrofit was not a modification requiring new emissions standards.

A modified permit to construct was issued by the IEPA on May 27, 1992. The permit granted construction of a flue gas humidification system, a sorbent silo with fabric filter, a sorbent surge tank with a fabric filter, a multiclone in the flue gas recirculation line, and the sorbent injection system. The permit also stated the following:

- The construction and operation of the Clean Coal Technology (CCT) program does not constitute a modification as defined in 40 CFR 60.14. Since the equipment installed has the primary function of reducing air pollutants, under 40 CFR 60.14 (e) (5), it is exempt from being considered a modification.
- Annual emissions of particulate matter and PM₁₀ during the CCT demonstration program shall not increase more than 24.9 and 14.9 tons, respectively, above the pre-CCT demonstration levels. Accordingly, the CCT project does not constitute a major modification for purposes of 40 CFR 52.21.
- The Clean Coal Technology (CCT) demonstration project shall be limited in operation to one year, provided that this project may be formally extended by

the Agency, if necessary, to complete the CCT demonstration program but not to exceed 5 years including time needed to restore the boiler to original operating conditions. The limited operation period classifies the project as temporary.

- As a temporary demonstration project, emissions from this unit during the demonstration project shall not be considered "representative" for the purposes of PSD or NSPS emissions comparisons. Accordingly, removal or discontinued use of the CCT demonstration equipment shall not be considered as a modification for purposes of 40 CFR 52.21 or 40 CFR 60.14.
- Routine actions taken to restore this unit to its pre-CCT demonstration condition and operating at the condition and capability will not subject this unit to the requirements of 40 CFR 52.21 or 40 CFR Part 60.
- The emissions limits, 35 Ill. Adm. Code 212, 214 and 217, which currently apply to this unit shall not change as a result of the construction, removal or discontinued use of the CCT demonstration equipment, as described in the application.

Therefore, a return to pre-project emissions will not trigger application of NSPS or PSD provisions.

The permit also required that particulate matter emissions measurements be conducted upon resumption of GR-SI testing. These tests revealed that humidification effectively enhanced ESP performance, resulting in no change in particulate matter emissions and little change in the ESP outlet and stack gas temperature.

The project originally called for construction of a new ash pond for disposal of the ash/spent sorbent. This would have required modification of the NPDES permit as well as additional permitting considerations due to construction in a 100-year floodplain. Due to several factors including prohibitive cost of construction of a new ash pond, sluicing of the GR-SI ash to the original pond was decided upon. A modified NPDES was issued by the IEPA addressing the required handling of GR-SI ash and the required environmental monitoring in case of a discharge to the Illinois River. The permit specified use of CO_2 , acetic acid or other chemical to adjust the pH to approximately 9.0. Other, less costly methods of neutralization were prohibited due to their potential to increase chloride and sulfate levels in the Illinois River and groundwater. Since no discharge to the river occurred during the GR-SI demonstration, the extensive monitoring specified was limited. If a discharge had occurred, two types of testing would have been required: chemical specific testing on a quarterly basis, and biomonitoring of acute toxicity. The chemical specific testing was conducted regularly, even though not required by the conditions of the NPDES Permit. Biomonitoring was not conducted.

5.0 MODIFICATIONS TO MONITORING PLAN

Outfall and Groundwater Monitoring (NPDES Permit)

Prior to the initiation of the project, a modified (NPDES) permit was issued July 15, 1985 with an expiration date of April 1, 1990. Five discharges were permitted plus four secondary discharge streams. Flow, pH, Total Suspended Solids, and Oil & Grease were being monitored on a weekly or twice monthly basis for Discharge No. 5 (from the [West] ash pond receiving ash sluice from Unit #1).

Subsequent to the installation and initial operation of the GR-SI system, a Reissued (NPDES) Permit was issued on August 10, 1992, to expire July 1, 1997. Modifications for Discharge No. 5 added the following special conditions:

- 13.a) Notification of Agency on date the GR-SI project begins
- 13.b) The raw residue transport water shall be pH adjusted using carbon dioxide or other chemicals which will not contribute chlorides or sulfates to the waste stream
- 13.c) Groundwater monitoring shall be conducted during the demonstration project and for six months, thereafter
- 13.d) Modeling or dye tracing to identify the West Ash Pond System effluent mixing characteristics with the Illinois River
- 17.a) Chemical-Specific Testing
- 17.b) Biomonitoring
- 17.b.1) Standard Definitive Acute Toxicity Tests
- 17.b.2) Testing Frequency
- 17.b.3) Toxicity Assessment
- 17.c) Benthic and sediment monitoring

Of these special conditions, only 13.a), 13.b) and 13.c became implemented, since no discharge occurred from the outfall of the West Ash Pond to the Illinois River.

Air Emissions Monitoring

Construction Permit

The construction Permit was granted for the construction of the Gas Reburning-Sorbent Injection system at Hennepin Boiler #1. The special conditions applicable to this construction were:

1a) The construction and operation of the Clean Coal Technology (CCT) demonstration equipment does not constitute a modification as defined in

40 CFR 60.14.

- 1b) Since annual emissions of PM and PM_{10} will increase minimally, the project does not constitute a major modification for purposes of 40 CFR 52.21.
- 2a) The CCT demonstration project shall be limited to operation to one year, but able to be formally extended by the agency.
- 2b) Emissions from this unit during the demonstration project shall not be considered "representative" for the purposes of PSD or NSPS emission comparisons.
- 2c) Routine restoration to pre-CCT demonstration condition will not subject this unit to the requirements of 40 CFR 52.21 or 40 CFR part 60.
- 3) The emissions limits which currently apply to this unit shall not change as a result of the construction, removal or discontinued use of the CCT demonstration equipment.
- 4a) Within 90 days of full load or 180 days of full startup, the particulate matter concentrations in the effluent stream of Boiler #1 shall be measured by an approved testing service.
- 4b) Prior to carrying out particulate tests, notice shall be given to the Agency's regional office and the Agency's Source Emission Test Specialist.
- 4c) Three copies of the Final Reports shall be submitted to the Agency within 14 days.
- 4d) A copy of the summary of Results, General Information, and Conclusions as contained in the Final Report, shall also be submitted to the Source Emission test Specialist.

Imposition of these Special Conditions in 4a - 4d of the Construction Permit established the requirement to test the emissions after the operation of the unit as fitted with the Gas Reburning-Sorbent Injection system. The Special Conditions of 1a - 3 established an understanding and assurances that the acts of installing, operating and restoring the GR-SI system would not cause reclassification of the unit to a higher level required emission control.

Reporting

The original environmental reporting schedule was based on quarterly reports covering multiple sites and possibly multiple phases. Through mutual agreement and approval by DOE, environmental reports will occur at the completion of each major portion of the demonstration and will include only that portion of the overall project.

The Environmental Monitoring Reporting is revised from a quarterly basis to one where a monitoring report, i.e., Environmental Monitoring Test Series Report (EMTSR) is written at the completion of each major demonstration task. DOE agrees that the EMTSR's would be more comprehensive, meaningful, and save manpower along with associated costs.

Modifications and Corrections

During the period of this (Long Term Load Following Operation), the following modifications were made to the monitoring plan:

<u>9-30-91</u>

There is one recommended modification to the proposed monitoring plan now listed in Tables 1 and 2. In Table 2, under the air measurement category, the coal dust parameter has been deleted and an ambient dust parameter added. This ambient dust parameter will be sampled with a Hi-Volume sampler once prior to Phase III and during Long Term Testing at a location upwind and downwind of the sorbent silo. Monitoring the ambient dust at the sorbent silo will more accurately document the potential impact of GR-SI related dust on worker health and safety.

<u>12-31-91</u>

The recommended modifications to the proposed monitoring plan 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 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 N_2O 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.

3/31/92

The recommended modifications to the proposed monitoring plan listed in Table 2 under Supplemental Gaseous Emissions are as follows: Under the frequency of monitoring for NO_x , SO_x , CO, CO_2 , O_2 , and HC, Footnote #9 should be changed to read Footnote #8. This was a typographical error.

9/30/92

Tables 1 and 2, incorporating the changes noted above, can be found in Appendix C.

6.0 CONCLUSIONS

Extensive environmental monitoring in the areas of gaseous and aqueous discharges, worker health, solid waste characterization, and other areas showed that GR-SI significantly reduced gaseous pollutants and had only minor effects on other areas. Over the long-term GR-SI demonstration, NO_x and SO₂ were reduced by 67 and 53%, respectively. Emissions of other species including CO, total particulate matter, and PM₁₀ were unaffected by GR-SI operation. The major aqueous stream which may have been impacted by the GR-SI process, the ash pond discharge, had no flow during the demonstration. However, direct sluice water and groundwater sampling showed acceptable water quality, with some elevated groundwater sulfate levels which existed before the GR-SI demonstration. Compliance analyses of coal showed that all samples had a theoretical SO₂ level below 6.0 lb/MBtu. Characterization of the solid waste, which is a mixture of fly ash and spent sorbent, indicated that it is a nonhazardous material with low levels of metals in the leachate, it results in a modest temperature rise upon addition of water, and it has cementitous properties. Worker health monitoring showed that exposure to noise and ambient dust was generally within applicable standards, with audiometric protection and goggles/dust mask required in specific areas. Overall, the project had minor impacts on the local environment, while significantly reducing acid rain gases.

APPENDIX A

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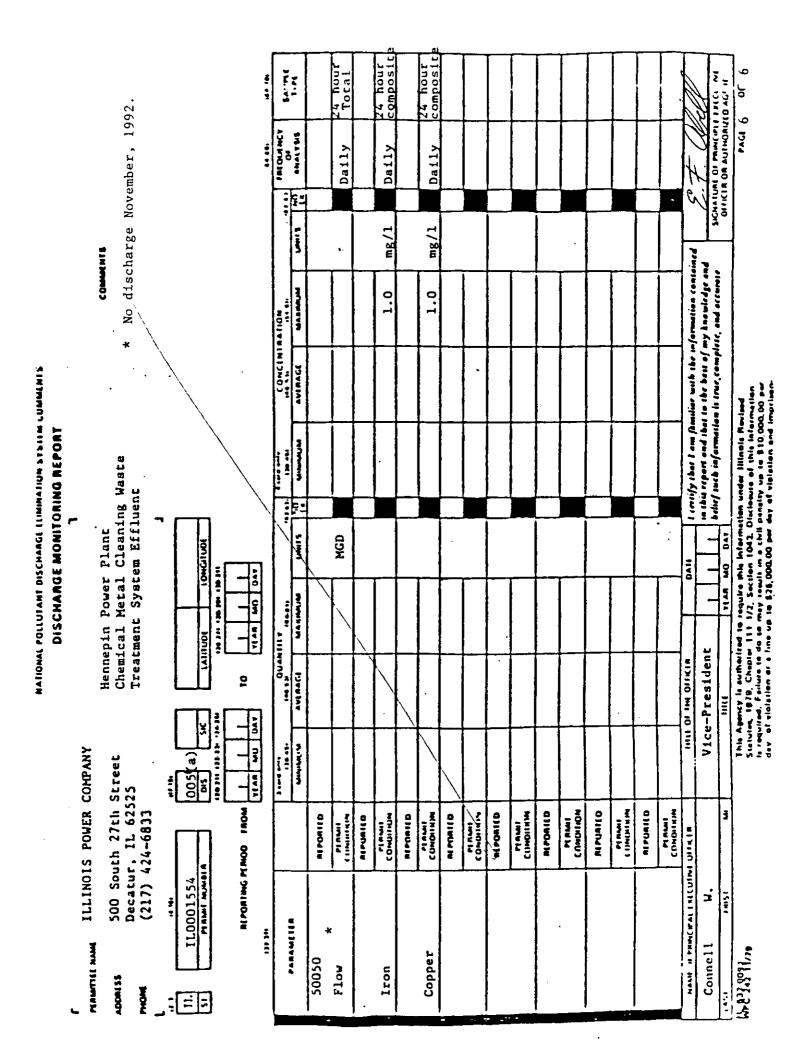
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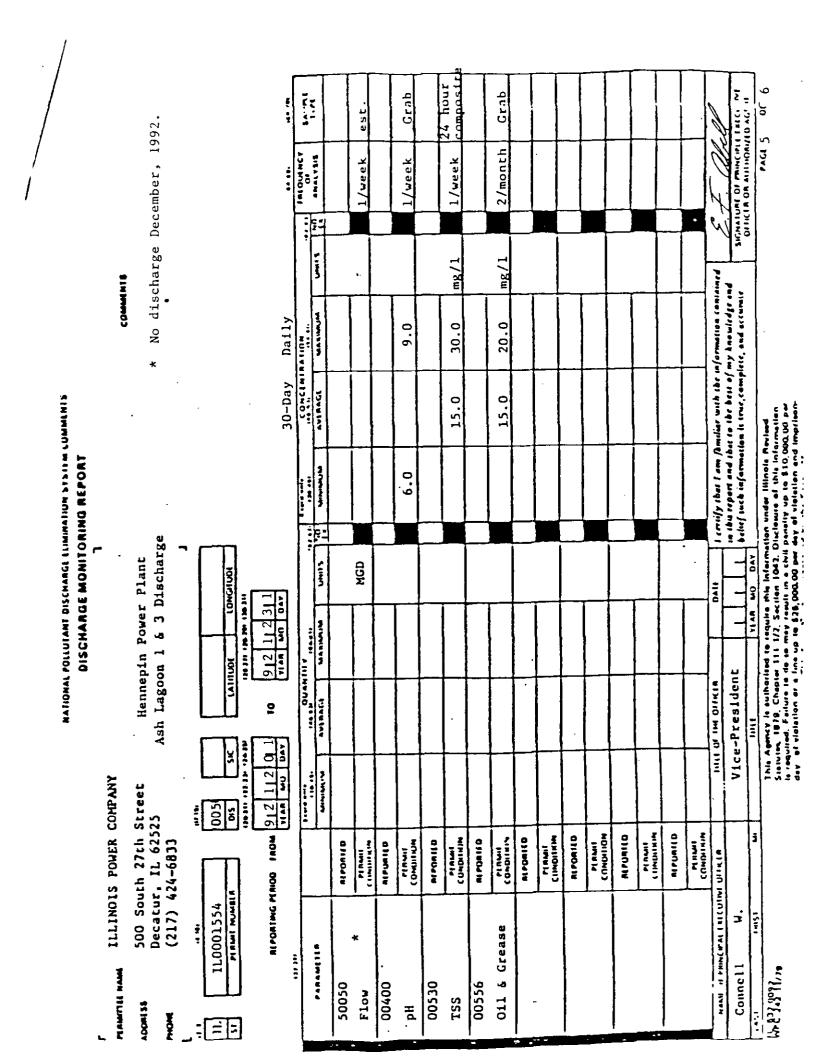
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This Agency is authorized to require the information under litinois Revised Statuted, 1979, Chapter 111 1/2, Section 1042, Disciouse of this Information is required. Failure to the may transity up to \$10,000,00 per day at violation or a fune up to \$28,000,00 per day of impliance		Connell W.		VIC	e-Preside			a tou report a belief such inf	ad (bat io to t stantion is tre	e, complete, M 201		<u>r</u>	FUAL DE PAINCIP	
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comnosit 24 hour Q SIGNATURE OF PRINCIPLE EXECT NE Grab Grab est. 5 No discharge November, 1992. PAGE 5 2/month FILOUNCY OF 1/week 1/week 1/week c 53 ٠ -----5 mg/1 $m_R/1$ I crity that I am familiar with the information contained ь. COMMAN NT & in this report and that to the best of my knowledge and belief such information to true, complete, and accurate NUMBER ST Da11y 30.0 20.0 0.6 CONCINIANDR × 30-Day AVIAAGE 15.0 15.0 MATIQNAL POLLUTANT DISCHAAGE LLIMMAINUN STATEM LUMMENTS This Agency is authorized to require this information under illinois Reviewed Statutes, 1938, Chapter 111 1/2, Section 1043, Olaciowas at this Information is required. Failure to do to may rewit in a civil pondity up to \$10,000,00 per day at violation of a line up to \$38,000,00 per day of violation and imprison. DISCHARGE MONITORING REPORT * 6.0 : F. Ash Lagoon 1 & 3 Discharge VLAR MO DAY 2 1 1 2 Hennepin Power Plant MGD 10mm/mol DAI 912 11 1 31 0 0044111 1441 LATIUDE Vice-President TISLE OF THE OFFICER 1.Jestve 2 912 111 01 1 METE: 42-82: 118981 ž ILLINOIS POWER COMPANY 500 South 27th Street 005 1 Decatur, IL 62525 FLAMIT L []ALDELH H PI AMIT PLIMMI CONDITIVIA CUMORIAN PI RAUS RIPURILD ź REPORTING PERIOD I ROM CUNDININ **RIPOAILO** ALFURITO COMPLIAN ALFOALD PIRALI CONDUCTION ALPORT O (217) 424-6833 **NEPONICO** 0 I NO4 IE o transfe NANE I PRINCHTAL LALCUTIVE ULIN. IN PLANT MUNDLA IL0001554 3 151111 Ī Oil & Grease PARAW(11) × Connell MAN INTERNET 00556 50050 00530 00400 Flow TSS ADOMI SS Hd MOL = 5 -

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	DISCHANGE MONITORING REPORT		Hennepin Fower Flanc Chemical Metal Cleaning Waste * See Treatment System Effluent 1	12011 TO 912 112 wu uar	0UANTITY	Tests Manada Unis 16 unuum Aviandi Uaus 10 10	.108		* * * * * * * * * * * * * * * * * * * *	1.0 mg/l Daily	.12 .31 .50 0	1.0 mg/l Daily											11111 01 144 0114(18 041) 1 certify that I am Amilier with the information contained	VICE-President being such information is the second of the second	-
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NATIONAL POLIUIANT DISCHANGE ELIMINATIUN STSTEM LUMMENTS DISCHARGE MONITORING REPORT HENNEPIN GROUNDWATER

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CA mg/l	98	108	87	110	11	87
ио ₃ -И то3	53.8 < 0.05	0.10	39.8 < 0.05	60.0 < 0.05	8.4	43.1 < 0.05
ug/l	53.8	81.3	39.8	60.0	26.1	
ן ש5/ן אס ² -א כר אס- ²	280 < 0.025	402 < 0.025	241 × 0.025	395 < 0.025	73 < 0.025	239 < 0.025
1/5ш 70 80	280			395	R	
8 119∕l	6.4	12.5	4.4	7.5	1.8	4.7
SQT Mg/l	738	824	663	867	418	696
so 3 ng/t	12.9 < 0.5	12.6 < 0.5	12.5 < 0.5	12.5 0.6	11.1 < 0.5	< 0.5
Temp	12.9	12.6	12.5	12.5	11.1	
Oq	1.8	4.0	2.6	2.8	3.2	•
Hq	7.4	8.9	7.4	7.3	7.9	1
Cond.	1014	1061	950	1126	640	1 9 1
Water Level	10.744	448.23	448.40	448.36	444.99	
Well #	2	И2	113	74	SN	U3REP
Sample Date	11-17-92	11-17-92	11-17-92	11-17-92	11-17-92	11-17-92

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	February, 1993.		Intoutwer		1/week est.		1/week Grab		1 J/week Comans. 11.		2/month Grab									11-11-1-5	Li F. (XUCCX SIGNATURE OF PRINCIPLE I REC. M		••61 5 OF b
	commun. dischafge F		TION 11 11 11 MATHAUM UNITS		•		9.0		30.0 mg/1		20.0 mg/1				-					Malian Contained	aowiedge and		
	0 N *	30-bay							15.0 3		15.0 2									I crity that I am familiar with the information contained	in thu report and that to the hest of my hnowledge and belief such information to true complete and accurate		tend Nation Octoper Solicor-
DISCHARGE ELIMINATION STRITM LUMMENTS IDE MONITONING REPORT			1	1			6.0													iify that I am fam	to the second and the second s		This Aponcy is substitud to require this intermetian under Hilnals Reviewd Statutes, 1914, Chapter 111 1/2, Section 1042, Uikalowus of this intermetian Is required, Failure to do so may result in a chill ponsity up to 1810,000,00 per day of station or a fine up to 838,000,00 per day of visiation and imprimen-
POLIUTANT DISCHAAGE LEIMINATIUN 575114 DISCNARGE MONITORING REPORT	Power Plant & 3 Discharge	10MGFUDI	Big Silvo	1	MGD														· .	0×11 1 1 cc		MO DAY	- Mile Information critical 1042, Usuci actical a civit prove 1,000,00 per de p
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	Street 525		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1																		VIC		
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	riaming have there appends 500 So Phome (217)	11. 11. 11. 11. 11. 11. 11. 11.	2]MCCC-4	50050 *	Flow	. 00400	pH	00530	TSS	00556	011 & Grease		•							NANU IL PRIME WALLAL CUTWI ULINIA	Connell W.	15111	••••11.05.62.3.47

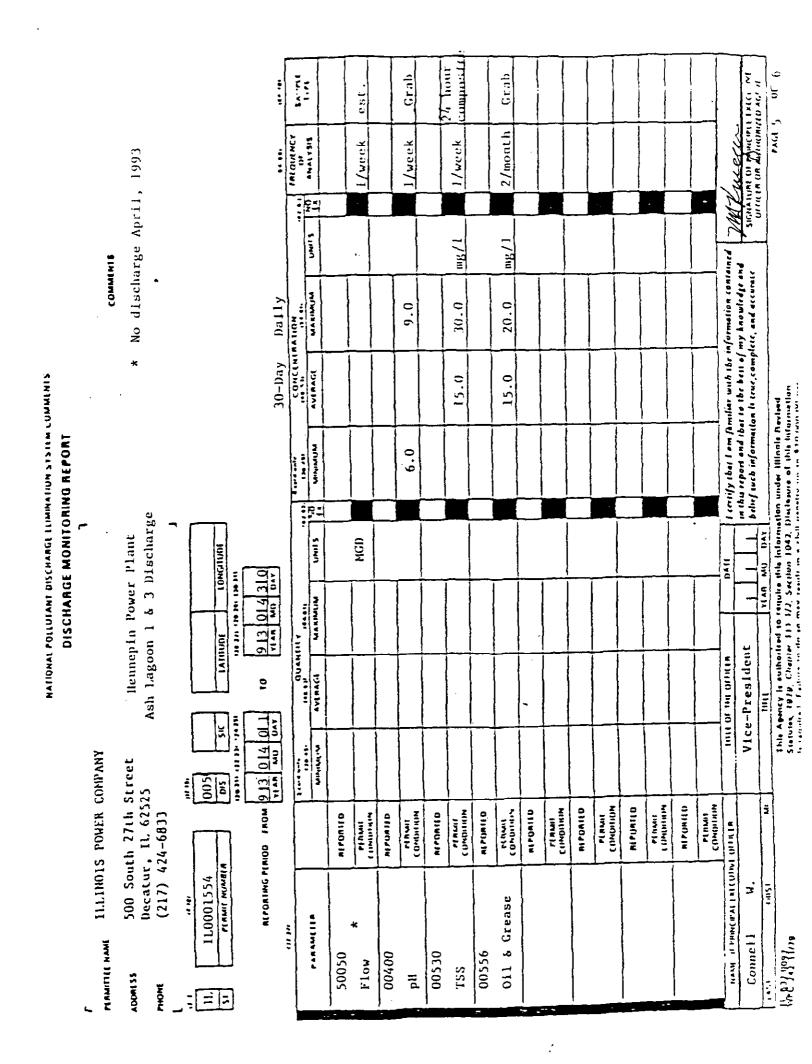
HENNEPIN GROUNDWATER

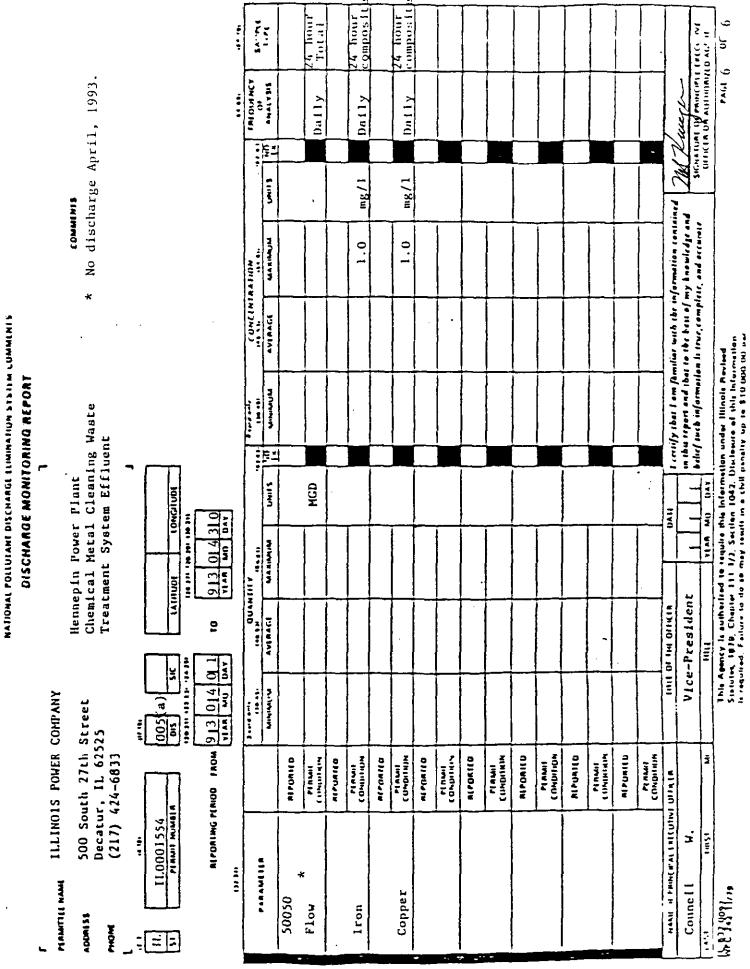
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СА <u>т971</u>	87	88	170	96	78	89
ио ₃ -и 1/6ш	< 0.05	87.4 < 0.05	39.5 < 0.05	< 0.05	8.0	< 0.05
10 10	43.2	87.4	39.5	60.2 <	24.8	45.3
ио - и 2 1/1	< 0.025	560 < 0.025	250 < 0.025	< 0.025	< 0.025	< 0.025
<u>1/Бш</u> УОS	230	560	250	400	76	230
8 8	4.6	12.2	4.8	4.7	1.6	5.1
17 <u>8</u> 172	609	1048	639	868	395	610
1760 203	< 0.5	12.1 < 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Temp	12.9	12.1	12.1	12.9	11.5	:
0	1.6	3.2	3.2	1.6	3.8	1 3 1
풥	7.1	7.1	7.1	7.1	7.0	, ,
Cond.	1178	1311	937	1178	665	: ; ;
Water <u>Level</u>	15-677	19.675	450.23	66-677	449.71	:
Hell #	ŝ	Иг	Н3	71	vs	W3REP
Sample <u>Date</u>	02-02-93	02-02-93	02-02-93	02-02-93	02-02-93	02-02-93

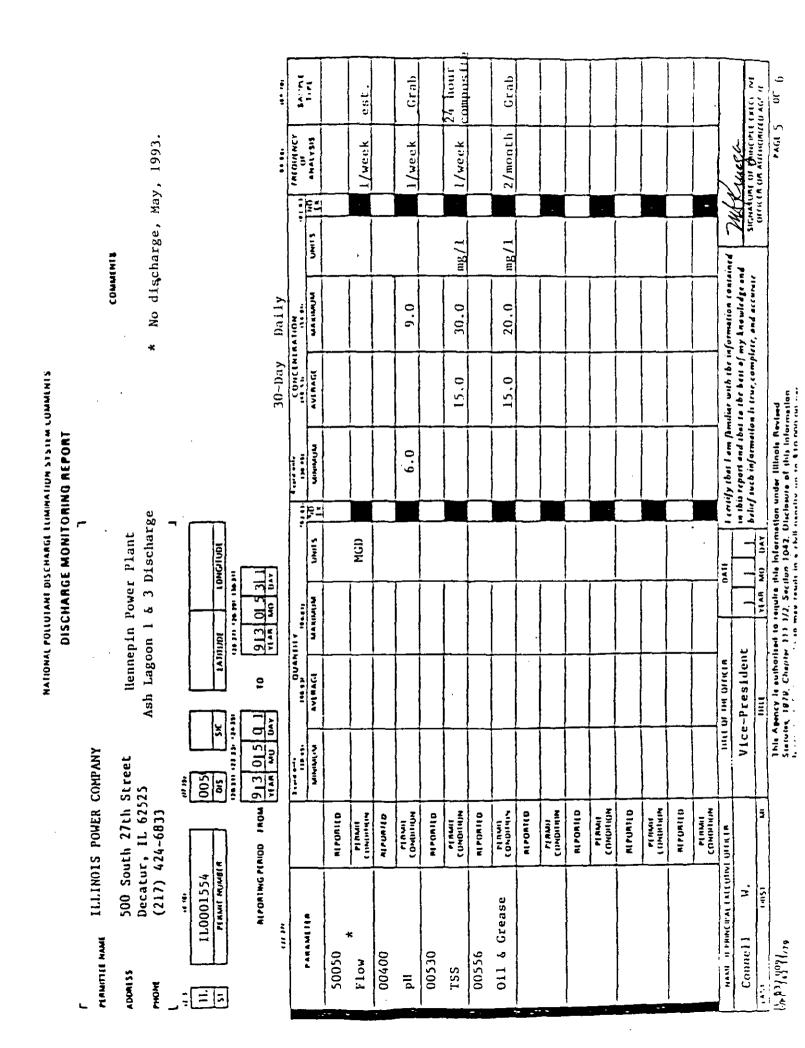
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lingur 24 hour و مر Grab Grab est. No'discharge March, 1993. PAGE 5 2/աօուհ I NI GIVI NCY DY ****** 1/week 1/week 1/week 1 . 2 Chirly <u>mB / 1</u> $\frac{m_{B}}{1}$. COMMENTS f credify that t am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate MININAN Datly 30.09.0 20.0 CONCININALION × 30-Day AVINAGE NATIONAL FOLLULANT DISCHANGE ELIMINATION STRIM LUMMENTS 15.0 15.0 This Approved is surfactured to resource this information under Hillanis Review Statutes, 1979, Chapter 111 1/2, Section 1042, Officience of this Information DISCHARGE MONITORING REPORT NININ 6.0 ----:pu Ash Lagoon I & 3 Discharge Hennepin Power Plant 11411 VAL UN RAIY NGD 10MC/11/01 DALI 110 PT 140 PT 140 PT 9 13 013 MANINAM DUANTI Y 141110E Vice-President HILL OF THE OFFICER AVIMAGI 2 1994 91 3 01 3 0 1 111 Pt. 41 It. 111 41) Ľ 1 4144 Ante N-111-111N ILLINOIS POWER COMPANY 500 South 27th Street es 005 Decatur, II, 62525 PLANEL CIMUIIUN E PANIE PI NMI CONDITION ALFORING PERIOD FAOM FLAMI EDMDHUN Ē (217) 424-6833 PLRMI CONDUION renert CONDITIES rtnau (Qedninge of LOAN O ALFURILO **UINUUIN** HIPOAILD PJ 10401 NFOALLU R FURILU ALFUALD AFFORTED PIRMU NUMBIA 1L0001554 3 1.51 ł Oll & Grease × UII INVNVJ MANITTLE NAME Connell J. 2. 1 00530 50050 00700 00556 Flow TSS ADUAL 35 ١١d MOH Ę н. 1 _

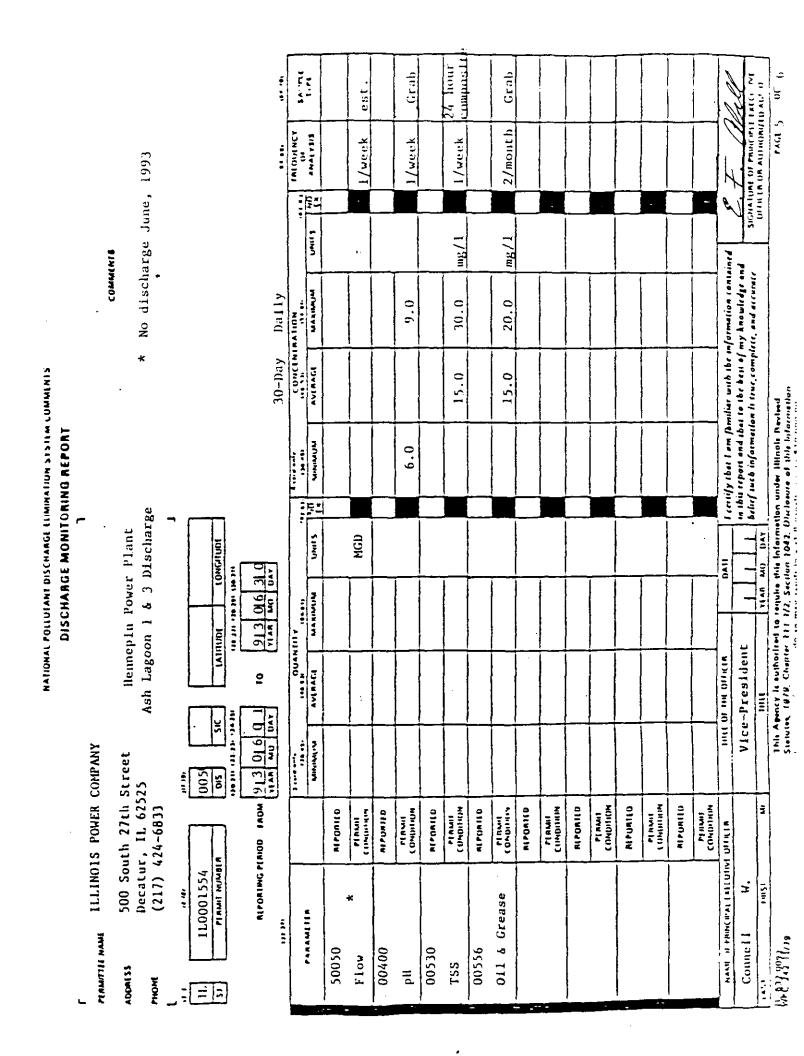




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MANTIE NAME ILLINO	ILLINOIS POWER COMPANY	COHPANY	:	:								
ADDNISS 500 SOU Decatu	500 South 27th St Decatur, IL 62525 7217) 424-6877	Street 25	Hennep Chemic Treatm	al M ent	ower Plant letal Cleaning Waste System Effluent	lng Wi luent	aste -	-	* No disch	No discharge,	May, 1993.	
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50050 <u>*</u>	alinonia					1						
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lron	COMULTUM								1.0	mg/l	Daily	24 hour compost
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Connell W.		Vice	Vice-President			in ibu r belief iv	rport and the chingarmaile	r to the hear of an la true, comp	in thu report and that to the helt of my knowledge and belief such information to true, complete, and accurate	<u>1</u>	SIGNATURE UF PARTY	
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Turnerit Mail 11.11/015 POHER COMPANY consist 500 South 27th Street Elemapian Power Plant consist consist consist Consist consist consist consist consist consist				NATION	NATIONAL FOLIULANT DISCHARGE LLIMINALIUN STSTIM LUMMINIS DISCHARGE MONITORING REFORT	POLUTANT DISCHARGE LIMINATIUN 37511M DISCHARDE MONITORING REPORT	TORING	NEFORT	CUMMINIS				
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ounell W. Vice-President J L Intervent and that to the heat of my havened for and one of the second stand on the second	MANU II PRIMEN'AL LEEU	1111 UILLA	Ī	01 114 011411		DAH	1 anily	ibei I am Ar	idiar with the i	nformetion con		1	1000
	0110		VIC	e-Presider			in thu re beinf and	port and Ibal ch informatio	to the here of a le frue, compi	my knowledge a lere, and accurat	<u> </u>	$\frac{1}{1000} = \frac{1}{1000} = \frac{1}{10000000000000000000000000000000000$	
		Ī				140 0m		•					

HENNEPIN GROUNDWATER

<u>176</u> л	140	25	270	120	< 5.0	27
СА <u>m9/1</u>	64	130	91	110	81	120
NON 3-N 1/рш	< 0.05	1.0	< 0.05	< 0.05	6.1	1.2
<u>า7</u> เ	52.4	77.2	42.0	69.6	38.0	76.6
ио - N 2 1 <u>7</u> Ет	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
1760 7 OS	270	420	260	430	130	470
8 8	5.6	11.4	4.6	7.7	1.8	11.6
10 S O J 1760	720	920	690	850	450	910
03 176m	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
<u>l emp</u>	14.0	15.1	14.2	14.4	11.6	÷
0	1.5	3.6	< 1.0	3.7	3.1	;
Hd	7.0	8.6	7.2	7.2	7.3	1 1 1
<u>cond.</u>	1082	1294	1040	1221	739	
Water Level	448.23	448.18	449.00	448.84	448.53	6 9 6
Ve(#	11	W2	N3	74	2N	UZREP
Sample Date	05-18-93	05 - 18 - 93	05-18-93	05-18-93	05-18-93	05-18-93

HENNEPLY GROUNDUALEZ

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ы0 - N 19671	د 1,05	Û. YJ	< 0.05	< U.US	3.8	4.1
17昭 73	56.42	70.2	8.12	13.0	2.05	54.4
но - N 2 11211	< 0.025	< 0,0%S	• 0.025	630 × 0.025	לכש-ט א	¢ 0,025
	500	067	324	630	540	062
1758 8	5. 19	۷.۷	4.9	9.1	2.5	2.3
1786 Martin	061	9 20	850	006	610	119
so, Ind.L	4 6.5	c 0.5	¢ 0.5	1 0.5	¢ 0.5	5.0 ×
L t we	14.2	11.3	11.5	14.2	11.8	:
8-	≂ <mark>–</mark> –	1.0	1.2	-	3.0	- • •
10	7.4	8, B	7.3	5.7	(.3	:
Eend.	1164	1234	1 196	1259	750	÷
Nater Love	44 0.2 2	148.2 <i>T</i>	¥2"857	448.71	14.824	:
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s anyal a Edite	08-17-93	66-11-90	66-11-D0	£5-11-88	66-11-90	08-17 93

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ILLINDIS FOWER COMPANY HENNEPIN POWER STATION COAL ANALYSIS REFORT FOR THE PERIOD 090191 TD 093091 FOR THE VENDOR : COAL TO BUNKERS

302 LIMIT Exceeded																																	
FOUNDS 502 PER MRTU		η. Γις	- 0 - 0 - 1	ים מ ייי יור			60.14	i i i		י ר - ר י ע	1	7 . C	50		0 1 1 1	0 7 1	1,61 1	5. 7	19.9 1	2 - 1 - 1	n 1 	5.46	4.97	5v	2.01	47.5	5.01	5.14					
UNIT COAL BTU/LB	14 405	14.451	14.533	14,503	14,495	14.490	14,437	14.535	44.440	14 505												14,018	14,084	14,504	0777.41	14,245	14,442	14,484					
ВТU/LB (М.А.F.)	14.216	14,191	14,249	14,241	14,223	14,207	14,177	14,260	14,196	14.234	14.229	14.230	14.249	14.050	14, 275					14. 74%			0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 / 0 /					14,210		LBS. S02	FER MBTU	5.31	
BTU/LB (DRY)	12,430	•	12,446	12,566	12,500	12,436	12,525	12,566	12,534	12,540	12,491	12,437	12,456	12 4 12	12 376	12 305	12 410	2 374	12.52	12.571	12 444	014 C	13 4/0		2 407	707 C				UNIT COAL	P (U/LB	14,502	,
BTU/LB (AR)	10,972	10,855	10,743	10,815	10,799	10,709	10, 761	10,934	10,857	10,809	10,694	10.462	10,857	10,792	10,512	10,979	10,920	10,991	10.712	10,827	11,136	10.901	11.138	10,830	10.942	10.911	19 057		0 093091	BTU/LB		14,224	1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -
ъг	5.93	1. 90 1. 90	20.5 1				2,81	5.03	50°.	2.90	2.82	2.70	2.93	2.96	2.91	3.17	3.24	3.73	2.85	2.84	2.23	2.79	3.26	2.78	2.38	2.81	2.39		0 090191 TO	BTU/LB		12,478	
	11.09	10.44	10.93		10.40	4	10.01	40.01	10.15	10.26	10.46	10.60	10.97	11.22	11.16	12.14	11.16	11.71	10.27	10.11	11.70	10.17	10.99	10.40	٠	10.42	10.75	1	THE FERIOD	BTU/LP	- I	10,846	
z MDISTURE (AR)		10 ° F	マ f ひ . つ F	57.5C	0	60 · · ·	80.41	λλ. γι 1	16.50	15.80	14.38		28.21	٠	•	10.78		•	14.58	13.87	10.51	13.69	10.58	12.67	4	12.62	5 		FOR	33		2.96	
TONS TO BUNKERS	ō,				10000000000000000000000000000000000000			00 7 2 7	00.000	140.00						00.410.	. 41 4. 00	1,014.00	1,125.00		, 4U5.00	00.01c.1	. 453.00	.102.00	00.11		141.00		ED AVERAGES	ASH (AR)		19.67	
				i -	-		ſ		ſ	Ω.C	1.					- 1	~ •		- 6	1 -		- ·	- 1	- <u>`</u> .	- ·	•	-	:	WEIGHTED	MOIJTURE (AR)		13.07	
SAMFLE DATE	16/00/60 16/00/60	09/03/91	09/04/91	09/06/91	16/20/60	16/60/60	09/10/91	09/11/91	16/01/00	09/13/91	09/14/91	09/15/91	09/16/91	10/11/00	10/10/01	10/07/00	16/02/60	10/10/60	16/20/60	16/12/20	06/20/00			10/10/20	10/00/00				*******	-			•

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··· END OF REPORT RUN ON 10/04/91 AT 15.05.25

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COML AMALYSIS FOWER COMPANY HENNEPIH POWER STATION COML AMALYSIS REPORT FOR THE PERIOD 100191 TO 103191 FOR THE VENDOR : COAL TO BUNKERS

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SAMPLE DATE	TONS TO BUNKERS	Z HOISTURE (AR)	X ASH (AK)	X SULFUR (AR)	BTU/LB (AR)	BTU/LB	BTU/LB (M.A.F.)	BTUAD COAL BTUAD	POURDS 502 PER ABTU	SO2 LIHIT EXCEEDED
10/01/01	6.428.00	50 12.7B	10.73	5. 51 10. 51		12.352	THU TS			
10/20/01	1,364.00		10.78	2.83	10,515	12,359	14.15			
10/05/31	1,268.00	*	10.77	5.93	10,551	12,343	14.123	100,41		
10/02/01			201	00.	•	ى	0	0		
16/20/01	00-007 30 53 3		62.11	 	16,938	945,51	542.41	14,538	1	
10/08/91					0.719	12,425	14,272	14,565	;₽ 	
10,00,01			45°X	69-11	10,300	10,610	14,255	14,514	4.85	
10/19/91		•	•	100		12,503	14,235	14,505	5.10	
10/11/01	-			60.	• <	9 4	•	0	ŝ	
10/12/91	1,392.	2 -	19, 4B	2.87	9.845	- 3	יי בי ר ר ר	0 ; ; ;		
10/13/91	1.739.96	-	10.57	2.45	0.437			1100 V	21 	
10/14/91	1.451.	00 11.39	-	26.53	11.034	19.494		14,240	19. 19. 19.	
10/15/01	1,889.00		10.57	2.99	11.009	12.51		707 I 1		
16/51/01	•	00. 00.	00.	20,	0					
14/91/01	213.00		10.25	2.81	10.472	12.468	14 182	54 450		
	1, 523.00	-	10.24	2.85	10.763	12,484			ין בי י י	
	2, 342.90	-	10.34	2.77	10,828	12,546	14.202		פני פר פר	
	1.501.00		10.47	2.91	10, 305	12,452	1.150		r v	
		~	10.37	2.65	1 C, 847	12,511	5 4 JOS			
	1,459,00	-	10.91	2.84	10,350	12, 42,	100.43		1	
	2.150.00	~	10.09	2.77	10,723	10.02	2.61 1.1			
	774.00	00 15.01	10.43	200 - C	10.595	12,465	1 1 1 1	1 1 1 7 7	1) - - - -	
	007 · 1070	-	16.22	2.31	10,527	12.39%	14.187		<u>}</u> . v	
	00.496	-	10.22	5.2	10,495	12,484	9.210	14, 130		
		-	10.57	· · · ·	10,542	52,414	14.190			
	90.120.1 1	JU 12.44		1.E3	16,957	12.513	14.2.39	14.075	2	
	1.520.06	06 13.75	10.14	3.33	10.753	12.469			, , , , , , , , , , , , , , , , , , ,	
14/19/01	1,541.00	00 14.10	10.42	2.87	16,712	12.470	191.41		รัง นี้สี วิชา	
	METCHTCE AV							•	2	
			INE FERIO	FERIOD 100191 10	192191					
101ÅL 10215	ω	5ULFUE (AE)	BTU/LE (AK)	BTU/LB (DRY)	BTU/LB (H.A.F.)	UNTT COAL	LKS . 502 FE8 HHTU			
30 (S) (S)										
	72'31 00'01	C) Z 70	10.150	12.460	14,150	14.4.1	5 17			

... END OF KEPORT KUN ON 12/05/91 AF 09.59.31

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ILLINDIS POUER CONPANY Hennepin Pouer Station Coal Amalysis Report for the Period 110191 To 113091 For the Vendor : Coal to bunkers

ГІМІТ	DED																																				
502 L	Ū X X) 1 1 1 1 1 1																																			
PGUNDS 202	VEK NOTU				1.5. C	30.26	5.15	11	5 5 5	5	5.13	٢.	1 1 1 1 1	2					- 0 0 1	5) 14 14	1) 1) 1)			•	5,42	c i	57.57	5.40	14 14 14	4			•				
UNIT COAL						•	14,495	14,446	14,495	145.41	14,475	14.465	14.410	14,500	215.41	• •	14 525								14, 625	14.600	14,500	14,515	1001.41	1 4 - GUN	14. 41	4.479					
RTU/LB		14,105		•	•		14,213	14,149	14,257		500.44	14,205	14,132	14.131	1-1, 245	14,239		14.405		•					14, 500	****	51,2,61	14,245	14,231	400.44	14.205	14.215			<u>ี้</u> รี่ รี่		;
BTU/LB (DRY)		12.417	12,575	12,423				12,422	•		12,500	12,457	12,342	12,520	12,510	12,554	12,440	12.536	12.471		224.01							12,546	12,560	12,457	12,436	12,459			UNIT COAL BTU/LB		
BTU/LB (AK)		10,553	11,079	10, 503	10.845					10,050	10, 693	10, 735	•			•	16, 887	•	14,530	14.505	10.729	19.698	0 360	10.444					10,004	10,822	10,982	11,010	130511 0		BTU/LB (H.A.F.)	* /	VEL PT
z SULFIIR (AR)		2.83	2.09		2.93			40				19.1	2012	2 	00.7	3.11	ы. Т.	2.33	2.67	2.90	2.94	2.94	2.98		28.5		2 2 7 7 7		. (5.1.0	3.12	0 110191 70		BTU/LB (DRY)	*****	X18 61 .
z ASH (AR)		10.59	92.61	10.41	10.91					2				n 10 10 10	.	5	11.08	18. Y	10.75	10.39	10.51	10.65	10.73	11.67	10.35			יי ריי ריי				10. 42	KE PERIUD		BTU/LB (AR)	1	19.733
z Holsture (Ar)		14.97	11.90	15.46	12.49	14.03		100				100 00 00 00 00 00 00 00 00 00 00 00 00			5 T	74.51	64.11	•	15.15	15.01	13.93	14.49	44.41	14.65	95.41	13.45		۲ د ۲			79.11	re.11	GES FOR THE		SULFUR (AR)	;	1.94
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4AHFLE DATE	11/01/04		11/20/20/11			16/20/11	11/06/91	16/20/11	11/00/91	16/60/11	11/10/91	10/2//11	いかくのくい	14/11/11	11/12/91	11/16/91	0.2.1	6.911							ージノタロノー・	16/22/11	11.25/61	16/22/15	16/22/11	16/22/11	14/06/11				1045	59 171 03	00.100.00

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SAMPLE DATE	NOL	TONS TO BUNKERS	HOLSTURE (AR)	A5H (AR)	SULFUR (AR)	BTU/LB (AR)	BTUZLE	BTU/LB	UNIT COAL	202 202	SD2 LIHIT
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... END OF REPORT RUN ON OLVOR/92 AT 12,48,54

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WEIGHED AVERAGE FILM 10.778 11.110 11.122 11.022 11.0125 11.0111 11.110 <	1,777,00 15,17 10,27 5,16 10,778 12,141 14,176 1,777,00 15,17 10,23 2,16 10,533 12,451 14,176 1,692,00 15,01 10,23 2,16 10,533 12,545 14,176 1,692,00 15,01 10,23 2,17 10,533 12,545 14,176 1,692,00 14,03 10,230 2,18 10,553 12,545 14,143 2,522,50 14,15 10,243 12,273 14,153 12,273 14,153 2,741,00 14,15 10,243 12,273 14,123 12,273 14,123 1,741,00 14,15 10,555 12,473 14,457 14,457 1,741,00 14,16 10,552 14,123 12,234 14,123 1,741,00 14,18 10,732 12,473 14,457 14,457 1,741,00 14,18 10,732 10,738 12,473 14,457 1,741,00 14,18 10,732 12,473 14,457 14,457 1,741,00 14,18 10,732	5/01/19	1 [1		10, 00 00, 00	15.85	10,89	2.90	10.430	12.394			1 1 1 1 1	
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1.487:00 15.02 10.44 2.81 10.627 12.563 14.143 2.200.00 14.03 10.318 3.37 11.285 12.545 14.180 14.433 2.200.00 14.03 10.318 17.7 10.43 17.744 12.337 14.133 2.200.00 14.03 10.318 14.133 14.237 14.133 14.133 2.537.00 14.187 10.404 2.776 10.553 17.2453 14.133 2.537.00 14.187 10.438 12.776 10.433 14.133 14.247 1.766.00 14.487 10.457 27.46 10.556 14.124 14.266 1.716.00 14.481 10.557 21.473 14.247 14.246 1.716.00 14.481 10.576 21.45 14.127 14.247 1.716.00 14.481 10.576 21.45 14.124 14.246 1.716.00 14.481 10.576 21.45 14.127 14.247 1.716.00 14.181 10.458 21.656 14.129 14.244 <	1.472.30 15.02 10.44 2.81 10.457 12.563 14.150 2.532.00 14.03 10.218 2.777 10.423 2.545 14.150 2.532.00 14.03 10.20 2.177 10.553 12.545 14.153 2.532.00 14.03 10.20 2.177 10.553 12.733 14.153 2.532.00 14.03 10.20 2.173 10.553 17.143 13.443 2.5512.00 14.13 10.640 2.74 10.553 17.143 14.133 1.716.00 14.13 10.640 2.74 10.535 17.143 14.123 1.716.00 14.13 10.640 2.74 10.535 17.143 14.123 1.716.00 14.83 10.53 2.744 10.535 17.143 14.127 1.716.00 14.83 10.553 2.744 10.535 17.143 14.127 1.716.00 14.83 10.553 12.143 14.57 14.127 14.127 1.716.00 14.81 10.640 2.743 12.550 14.279	01.01.10	i și	-	60.144	15.31	10.25	2.05	10.553			14,519	5.71	
1.001 10.01 <td< td=""><td>1.001 10.01 10.01 0.010 0.011 <td< td=""><td>0.11.10</td><td>15</td><td>. .</td><td>967 ° 784</td><td>n</td><td>10.44</td><td>2.84</td><td>10.629</td><td></td><td></td><td>19,449</td><td>5.27</td><td></td></td<></td></td<>	1.001 10.01 10.01 0.010 0.011 <td< td=""><td>0.11.10</td><td>15</td><td>. .</td><td>967 ° 784</td><td>n</td><td>10.44</td><td>2.84</td><td>10.629</td><td></td><td></td><td>19,449</td><td>5.27</td><td></td></td<>	0.11.10	15	. .	967 ° 784	n	10.44	2.84	10.629			19,449	5.27	
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Z-477.00 14.03 10.20 2.82 10.563 12.273 14.202 14.205 Z-477.00 14.15 10.46 2.90 10.705 12.473 13.847 14.1205 1.741.00 14.15 10.46 2.90 10.705 12.43 13.847 14.1205 1.741.00 14.15 10.45 2.74 10.555 12.74 12.374 14.205 1.741.00 14.12 10.45 2.74 10.555 12.473 14.205 14.106 1.741.00 14.12 10.43 2.56 9.741 12.347 14.205 1.741.00 14.12 10.43 2.56 9.741 12.437 14.206 1.755.00 15.44 10.471 2.55 14.206 14.737 14.247 1.755.00 15.50 12.564 12.296 14.247 14.247 1.755.00 11.257 12.564 14.247 14.247 1.755.00 12.564 12.566 14.247 14.247 1.755.00 12.72 10.478 12.564 14.247 14.247	7427,00 14.03 10.20 2.82 10.559 12.73 12.73 12.73 14.269 1,744,00 14.89 10.49 2.74 10.335 12.143 13.847 14.106 1,744,00 14.89 10.59 2.74 10.335 12.143 13.847 14.106 1,716,00 21.12 10.49 2.75 10.435 12.122 13.974 14.106 1,716,00 21.12 10.49 2.56 9.741 12.327 13.947 14.106 1,716,00 21.12 10.49 2.56 9.741 12.348 14.107 14.727 1,716,00 14.83 10.73 2.94 10.763 12.536 14.457 14.727 1,935,00 14.97 10.41 2.76 10.436 12.536 14.727 14.747 1,935,00 15.16 10.47 2.76 10.476 12.535 14.727 14.747 1,935,00 15.19 10.475 12.555 12.556 14.727 14.757 1,936 15.556 14.97 10.475 12		V.	ri I	204.00	5	10.45	6С г.				244.41		
2.532.00 14.15 10.64 2.90 10,700 12.473 14.237 14.205 1.761.00 14.8 10.67 2.74 10.335 12.143 14.237 14.205 1.644.00 14.8 10.67 2.74 10.335 12.143 14.277 14.205 1.644.00 14.8 10.67 2.74 10.355 12.127 14.147 14.147 1.644.00 14.8 10.67 2.56 10.73 2.96 10.747 12.379 14.147 1.644.00 14.8 10.65 2.96 10.776 12.573 14.277 14.244 747 747 10.535 10.476 12.573 14.297 14.777 1.755.00 15.160 12.127 2.74 10.552 12.550 14.277 17.545 1.755.00 11.97 10.647 12.550 12.727 12.542 14.277 14.267 1.755.00 11.97 10.277 2.75 10.552 12.552 14.279 14.567 1.755.00 11.79 12.751 10.552 12	2,532,50 14.15 10.44 2.90 10,709 12.173 14.124 14.15 1,761.00 14.48 10.49 2.74 10.535 12.143 13.127 14.124 1,716.00 14.48 10.49 2.74 10.535 12.143 13.73 14.187 1,716.00 21.12 10.49 2.55 7.74 10.535 12.143 14.147 1,716.00 21.12 10.49 2.55 7.74 10.535 12.143 14.147 1,716.00 21.12 10.45 2.56 7.74 12.546 14.147 14.747 1,716.00 14.57 16.50 2.94 10.743 12.556 14.147 14.247 1,716.00 14.57 16.50 2.94 10.743 12.559 14.747 14.747 1,716.00 14.57 10.57 2.94 10.478 12.273 14.747 1,730 14.74 10.27 2.37 15.564 14.747 14.747 1,730 11.25 12.554 12.552 12.5563 14.566 14.566 <td></td> <td>4 <u>c</u></td> <td>r4 -</td> <td>427.09</td> <td>T</td> <td>10.20</td> <td>2.82</td> <td></td> <td>1 1 1</td> <td>14,002</td> <td>14.269</td> <td>4</td> <td></td>		4 <u>c</u>	r4 -	427.09	T	10.20	2.82		1 1 1	14,002	14.269	4	
1,741.00 14.89 10.49 2.74 10.335 14.43 14.518 574.00 21.12 10.67 2.74 10.335 12.143 14.237 574.00 21.12 10.67 2.75 10.458 17.43 15.16 574.00 21.12 10.67 2.55 9.741 12.556 14.457 14.747 574.00 14.83 10.73 2.65 9.741 12.556 14.457 14.747 574.00 14.50 7.98 10.753 2.65 14.457 14.747 17.935.00 15.14 10.60 2.77 10.476 12.560 14.270 14.747 17.935.00 15.14 10.60 2.77 10.475 12.563 14.200 14.571 17.355.00 15.14 10.60 2.77 19.125 12.563 14.200 14.571 17.355.00 11.97 10.27 2.37 19.125 14.200 14.571 17.355.00 11.98 2.72 19.40 12.563 14.200 14.539 5.78 10.412	1761.00 14.89 10.40 27.74 10.335 17.143 14.237 14.151 1765.00 21.48 10.45 27.74 10.335 17.143 14.237 14.157 544.00 14.48 10.45 2.74 10.335 17.143 14.27 14.27 544.00 14.83 10.45 2.74 10.335 17.143 14.27 14.27 544.00 14.83 10.45 2.74 10.335 17.143 14.27 14.27 544.00 14.83 10.45 2.76 10.458 12.556 14.27 14.27 176.00 15.50 19.49 2.75 10.475 2.566 14.279 14.277 176.00 11.91 10.57 2.75 10.475 17.259 14.279 14.577 1755.00 11.91 10.47 2.77 19.459 14.299 14.577 1761.00 11.91 10.47 2.72 19.629 14.299 14.577 1751.00 11.91 10.47 2.72 19.629 14.299 14.577		1	5	532.00	-	10.64	2.90			13,947	14,205	5.20	
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WEIGHTED AVERAGES FOR THE PERIAD 010192 TO 01192 TO 01192 TO 01192 TO 0112 TO 0	WEIGHTED AVERAGES FOR THE PERIOD 010122 14,190 14,190 14,170 14,170 14,170 14,170 14,170 14,170 14,170 14,170 14,170 14,170 14,177 55 14,110 14,177 55 14,110 14,177 55 14,110 14,177 55 14,127 14,177 55 14,170 14,177 55 14,187 14,110 14,177 55 14,127 14,177 55 14,127 14,177 55 14,187 14,177 55 14,187 14,187 14,177 55 14,187 14,187 14,187 14,187 14,187 14,187 14,187 14,187 14,187 14,187 14,187 14,187 14,187 14,137 55 55 14,187 14,187 14,187 14,187 14,187 14,187 14,137 5 50 14,187 14,187 14,187 14,187 14,137 5 50 14,137 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 </td <td>01/27/9</td> <td>r:</td> <td></td> <td>50.000 50.000</td> <td>11.95</td> <td>10.27</td> <td>3.37</td> <td>11.125</td> <td>12.429</td> <td></td> <td>1994 61</td> <td>5.03 60.1</td> <td></td>	01/27/9	r:		50.000 50.000	11.95	10.27	3.37	11.125	12.429		1994 61	5.03 60.1	
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WEIGHTED AVERAGES FOR THE PERIOD 010192 TO 013192 TDTAL WEIGHTED AVERAGES FOR THE PERIOD 010192 TO 013192 TDTAL MOISTURE ASH SULFUR BTU/LB BTU/LB ETU/LB EER HETU 10HS (AR)	WEIGHTED AVERAGES FOR THE PERIOD 010192 TO 013192 TDTAL MOISTURE ASH SULFUR BTU/LB			•	00.810	15.54	ŝ	2.67	10,612		• •	•	ŝ	
TDIAL HOISTURE ASH SULFUR BTU/LB BTU/LR BTU/LB BTU/LB <td>TDIAL HOISTURE ASH SULFUR BTU/LB BTU/LB<td>i i</td><td></td><td>UEICHIE</td><td>D AVERA</td><td></td><td></td><td></td><td></td><td></td><td>•</td><td>-</td><td></td><td></td></td>	TDIAL HOISTURE ASH SULFUR BTU/LB BTU/LB <td>i i</td> <td></td> <td>UEICHIE</td> <td>D AVERA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td>-</td> <td></td> <td></td>	i i		UEICHIE	D AVERA						•	-		
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URE ASH SULFUR BTU/LB TU/LB UNTT COM. LB COM LB DTU/LB BTU/LB BTU	TONG TO TONG TO TANA TULL TULL TULL PULL							- CUMP IN BUNKERS	DUNKENS				
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WEIGHTED AVERAGES FOR THE FERIOD 020192 177 10,441 12,337 14,201 14,408 WEIGHTED AVERAGES FOR THE FERIOD 020192 13,351 12,351 14,270 14,564 WEIGHTED AVERAGES FOR THE FERIOD 020192 14,371 14,412 S282.90 11,08 13,40 2,74 10,926 12,351 14,270 14,564 3,282.90 11,08 13,40 2,77 10,401 12,337 14,270 14,564 3,282.90 11,08 13,40 2,77 10,401 12,079 14,221 14,540 14,540 3,282.90 11,08 13,40 2,77 10,501 12,437 14,472 14,540 14,540 1,524.00 15,75 10,555 2,77 10,501 12,079 14,222 14,540 14,540 MEIGHTED AVERAGES FOR THE FERIOD 020192 TD 022397 14,522 14,540 12,357 14,540 14,540 14,540 14,540 14,540 14,540 14,540 15,341 12,340 14,5	WEIGHTED AVERAGES FOR THE FERIOD 020192 177 10,441 12,339 14,790 14,403 WEIGHTED AVERAGES FOR THE FERIOD 020192 19,315 12,339 14,790 14,403 WEIGHTED AVERAGES FOR THE FERIOD 020192 10,915 12,339 14,790 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 10,926 12,339 14,790 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 10,926 12,335 12,316 14,295 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 14,137 14,412 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 14,137 14,412 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 14,137 14,412 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 14,137 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 14,137 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 14,137 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 12,357 14,571 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 12,357 14,571 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 12,357 14,571 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 12,507 14,571 12,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 12,507 14,571 14,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 12,507 14,571 12,540 WEIGHTED AVERAGES FOR THE FERIOD 020192 TO 022397 14,192 14,192 14,712 5,551 14,540	52/22/25			99-21	47.87	2.86	10, 284	115.43		14, 500	50	
WEIGHTED AVERAGES FOR THE PERIOD 020192 TO 0100 15.351 14,401 14,401 1,541.00 12.40 10,925 12,351 14,179 14,401 1,541.00 12.40 10,925 12,351 14,179 14,401 1,521.00 13.11.24 2.74 10,925 12,351 14,270 14,412 3,282.400 11.24 2.75 10,926 12,351 14,271 14,540 3,282.400 11.28 2.77 10,419 12,357 14,515 14,515 3,282.400 15.75 10.555 2.77 10,419 12,357 14,516 3,282.400 15.75 10.555 2.77 10,419 14,512 14,516 1,564.60 15.75 10.555 2.77 10,419 14,512 14,412 WEIGHTED AVERAGES FOR THE PERIOD 020192 TO 0222992 12,357 14,412 14,412 14,412 MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 0222992 14,417 02,419 14,412 34,412 1,664.60 15.414 10,104 14,412 14,412 34,412 34,412 1,664.60	WEIGHTED AVERAGES FOR THE PERIOD 020192 T10, 406 12, 350 10, 926 12, 350 10, 926 12, 350 14, 403 1, 541.00 12, 40 12, 40 10, 926 12, 350 14, 79 14, 403 1, 541.00 15, 43 11, 24 2, 84 19, 415 12, 350 14, 79 14, 403 1, 522.400 11, 24 2, 75 10, 926 12, 315 14, 250 14, 504 3, 282.400 11, 26 10, 926 12, 339 14, 251 14, 515 14, 546 3, 282.400 15, 75 10, 501 12, 755 10, 601 12, 357 14, 522 14, 546 3, 282.400 15, 755 10, 501 12, 755 10, 741 12, 757 14, 472 3, 282.400 15, 755 10, 505 12, 775 10, 419 14, 712 14, 412 3, 282.400 15, 400 12, 400 12, 400 12, 412 14, 412 14, 412 1, 664.60 15, 775 10, 20, 501 12, 257 14, 412 14, 412 14, 412 MEIGHTED AVERMEES FOR THE PERIOD 020192 TO 0225992 12, 192 10, 10, 10, 10, 10, 10,			(i) (i)	15,39	11.02	2.77	19.441			14,434	39. G	
1,541.60 12.68 10.86 2.74 10.926 12.513 14.70 1,524.00 15.43 11.24 2.84 19.415 14.250 14.564 44.412 3,5224.00 14.77 10.88 2.75 10.926 12.456 14.564 44.47 3,5224.00 11.08 13.40 2.75 10.601 12.456 14.564 3,582.90 11.08 13.40 2.75 10.601 12.456 14.564 3,582.90 11.08 13.40 2.75 10.601 12.456 14.566 3,582.90 11.08 13.40 2.77 10.601 12.456 14.540 3,582.90 11.08 13.40 2.77 10.419 14.540 45.15 10.607 12.357 14.412 14.412 461.106 64.70 62.357 14.412 14.412 461.106 64.741 12.079 14.412 14.412 461.106 64.741 10.414 14.412 14.412 461.106 64.741 10.2297 10.2395 14.192	1,541.60 12.68 10.86 2.74 10.926 12.513 14.504 1,524.00 15.43 11.24 2.84 19.415 14.504 14.504 3,524.00 15.43 11.24 2.84 19.415 14.504 14.504 3,524.00 14.77 10.88 2.75 10.601 12.435 14.504 3,582.90 11.08 13.40 2.75 10.601 12.435 14.504 3,582.90 11.08 13.40 2.75 10.601 12.435 14.50 1,664.60 15.75 10.55 2.77 10.601 12.437 14.412 1,664.60 15.75 10.55 2.77 10.419 12.357 14.412 1,664.60 15.75 10.55 2.77 10.419 12.357 14.412 1,664.60 15.40 12.419 12.357 14.412 14.412 1,617 10.419 12.419 12.4192 14.412 14.412 1,618 10.72 10.72 10.52992 14.192 14.474 5.25 1,61	107 107 TO	(o'	60.34	15.20	10.92	2.76	10.406			14,438	۳.	
1,524.00 15.43 11.24 2.84 19.415 12.15 14.564 14.564 3,524.00 14.77 10.88 2.75 19.601 12.435 14.564 3,524.00 14.77 10.88 2.75 19.601 12.435 14.564 3,524.00 11.08 13.40 2.75 10.601 12.435 14.540 3,524.00 15.75 10.55 2.77 10.419 12.357 14.521 14.540 1.664.60 15.75 10.55 2.77 10.419 12.357 14.412 554 WEIGHTED AVERAGES FOR THE PERIOD 020192 TO 0223992 12.357 14.412 54 54 54 MEISTURE 4.51 SULFUR STU/LB SULL 14.412 54 54 1.6.R) (AR) (AR) 022392 12.357 14.412 50 1.6.R) (AR) 10.22992 12.357 14.412 50 54 54 1.6.R) (AR) (AR) 022392 14.414 57 54 54 54 54 54 <	1,719.00 15.43 11.24 2.84 19.415 17.10 14.564 3,524.00 14.77 10.88 2.75 10.601 12.435 14.501 14.564 3,524.00 14.77 10.88 2.75 10.601 12.435 14.501 14.564 3,524.00 11.08 13.40 2.75 10.601 12.435 14.551 14.540 3,524.00 15.75 10.55 2.77 10.419 12.347 14.522 14.522 1.664.60 15.75 10.55 2.77 10.419 12.347 14.522 14.522 WEIGHED AVERAGES FOR THE PERIOD 020172 TO 022392 12.347 14.477 14.412 5 MEISTURE A.H. ULFUR BTU/LB BTU/LB UNIT COML 14.55 502 (AR) (AR) (AR) (BRY) (AA-F.) BTU/LB 502 8:00 13.40 14.192 14.192 14.474 5.25	02/26/02	40.	11.60	12.60	10.86	2.74	10.074		14,139	14,404	1	
3.282.00 14.77 10.88 2.75 10.601 12.437 14.550 14.496 5 3.282.00 11.08 13.40 2.76 10.601 12.437 14.550 14.540 5 1.664.60 15.75 10.55 2.76 10.741 12.079 14.550 14.540 5 WEIGHTED AVERAGES FOR THE PERIOD 020172 10.419 12.357 14.437 14.412 5 MEISTURE 4.51 5.75 10.552 2.77 10.419 14.512 14.412 5 MEISTURE 4.51 5.75 10.20172 022392 12.357 14.412 5 MEISTURE 4.51 5.002 12.357 14.437 14.412 5 MEISTURE 4.51 500 12.347 10.22 14.412 5 5 1.4R) (AR) (AR) (AR) (AR) 10.72 502 14.412 5 1.4R) 10.72 10.72 10.52 14.192 14.474 5 5 5 5 5 5 5 5 <	3.282.90 14.77 10.88 2.75 10.601 12.437 14.250 14.496 5 3.282.90 11.08 13.40 2.76 10.501 12.437 14.530 14.540 5 1.664.60 15.75 10.55 2.77 10.419 12.079 14.232 14.540 5 WEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 13.417 14.417 5 14.417 5 MEISTURE 4.51 SULFUR BTU/LB BTU/LB UNIT COML LBS. 502 14.81 (AR) (AR) (AR) (BRY) (N.A.F.) RU/LB ER WEIU 2.00 13.43 10.92 2.87 10.535 14.192 14.474 5.25				51.43	11.24	2.84	19.415		04.41	14,564	4.93	
0.748.00 11.08 13.40 2.76 10.741 12.079 14.221 14.540 1.664.60 15.75 10.55 2.77 10.419 12.347 14.222 14.546 5 WEIGHTED AVERAGES FOR THE PERIOD 020192 10.419 12.347 14.412 5 MEIGHTED AVERAGES FOR THE PERIOD 020192 022392 14.412 5 MEIGHTED AVERAGES FOR THE PERIOD 020192 022392 14.412 5 MEIGTURE 6.5H SULFUR BTU/LB BTU/LB UNIT <coml< td=""> LBS. 502 14.1 15.93 10.92 2.87 10.410 PER MBTU 5 2.00 15.93 10.92 2.87 10.412 FER MBTU 5</coml<>	0.748.90 11.08 13.40 2.76 10.741 12.079 14.221 14.540 1.664.60 15.75 10.55 2.77 10.419 12.357 14.137 14.546 WEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 12.357 14.137 14.412 5 MEISTURE 6.5H 5.77 10.22992 14.137 14.412 5 MEISTURE 6.5H 5.05 10.022992 14.117 14.412 5 MEISTURE 6.5H 60.741 8TU/LB 8TU/LB 1411 5.02 0.6R) (AR) (AR) (AR) (AR) (AR) 5.25 3.00 15.33 10.92 2.87 10.680 12.395 14.192 14.474 5.25	C0/60/00			14.77	10.88	2.75	10.401			14,496	5.32	
No.04.60 IS.75 IO.55 Z.77 IO.419 IZ.347 IA.222 IA.544 S WEIGHTED AVERAGES FOR THE PERIOD 020192 D.023992 IA.412 S S IA.412 S <ths< th=""> <ths< th=""> <ths< th=""></ths<></ths<></ths<>	No.64.60 15.75 10.55 2.77 10.419 12.347 14.412 5 WEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 NAIT TOM LASS 14.412 5 5 MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 NAIT COM LASS 500 13.412 5 MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 NAIT COM LASS 500 13.412 5 MEIGTURE 6.5H SULFUR RTU/LB BTU/LB BTU/LB UNIT COM LASS 502 CAR (AR) (AR) (BRY) (H.A.F.) BTU/LB FER MBTU CAR 15.93 10.92 2.87 10.4192 5.25	20/06/20		99.77	11,08	13.40	2.76	0.745			14,540	5,05	
UEIGNTED AVERAGES FOR THE PERIOD 020192 TO 022992 14.412 5 TOTAL MGISTURE 65H SULFUR BTU/LB BTU/LB BTU/LB BTU/LB UNIT COML LBS. S02 64.412 5	WEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL MEIGHTED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL MEIGHTED AVERAGES FOR REVILLE TOTAL MEIGHTED AVERAGES FOR REVILLE TOTAL MEIGHTED AVERAGES FOR REVILLE TOTAL MEIGHTED AVEN REVILLE TOTAL MEIGHTED AVEN REVILLE TOTAL LES NOT 44.128.00 10.92 2.87 10.680 12.395 14.192 14.412		1.66	1.60	15.75	10.55	1.7	0 1 0)			•	5.33	
TOTAL MELGHIED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL NGISTURE 4.2H SULFUR BTU/LB BTU/LB BTU/LB BTU/LB UNIT COAL LFS. 502 TONS (AR) (AR) (AR) (AR) (AR) (AR) (AR) (AC) 4.4.128.00 15.93 10.92 2.87 10.680 12.395 14.192 5.1.47 5.2	TOTAL MELGHIED AVERAGES FOR THE PERIOD 020192 TO 022992 TOTAL NEISTURE ASH SULFUR BTU/LB BTU/LB BTU/LB UNIT COAL LBS. 502 TONS (AR) (AR) (AR) (AR) (AR) (BRY) N.A.F.) BTU/LB FER MBTU 44,128.00 (5.93 10.92 2.87 (0,680 12,395 14,192 14,474 5.25						•			14, 137	٠	5,10	
TOTAL HGISTURE ASH SULFUE BTU/LB BTU/LB BTU/LB UNIT COML LBS. TONS (AR) (AR) (AR) (AR) (BRY) (M.A.F.) NU/LB FEF 44,122.00 (3.93 10.92 2.87 :0,680 12,395 14,192 14,474 5.7	TOTAL HGISTURE ASH SULFUK BTU/LB BTU/LB BTU/LB UNIT COML LBS. TONS (AR) (AR) (AR) (AR) (BRY) (N.A.F.) NU/LB FER 44,122.00 (3.93 10.92 2.87 :0,680 12,395 14,192 14,474 5.2	1	WEIGHTED	AVERAG				022392					
44,128.00 [3.93 10.92 2.87 10,680 12,395 14,192 [4,474 5.7	44,128.00 [3.93 10.92 2.87 10,680 12,395 14,192 [4,474 5.2	h-	-			ETU/LB	BTU/LR	BTU/LB	UNIT COAL				
7711-6.00 13.93 10.92 2.87 10.680 12,395 14,192 14,474 5	7.11-6.90 13.93 10.92 2.87 10.680 12,395 14,192 14,474 5.	1						(A.A.F.)	FTU/LD	2			
		ł	5.93	0.92	2,87	:0,680	12,395		14.474	16			

... EHD GF REFORT KUH UN 03/04/92 AT 11.47.18

903 S72# - -_ -- - -

1252-292-212-1:0N 731 ENTH ENTHERING AT 101

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JAPPE TO T X 0300000000000000000000000000000000000				CUAL N	ANALYSIS	REPORT FOR THE THE VENDOR : CO	THE FERIOD 030192 : COAL TO BUNKERS	10	033192			
1,600.00 15.54 10.47 2.77 0.515 12.245 14.206 15.55 1,735.00 14.37 10.45 2.04 10.528 2.71 10.528 5.266 1,735.00 14.37 10.45 2.04 10.528 2.71 10.475 5.266 1,735.00 13.36 10.73 2.94 10.838 12.246 14.376 1,735.00 13.36 10.73 2.94 10.838 12.246 14.475 5.266 1,735.00 13.36 10.71 2.97 10.743 2.328 14.479 5.266 1,735.00 13.44 10.71 2.97 10.838 14.300 14.479 5.266 2,333.00 14.14 10.71 2.97 10.481 14.276 14.470 5.273 2,467.00 13.44 10.77 10.481 14.266 14.476 5.273 2,477.00 13.44 10.77 10.481 14.266 14.476 5.266 2,477.00	t. t		IS TO	Z HDISTURE (AR)	x ASH (AR)	Z Sulfur (Ar)		(780) AJ/UTA	BTU/LN (M.A.F.)	UNIT COAL ETU/LA	POLINDS 502 PER MATU	SO2 LIHII Exceeded
3255.00 14.11 11.05 2.04 10.45 2.713 14.212 3795.00 14.37 10.45 2.04 10.45 2.04 14.470 1.775.00 15.36 15.37 10.45 2.74 12.26 14.470 1.775.00 15.37 10.43 2.04 10.43 2.04 14.470 1.775.00 15.36 10.43 2.04 10.745 2.794 14.700 1.775.00 15.37 10.43 2.04 10.745 2.794 14.700 2.552.00 15.46 15.470 10.745 2.794 14.700 2.552.00 15.41 10.71 2.94 10.726 14.700 2.552.00 15.41 10.71 2.97 10.726 14.77 2.552.00 15.41 10.71 2.99 10.726 14.76 2.552.00 15.41 10.75 2.99 10.726 14.76 2.552.00 15.41 10.745 2.94 14.76 14.76 2.552.00 15.41 10.75 2.97 10.766 14.76 2.552.00 15.40 12.76 10.745 14.76 2.552.00 15.74 10.745 12.766 14	92	-	600.00	15.54	10.49		19	12		11		
595.00 14.37 10.76 2.04 10.723 12.226 14.078 1.775.00 15.37 10.76 2.04 10.733 12.326 14.194 1.775.00 15.37 10.74 2.394 10.733 12.326 14.194 1.775.00 15.37 10.74 2.394 10.733 12.326 14.194 1.775.00 15.37 10.71 2.94 10.633 12.326 14.194 1.775.00 15.37 10.71 2.94 10.633 12.326 14.194 2.3303.00 14.31 10.71 2.94 10.631 12.300 14.194 2.775.00 15.37 10.73 2.94 10.641 12.326 14.197 2.775.00 15.37 10.73 2.94 10.641 12.314 2.775.00 15.47 10.736 12.441 12.245 2.778 10.744 12.745 12.745 14.147 1.776.00 15.77 10.775 12.441 14.757 1.778 10.746 12.748 12.748 14.147 1.776 11.17 10.775 12.748 12.745 1.776 11.17 10.775 14.757 14.757	72	3.	256.00		11.0	2.84				14,491		
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563.00 (5.09 (0.59 2.83 10.593 (2.473 (4.250 (4.530 5) 4CIGHLED AVERAGES FUR THE FERIOD 030152 TO 033152 HOLSTURE ASH SULFUR DTU/LW FTU/LW BTU/LB UNIT COAL LES. 502 (AR) (AR) (AR) (AR) (AR) (AR) (A.F.) BTU/LB FER NRTU 52.00 (4.15 12.87 10.657 (2.413 14.205 14.406 5.25		-	00.115	15.20	9, 95	07 - N	10.454	12.54	14.235			
4EIGHTED AVERAGES FOR THE FERIOD 030192 TO 033192 HOLSTURE ASH SULFUR DTU/LW BTU/LB URIT COAL LPS, 502 (AR) (AR) (AR) (AR) (AR) (DRY) (H.A.F.) BTU/LB FER HKTU B2.09 14.15 19.42 2.87 19.657 (2,413 14,295 14,406 5.25	1		563.90			13.1	10,573	12,473	14.250	14,530		
HOISTURE ASH SULFUR DTU/LU PTU/LU RTU/LB UHIT COAL LPS. (AR) (AR) (AR) (AR) (AR) (AR) (A.F.) BTU/LB FER) (A.15 19.82 2.87 19.657 (2,413 14,295 14,466 5.)	3	4CIGHIE	D AVERA	GES FOR TH		030152						
(AR) (AR) (AR) (AR) (DRY) (H.A.F.) ETU/LB FER 1 0/ 14.15 19.42 2.87 19.657 17,413 14,295 14,406 5.5	a i	HOLSTURE	ASH	SULFUR	010/LB	etu/Lb	FUALB		•			
14.15 19.82 2.87 10.657 12,413 14,205 14,406 5,25	N.S.	(AR)	(48)	(AR)	: AK)	(DRY)	(H.A.F.)		-			
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SAIN SMIMPLE ALL 2262-292-212-1:ON TEL 12:21 (IBH 26)-32-338 ILLINOIS FOWER COMPANY HENNEPIN FOWER STATION Coal Analysis Refort for the Period 040192 to 043672 For the Vendor : coal to bunkers

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	FOUNDS 202 FER NATU		50° N	5.18	0 1 1 0		א יי יי ר צ	י ר ר ר	- 11 - 11 - 11	י י י י י	7 (7 -	0 - 7 - 7 -	7 0 7 0 1 9	1		0 ° ° °		5.01	55.5	5.91	7 (4) (1)		10's					
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	вти/гв (Н.А.Е.)					14,133	14,129	942.41	14,252	12,277	14.128									•	14,225	14,200	14,203		LBG. 202	FER HUTU	5.31	
	BTUZEB (DRY)					12,495	12,225	12,344	12,241	12.295	1144,01	12,508	1001	12.454	121-121					0)-7 . V -	12,500	12,459	12,563		UNIT COAL	BUULE	14,438	
•	BTU/LB (AR)	600°C)	10.947	10.704	10,907	10,592	10,455	10,754	10.393	19,504	10,704	10,761	10,543	10.795	10,684	10.874	10.827	10.917				10, 401	10,921	043092	BTU/LB	(. 1.H.U.	14,219	
	ZULFUR (AR)	70.01	2.91	2 83	2.91	2.35	2.75	3.15	2-96	E & -	3.91	00.0	1 SS:	26.2	5.03	2 ¢ 1	61- C	4.55					50.14 14	PERIOD 040192 TO	RTU/LB		12,455	
	Z ACH (AR)	10.29	9.U4	10.08	19.22	10.49	1.52	11.63	11,99	11.86	10.63) い い の ー	10.12	10.41	10.64	10.99	10.31	11.12	10.40				00.01		BTU/LB		10,754	
	X HOISTURE (AR)	13.28	13.22	14.63	12.51	14.46	٠	12.93		•		10 m		•	85.51	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	44.01	12.02					•	_	ZULFUR (AR)		2.95	
	TONS TO BUNKERS	543.00	714,00	622.60	00.000	591.00		99.407 VV			000 m				00.110.	1.3.00	SET.00	602.90	516.00		248.00	7.4.5 6.0		JEIGHTED AVERAGES	111 111		10.60	
	FURG				-	•	•	-	•••	•••		- (-						-	•	DE IGHTE	HCISTURE (AR)	í 		
	50:4FLE DATE 	04/01/92	25/20/12		01/00/20			04/14/00	16,51,40	CU.71740		04/18/90	04.10						ロル人にはべてう	24/20/F0	じゅくらじくせつ	04/00/40			T07AL T045		25.378.00	

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... EHD OF REPORT RUN ON 05/02/92 AT 14,18,50

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KEFORT FOR THE FERIOD 050192 TO 053192 THE VENDOR : COAL TO BUNKERS ILLINDIS POWER COMPANY HEINEPIN POWER STATION FOR COAL ANALYSIS

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202 LIAIT Eaceeded) ! ! ! ! ! ! ! ! 202 PER HETU 50.04 20.04 20.04 5.11 Founds 1117 1117 1117 14,330 14,530 14,530 14,335 14,345 14,335 14,335 525 FI 14,543 L.0.5. 502 F.ER HRTU 14,131 14,004 14,0004 14,0004 14, 769 64, 746 14, 460 14, 460 BTU/LB (H.A.F.) 14,298 14,368 14,266 UNIT CIAL BTU/LE 444440390910 444440390910 1901-09091910 1901-0490919 1901-04901999-99 67U/LB (PRY) ВТU/18 (й.А.°.) 10,728 10,729 10 10, 610 10, 610 10, 640 11, 426 16, 955 16, 955 16, 959 16, 95 10, 630 ACTINIEL AVERAGES FOR THE FERIOD ASONAL YO ATTAC BTU/LB 616,510 16, 801 ETU/LE (ERY) 20LFUR 20LFUR (...ี.R.) 000---00-00000 000---00-00000 810/718 (ato) 1111 111 AZH AZH Z MOISTURE 14.12 (30) (35) (JAR) 1 1 1 1 2, 195, 00 1, 524, 00 1, 524, 00 2, 524, 00, 3, 329, 65 3, 369, 95 4, 717, 65 3, 259, 95 3, 259, 95 4, 660, 65 2,132,00 2,125,00 830,00 2,902,00 2.114.00 1,745.60 1,634.00 1,676.69 . , , TOURS TO **JALIANCERS** Data Linn (UIC) 1 05/01/72 0570472 05707752 057.06775 70.6.1L 70.6.1L 05/03/72 2012102 00/32/30 SANTLE DATE

... EHD DF RUEDRY RUA DN 05/04/92 AT 14,26,14

44,514

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(AE)

10,782

12,469

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	480VE 5.0 FOUNDS 502				
	FOURDS 502 FER ABTU		400490044 400440044 400440044	មលាលលាលលាលលាល ភ្លាំងពេលលាលលាល ភ្លាំងពេលលាប់ក្រុមប៉ុន្ម ភ្លាំងពេលលាប់ក្រុមប៉ុន្ម	5.37
		M-011-00/-1 4-0101010 4-4-1-4-0	দিব বিবার করা	4444000004	14, 486 14, 544
063092					14,245 14,265
AUY TON D 060192 TO BUNKERS S)	201	4 M M + 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		10000000000000000000000000000000000000	1 N. 566
ILLINDIS POWER COMP HENNEFIN POWER STAT EFORT FOR THE FERICI HE VENDOR : COAL TO (COMFLETED SAMPLE)		00000000000000000000000000000000000000	0 - 0.001-0001	0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	2.99		00000000000000000000000000000000000000	00000000000000000000000000000000000000	10'E
S15 FOR	2 ASH (AR) 	180-50 180-50 190-50 100 100-50 100000000000000000000000	101-410-00- 000-00-0-	00110000000000000000000000000000000000	е 1 1
COAL ANALY	X HGISTURE (AR) 12.52	1001.000		CINCIPULATION CI	12.7 FOR
	1015 10 BUNKERS 	662.00 1514.00 1,514.00 1,269.00 1,269.00	1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	1,774,69 1,594,00 1,597,00 1,710,000 1,710,0000000000	2.172.00 HTED AVER
	·				DIEN CIEN WINTER
	SAMPLE DATE 06/01/92	06/02/90 06/06/96 06/06/96 06/05/96 06/96/96 06/96/96 06/96/96	100/11/00 100/10 100/100/		

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···· END OF REFORT RUN ON 67/07/92 AT 11.25.34

43,800.00 -----TOTAL 10N5

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13.17 MOISTURE (AR)

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UNIT COAL BTU/LB 14,471

BTU/LB (M.A.F.) 14,197

RTU/LB (DRY) 12,475

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YUL! JEN GANI HENNEPIN FOWER STATION COAL ANALYSIS REPORT FOR THE PERIOD 070192 TO 073192 FOR THE VENDOR : COAL TO BUNKERS (COMPLETED SAMPLES)

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AROVE 5.8							•																											
FOUNDS 502 FER MRTH									• •	5.43	•		5			- <i>U</i> - <i>V</i> - <i>V</i>	ר י י י	۹.	2 7 7 7 8		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 C 1 C 1 C					۰.	0.06	0					
RTU/LE COAL UNIT		0000,44	•		14.471	14.417	• •	• •	14,460	14,353	14,418	14,362	14,491	044.41		4.445		14.490	707.41	9-2-61	14.500	14 457	•	•										
БТU/LB (М.А.F.)		14.170	14.201	• •	14,202	14,152	14,105	14,073	14,197	14,070	14,155	14,110	14,208	14,156	14,227	14,186	14,254	14,215	14.222	14,254	14,225	14.174	14.17	14.7.04	A 754	14 170		• •					5.33	
BTU/LR (DRY)	12.346	• •	12,532	12,503	12,523	12,485	11,259	12,359	12,574	12,469	12,477	12,440	12,420	12,349	12,416	12,600	12,678	12,502	12,506	12,544	12,489	12,378	12,513	12,541	12,595	12,460	11.908	12,345			UNIT COAL		14,452	
BTU/LB (AR)	10,029	10,918	10,945	10,783	•	•	•	•	•	•	•			10, 272	•	10,974		10,740	•			10,548	10,793	11,051	10,949	10,985	9,829	10, 697	C03220 D1		ETU/LE (M.A.F.)		14,172	
z SULFUR (AR)		2.93	2.93	•	2.94	2.95	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								O A I	10-1 1	4 P	50.00	50° M	26.2	C1 : C1 :	2.89	2.79	2.98	40°E	2.88	เม	2.00	D 070102 TO		ETU/LE (DRY)		12,401	
		<u> </u>	÷	-	2	2.		-	- 0 - 0	• 0	• •				-	~ (<u>- 1</u>			- `		2	~ ~	-	-	2	~	10.77	NE PERIOD	- 1	DTU/LB (AR)		10,652	
Z HOISTURE (AK)	-	12.48	. N. 10	13.76	10.4 1 1					15.79	11 57	10.71				9 F 7 7 7 7 6		4			50 V V	10"F	13.74	11.88	12.21	11.84	1 / 45	13.49	LES FOR THE		SULFUR I (AR)	ļ	2.91	
TONS TO BUNKERS	. 669.00	2,267,00	1, 140.00 5 545 00				1. HAD 00	1.395.00	2,350,00	1,514.00	1.659.00	2,089.00	2.297.00	1.849.00	20 20 Y				594 00	00.042.1			00,040,0	00.167.		00.101		100.100,	WEIGHTED AVERAGES	1	<u> </u>		10.72	
	(4)		- 4		- [4				•••	-						- •	- •	- •			. •	- •	- •	- •	- •	- 4	-	LHDI3M		HOISTURC (AR)		71.4.	
SAMPLE DATE	07/01/92 07/07/50	26/20/20	07/04/92	26/20/20	26/90/20	26/20/20	07/08/92	27/09/72	26/01/20	07/11/72	-07/12/92	07/13/92	26/41/20	07/15/92	26/91/20	26/21/20	07/18/92	26/61/20	26/02/20	07/23/92	26/42/20	26/92/20	07/27/92	28/82/20	66/62/20	64/02/20	07/35/92				1015C	51 580 00		

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... END OF REPORT KUN ON 08/05/92 AT 14.54.15

ILLINDIS POWER COMPANY Hennepin Power Station Coal Analysis report for the feriod 080192 to 083192 For the Vendor : Coal to Bunkers (completed Samples)

ABOVE 5.0 202 *S*87

ระคายสายครั้ง 200 เป็น PER MBTU POUNDS 202 ເກເກ 14,569 14,436 14,455 14,467 14, 431 14,505 BTU/LB 4,504 14,442 14,530 14,455 4,468 14,510 4,469 4,479 4,430 4,402 14,452 4, 150 4.474 14,509 4,432 4,517 4,452 4 477 UNIT 1 1 1 1 1 1 1 COAL PER MINTU LBS. 502 L1.2000 L1.4 1000 L1.4 100 14, 161 14, 207 14, 170 14, 1797 14, 1 14,250 (M.A.F.) **BTU/UB** UNIT COAL םTU/LE (DRY) 10, 400 10, 40 **BTU/LB** 544. 2,520 515 , 481 (H.A.F.) 10,721 10,721 10,872 10,872 10,872 10,872 10,872 10,825 10,825 10,825 10,825 10,825 10,825 10,825 10,825 10,825 10,825 10,825 10,721 10 10, 772 10, 689 10,861 10,840 10,663 10,610 10,945 10.922 10,041 9,619 WEIGHTED AVERAGES FOR THE FERIOD 080192 TO 083192 BTU/LE 0.814 0,896 (AR) BTU/LB BTU/LB (DRY) z SULFUR (AR) 11.07 19.55 19.55 10.76 10.76 10.76 10.76 10.28 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.58 10.57 10.78 19.74 11.17 9.51 10.18 10.22 z ASH (AR) 26.93 10.40 10.74 1111 2.02 (AR) BTU/LB MOISTURE (AR) 1.74 сі сі 3.50 4.09 12.02 13.72 67 ភេស ភេស 1111111 SULFUR N 747.00 747.00 7.457.00 7.457.00 7.457.00 7.457.00 7.457.00 7.457.00 7.757.00 7.757.00 7.757.00 7.756.00 2,128,00 2,128,00 1,571,00 1,503,10 0,503,10 1,603,00 1,571,00 168.00 914.00 472.00 2,293,00 1,737,00 1,602,00 1,602,00 1,602,00 1,602,00 (AE) 571 00 TONS TO RUNKERS ASH (Af:) HOISTURE 08/05/92 08/05/92 08/05/92 08/06/92 08/06/92 08/15/92 08/15/92 08/15/92 08/15/92 08/15/92 08/15/92 08/15/92 08/15/92 08/15/92 08/15/92 00/20/92 08/21/92 08/22/92 08/23/92 26/62/80 26/82/80 26/22/80 26/92/80 26/92/80 26/01/00 TONS 26/20/80 26/02/80 TOTAL SAMFLE DATE

... END OF REPORT RUN ON 07/08/92 AT 13.00.24

14,477

14,200

12,455 1111111111

10,806

2.94

10.66

13.24

50.129.00

5.31

PAGE

					(COMPLET	(COMPLETED SAMPLES)					
SAMFLE DATE	TONS TO FIUNKERS	TO RS	X MOISTURE (AR)	Z ASH (AR)	Z SULFUR (AR)		ВТU/LB (DKY)	<u>ыти/ср</u> (М.А.F.)	UNIT COAL Truvle	POUNDS SO2 Per Mrtu	ABOVE 5.0 1 15 507
09/01/92	1,73	734.00	-	10.58	3,06	10.846	10 457				
	3,13	3,136.00	13.49	10.05	2.83	•	•			02.1	
26/00/00		2,176.00		10.14	2.91	• •	12,489	071.41	14,404	0 	
		, 107.00	٠	10.63	2,84	10,710	12.415			, .	
09/06/92		12.00		10.76	2.96	10,707	12,411				
09/07/95		178.00 007 00		10.51	2.94	10,558	٦,	14.149	004 4 4	•	
09/08/92		883,00 571,00	13.97	10.39	2.93	-	12,553	14.278	14.554	າ¢ ເ າ⊮	
26/60/60	570 F			10.41	2-95	10,555	•		4 · 4 · 4		
26/01/60	7 P - r	00,040,0		10. JZ	10.41	•	12,416	14,132	14,402		
09/11/92			22.2	10.72	1.03	•	12,441	14,199	14,4BO		
09/12/92			2	10.69	3.02	•	12,413	14,171	14.455	•	
09/13/92				10.00	C1		•	14.175	200.01		
26/41/60		00 212		10.06	2 79	10,530	12,482	14,173	14.439		
09/15/92			79°11	19.72	3.06	•	12,493	14.224	14.507	- r 	
09/16/92		414.00	18.41	9.87	2.8	10,694	12,562	14,209	14.475	* •	
26/21/60			0	10.17	2.96	10,413	12,441	14,160	14.458	- ม า ม	
09/18/92				7.75	10.1	10,611	12,501	14.123	14 791		
09/19/92		00,705	15, 21	11.35	3.13	10,724	12,362	14.222			
66/02/60				22.6	2,98	10,680	12,586	14.179	14 AT7		
26/12/60			12.92	11.33	2.96	10,793	12,394	14.243			
26/22/60			10,01	16.9	2.05	10,641	12,526	14.181		0 F 0 F	
09/23/92				10.29	2.84	10,859	12,587	14.291		ייי ייי ש	
6/10/60			14.10	11 . 75	3.00	10,566	12,300	•			
10/50/60			14.19	11.05	2.86	10,655	52,417				
26/92/60	50 50 50 50 50 50 50 50 50 50 50 50 50 5	0,000,00 1 777 00	12.64	10.95	2.97	10,903	12,486	776.44	1021 T		
26/22/60				10.95	3.06	10,972	12,400	14.254			
09/28/92		007014		10.39	2.80	10,812	12,507			ส เ ส เ ก เ	
26/62/60			24.41	10.64	2.87	10,629	12,428				
09/30/97			12.66	10.97	3.66	10,883	12,460	14.245	う r L		
	C/+ ' -	20.0	12.47	10.21	3.11	11,033	12,605	14,269	44.544		
	WEIGHTED AVERAGES	AVERAG	ES FOR THE	E PERIOD	096197	TO GIOD		ı	-		
		ļ									
	HULSTUKE ASH (AK) (/	٩R)	~	ETU/LE (AR)	BTU/LB (DRY)	ETU/LE (M.A.F.)	UNIT COAL BTU/LB	LRS. SO2 FER MATH			
53,943.00	I 	ი ი		042 01							
				* 1	5/6'31 	14,198	14,473	5.32			
								* - * * * * * * .			

... END DF REFORT RUN DN 10/06/92 AT 08.31.44

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ILLINDIS FOWER COMPANY HENNEFIN POWER STATION COAL ANALYSIS REPORT FOR THE PERIOD 090192 For the Vendor : Coal to Bunkers (Compileted Sameles)

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ILLINOIS FOWER COMPANY HENNEPIN FOWER STATION COAL ANALYSIS REFORT FOR THE PERIOD 100192 TO 103192 FOR THE VENDER: COAL TO BUNKERS

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				(COMPLET	(COMPLETED SAMPLES)					
SAMPLE DATE	TONS TO BUNKERS	z MOISTURE (AR)	z ASH (AR)	Z SULFUR (AR)	BTU/LB (AR)	ВТU/LB (DRY)	BTU/LB (M.A.F.)	UNIT CDAL BTU/LB	FOUNDS SO2 FFR MBTH	AHOVE 5.8 1 67 707
10/01/02			\$ } 							204 443
	1,260.00	12.60	10.40	3,06	10,955	12,534	14.226	14 500		
	3,561.00	5.7	10.06	2.78	10.516	12 482	4 4 7 E		1 - 1 1 - 1	
10/03/92	1, 737.00	14.7	10.28	R C	572 61			14,441	5.16	
10/04/92	1.315.00	5	02 01				14,181	14,450	5.19	
10/05/92	1 613 00				11,000	12,554	14,239	14,509	5.23	
10/06/92				N . 4	10,639	12,479	14,176	14,447	9 M 9	
10/07/91	00 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0		10.57	2.94	11,014	12,488	14,188	14.457	2 2 2 2	
		16.8	9.88	2.82	10,356	12,450	14.177	201 1 1		
	1,437.00	13.1	10.11	3.18	10.866	102 01				
26/60/01	2,027.00	13.4	10.15	7 07				14,427	5.71	
10/10/92	1 644 99	V 7)	5		100 01	200,21	14,221	14,493	5,51	
10/11/01			4 D - 4	2.46	10,441	12,496	14,164	14.431		
CO/51/01		4 · ·	18 01	2.95	10,511	12,361	14.167	14 445	r f 3 4 3 6	
	00.155.5	~ 4 ~	10.36	2.94	10.714					
74747	1,542.00	13.2	10.87	3,00	10 755			14,471	5.34	
10/15/92	3,024,00	C 12 5	10 27			C / C / J	14,169	14,451	5,44	
10/16/92	2 574 00			<u></u>	0// 0/	12,483	14,179	14,459	5.70	
10/17/92		- 1	29 - 91 2	2.90	10,340	12,486	14.263	14.550		
CO/8//0/	×, ×00, 00		9.87	2.74	10, 301	12,534	14 245		- c r - r -	
	1,558.00	14.92	10.89	2,90	10.530	202 01			41.0	
24741701	1,937.00	14.56	10.01	1 01				14,491	5.37	
10/20/92	2 046 00		1			12,371	14,183	14,471	5.51	
10/21/02		j.	10.10	2.68	10,683	12,371	14.132	14 400		
00/00/01		र 	10.89	2.98	10.642	12.404	14 207			
	2.411.00	4	10.40	2.96	10.47B	400			0.46	
74767761	663.00	14.69	10.46	P O P				14,44/	5.4	
10/24/92	99.		00		370121	14,400	14,190	14,473	5.58	
10/25/92				99.4	•	¢	•	O	00	
	~ ~~		90.	00 -	•	0	0	0	00	
	UFICHTED AVERAFER FOR							•		
			IE YEKIU	THE FERIUD 100192 TO 103192	261201 0.					
TOTAL M	WUISTNEE AEU									
		~	BIU/LB	BTU/LB (DRY)	BTU/LB (M.A.F.)	UNIT COAL BTU/LB	LBS. SO2 PER MBTU			
	i]						
90.901,04	14.68 10.37	2.94	10.639	12.440	101 101					

... END OF REFORT RUN ON 11/03/92 AT 09.25.16

5.38

14,469 1 ł

14,194

12,469

10,639

(AR) 10.37

43,138.00

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ILLINUIS POWER COMPANY HENNEPIN POWER STAFION COAL ANALYSIS REPURT FOR THE PERIOD 110192 10 113092 FOR THE VENDUR : COAL TO BUNKERS (COMPLETED SAMPLES)

AROVE 5.8 LRS SO2																																
FOUNDS 502 FER MBTU		0 ° °	ע ע עריי	9 : 2 n 2 n 2		ט ר ד ר צ	к с т 3 г 4	יש כ יים שרים	יי ר עי יער יער	5 0 1 4 1 4	0 7 0 7 0 1 0	0 P		0 - 1 - 1	9		94°C	5.79	5.62	5.61	د. 44	5.27	5.27	40°.				1 1 1 1 1 1 1				
UNIT COAL BTU/LE		347 4 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7					1. 46	14.407	0-4 410		14 479	11 200					(), t () (), t ()	NO.41		- 4 ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	14,501	14,506	14,425	14,601	14.576	14.534	14 462	14,500				
ВТU/LR (M.A.F.)	14 244		512.4	14 187	141	14 159	14 192	14,127	841 41	14,405	14 153	14 11 2	4 470	4 1 1 4	101.4							4.255	14,155	44.344	14,269	14,270	14.122	14,206		*******	LBS, 302 PER MHTH	5.45
4 4	12.395	590.04	12,417	12,322	12,474	12,509	12,414	12,218	12,387	12, 348	12,489	12,337	12,355	12.461	12,302	12.452							12,453	12,770	12,694	12,657	12,369	12,333			UNIT COAL BTU/LB	14,483
RTU/LB (AR)	10.467	10,363	10,665	10,315	10,628	10,862	10,797	10,496	10,403	10,369	10,459	16,442	10,644	10,667	10,328	10,575	10, 807	10 551	0 250				19,471	10, 984	10,896	10,677	10,424	10,435	rù 113092		BTU/LB (M.A.F.)	14,205
z SULFUR (AR)	3.11	3.07	3.01	2.95	2.96	3.0ń	3.21	3.04	2.95	3.02	3.03	3.07	2.63	2.93	2.92	2.96	3.21	3.04	2.94		E a C			4 1 0 1 V 1	18.2		26 1	2.92	HE FERIOD 110192 TO 113092		ΒΤU/LB (DKY)	12,485
х А5н (Аб)	11.17	10.66	10.98	10.93	10.04	10.12	10.40	11.61	10.45	10.46	9.88	10.45	10.51	10.55	10.72	10.52	10.63	10.57	10.13	10.06	9.89					ስ	10.46	11.15	HE PERIO		TU/LB (AR)	10,583
z MOISTURĘ (AR)	13.94	16.22	14.11	14.28	14.80	13.16	13.02	14.09	16.02	16.03	16.62	15.57	13.85	13.98	16.05	15.08	13.49	15.32	17.17	15.90	16.53	10.21				1 n 1 n 1 n	57.01	15.39	FOR T		<i>3</i> 1,	2.96
TONS TO BUNKERS	,724.00	, 631.00	, 718.00	3, 384, 00	, 55.90	, 566.00	, 600.00	. 677. 00	00.5.0.	, 109, 60	00	99.909.	, 622.00	., 761,00	.579.60	3,346.00	1,415.60	3,420.00	2,148.00	1,855.00	2,551.00	1,431,00	2.428.06		200.000	00.001.00	00.000	4,493.00			~	10.27
	.			., .				- 1				-			-	-,	-			*-		•••			*	•	, ,	•	nEI GH1		(JA) (JAE)	15.24
CAMFLE DATE	11/01/92	26/20/11													74/01/11				26/02/11		26/22/11	11/13/92	11/124/92	11/25/92	11/25/92	11/29/92	CO/02/11				TONS	

... END OF REPORT RUN ON 12/11/92 AT 10.49.47

5.45

1

12,485 .

FAGE

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ILLINOIS FOWER COMPANY HENNEPIN POWER STATION COAL ANALYSIS REFORT FOK THE PERIOD 120192 TO 123192 FOR THE VENDOK : COAL TO RUNKERS (COMPLETED SAMPLES)

ON 01/06/93 AT 17.58.01 RUN REPORT ЧO QN3 :

14,443

14,173

12,448 ----

10,659

2.94

(AR)

(AR) 10.42

(AR)

14.37

54,797.00

(DRY)

5.38

PAGE

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		-	CCAL AN	ALYSIS REP	ORT FOR THE	E PERIOD	01/01/93 1	0 03/31/93		}
					HE VENDOR			1		1
				(COMPLETED	SAMPLES)				
					1					
		7.	*	%				UNIT	POUNDS	HEAT
SAMPLE	TCNS	MOISTURE	ASH	SULFUR	BTU/LB	BTU/LB	BTU/LB	COAL	SO2	INPUT
DATE	SAMPLED	(AR)	(AR)	(AR)	(AR)	(DRY)	(M.A.F.)	BTU/LB	PER MBTU	MH8TU/H
T. AVE.	153,404	14.64	10.48	2.97	10609.00:	12,428	14,168	14,446	5.45	
1/2/93	2,610	15.38	10.16	2.84	10,534	12,448	14,148	14,417	5.26	
1/3/93	1,340	14.20	10.36	2.88	10,670	12,435	14,143	14,412	5.26	
1/4/93	1,238	16.07	9.52	2.87	10,555 !	12,577	14,205	14,469	5.30	
1/5/93	1,353	14.65	10.51	3.21	10,582	12,399	14,139	14,427	5.92	1405
1/6/93	797	14.30 (10.54	3.17	10,663	12,443	14,187	14,474	5.80	
1/7/93	2,199	17.33	9.82	2.83	10,315	12,478	14,161	14,429	5.35	
1/8/93	410	12.29	11.21	3.21	10,812 1	12,327	14,133	14,425	5.79	
1/9/93	2,253	13.53	10.66	3.60	10,749	12,429	14,176	14,480	6.51	1370
1/10/93 i	1,314	12.77	10.45	3.07	10,813 (12,396	14,084	14,355	5.54	
1/11/93	1,816	14.38	10.26	2.91	10,665	12,455	14,151	14,421	5.32	
1/12/93		13.51	10.21	2.92	10,790	12,475	14,146	14,411	5.28	
1/13/93 1		13.79	10.5Z	3.00	10,686	12,395	14,118	14,394	5.48	
1/14/93	1,776	12.99	10.59	3.28	10,853		14,217	14,490	5.89	
1/15/93	1,116	12.55	12.11	3.07	10,668	12,198	14,158	14,466	5.61	
1/16/93	1,761	17.61	9.52	2.80	10,306		14,161	14,428	5.30	
1/17/93	2,616	15.09	10.90	2.97	. 10,438	12,292	14,102	14,389	5.54	
1/18/93 :	1,254	15.19	10.50	2.81		12,402	14,154	14,429	5.21	
1/19/93 i	1,211	12.46	11.89	3.57	10,712		14,140	14,482	6.50	2651
1/20/93 1	3,470	14.13	10.58	2.99	10,683	12,439	14,189	14,469	5.46	
1/21/93	1,632	17.88	10.40	2.84	10,129	12.334	14,121	14,406	5.47	
1/22/93	1,773	12.25	11.18	3.36		12,344	14,190	14,445	6.05	1457
1/23/93	2,752	14.20	11.70	3.10	10,547		14,234	14,543	5.74	
1/24/93	1,039	16.53	10.32	2.87	10,344	12,393	14,141	14,419	5,41	
1/25/93	1,532	15.82	11.14	2.89	10,396	12,350	14,233	14,530	5.42	
1/26/93	1,501	15.96	10.67	2.89	10,413	12,390	14,193	14,478	5.41	
1/27/93	1,641	12.12	10.43	3.03	10,986	12,502	14,186	14,456	5.38	
1/28/93	1,770	12.35	10.77	3.05	10,950	12,493	14,243	14,525	5.43	
1/29/93	1,207	12.27	11.27	3.24	10,914	12,441	14,275	14,574	5.79	
1/30/93	1,594	12.28	10.74	3.15	10,926	12,456	14,193	14,476	5.62	
1/31/93	609	12.70	10.90	2.88	10,841	12,418	14,189	14,467	5.18	
2/1/93	893	16.04	11.32	2.89	10,206	12,156	14,050	14,344	5.52	
2/2/93	1,758	15.77	11.01	2.93	10,378	12,322	14,174	14,466	5.51	
2/3/93	1,751	15.78	10.33	2.79	10,464	12,424	14,162	14,434	5.20	
2/4/93	1,744	12.70	9.84	2.92		12,636	14,241	14,500	5.16	
2/5/93	1,559	12.47	10.29	3.15	10,948 1	12,508	14,175	14,448	5.61	<u> </u>
2/7/93	1,787	15.04	10.04	2.92		12,560	14,244	14,516	5.34	
2/8/93	1,616	15.16	10.00	2.89	10,635	12,535	14,210	14,479	5.30	
2/9/93	1,705	15.34	10.68	3.05	10,517	12,422	14,215	14,507	5.66	
2/10/93	1,602	15.24	10.50	2.97		12,394	14,146	14,427	5.51	
2/11/93	1,625	14.31	10.56	2.95		12,441	14,190	14,468	5.40	
2/12/93	1,969	14.79	10.95	2.91		12,358	14,181	14,465	5.39	· · · · · · · · · · · · · · · · · · ·
2/14/93	1,623	14.36	10.93	3.00		12,378	14,189	14,477	5.52	
2/15/93	1,734	15.73	10.25	2.85	10,475		14,150	14,424	5.31	
2/16/93	3,224	15.45	10.64	2.88	10,494		14,178	14,480	5.35	·
2/17/93	1,754	14.24	10.56	2.90		12,491	14,244	14,523	5.28	
2/18/93 .	1,922	14.51	10.39	2.95	10,645		14,175	14,450	5.40	
2/19/93	2,358	16.03	10.46	2.90	10,436	12,428	14,197	14,479	5.42	
2/20/93	1,773	16.54	10.35	2.76	10,378	12,435	14,195	14,471	5.19	
2/21/93	1,614	16.28	10.67	2.88	10,374	12,392	14,201	14,488	5.41	
2/22/93	1,656	16.61	10.42	2.87		12,406	14,177	14,458	5.41	
2/23/93	1,471	14.74	10.55	2.94	10,585	12,415	14,168	14,447	5.42	
2/24/93	1,449	14.06	10.36	2.98		12,452	14,158	14,432	5.43	
2/25/93	1,541	14.02 +	10.01	2.89		12,503	14,151	14,413	5.24	

					EPIN POWER				1	
			CCAL AN	ALYSIS REP	PORT FOR TH	E PERIOD	01/01/93 T	0 03/31/9	3	
					THE VENDOR		ERS			
					(COMPLETED	SAMPLES)				
0.000	TONG	X	7	% .				UNIT	POUNDS	HEAT
SAMPLE	TONS	MOISTURE	ASH	SULFUR	BTU/LS	STU/LB.		CCAL	S02	INPUT
DATE	SAMPLED	(AR)	(AR)	(AR)	(AR)	(DRY)	(M.A.F.)	BTU/LB	PER MBTU	MMBTU/HR
2/26/93		16.82	10.37	2.91		12,404	14,171	14,453	5.50	
2/27/93		14.47	10.55	2.94	10,560		14,216		5.38	
2/28/93 1	1,485	15.78	10.59	2.93	10,455		14,200	14,484	5.46	
3/1/93	1,697	16.92	10.37	2.80	10,277		14,134	14,411	5.31	
3/2/93	1,819	14.30	9.74	3.07	10,771		14,181		5.56	
3/3/93	1,028	15.23	10.12	3.02	10,516	12,405	14,087	14,361	5.60	
3/4/93	2,023	13.29	8.13	2.99	11,301	13,033	14,381	14,619	5.16	
3/5/93	2,203	13.03	8.63	3.04	11,250	12,947	14,373	14,620	5.26	
3/6/93	2,010	15.92	10.33	2.84	10,475	12,459	14,203	14,480	5.29	
3/7/93	1,374	14.79	10.13	2.87	10,654	12,502		14,458	5.25	
3/8/93	1,451	11.22	10.29	3.06	11,174	12,586	14,235		5.34	
3/9/93	1,524	14.61	10.11	2.92	10,622	12,439	14,110	14,377	5.36	
3/10/93	2,212	14.61	10.16	3.01	10,634	12,453	14,134	14,408	5.52	
3/11/93	2,181	15.00	10.10	2.84	10,493	12,344	14,008	14,271	5.28	
3/12/93	2,010	15.60	10.05	2.84	10,529	12,475	14,161	14,430	5.26	
3/13/93	2,275	15.51	10.30	2.77	10,409	12,320	14,029	14,296	5.19	
3/14/93	2,173	14.49	9.58	2.83	10,721	12,538	14,138	14,394	5.15	
3/15/93	2,559	14.65	9.84	2.85	10,661	12,491	14,118	14,378	5.21	
3/16/93	525	14.53	10.32	2.93	10,586	12,386	14,086	14,357	5.40	
3/17/93	3,216	13.16	11.19	3.11	10,567	12,285	14,099	14,390	5.68	
3/18/93	3,318	11.68	12.13	3.28	10,804	12,234	14,182	14,494	5.91	
3/19/93	2,851	13.66	11.37	3.00	10,582	12,259	14,114	14,406	5.53	
3/20/93	1,566	14.76	10.52	2.89	10,489	12,305	14,055	14,331	5.37	
3/21/93	1,758	14.72	10.44	2.91	10,614	12,445	14,181	14,458	5.35	
34,050.	1,644	14.24	11.18	2.97	10,500	12,244	14,079	14,367	5.52	
34,051	1,564	15.40	10.43	2.83	10,478	12,384	14,126	14,400	5.27	
34,052	2,134	15.11	10.25	2.94	10,565	12,446	14,154	14,428	5.42	
34,053	1,729	14.39	10.51	2.93	10587.00	12,366	14,095	14,371	5.40	
3/26/93	1,741	14.83	10.85	2.96	10525.00	12,357	14,161	14,447	5.48	
3/27/93	1,739	16.05	10.75	2.88	10325.00		14,105	14,388	5.44	
3/28/93 1	1,757	15.98	10.29	2.88	10416.00	12,398	14,129	14,402	5.39	
3/29/93	1,660	12.98	10.84	3.01	10841.00	12,458	14,231	14,514	5.41	
3/30/93	1,293	16.05	10.19	2.85	10467.00		14,189	14,464	5.31	
3/31/93 i	1,806	17.15	10.13		10320.00				5.31	

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APPENDIX B

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Illinois Environmental Protection Agency

Division of Water Pollution Control

2200 Churchill Road

P.O. Box 19275

Springfield, Illinois 62794-9276

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Reissued (NPDES) Permit

Expiration Date: July 1, 1997

Issue Date: August 10, 1992 Effective Date: September 9, 1992

Name and Address of Permittee:

Illinois Power Company 500 South 27th Street Post Office Box 511 Decatur, Illinois 62525-1805

Discharge Number and Name:

No. 001 Condenser Cooling Water No. 001(a) Boiler Blowdown No. 001(b) Intake Screen Backwash No. 001(c) Roof Drain Discharge No. 003 Ash Lagoon #2 and #4 Discharge No. 005 Ash Lagoon #1 and #3 Discharge No. 005(a) Chemical Metal Cleaning Waste Treatment System Effluent

In compliance with the provisions of the Illinois Environmental Protection Act, Subtitle C Rules and Regulations of the Illinois Pollution Control Board, and the FWPCA, the above-named permittee is hereby authorized to discharge at the above location to the above-named receiving stream in accordance with the standard conditions and attachments herein.

Permittee is not authorized to discharge after the above expiration date. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit the proper application as required by the Illinois Environmental Protection Agency (IEPA) not later than 180 days prior to the expiration date.

Thomas G. McSwiggin, P.E.

Manager, Permit Section Division of Water Pollution Control

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TGM: TRK: jd/0495E/3

Facility Name and Address:

Illinois Power Company Hennepin Power Plant Hennepin, Illinois 61327 Putnam County

Receiving Waters

Illinois River

Effluent Limitations and Monitoring

	LOAD I	LIMITS	CONCENT	RATION		
	1bs/	/dav		<u>S mg/1</u>		
	30 DAY	DAILY	30 DAY	ÖAILY	SAMPLE	SAMPLE
PARAMETER	AVG.	MAX.	AVG.	MAX.	FREQUENCY	TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

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Outfall(s):	001 Condenser	Cooling Water	

	This discharge consists of: 1. Condenser Cooling Water 2. House Service Water 3. Boiler Blowdown 4. Intake Screen Backwash 5. Roof Drain Discharge			Approximate 153.26 MGD 7.0 MGD 0.027 MGD 0.253 MGD Intermitten	
Flow				Daily	24-Hour Total
Total Residual Chlorine	See Special Condition No. 3			1/Week	•
Temperature	See Special Condition No. 4			Daily	Continuous
*See Special Con	dition No. 3				
	Outfall(s): 001(a) Boiler Blo	wdown		Approximate 0.027 MGD	Flow
Flow				1/Week	Single Reading- Estimate
Total Suspended	Solids	15.0	30.0	ì/Week	24-Hour Composite

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Effluent Limitations and Monitoring

	LOAD I	LIMITS	CONCENT	RATION		
	lbs,	/day	LINIT	<u>5 mg/1</u>		
	30 DAY	DAILY	30 DAY	DAILY	SAMPLE	SAMPLE
PARAMETER	AVG.	HAX.	AVG.	MAX.	FREQUENCY	TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): 001(b) Intake Screen Backwash

Approximate Flow	
0.25 MGD	

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Flow

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ow		1/Week	Singl e Reading Estimate
this p mainter	to minimize adverse impacts, for purposes of ermit, the intake structure operation and nance shall include, but not be limited to, llowing: Outer bar racks shall be routinely cleaned and collected debris properly disposed. The traveling screens shall commence operating whenever the head loss across the screens exceeds four (4) inches. The traveling screens shall be operated at least once per 8 hour shift, provided, however, that this requirement shall be inapplicable when the generating units are not operating.		
	Outfall 001(b) may be routed either to the discharge flume or directly to the Illinois River.		
	Outfall(s) OD1(c) Roof Drain Discharge		
	This discharge consists of: 1. Power Block Building Roof Drains	Approximate Intermittent	
	See Standard Condition No. 17		

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Effluent Limitations and Monitoring

	LOAD I	LIMITS	CONCENT	RATION		
	<u>1bs</u>	/dav	LIMIT			
	30 DAY	DAILY	30 DAY	DAILY	SAMPLE	SAMPLE
PARAMETER	AVG.	MAX.	AVG.	HAX.	FREQUENCY	TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): 003 Ash Lagoon #2 and #4 Discharge

	This discharge consists of: 1. Unit 2 Sottom Ash and Fly 2. Demineralizer Regenerate 3. Unit 2 Non-chemical Metal 4. Unit #1 and Unit #2 Ash H 5. Fly Ash Air Separator Ove 6. Ash Hopper Tank Emergency 7. Demineralizer Room Floor 8. Power Block Building Floo 9. Reverse Osmosis Unit Conc	Wastes Cleaning Was opper Overflo rflow Overflow Drainage r Drains and	4**	Approxima 2.9 MGD 0.035 MGI Intermitta 0.20 MGD Intermitta Intermitta 0.1 MGD 0.036 MGD	D ent ent ent
Flow				1/Week	Single Reading Estimate
рН	See Special Condition No. 3			1/Week	Grab
Total Suspen	ded Solids	15.0	30.0	1/Week	24 Hour*** Composite
011 and Grea	se	15.0	20.0	2/Month	Grab
**This waste	stream may be discharged to the East	t (Outfall 00)	3) or West (Outf	all 005) As	sh Pond

**This wastestream may be discharged to the East (Outfall 003) or West (Outfall 005) Ash Pond System.

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***See Special Condition No. 6

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Effluent Limitations and Monitoring

	LOAD I	LIMITS	CONCENT	RATION		
	lbs,	/day	LIMIT	<u>S_mg/1</u>		
	30 DAY	DAILY	30 DAY	DAILY	SAMPLE	SAMPLE
PARAMETER	AVG.	MAX.	AVG.	MAX.	FREQUENCY	TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): 005 Ash Lagoon #1 and #3 Discharge

	This discharge consists of: 1. Unit #1 Bottom Ash and F1 2. Unit #1 and #2 Ash Hopper 3. Coal Breaker Building Dra 4. Illinois River Dredge Spo 5. Unit #1 Non-chemical Meta 6. Chemical Metal Cleaning W Effluent 7. Coal Pile Runoff 8. Unit #1 and Unit #2 Ash L 9. Crib House Sump 10. Well Water Drain Line 11. Water Treatment Plant Sum 12. Boiler Drum Chemical Tank 13. Gas Reburning/Sorbent Inje	Overflow==== in Sump ils Cleaning Wa aste Treatmen ine Low Point Drainage	shwater t System	Approxima 0.21 MGD 0.2 MGD Intermitt Intermitt Intermitt Intermitt Intermitt Intermitt Intermitt Intermitt Intermitt Intermitt 0.96 MGD	ent ent ent ent ent ent ent ent ent
Flow				1/Week	Single Reading Estimate
рН	See Special Condition No. 1			1/Week	Grab
Total Suspended	Solids	15.0	30.0	1/Week	24 Hr===== Composite
Oil and Grease		15.0	20.0	2/Month	Grab

****This wastestream may be directed to the East Ash Pond System (Outfall 003). ***** See Special Condition No. 6

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Effluent Limitations and Monitoring

	LOAD L	.IMITS	CONCENTI	RATION		
	16s/	dav	LIHIT	<u>S_mg/1</u>		
	30 DAY	DAILY	30 DAY	DAILY	SAMPLE	SAMPLE
PARAMETER	AVG.	MAX.	AVG.	MAX.	FREQUENCY	TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

	Uutrain(s):	003(4)	Chemical	metal	Greaning	Maste I	reatment	System Lit	ruent
					-			Approximate Intermittent	
Flow								Daily When Discharging	
Iron (Total)					•	1.0		Daily When Discharging	
Copper (Total)						1.0		Daily When Discharging	

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Outfall(s): 005(a) Chemical Metal Cleaning Waste Treatment System Effluent

Special Conditions

- 1. The pH shall be in the range 6.0 to 9.0.
- 2. Samples taken in compliance with the effluent monitoring requirements shall be taken at a point representative of the discharge, but prior to entry into the receiving stream.
- 3. A. During times when the condenser cooling water is chlorinated intermittently, total residual chlorine (TRC) may not be discharged from the station for more than three hours per day or from any single generating unit's main cooling condensers for more than two hours per day. The discharge limit is 0.2 mg/l, measured as an instantaneous maximum.
 - Continuous TRC monitoring throughout a representative chlorination period shall be performed once per week in the cooling water discharge flume during the respective chlorination period of one condenser half allowing for lag time between the initiation of chlorination and the time of sampling. For continuous chlorine monitoring, analytical data from only two representative monitoring periods each month need be reported on the monthly discharge monitoring report. The time of sampling, the time and duration of the chlorine dosing period, and the amount of chlorine applied shall be reported.
 - 2. If continuous monitoring cannot be performed, a minimum of three grab samples shall be collected in the discharge flume at five minute intervals or less, once per week during a representative chlorination period, allowing for lag time between the initiation of chlorination and the time of sampling, to develop a chlorine concentration curve. The time of sampling, the time and duration of the chlorine dosing period, and the amount of chlorine applied shall be reported.
 - B. During times when the condenser cooling water is chlorinated continuously, the discharge limit is 0.05 mg/l, measured as an instantaneous maximum.
 - C. Chlorination of house service water is authorized by this permit, provided that the discharge limits above are not exceeded at Outfall 001.
- 4. Discharge of wastewater from this facility must not alone or in combination with other sources cause the receiving stream to violate the following thermal limitations at the edge of the mixing zone which is defined by Section 302.211, Illinois Administrative Code, Title 35, Chapter 1, Subtitle C, as amended:
 - A. Maximum temperature rise above natural temperature must not exceed S*F (2.78*C).
 - B. Water temperature at representative locations in the main river shall not exceed the maximum limits in the following table during more than one (1) percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature at such locations exceed the maximum limits in the following table by more than 3°f (1.67°C). (Main river temperatures are temperatures of those portions of the river essentially similar to and following the same thermal regime as the temperatures of the main flow of the river.)

	<u>Jan.</u>	<u>Feb.</u> 60	<u>Mar</u> ,	<u>Apr.</u>	May	June	July	Aug.	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	Dec.
۰۶	60	60	60	90	90	90	90	90	90 ·	90	90	60
•C	15.6	15.6	15.6	32.2	32.2	32.2	32.2	32.Z	32.2	32.2	32.2	15.6

- C. At times when the river water intake temperature is less than or equal to 41°F, the permittee shall either (1) screen the condenser cooling water discharge flume so as to restrict the entry of fish into the discharge flume but allow the passage of fish from the flume which may have become trapped in the flume as a result of high river stage conditions, or (2) operate the condenser cooling water pumps at the cribhouse according to the following protocol:
 - a. Whenever Unit I is in service, both Unit I circulating cooling water pumps must be operated if available, or one Unit I pump and one Unit 2 pump must be operated.
 - b. Whenever Unit 2 is in service, both Unit 2 circulating cooling water pumps must be operated if available.
- 5. There shall be no discharge of polychlorinated biphenyl compounds.

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Special Conditions

- 6. If inclement weather prohibits the collection of a 24-hour composite sample for five consecutive days, sampling shall consist of a grab sample.
- 7. Illinois Power Company has complied with Section 302.211(f) of Title 35, Chapter 1, Subtitle C: Water Pollution Regulations and Section 316(a) of the CVA by demonstrating that thermal discharge from Hennepin Power Plant has not caused and cannot reasonably be expected to cause significant ecological damage to the Illinois River as approved by the IPC3 in PC3 78-3 on October 19, 1978. Pursuant to 35 Ill. Adm. Code 302.211(g) no additional monitoring or modification is being required for reissuance of this NPDES permit.
- 8. Illinois Power Company's demonstration for the Hennepin Power Plant in accordance with Section 316(b) of the CWA has been approved by this Agency by letter dated December 29, 1978. It is determined that no additional intake monitoring or modification is being required for reissuance of this NPDES permit.
- 9. Standard Condition No. 9 shall not constitute a waiver of any constitutional rights of the permittee.

10. The provisions contained in Standard Condition No. 17 shall not prejudice permittee's right to obtain or be granted a reasonable time in which to comply, but in no event shall such time be later than any applicable Federal or State of Illinois statutory or regulatory compliance date, in connection with any modification made pursuant thereto.

11. Standard Condition 11(a) of Attachment H is rewritten as follows:

An application submitted by a corporation shall be signed by a principal executive officer of at least the level of vice president, or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the application form originates. In the case of a partnership or a sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively. In the case of a publicly owned facility, the application shall be signed by either the principal executive officer, ranking elected official, or other duly authorized employee.

12. Standard Condition 11(b) of Attachment H is rewritten as follows:

Pursuant to 40 CFR 122.22(b) all reports required by permits, other information requested by the Director, and all permit applications submitted for Group II storm water discharges under 122.26(b)(3) shall be signed by a person described in 40 CFR 122.22(a), or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- The authorization is made in writing by a person described in paragraph (a) of this section;
- (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) and
- (3) The written authorization is submitted to the Director.
- 13. Disposal of GR-SI Residues in the West Ash Pond System shall be monitored and limited in accordance with the following Best Management Practices Plan:
 - Authorization to dispose GR-SI Residues in the West Ash Pond System is granted only for the term of the demonstration project. The Agency shall be notified on the date the demonstration project begins.
 - b) The raw residue transport water shall be pH adjusted to approximately 9.0 prior to discharge into the West Ash Pond System using carbon dioxide, acetic acid or other approved chemicals which will not contribute chlorides or sulfates to the wastestream.

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Special Conditions

c) Groundwater monitoring shall be conducted during the demonstration project and for six months thereafter. Quarterly sampling of all four existing downgradient wells for Boron, Calcium, Chloride, Manganese, Nitrate, Nitrite, pH, Sulfate, Sulfite and Total Dissolved Solids is required. Analytical data shall be submitted to the Agency within 60 days after sample collection. The first samples shall be collected upon commencement of the demonstration project.

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- d) Modeling or dye tracing to identify the West Ash Pond System effluent mixing characteristics with the Illinois River shall be conducted and the point in the river where the sulfate water quality standard will be met identified. This information shall be submitted to the Agency within six months after commencement of the demonstration project.
- 14. Sludge generated by the pretreatment of chemical metal cleaning waste in the chemical metal cleaning waste treatment tank at Hennepin Power Plant may be disposed of on the active area of the coal pile at the Hennepin Power Plant within the following guidelines:
 - Chemical metal cleaning waste treatment tank sludge shall not exceed the Toxicity Characteristic regulatory levels when subjected to the Toxicity Characteristic Leaching Procedure for the 25 organic constituents and 8 metals regulated under the Toxicity Characteristic Rule (FR Vol. 55, No. 61/March 29, 1990, 11798-11877.
 - 2. Sludge shall be applied on the active area of the coal pile.
 - 3. Sludge shall be applied on the active area of the coal pile at a controlled rate to prevent coal pile runoff.
 - 4. Sludge application shall not be permitted if the coal pile has been wetted by rainfall within the 24-hour period preceding the intended application time.
 - 5. Sludge application shall not be permitted on the coal pile during precipitation or when precipitation is imminent.
 - 6. The filter cake from the portable sock filter may be disposed on site with the sludge generated by the chemical metal cleaning wastewater treatment process.
 - 7. Sludge or filter cake which is a hazardous waste shall not be placed on the coal pile.

This Special Condition does not relieve the permittee of any State or federal requirements for management of hazardous waste. Documentation to support a hazardous waste determination pursuant to 40 CFR 262.11 shall be maintained by the permittee.

15. The permittee shall record monitoring results on Discharge Monitoring Report Forms using one such form for each discharge each month.

The completed Discharge Monitoring Report forms shall be submitted to IEPA no later than the 15th day of the following month, unless otherwise specified by the permitting authority.

Discharge Monitoring Reports shall be mailed to the IEPA at the following address:

Illinois Environmental Protection Agency Division of Water Pollution Control 2200 Churchill Road Springfield, Illinois 62706

Attention: Compliance Assurance Section

16. Within 180 days after the beginning of a discharge from the ash ponds (Outfalls 003 and 005), a 2 C application form shall be completed as required by 40 CFR 122.21(g)(7) and submitted to IEPA. The monitoring must include at least three samples for the required metals, ammonia, and cyanide. This permit may be modified, following public notice and opportunity for hearing, based on the monitoring results if necessary to prevent violations of water quality standards.

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Special Conditions

- 17. During the time period of the GR-SI demonstration project, the following additional monitoring shall be done on Outfall 005 if a discharge from this outfall occurs:
 - a. Chemical-Specific Testing

On a quarterly basis, a grab sample of the discharge shall be analyzed for the following parameters, and the results reported with the Discharge Monitoring Report for the month in which the samples are collected:

Antimony	Nickel
Arsenic	Selenium
Beryllium	Silver
Cadmium	Thallium
Chromium	Zinc
Copper	Sulfates
Lead	Total Dissolved Solids
Mercury	•

b. Biomonitoring

The permittee shall prepare a preliminary plan for biomonitoring and submit the plan to IEPA for review and approval prior to any discharge from Outfall 005 related to GR-SI demonstration project. The permittee shall begin biomonitoring of the effluent discharge within 90 days after approval of the biomonitoring plan or other such date as contained in the Agency's notification letter.

 Acute Toxicity --- Standard definitive acute toxicity tests shall be run on two trophic levels of aquatic species representative of the aquatic community of the receiving stream. Except as noted here and in the IEPA document "Effluent Biomonitoring and Toxicity Assessment," testing must be consistent with <u>Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms EPA-600/4-85-013</u>. Unless substitute tests are pre-approved, the following tests are required:

a. Invertebrate 48-hour static LC₅₀ Bioassay using Ceriodaphnia.

- b. Fish 96-hour static renewal LC_{50} Bioassay using fathead minnow.
- 2. Testing Frequency The above tests shall be conducted on a monthly basis for three months within 90 days following approval of the biomonitoring plan or other such date as contained in the Agency's notification (approval) letter. Results shall be reported according to EPA/600/4-85/014, Section 10, Report Preparation, and shall be submitted to IEPA within 1 week of becoming available to the permittee.
- Should the results of any two months of sampling indicate toxicity for each month, the permittee shall submit within 90 days of the second toxicity event a plan for a toxicity identification evaluation (TIE) to the Agency. The Agency should be contacted at that time.
- 3. Toxicity Assessment Should the review of the results of the biomonitoring program identify toxicity, the Agency may require that the permittee prepare a plan for toxicity reduction evaluation and identification. This plan shall include an evaluation to determine which chemicals have a potential for being discharged in the plant wastewater, a monitoring program to determine their presence or absence and to identify other compounds which are not being removed by treatment, and other measures as appropriate. The permittee shall submit to the Agency its plan for toxicity reduction evaluation within 90 days following notification by the Agency. The permittee shall implement the plan within 90 days or other such date as contained in a notification letter received from the Agency.

The Agency may modify this permit during its term to incorporate additional requirements or limitations based on the results of the biomonitoring. In addition, after review of the monitoring results, the Agency may modify this permit to include numerical limitations for specific pollutants. Modifications under this condition shall follow public notice and opportunity for hearing.

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c. Benthic and Sediment Monitoring

Prior to any discharge from Outfall 005 related to the GR-SI demonstration project, the permittee shall prepare a plan for benthic and sediment monitoring of the receiving stream in the immediate vicinity of Outfall 005, and submit the plan to IEPA for review and approval. The monitoring program should be designed to document any instream chemical or biological impacts from the discharge, and should include monitoring prior to, during, and after discharges associated with the GR-SI project.

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18. During the winter season (December 1 - March 15), a summary of winter operating conditions shall be prepared. The summary shall include daily average and maximum "Delta T" and discharge temperatures, and shall be submitted to IEPA for review by May 15 of each year.

ATTACHMENT H

Standard Conditions

Definitions

Act means the Illinois Environmental Protection Act. Ch. 111-1/2 & Rev. Stat. Sec. 1001-1051 as Amended.

Agency means the illinois Environmental Protection Agency,

Board means the Illinois Pollubon Control Scant.

Clean Water Act Iformenty referred to as the Federal Water Pollution Control Act means Pub. L. 92-500, as amended, 33 U.S.C. 1251 et seg.

NPDES (National Poliutant Discharge Elimination System) means the national program for issuing, modifying, revoluting and reissuing, terminating, monitoring and enforting permits, and imposing and enforting pretraisment requirements, under Sections 307, 402, 318 and 405 of the Class Water Act,

USEPA means the United States Environmental Protection Agency.

Deily Discharge means the clackarge of a polikitant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For polikitants with limit bond expressed in units of mass, the "day' discharge" is calculated as the total mass of the polikitant discharged over the day. For polikitants with limitations expressed in other units of measurements, the "day's discharge" is calculated as the everage measurement of the polikitant over the day.

Maximum Daily Discharge Limitation (daily maximum) means the highest allowable daily discharge.

Average Monthly Discharge Limitation (30 day average) means the highest allowable average of cavir discharges over a calencar month, calculated as the sum of all daily discharges measured during that month, divided by the number of cavir discharges measured during that month.

Average Weekly Discharge Limitation (7 day average means the highest slowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Sext Management Practices (BMPs) means schedules of activities, prohibitions of procedules, maintenance procedures, and other management practices to prevent or reduce the polition of waters of the State, BMPs also include treatment requirements, operating procedures, and practices to control plant site hundif, spillage or leaks, sludge or waste disposed, or drainage from raw material storage.

Aliquot means a sample of specified volume used to make up a total composite sample.

Grab Sample means an individual sample of at least 100 milliters collected at a randomlyselected time over a period not exceeding 15 minutes.

24 Hour Composite Sample means a combination of at least 8 sample aliquets of at least 100 millitars, collected at periodic intervals during the operating hours of a facility over a 24hour period.

8 Hour Composite Sample means a combination of at least 3 sample signots of at least 100 militars, collected at benodic intervals during the operating hours of a facility over an 8-hour penod.

Now Proportional Composite Semple means a combination of sample aliquots of st least 100 millitars conjected at periodic intervals such that either the time interval between each aliquot of the volume of sech aliquot is proportional to either the stream flow at the time of sampling or the total stream flow surce the collection of the previous aliquot.

- (1) Duty to comply. The permittive must comply with all conditions of this permit. Any permit noncomplence construines a violation of the Act and is grounds for enforcement action, permit terministion, revolution and ressurance, modification, or for deniel of a permit renewal application. The permittee shall comply with enfluent standards or prohibitions established under Section 307(a) of the Clean. Water Act for this collutions within the time provided in the regulations that established thes standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.
- (2) Duty to respery. If the permittee visites to continue an activity regulated by this permit after the expension date of this permit, the permittee must apply for and obtain a new permit. If the permittee submits a proper applicable as required by the Agency no later than 180 days prior to the expension date, this permit shall continue in full force and effect until the final Agency decision on the application has been made.
- (3) Need to helt or reduce activity not a defense. It shell not be a defense for a permittae in an enforcement action that it would have been necessary to helt or reduce the permitted activity in order to meintain compliance with the conditions of this permit.
- (4) Duty to mitigate. The permittee shall take all reasonable steps to minimize an prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or she environment.
- (5) Proper operation and maintenance. The permittee shall at all times property operate and maintain all facilities and systems of treatment and composity operate and maintain all facilities and systems of the permittee to achieve compliance with the conditions of this permit. Proper operation and maintainance includes effective performance, adequate functing, adequate operators stiffing and training, and adequate apportancy and process controls, including appropriate quality assurance procedures. This provision requires the operation of beck-up, or austiany "polities, or sumilar systems only when accessary to achieve oppointing.

- (S) Permit actions. This permit may be modified, revoked and revisived, or terminated for cause by the Agency pursuant to 40 CFR 12162. The filing of a request by the permittee for a permit modification, revocation and revisivance, or termination, or a notification of planned changes or antibioated noncompliance, does not stay any permit condition.
- (7) Property rights, This permit does not convey any property rights of any sort, or any exclusive privilege.
- (5) Duty to provide information. The permittee shall furnish to the Agency within a reasonable time, any information which the Agency may request to determine whether cause exists for modifying involving and reasuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also furnish to the Agency, upon request, copies of records required to be kept by this permit.
- (3) Inspection and entry. The permittee shall allow an authoritist representative of the Agency, upon the presentation of oredentials and other documents as may be required by law, to:
 - (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
 - b) Have access to and copy, at resionable times, any records that must be kept under the conditions of this permit;
 - (c) Inspect at reasonable times any facilities, equipment linctuding monitoring and control equipment, precises, or operations regulated or required under this bermit; and
 - Sample or monitor at reasonable times, for the purpose of assuring permit compliance, or as otherwise authorized by the Act, any substances or parameters at any locabon.

(10) Monstoring and records.

- Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
- bi The parmittee shall retain records of all monitoring information, including all calibration and meansurance records, and all original strip chart recordings for contravous monitoring instrumentation, copies of all reports mounted by this permit, and records of all data used to complete the application for this permit, for a pened of at least 3 years from the date of this permit, measurement, report or application. This pened may be extended by request of the Agency at any time.
- Id Records of monitoring information shall include:
 - (1) The data, exact place, and time of sampling or measurements:
 - (2) The individualia) who performed the sampling or measurements;
 - (3) The date(s) analyses were performed;
 - (4) The individualist who performed the analyses:
 - (S) The analytical techniques or methods used; and
 - (6) The results of such analyses.
- (d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Where no test procedure under 40 CFR Part 136 has been approved, the permittee must submit to the Agency a test methods for approved. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to ensure accuracy of measurements.
- (11) Signatory requirement, All applications, reports or information submitted to the Agency shall be signed and cartified.
 - (a) Application. All permit applications shall be signed as follows:
 - (1) Fer a corporation: by a principal executive officer of at least the level of vice president or a person or position having oversit responsibility for environmental matters for the corporation;
 - 12) For a partnership or sole proprietorship; by a general partner or the proprietor, respectively; or
 - For a municipality, State, Federal, or other public agency: by other a principal executive officer or ranking elected official.
 - Di Reporta. All reports required by permits, or other information requisited by the Agency shall be signed by a perion described in paragraph (a) or by a duly suthenzed representative of that person. A person is a duly authenzed representative only if:
 - (1) The authorization is made in writing by a person described in paragraph (a); and
 - (2) The authorization specifies either an individual or a position responsible for the overall operation of the facility, from which the discharge organizes, such as a blant manager, superintendent or person of equivalent responsibility; and
 - (3) The written authorization is submitted to the Agency.

- (c) Changes of Authorization. If an authorization under (b) is no longer accurate because a different individual or position resiresponsibility for the overall operation of the facility, a new authorization satisfying the requirements of (b) must be submitted to the Agency prior to or together with any reports, information, or applications to be signed by an authorized representative.
- (12) Reporting requirements.
 - (a) Planned Changes. The permittee shall give notice to the Agency as soon as possible of any planned physical attarations or additions to the permitted facility.
 - (b) Anticipated honcompliance. The permutae shall give advance hotos to the Agency of any planned changes in the permutad facility or activity which may result in noncompliance with permit regularements.
 - (c) Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final networkersts contained in any compliance schedule of this permit shall be submitted no later than 14 days following sect schedule date.
 - (d) Monitoring reports, Monitoring results shall be reported at the intervals specified assemblers in this permit.
 - Monitoring results must be reported on a Discharge Monitoring Report (DMR);
 - 12) If the permittee monitors any policitant more frequently than required by the permit, using test procedules approved under 40 CFR 138 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
 - (3) Calculations for all limitations which require averaging of measurements shall utilize an antimetic mean unless otherwise specified by the Agency in the permit.
 - (a) Twenty-feur haur reporting. The permittes shall report any noncompliance which may endanger hearth or the envenment, Any information snall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission snall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission snall contain 3 description of the noncompliance and its cause; the bened of noncompliance, including easet dates and emes; and if the noncompliance has not been convected, the ambiguited time it is expected to continue; and state taken or planned to induce, alimingte, and prevent recommence of the noncompliance. The following shall be included as information which must be reported within 24 hours:
 - Any unanticipated bypass which exceeds any effloent limitation in the permit;
 - (2) Violation of a maximum daily discharge Enviration for any of the pollutants listed by the Agency in the permit to be reported within 24 hours;

The Agency may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

- (f) Other noncompliance. The permittee shall report all instances of noncompliance not reported under paragraphs (121c), (d), or (a), at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (121c).
- (g) Other information, Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the Agency, it shall promptly submit such facts or information.
- [13] Transfer of permits. A permit may be sutomatically ransferred to a new permittee if:
 - The current permittee notifies the Agency at least 30 days in advance of the proposed transfer date;
 - (b) The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage and liability between the current and new permittees; and
 - (c) The Agency does not notify the existing permittee and the proposed new permittee of its intent to modify or revoke and ressue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement.
- (14) All manufacturing, commercial, mining, and silvicultural dischargers must notify the Agency as soon as they know or have reason to believe;
 - (a) That any actionty has occurred or will occur which would result in the discharge of any toxic pollutant identified under Section 307 of the Claim Water Act which is not limited in the permit, if that discharge will acceed the highest of the following notification levels;
 - [1] One hundred micrograms per liter (100 ug/9)

- (2) Two hundred micrograms per liter .200 ug/8 for acrolein and acrylonizmle; five hundred micrograms per liter .500 ug 8 for 2,4distrophenol and for 2-methyl=4,5-distrophenol, and one milligram per liter 11 mg/8 for antimomy;
- (3) Five (5) times the maximum concentration value reported for that pollutant in the NPDES permit application, or
- (4) The level established by the Agency in this permit.
- b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or syproduct any toxic pollutant which was not reported in the NPOES permit application.
- (15) All Publicly Owned Treatment Works (POTWs) must provide adequate notice to the Agency of the following;
 - (a) Any new introduction of polytrants into thet POTW from an indirect discharger which would be subject to Sections 301 or 305 of the Clean-Water Act if it were directly discharging those polytrants; and
 - (b) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permut.
 - (c) For purposes of this paragraph, adeduate notice shall include information on (i) the quarky and quantity of effluent introduced into the POTW, and (ii) any annopated impact of the change on the quantity or quality of affluent to be discrarged from the POTW.
- (10) If the permit is issued to a publicity owned or publicity regulated treatment works, the permittee shall require any industrial user of such treatment works to comply with federal redurements concerning;
 - User charges pursuant to Section 204/b) of the Clean Water Act, and applicable regulations appearing in 40 CFR 35;
 - (2) Taxic poliutant effluent standards and pretrastment standards pursuant to Section 307 of the Clean Water Act; and
 - Inspection, monitoring and entry pursuant to Section 308 of the Clean Water Act.
- (17) If an applicable standard or fimitation is promulgated under Section 301 (b)(2)(C) and (D), 304(b)(2), or 307(b)(2) and that affluent standard or filmitation is more strangent than any effluent limitation in the permit, or controls a pollutant not limitated in the permit, the permit shall be promptly modified or revoked, and reassued to conform to that effluent standard or limitation.
- (18) Any authorization to construct issued to the permittee pursuant to 35 IR. Adm. Code 309.154 is hereby incorporated by reference as a condrison of this permit.
- (19) The permittipe shall not make any false statement, representation or certification in any application, record, report, plan or other document submitted to the Agency or the USEPA, or required to be maintained under this permit,
- (20) The Clean Water Act provides that any person who violates a permit condition implementing Sectore 301, 302, 308, 307, 208, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed 310,000 per day of such violation. Any person who within or negligently violates permit conditions implementing Sections 301, 302, 306, 307, or 308 of the Clean Water Act is subject to a fine of not less than \$2,500, nor more than \$25,000 per day of violation, or by impresonment for not more than one year, or both.
- (21) The Clean Water Act provides that any person who fatarfies, tampers with, or knowingly renderts inaccurate any monitoring device or method required to be maintained under permit shall, upon conviction, be builtered by a fine of not more than \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by poth.
- 1223 The Clean Water Act provides that any person who knowingly makes any felse statement, representation, or certification in any record or other document submitted or required th be maintained under this permit shall, including monitoring reports or reuorts of compliance or non-compliance shall, upon conviction, be punched by a fine of not more than \$10,000 per violation, or by imprisonment for not more than \$ monits per violation, or by 5bth.
- (23) Collected screening, sluries, sludges, and other solids shall be disposed of in such a manner as to prevent entry of those wastes for nunoff from the wasteril into waters of the State. The proper authorization for such disposal shall be obtained from the Agency and is incorporated as part hereof by reference.
- (24) In case of conflict between these standard conditions and any other condition(s) included in this permit, the other condition(s) shall govern.
- (25) The permittee shall comply with, in addition to the requirements of the permit, all applicable provisions of 35 III. Adm. Code, Subtite C, Subtite D, Subtite E, and all applicable orders of the Board.
- (28) The provisions of this permit are severable, and if any provision of this permit. Of the application of any provision of this permit is held invalid, the remaining provisions of this permit shall continue in full force and effect.

APPENDIX C

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MEASUREMENT	SAMPLE TYPE	FREQUENCY	LOCATION
GASEOUS EMISSIONS Particulate Loading Particle Size	Method 17 Method 5 cascade impactors	(4) (4)	ESP intet ESP outlet ESP intet and outlet
Lusurbuuon Resistivity N2O	cyclonic flow probe extractive	(4) (5)	ESP intet stack breeching
SOLID BY-PRODUCTS Ash (6)	composite of	6	bottom ash hopper, economizer, and ESP hoppers #1 and #2
WORKER HEALTH Hcaring Pulmonary Function TSP	N/A N/A N/N	once/yr once/yr once/yr	DEL DEL DEL DEL
AIR Noise	single reading	once (4)	ncar equipment
Ambicat Dust	single reading-Hi-Volume Sampler	once (4)	upwind and downwind of sorbcnt silo

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

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TABLE 2. FOOTNOTES- HENNEPIN PROJECT MONITORING IN PHASE III

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Monitoring will occur once prior to GR-SI operation, quarterly until the program is completed, and quarterly through closure and
post-closure periods.
Water will be analyzed for arsenic, banum, boron, cadmium, chromium, iron, lead, mercury, oil and grease, pH, selenium, silver, sulfates,
TDS, TSS, zinc, and flow rate.
Sampling will be conducted once prior to Phase III, then monthly for the first six months of long-term testing.
Measurements will be taken once prior to Phase III, then once during long term testing.
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.
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.
Sampling will be conducted once prior to Phase III. During long-term testing sampling and analysis will be conducted monthly for the first

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3 months. Sampling will occur once prior to Phase III, and CEM data will be reported during long-term testing. æ